Nordson
ELECTRONICS SOLUTIONS

ASYMTEK

DV-7000 Heli-Flow® Valve

Owner's Manual

Revision 03

NOTICE

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Nordson Electronic Solutions	
WEBSITE	www.nordson.com/electronics
MAIN OFFICE	**2747 Loker Avenue West** **Carlsbad, CA 92010-6603** **USA**
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Table of Contents

1 Introduction

1.1 Overview

The DV-7000 Series Heli-Flow Valve is a rotary, positive displacement auger valve. Each valve has a closed-loop, servo-controlled motor with encoder feedback that can reverse to create a clean fluid cutoff. The DV-7000 valve is designed and exclusively manufactured by Nordson to meet high-volume production requirements.

The DV-7000 (Figure 1-1) can be used as a floating head valve for dispensing dots, or as a standard valve for dispensing lines and/or patterns. The DV-7000 is available in a Luer-lock or footed-needle design with interchangeable cartridges, allowing the valve to work with several different fluid types. The DV-7000 has a hardened auger for use with filled epoxy materials and features a high flow rate.

1.2 Dispensing Systems

- Spectrum - S2-9XX Series Dispensing Systems
- Quantum - Q-6800 Dispensing Systems

1.3 Configurations

Table 1-1 identifies all currently available standard configurations for the DV-7000. Contact Technical Support for other configurations that may better suit your application.

Table 1-1 DV-7000 Standard Configurations

Model	Description	Applications
DV-7222-SF1	Footed needle cartridge	Surface Mount Adhesive, Solder Paste, Silver Epoxy
DV-7222-SL1	Luer-lock needle cartridge	Surface Mount Adhesive, Solder Paste, Silver Epoxy
DV-7223-CP-SLP	Luer-lock needle cartridge	Silver Epoxy, Types 3 and 4 Solder Paste
DV-7223-CP-0LP	Luer-lock needle cartridge	Types 5 and 6 Solder Paste
DV-7321-CL8	Luer-lock needle cartridge	Dam Writing
DV-7322-CL8	Luer-lock needle cartridge	Glob Top, Encapsulation
DV-7331-CL8	Luer-lock needle cartridge	Lid Seal

1.4 Specifications

Table 1-2 DV-7000 Specifications

Dimensions	Length: 190-192 mm (7.48-7.56 in.) Width: 33 mm (1.3 inch) Depth: 72.6 mm (2.86 inch)
Air Pressure	34-552 kPa (5-80 psi) Depending on the fluid, higher viscosities require higher pressures
Motor	Closed-loop control with encoder feedback on the dispensing platform

1.5 DV-7000 Features

The DV-7000 (Figure 1-1) is designed with the following key features:

- Footed cartridge with a fixed mechanical stand-off nozzle for extremely consistent dots and increased throughput
- Luer-cartridge option to allow use with a wide range of standard needles
- Tool-free disassembly of wetted parts for quick and easy cleaning
- Fast cartridge changeover
- Interchangeable cartridges with DV-8000C valves
- Closed-loop motor control with encoder feedback to ensure high repeatability and precision dispense control

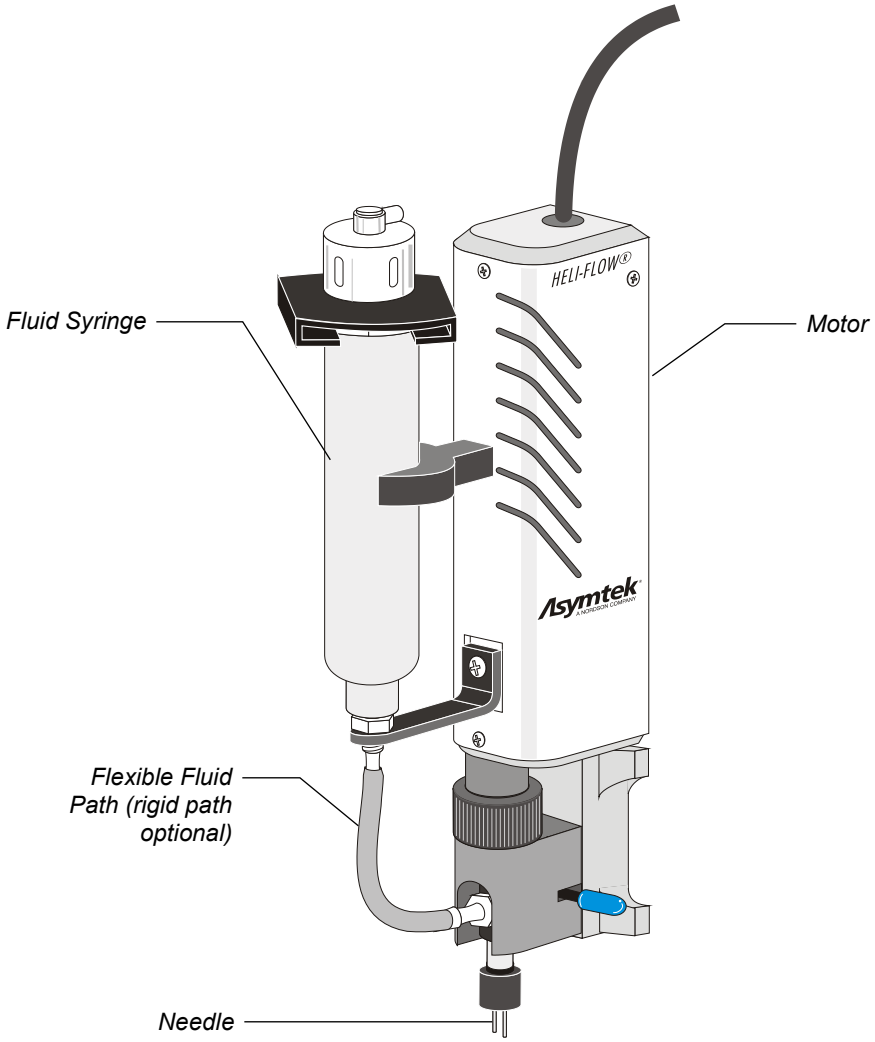


Figure 1-1 DV-7000 (DV-7222-SF1 shown)

2 Safety

2.1 Overview

This section is intended to provide basic safety information necessary for operating and servicing the DV-7000. This section covers the following topics:

- Intended Use
- Basic Safety Precautions and Practices
- Preventing Equipment and Workpiece Damage
- Disposal
- Emergency Shutdown
- Safety Warning Labels

WARNING! Failure to comply with any of the safety recommendations could cause serious injury to the user or damage to the dispensing system.

CAUTION! The DV-7000 valve is a precision instrument. Follow all precautions and use care when installing, operating, or performing maintenance and service. Failure to do so may damage the valve. Only trained personnel should perform valve installation, operation, maintenance, and service.

NOTE Safety is considered a joint responsibility between the original equipment manufacturer (Nordson) and the end-user (owner). In addition to those recommended in this manual, safety precautions and practices should be in accordance with local laws and regulations.

2.2 Intended Use

The DV-7000 valve is intended for use as described in this manual. Using the valve for other purposes is not recommended. Some examples of valve misuse 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

WARNING! Unsafe equipment conditions can result in personal injury or property damage. Failure to adhere to safety warnings and precautions could result in serious bodily harm to the user.

2.3 Basic Safety Precautions and Practices

Compliance with the following recommended precautions and practices will prevent personal injury or damage to property during applicator operation and maintenance.

2.3.1 Safety of Personnel

- Only trained personnel should be permitted to perform installation, operation, maintenance, and troubleshooting procedures on the DV-7000.
- A second person should always be present when performing maintenance on a powered-up system.
- Before performing maintenance or service on the DV-7000, position it at the front of the dispensing chamber. This will provide easy access to components and limit exposure to hazardous areas.
- Immediately push the red Emergency Machine Off (EMO) button on your dispensing system if personnel are in danger.
- Do not touch the moving parts while the dispensing system is operating.
- Remove the DV-7000 completely from the dispensing system and allow the heated parts to cool before cleaning or performing maintenance.
- Relieve pneumatic pressure before adjusting or servicing pressurized components.

2.3.2 Material Safety

- Follow Safety Data Sheet (SDS) recommendations for the proper handling, cleanup, and disposal of all materials and fluids and their containers (i.e., syringes, cups, reservoirs, etc.) used with the dispensing system.
- Know the SDS recommendations for treatment of injury resulting from exposure to hazardous materials.
- Always wear appropriate Personal Protective Equipment (PPE) as recommended by facility safety practices and the material manufacturer's SDS.
- When working with multiple fluids, refer to the SDS to ensure the materials are compatible.
- If possible, save or recycle unused materials. Refer to the SDS before saving or recycling unused materials.
- Do not dispense fluids with a flash point less than 93 °C.

2.4 Preventing Equipment and Workpiece Damage

- Immediately push the EMO button on the dispensing system if the dispensing system, DV-7000, or a workpiece is in danger of being damaged.
- Use standard Electrostatic Discharge (ESD) precautions when working near sensitive components. Always wear a grounding strap and connect it to the ESD ground before handling workpieces and equipment.
- Perform all recommended DV-7000 maintenance procedures at the suggested intervals.
- Immediately contain and clean up any caustic or conductive fluid spills as recommended in the material manufacturer's SDS.
- If fluid gets into internal portions of the DV-7000, immediately contact Technical Support.
- Use only replacement parts that are designed for use with the original equipment. See *Section 8 - Parts Replacement* for a list of available parts and part numbers.

2.5 Disposal

Dispose of equipment and materials used in operation and servicing in accordance with local regulations.

Depending on the fluid dispensed and cleaning materials used, the following items may contain substances whose disposal might be regulated:

- Purge/Scale Cups
- Purge Boots
- Dispensing Needles/Nozzles
- Seats
- Luer Fittings
- Fluid Tubes
- Syringes

2.6 Emergency Shutdown

In the event of an emergency or malfunction, press the EMO (E-Stop) button on the dispensing system and perform the following steps:

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

2.7 Safety Warning Labels

Warning labels on your equipment point out areas where personnel must use extreme caution to prevent serious injury and property damage. Table 2-1 shows the warning symbols that may be found on your dispensing valve.

Table 2-1 Safety Warning Symbols

Warning Type	Symbol	Part Number	Hazard
Hot Surface		7207207	**Thermal Hazard** - Warns personnel of hot surfaces that may cause burns if touched.

3 Installation

3.1 Overview

This section includes DV-7000 installation instructions and covers the following topics:

- Installing the Valve
- Installation Verification Test

NOTE For more information, refer to the manual for your dispensing system.

3.2 Installing the Valve

If your DV-7000 valve was factory installed, you do not need to perform this procedure.

NOTE The installation instructions below do not include installation of an upgrade kit. If the valve is installed on a system that requires an upgrade kit, contact Technical Support for additional information.

WARNING! Before installing the valve, perform a dispensing system service shutdown as described in the applicable dispensing system manual. Lock out and tag out power to the dispensing system to prevent accidental restoration of power during valve installation.

WARNING! The procedures in this section should be performed by trained personnel only.

To install the dispensing valve:

1. Prior to installation, use the Fluidmove jog controls to move the dispensing head to the front center of the dispensing area.
2. Perform a service shutdown as specified in the applicable dispensing system manual.
3. Slide the dovetail bracket (included with the dispensing valve) into the valve mounting bracket on the Z-axis face plate.
4. Tighten the bolt on dovetail bracket to secure the valve.
5. Make the appropriate electric and pneumatic connections.
   > Refer to the applicable dispensing system manual.

3.3 Installation Verification Test

Once you have installed the valve on your dispensing system and configured the software, it is recommended that you perform this test to ensure that the valve accepts commands from your operating system and responds by moving the feedscrew in the correct direction.

WARNING! Only trained service technicians should perform this procedure.

To verify proper installation:

1. Perform a system startup as specified in the applicable dispensing system manual.
2. Start the Fluidmove software by double-clicking the **Fluidmove** icon on the Windows desktop.
3. In the Main Window, click on **Tools**.
4. In the Tools Window, click on **I/O Test** and then click on **Dispenser**.
5. Select the Outputs 0-31 tab.
6. Locate the valve forward output (V1_FORWARD/JET) (Figure 3-1).
   > The output name may be different on your system, but it should be similar enough to be easily identified.
   > On systems with dual-action dispensing heads, you will have to select Valve 1 (V1) or Valve 2 (V2) for I/O testing, as applicable.

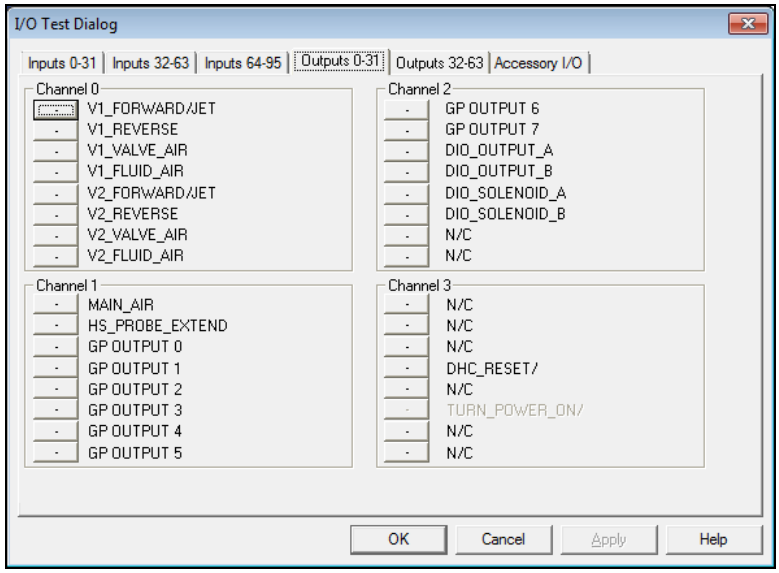


Figure 3-1 Dispenser I/O Test Dialog Box (typical)

7. Toggle the output ON and check the direction of the ball coupling (Figure 3-2). It should be turning in a clockwise direction if viewed from above.
   > If the ball coupling is not turning, make sure that the valve power cord is properly connected. Then repeat this step.
8. Toggle the output OFF and make sure that the ball coupling stops turning.

9. In the Dispenser I/O Test dialog box, locate the **Valve Reverse** output (V1_REVERSE) (Figure 3-1).
   > The output name may be different on your system, but it should be similar enough to be easily identified.
   > On systems with dual-action dispensing heads, you will have to select Valve 1 (V1) or Valve 2 (V2) for I/O testing, as applicable.
10. Toggle the output ON and check the direction of the ball coupling. It should be turning in a counterclockwise direction if viewed from above.
    > If the ball coupling is not turning, make sure that the valve power cord is properly connected. Then repeat this step.
11. Toggle the output OFF and make sure that the ball coupling stops turning.

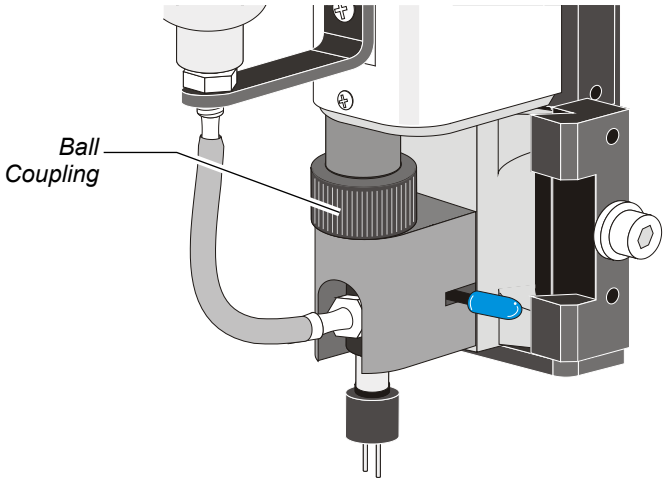


Figure 3-2 Ball Coupling Location

4 Operation

4.1 Overview

This section covers the following topics:

- Valve Adjustments
- Loading a Dispensing Cartridge
- Installing/Changing a Fluid Syringe
- Priming the Valve
- Valve Offsets

4.2 Valve Adjustments

You can optimize the performance of the valve by changing various settings, such as motor speed and air pressure. Software parameters can also be changed to meet your specific application requirements.

CAUTION! Only trained service technicians should perform valve settings adjustments.

4.2.1 Motor Speed

The dispensing system model, fluid properties, needle size, and substrate must be considered when determining the optimum valve speed for your application.

To adjust the valve speed:

1. Select **Configuration > Setup Valves** in the Fluidmove Main Window.
2. Click on **Edit** in the Setup Valves dialog box and select the Settings tab.
3. Adjust the speed settings as desired and click on **OK**.
4. Refer to the *Fluidmove User Guide* or Online Help for more information.

4.2.2 Air Pressure

Air pressure is used to move the material from the syringe to the feedscrew. The greater the pressure, the faster the material reaches the feedscrew. However, excessive air pressure can be detrimental to the dispensing process. See *Section 7 - Specifications* for recommended air pressure settings.

4.2.3 Software Parameters

Refer to the *Fluidmove User Guide* or Online Help for detailed explanations of line and dot parameters.

4.3 Loading a Dispensing Cartridge

WARNING! Only trained service technicians should perform this procedure.

NOTE This procedure is for a valve already mounted on the dispensing head.

To load the dispensing cartridge:

1. Use the Fluidmove jog controls to move the dispensing head to the front center of the dispensing area.
2. Perform a production shutdown as specified in the applicable dispensing system manual.
3. Open the dispensing system door or hatch and locate the valve on the dispensing head.
4. Obtain the appropriate cartridge assembly for your application.
5. Push the cartridge into the valve body making sure to align the guide pin (Figure 4-1).
   > You will hear the cartridge release lever click as the cartridge snaps into place.
6. Install the fluid syringe, fittings, and feed tube, see *4.4 Installing/Changing a Fluid Syringe*.

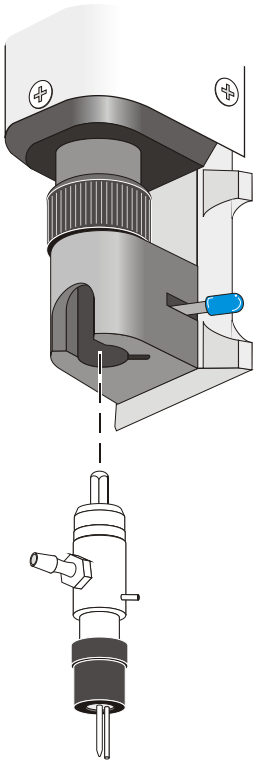


Figure 4-1 Cartridge Loading: DV-7000

4.4 Installing/Changing a Fluid Syringe

WARNING! Refer to the Safety Data Sheet (SDS) for information on safety, handling, and disposal for all fluids and materials before use. All fluids and materials must be disposed of according to local regulations. Wear Personal Protective Equipment (PPE) when performing this procedure to prevent contact with caustic chemicals.

CAUTION! Only trained service technicians should perform this procedure. When changing syringes, avoid introducing air into the fluid path. Air in the fluid path will adversely affect dispensing performance.

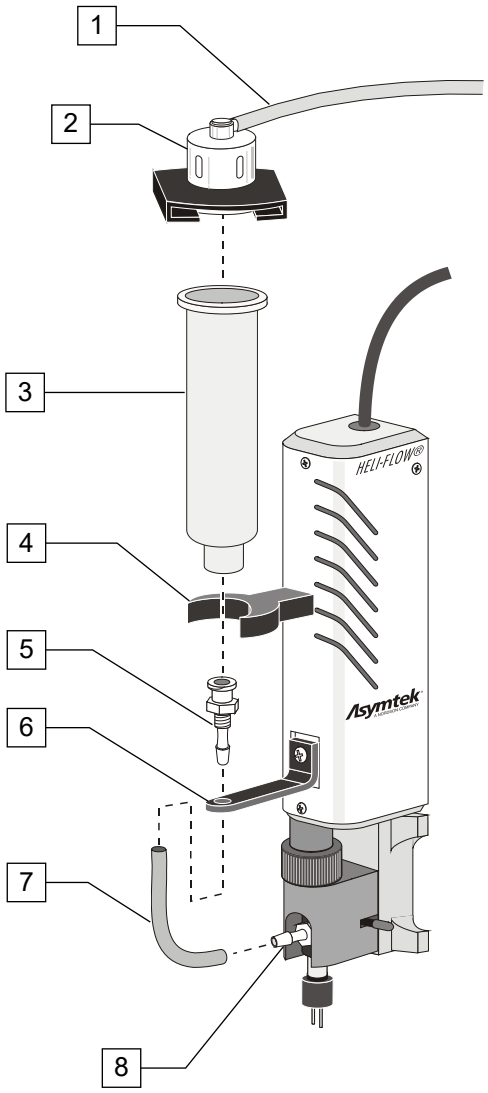
Tools and Materials Needed

- Clean Cloth and Solvent (for spills)
- 1/4-inch Wrench or Pliers (as needed)
- Syringe of Fluid to be Dispensed
- New Feed Tube and Fittings (if changing fluid)
- Appropriate Personal Protective Equipment

NOTE If changing fluid types, you must clean the valve, see *5.7 Cleaning the Valve* before installing the syringe.

To install the syringe:

1. Use the Fluidmove jog controls to move the dispensing head to the front center of the dispensing area.
2. Perform a production shutdown as specified in the applicable dispensing system manual.
   > If there is no syringe installed, skip to Step 6.
3. Disconnect the syringe air hose from the **FLUID AIR** connector on the dispensing system bulkhead.
4. Remove the syringe receiver head from the empty syringe and unscrew the depleted syringe from its fitting.
   > If the fitting turns with the syringe, use a small wrench or pair of pliers to hold the fitting while unscrewing the syringe.
5. Remove the syringe and discard it in accordance with local regulations.
6. Obtain a new syringe and inspect the fluid for voids. If voids are present, obtain another syringe.
7. Remove the syringe cap and hold the syringe tip-side-down to allow the fluid to completely fill the syringe tip.
8. Slide the new syringe down through the syringe clip and screw it onto the syringe fitting.
   > There should be no fluid voids at the top of the syringe fitting. If any material seeps over the fitting, clean the fitting with a cloth and recommended solvent.
9. Screw the receiver head onto the top of the new syringe.
10. Connect the syringe air hose to the **FLUID AIR** connector on the dispensing system bulkhead.
11. Perform a dispensing system startup as specified in the applicable dispensing system manual.



Item	Description
1	Syringe Air Hose
2	Receiver Head
3	Syringe
4	Syringe Clip
5	Syringe Fitting
6	Syringe Bracket
7	Flexible Feed Tube
8	Barbed Cartridge Fitting

Figure 4-2 Installing/Changing a Syringe

4.4.1 Installing a Syringe of Conditioning Fluid (Solder Paste Applications Only)

When using the DV-7000 valve to dispense solder paste, you should install a syringe of conditioning fluid and prime the valve in between cleaning, see *4.5.2 Solder Paste Applications*. You may leave the conditioning fluid installed, until you are ready to install the syringe of solder paste.

WARNING! Refer to the Safety Data Sheet (SDS) for information on safety, handling, and disposal for all fluids and materials before use. All fluids and materials must be disposed of according to local regulations. Wear Personal Protective Equipment (PPE) when performing this procedure to prevent contact with caustic chemicals.

WARNING! Only trained service technicians should perform this procedure.

Tools and Materials Needed

- Syringe of Conditioning Fluid
- Syringe Receiver Head and Air Hose
- Personal Protective Equipment
- Feed Tube and Fittings

To install the syringe (solder paste applications):

1. Install the fittings and the feed tube on the valve as required by your application (Figure 4-2).
   > For most applications using the DV-7000, a flexible feed tube attaches to one barbed fitting threaded into the syringe bracket and another threaded into the dispensing cartridge.
   > For line and pattern applications using the optional DV-7000 configuration, a rigid feed tube assembly threads into the syringe at one end (using a threaded Luer fitting) and the cartridge fitting at the other end. The syringe bracket is not installed.
2. Obtain a syringe containing conditioning fluid and remove the cap from the end.
3. Slide the syringe down through the syringe clip and screw it into the syringe fitting.
4. Screw a clean receiver head onto the top of the syringe.
5. Connect the syringe air hose to the receiver head and to the **FLUID AIR** connector on the dispensing system bulkhead.
6. Perform a dispensing system startup as specified in the applicable dispensing system manual.
7. Prime the valve, see *4.5 Priming the Valve*.

4.5 Priming the Valve

The purpose of priming is to initiate fluid flow into the valve and to eliminate any air in the fluid path. Priming is necessary after any of the following has occurred:

- Initial setup of the valve during installation
- Disassembly/cleaning of the dispensing cartridge and/or fittings
- Syringe change

This section contains priming procedures for both solder paste and non-solder paste applications.

WARNING! Refer to the Safety Data Sheet (SDS) for information on safety, handling, and disposal for all fluids and materials before use. All fluids and materials must be disposed of according to local regulations. Wear Personal Protective Equipment (PPE) when performing this procedure to prevent contact with caustic chemicals.

4.5.1 Non-Solder Paste Applications

Tools and Materials Needed:

- Syringe of Production Fluid
- Dispensing Needle (application specific)
- Plastic Purge Cup
- Appropriate Personal Protective Equipment

WARNING! Only trained service technicians should perform this procedure.

NOTE This procedure assumes that a clean dispensing cartridge and needle are installed. If not clean, see *5.7 Cleaning the Valve*.

To prime the valve (non-solder paste applications):

1. Perform a dispensing system startup as specified in the applicable dispensing system manual.
2. Use the Fluidmove jog controls to move the dispensing head directly over the purge station.
3. Open the dispensing system door/hatch and perform the following:
   a. Install a syringe of production-run fluid on the valve, see *4.4 Installing/Changing a Fluid Syringe*.
   b. Remove the purge station lid.
   c. If the purge cup contains fluid, remove it and replace with a clean cup.
4. Close the dispensing system door/hatch.
5. In the Fluidmove Main Window, click on **Run a Program**.
   > The Production Window opens.
   > Authorized personnel can also turn the Valve ON and OFF by going to **Tools > I/O Test > Dispenser** and toggling the Valve Forward output.

6. In the Production Window, click on **Setup** and then double click on **Valve - Forward/Reverse** (Figure 4-3).

   > On systems with a dual-action dispensing head, you will be prompted to select Valve 1 (V1) or Valve 2 (V2), as applicable.

7. In the Valve Forward dialog box, click the radio button next to **Duration** and enter a duration of 120 seconds (2 minutes).

   > The 120-second Valve Forward duration is an estimate of the time necessary for the production-run fluid to flow completely through the valve and be dispensed in a steady, unbroken stream. The preferred duration may vary.

   > Valve motor speed should be at your production-run setting.

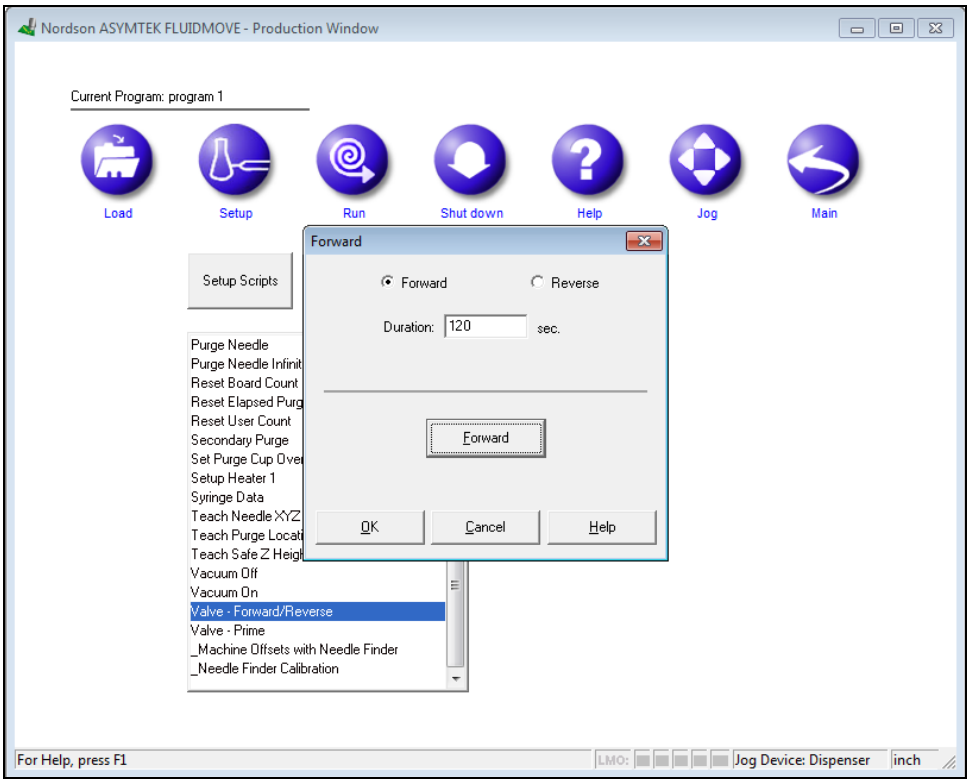


Figure 4-3 Production Window – Valve Forward

8. Click on the **Forward** button to start the valve.

9. After the valve has stopped, check for drooling.

   > "Drooling" means that fluid continues to drip from the tip of the needle when the valve is OFF. If drooling occurs, it means that there is air in the fluid path, or the system air pressure is set too high.

10. If there is no drooling present, proceed to Step 11. If the fluid is still drooling, repeat Step 8 through Step 10 until no drooling occurs.

    > There should be no drooling of fluid from the needle after the valve has stopped. If drooling is persistent, see *Section 6 - Troubleshooting*.

11. Open the dispensing system door/hatch and remove the purge station lid. If the purge cup contains fluid, remove it and replace with a clean cup.

12. Replace the purge station lid and close the dispensing system door/hatch.

4.5.2 Solder Paste Applications

Solder paste applications require a different priming procedure than non-solder paste applications that increases feedscrew wear and affects dispensing performance.

Tools and Materials Needed:

- Syringe of Solder Paste
- Syringe of Conditioning Fluid
- Dispensing Needle (application specific)
- Appropriate Personal Protective Equipment
- Plastic Purge Cup
- Clean Cloth with recommended Solvent

WARNING! Only trained service technicians should perform this procedure.

NOTE This procedure assumes that a clean dispensing cartridge and needle are installed. If not clean, see *5.7 Cleaning the Valve*.

To prime the valve (solder paste applications):

1. Perform dispensing system startup as specified in the applicable dispensing system manual.
2. Use the Fluidmove jog controls to move the dispensing head directly over the purge station.
3. Open the dispensing system door/hatch and perform the following:
   a. Install a syringe of conditioning fluid on the valve, see *4.4 Installing/Changing a Fluid Syringe*.
   b. Remove the Purge Station Lid.
   c. If the purge cup contains fluid, remove it and replace with a clean cup.
4. Close the dispensing system door/hatch.
5. In the Fluidmove Main Window, click on **Run a Program**.
   > The Production Window opens.
6. In the Production Window, click on **Setup** and then double click on **Valve - Forward/Reverse (**Figure 4-3).
   > On systems with dual-action dispensing heads, you will be prompted to select Valve 1 (V1) or Valve 2 (V2), as applicable.
7. In the Valve Forward dialog box click the radio button next to **Duration** and enter a duration of 60 seconds (1 minute).
   > The 60-second Valve Forward duration is an estimate of the time necessary for the conditioning fluid to flow completely through the valve and be dispensed in a steady, unbroken stream. The preferred duration may vary.
   > Valve motor speed should be at your production-run setting.
8. Click on the **Forward** button to start the valve.

NOTE Authorized personnel can also turn the Valve ON and OFF by going to **Tools > I/O Test > Dispenser** and toggling the Valve Forward output.

9. After the valve has stopped, check for drooling.

   > "Drooling" means that fluid continues to drip from the tip of the needle when the valve is OFF. Drooling occurs because there is air in the fluid path or the air pressure is too high.

10. If there is no drooling present, proceed to Step 11. If drooling persists, see *Section 6 - Troubleshooting*.

11. When drooling has stopped, open the dispensing system door/hatch, and perform the following:

    a. Remove the syringe of conditioning fluid and install a syringe of solder paste.

    b. Remove and set aside the needle from the dispensing cartridge.

    c. If the purge cup is full, remove it and replace with a clean purge cup.

12. Close the dispensing system door/hatch.

13. Set the valve motor speed to a slow rate to prevent cold welding of the solder paste during the priming operation.

14. Set the Valve Forward duration to 180 to 300 seconds (3 to 5 minutes) and click on the **Forward** button to start the valve.

    > The Valve Forward duration above is an estimate of the time necessary for the solder paste to completely purge the conditioning fluid from the valve.

15. Repeat Step 14 as needed until you can see that all conditioning fluid has been purged into the purge cup.

    > There should be no drooling of solder paste from the valve after it has stopped.

16. Open the dispensing system door/hatch and clean any residual solder paste from the end of the cartridge using a clean cloth and manufacturer-recommended solvent.

17. Reinstall the needle removed in Step 11 and close the dispensing system door/hatch.

    > The needle should still be coated inside with conditioning fluid.

18. Set the Valve Forward duration to 60 seconds (1 minute) minimum and click on the **Forward** button to start the valve. Valve motor speed should still be at the slow rate set in Step 13.

    > The Valve Forward duration above is an estimate of the time necessary for the solder paste to flow through the needle and into the purge cup.

19. Reset the valve motor speed to the rate recommended for your dispensing application.

    > If the needle becomes plugged during the first few minutes of dispensing, do not clean the dispensing cartridge. Remove the needle and repeat Step 14 through Step 19. Make sure the needle is clean before reattaching it.

4.6 Valve Offsets

A Fluidmove Valve Offsets routine must be performed after any of the following:

- Initial Valve setup
- Valve change
- Height Sensor change or adjustment

This screen-prompted routine identifies and records a safe Z-height for dispensing head travel, the XYZ locations of the purge station and weigh station (if present), needle, and the substrate height. It also calibrates the camera-to-needle and needle-to-height sensor offsets, if these accessories are installed on the dispensing system. Refer to the *Fluidmove User Guide* or *Online Help* for additional information.

5 Maintenance and Service

5.1 Overview

Performing the recommended maintenance and service procedures increases the life of your DV-7000 valve and ensures high quality dispensing performance for every production run. Some service procedures require special tools. These tools may be ordered through Technical Support.

- Recordkeeping
- Calibration and Adjustment
- Parts Ordering Information
- Preventive Maintenance
- Cleaning the Valve
- Removing the Valve from the Dispensing System
- Valve Assembly and Disassembly

5.2 Safety First

Operation of the DV-7000 involves air pressure, electrical power, mechanical devices, heat, and the use of hazardous materials. It is essential that every person servicing or operating the DV-7000 fully understands all hazards, risks, and safety precautions. See *Section 2 - Safety* for additional information.

WARNING! Before performing any of the maintenance procedures in this section, perform a service shutdown as described in the applicable dispensing system manual.

WARNING! Maintenance procedures should be performed by trained personnel only.

5.3 Recordkeeping

The type of maintenance performed (such as preventive and parts replacement) should be recorded in maintenance records for the valve. Dates, part numbers/serial numbers of replaced parts, names of technicians, and other pertinent data should be recorded.

5.4 Calibration and Adjustment

There are no maintenance-related calibration and adjustment requirements for the valve. Before operating the valve, adjustments are made to dispensing system air pressure and valve motor speed as determined by your application.

5.5 Parts Ordering Information

NOTES Part numbers can be found in the illustrations and tables in *Section 8 - Parts Replacement*.

Make sure that the cartridge assembly part numbers match your valve's configuration number when ordering spare parts.

5.6 Preventive Maintenance

The recommended preventive maintenance schedule for DV-7000 valves is shown in Table 5-1. The recommended frequencies are based on an average production environment. Your production operations and environment may differ.

Table 5-1 Recommended Maintenance Schedule

Maintenance Procedure	Recommended Frequency	Instructions
Clean the dispensing cartridge	Daily	See *5.7 Cleaning the Valve*.
Prime the fluid valve	Daily	See *4.5 Priming the Valve*.
Inspect for fluid leakage and other abnormalities	Daily	See *Section 6 - Troubleshooting*.

5.7 Cleaning the Valve

NOTE The cleaning procedures assume that a syringe is presently connected to the valve.

WARNING! Refer to the Safety Data Sheet (SDS) for important information about safety, handling, and disposal for all fluids and solvents. All fluids, solvents, and contaminated materials must be disposed of according to local regulations. Wear Personal Protective Equipment (PPE) when performing this procedure to prevent contact with caustic chemicals.

Tools and Materials Needed:

- Cotton Swabs
- 1/4-inch Wrench
- Cleaning Kit
- Cartridge Fitting
- Syringe Fitting
- Appropriate Personal Protective Equipment
- Seal Insertion Tool Set (Item 46)
- Cleaning Solution (SDS recommended)
- Feed Tube

To clean a DV-7000 Cartridge (Figure 5-1):

1. Use the Fluidmove jog controls to move the dispensing head to the front center of the dispensing area.
2. Perform a service shutdown as specified in the applicable dispensing system manual.
3. Open the dispensing system front doors/hatch and locate the valve on the dispensing head.
4. Disconnect the feed tube from the cartridge fitting.
5. Push the blue cartridge release lever back towards the valve bracket.
6. Pull the cartridge out of the valve by gently pulling down on the nozzle.
7. Using a 1/4-inch wrench, remove the cartridge fitting from the cartridge body.
8. Discard the cartridge fitting in accordance with SDS recommendations.

9. While holding the cartridge body in one hand and the end of the feedscrew in the other, gently pull the feedscrew out of the cartridge.

   > The thrust collar should remain attached to the feedscrew.

10. Using your fingers, remove the lower bearing from inside of the cartridge body.

11. Using a cotton swab, carefully remove the seal from inside of the cartridge body.

    > The seal is very fragile. If the seal is not damaged, it may be reused.

12. While holding the cartridge body in one hand and the needle retainer in the other, gently twist the retainer to the left to remove it from the end of the cartridge.

13. Remove the needle from inside the needle retainer.

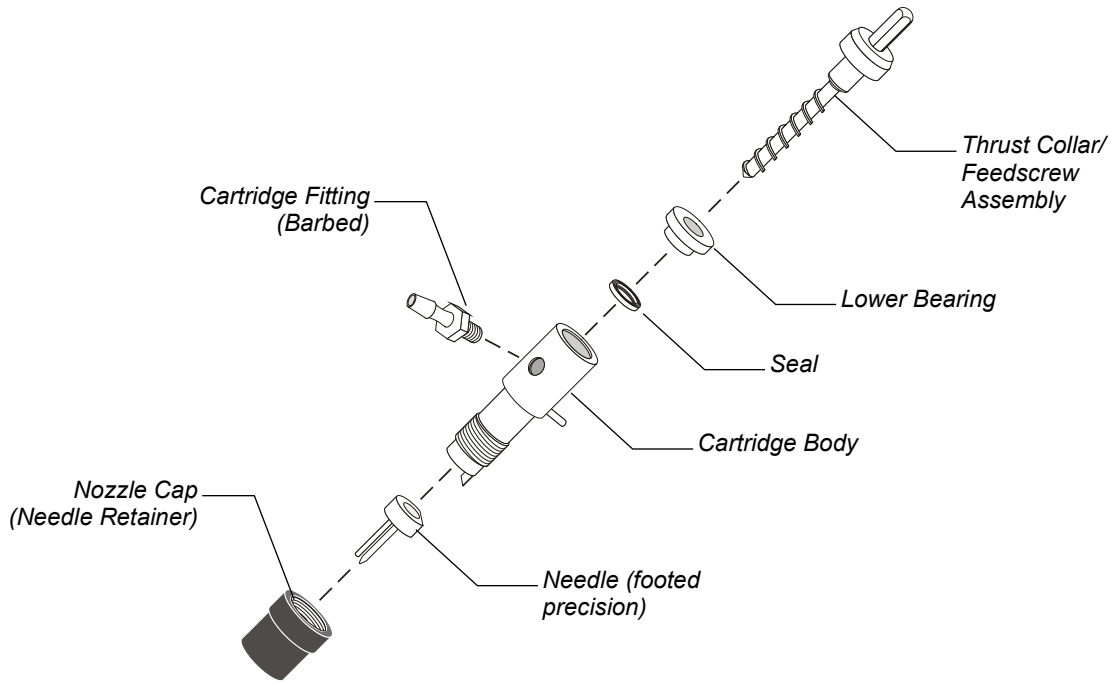


Figure 5-1 DV-7000 Cartridge Disassembly (typical)

14. Use SDS recommended cleaning solution and a small bottle brush or cotton swab to thoroughly clean the following parts making sure all fluid and residue is removed:

    - Feedscrew
    - Thrust Collar
    - Seal
    - Needle Retainer
    - Cartridge Body

    > Use the reamer from the cleaning kit to remove any residual fluid from inside the cartridge body.

NOTE If your DV-7000 is configured with a precision needle, perform Steps 15 through Step 17. If the valve is configured with a Luer adapter and standard needle, skip to Step 18.

15. Flush the large end of the needle with SDS recommended cleaning solvent.

16. Insert the appropriate size tungsten wire into the needle to open a path through the end of the needle. Do not force the wire through the needle. If there is a hard plug, proceed as follows:

    a. Use the drill bit supplied in the cleaning kit to remove the plug by gently rotating the bit by hand, being careful not to run the bit all the way through the needle.

CAUTION! Do not run the drill bit all the way through the needle as this will increase the size of the needle opening.

    b. Once you have removed most of the material with the drill bit, try again to push the tungsten wire through the needle.

    c. If the wire still does not go through the needle, try again with the drill bit until you can get the wire all the way through the needle.

NOTE If great care is taken to maintain the needle, it should last indefinitely.

17. Once you have cleared a path through the needle, flush the needle with cleaning solvent until a clear stream of solvent flows from the end of the needle.

    > If necessary, use a small bottle brush to remove residual fluid. Rotating the bottle brush counterclockwise while slowly inserting it into the needle will pull out any residual fluid.

18. Inspect the seal and the lower bearing for wear and replace if worn.

19. Reassemble the cleaned cartridge.

    > Load the cartridge, see *4.3 Loading a Dispensing Cartridge*.

20. Connect a new feed tube to the cartridge fitting.

21. Prime the valve, see *4.5 Priming the Valve*.

5.8 Removing the Valve from the Dispensing System

To remove the valve for servicing (Figure 5-2):

1. Using the Fluidmove jog controls, move the dispensing head to the front center of the dispensing area.

2. Perform a service shutdown as specified in the applicable dispensing system manual.

3. Open the doors/hatch and locate the valve on the dispensing head.

4. Disconnect the following:

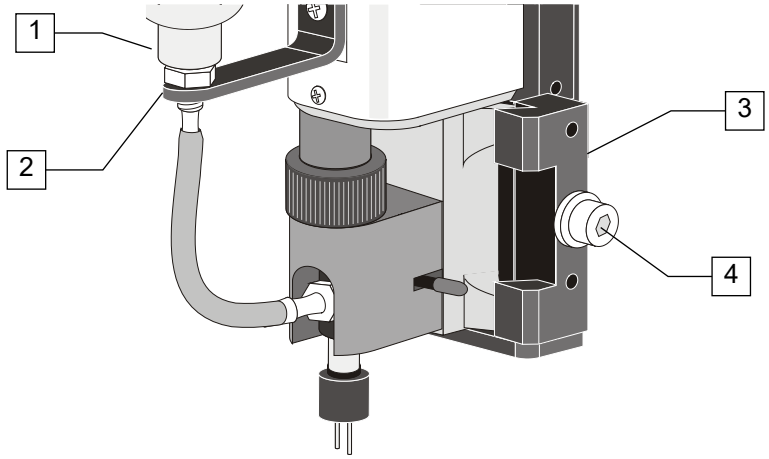
    a. Syringe air hose from the fluid syringe.

    b. Power cords for the valve and height sensor (if present) from the dispensing system bulkhead.

5. Unscrew and remove the fluid syringe with the receiver head from the syringe fitting.

6. Use a 4 mm hex key to loosen the locking screw on the side of the valve bracket.

7. Carefully lift the valve out of the valve bracket and place it in a safe location for servicing.



Item	Description
1	Fluid Syringe
2	Syringe Fitting
3	Valve Bracket
4	Locking Screw

Figure 5-2 Removing the Valve for Service

5.9 Valve Assembly and Disassembly

Use the exploded diagrams and tools lists in *Section 8 - Parts Replacement* to help you disassemble and reassemble the valve. Contact Technical Support if you have questions.

WARNING! Only trained service technicians should perform valve assembly and disassembly.

6 Troubleshooting

6.1 Overview

This section will help you determine the origin of problems you may experience with your valve and suggest the recommended corrective actions.

If you experience problems that are not listed in this section or continue experiencing the problem after trying the suggested corrective actions, please contact Technical Support.

6.2 Safety First

Operation of the DV-7000 involves air pressure, electrical power, mechanical devices, heat, and the use of hazardous materials. It is essential that every person servicing or operating the DV-7000 fully understands all hazards, risks, and safety precautions. See *Section 2 - Safety* for additional information.

WARNING! Dispensing equipment in need of troubleshooting may have high voltage present in both designated and unsuspected places. High voltage can result in personal injury or death.

6.3 Troubleshooting Procedures

Basic troubleshooting and suggested recovery measures are presented in Table 6-1. Due to variances in production environment and operational conditions, not every possible problem can be addressed.

WARNING! Troubleshooting should only be performed by trained service technicians.

NOTE To quickly identify problems, look for obvious signs such as burnt, missing, damaged, or loose parts as well as obstructions and spills. Obvious uncharacteristic heat, noise, vibration, odor, or movement can also help to isolate problems.

Table 6-1 Troubleshooting Guide

Symptom	Possible Cause	Recovery
Intermittent or no fluid dispensing	Valve poorly primed	See *4.5 Priming the Valve*.
	Clogged needle	Clean or replace the needle.
	Plugged valve	Clean valve, see *5.7 Cleaning the Valve*.
	Speed Control set to 0 rpm	See *4.2 Valve Adjustments*.
	No power to motor	Make sure that valve power cord is connected to the power outlet on the dispensing head.
	Fluid syringe is empty	See *4.4 Installing/Changing a Fluid Syringe*.
Needle repeatedly clogs with fluid	Fluid particles too big for needle size	Replace needle with a larger diameter needle.
	Needle bent or damaged	Replace needle.
	Fluid has exceeded pot life or fill has separated	See *4.4 Installing/Changing a Fluid Syringe*.
Material drips or drools continuously from dispensing tip	Valve poorly primed	See *4.5 Priming the Valve*.
	Wrong type of stopper in the syringe	Use zero draft (orange or yellow) stoppers in the syringe.
	Air inside syringe expands	Add a short reverse motor command to the end of the dispensing command. Refer to the *Fluidmove User Guide* or Online Help for instructions.
	Cartridge preload is improperly set (DV-8000)	See *4.3 Loading a Dispensing Cartridge*.
Inconsistent shot sizes	Syringe air pressure set too low	Increase syringe air pressure (30 psi max.). Refer to the applicable dispensing system manual for instructions.
	Drive mechanics do not have time to damp-out after an X-Y move	Increase the settling time in the Dot Parameters. Refer to the *Fluidmove User Guide* or Online Help for instructions.
	Feed screw damaged or binding	Contact Technical Support.
Shots too large	Needle is too big	Replace needle with a smaller needle.
	Syringe air pressure set too high	Decrease syringe air pressure (30 psi max). Refer to the applicable dispensing system manual for instructions.
Fluid flow rate too fast or too slow	Incorrect valve motor speed	Correct valve motor speed to rate recommended for the fluid used. Refer to the applicable dispensing system manual for instructions.
Valve is contacting other components during dispensing head movement	Incorrect Valve Bracket/Mounting Plate installation	Adjust bracket/plate height, see *Section 3 - Installation*.

7 Specifications

7.1 Overview

The specifications below are intended as a convenient reference for personnel involved with installation, operation, and maintenance of the DV-7000.

7.2 Safety First

Operation of the DV-7000 involves air pressure, electrical power, mechanical devices, heat, and the use of hazardous materials. It is essential that every person servicing or operating the DV-7000 fully understands all hazards, risks, and safety precautions. See *Section 2 - Safety* for additional information.

7.3 Specifications

Table 7-1 contains the technical specifications for the DV-7000 valve. If you have any questions about these specifications or valve performance, contact Technical Support or your authorized distributor.

Table 7-1 Valve Specifications

Parameter	Specification
Dimensions	
Length:	190 to 192 mm (7.48 to 7.56 inch)
Width:	33 mm (1.3 inch)
Depth:	72.6 mm (2.86 inch)
Weight (dry, without syringe):	362 g (0.8 pound)
Operating Voltage:	24 VDC
Operating Air Pressure (max):	
With Feed Tube:	275 kPa (40 psi)
With Elbow Fitting:	551 kPa (80 psi)
Syringe Sizes:	5, 10, 30, 74, or 177 cc (0.17, 0.34, 1.0, 2.5, or 6.0 ounce)
Motor Type:	Closed-loop velocity control with encoder feedback

8 Parts Replacement

8.1 Overview

This section contains information that will aid in assembling, disassembling, and ordering replacement parts for the DV-7000 Heli-Flow Valve.

8.2 Safety First

Operation of the DV-7000 involves air pressure, electrical power, mechanical devices, heat, and the use of hazardous materials. It is essential that every person servicing or operating the DV-7000 fully understands all hazards, risks, and safety precautions. See *Section 2 - Safety* for additional information.

8.3 Parts Ordering Information

Customers can order spare parts by contacting Technical Support. Contact information is listed in the front of this manual. Spare parts can also be ordered online through our Internet Web Store. To set up a web store account, send an email to americas.es.cs@nordson.com.

When ordering parts, be prepared to provide the following information:

- Your Company Name
- Shipping Address
- Purchase Order Number
- System Serial Number (found on back panel)
- Billing Address
- Part Number and Description of Part
- Quantity
- Shipping Instructions with Collect Account Number

8.3.1 Shipping Instructions

When ordering parts, specify which carrier you prefer to use and provide your shipping account number. If no instructions are received, Technical Support will determine the best shipping method and items will be shipped prepaid with the shipping charge added to the invoice.

8.3.2 Warranty

Contact Technical Support for any warranty issues pertaining to spare parts. Wear items and consumables are covered under warranty against manufacturer defect only. Expected lifetimes for these parts will vary based upon application and use.

Consumable parts are generally considered as parts that are replaced on a frequency of > 1 per calendar year under expected regular usage. In most cases, these parts are “wetted parts” that make contact with the dispensed fluid.

Wear items are those items that have been identified to have limited life expectancy (less than 5 years) but are not considered consumables. Wear items are often highly application dependent, high user-touch, or adjusted parts.

8.3.3 Credit and Exchanges

Contact Technical Support for credit or exchanges of recommended spare parts or refurbished components (components restored to original specifications but not sold as new). Obtain a Return Material Authorization (RMA) from Technical Support before returning parts.

8.3.4 Return Material Authorization

Contact Technical Support to obtain a Return Material Authorization (RMA) before returning any parts.

NOTE Find your local Technical Support contact on the Nordson web page, www.nordsonasymtek.com.

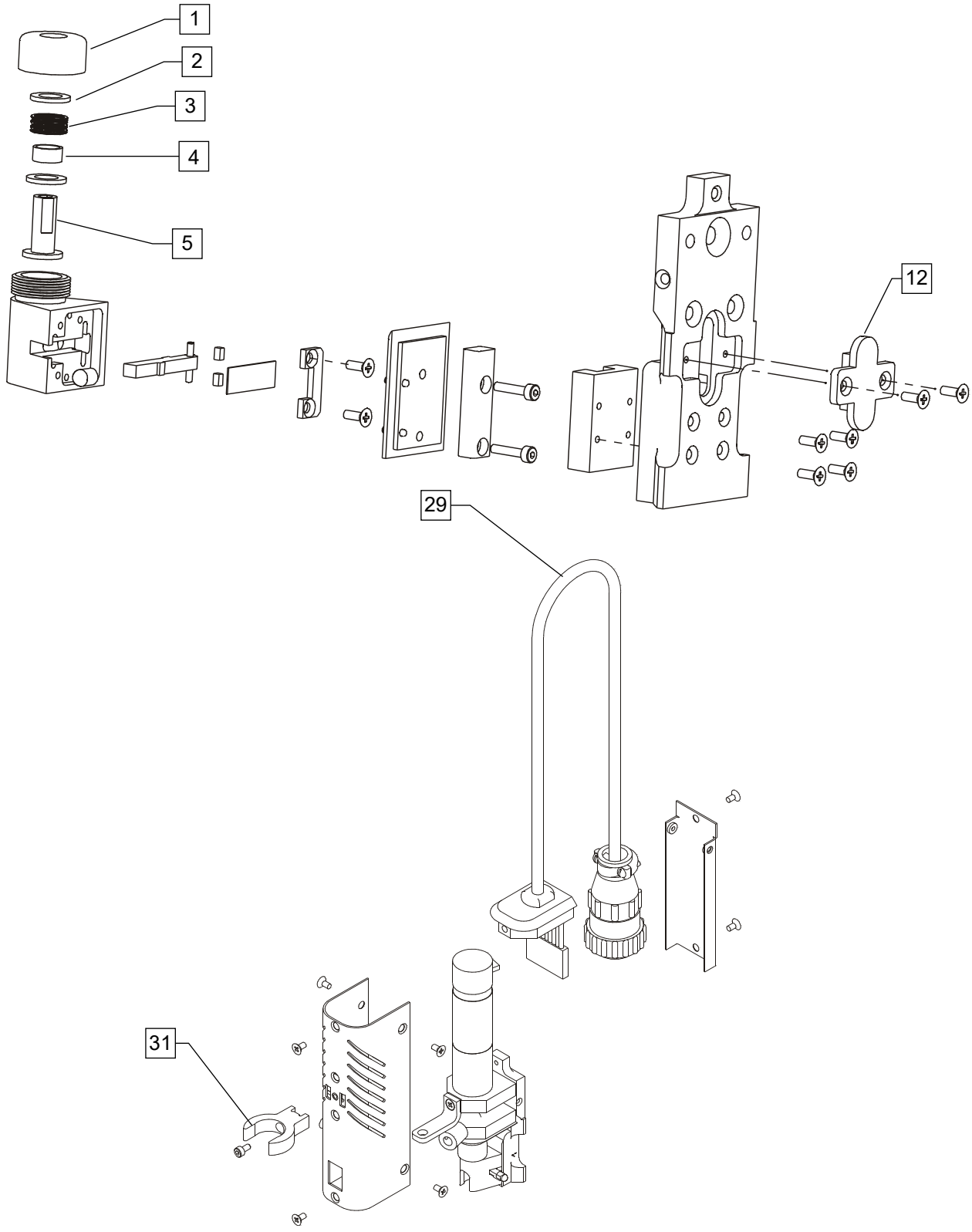
8.4 Unpacking and Inspecting Replacement Parts

Replacement parts are shipped to distributor or customer facilities in individual shipping cartons. Review the packing slip to ensure that the correct parts were received. Contact Technical Support if any discrepancies are discovered. Before unpacking your spare parts, visually inspect the carton for damage. If applicable, check the "ShockWatch" and the "Tip N' Tell" stickers for indications of improper shipping and handling. Inform the freight carrier of any damage.

WARNING! Parts replacement should only be performed by a trained service technician. Nordson assumes no liability for personal injury or property damage that may occur as a result of spare parts being replaced by other than Nordson trained technicians.

8.5 Spare Parts List

Use the following tables to locate the item number corresponding to a procedure in this technical manual. Nearly all spare parts are sold as part of a spares kit, with a few exceptions. To order parts, access www.nordson.com/electronics, use the search feature to search for a kit part number or part description to locate the appropriate spares list, and follow the instructions in that file to complete the ordering process. Contact Technical Support for questions.



Kit Part Number	Kit Name	Item Number	Part Description	Quantity
6655201	**KIT, REPAIR, DV-7000**			
			TOOL, GAP,2MM	1
		1	CAP, VALVE BODY	1
		5	COUPLING, DRIVE, HEX	1
		2	PAD, THRUST, SPRING	2
		4	GUIDE, SPRING	1
		3	SPRING, WAVE, 3/8 OD,1/4 ID	1
			TOOL, GAP, 0.64MM (0.025")	1
			BAG, SEALTOP 2X3, 2 MIL, W/WHT	1
			LABEL, ZEBRA, 4"X2", THERM WHT	1
			CABLE, ADAPT DV14 TO 28-PIN BH	1
		29	CABLE ASSY, DA DV-7000	1
6652116	**KIT, STARTUP, DV-7000**			
			LUER, FEMALE, 10-32 TPD, NYLON	10
			ELBOW, LUER M/F, LOCKING	10
			LUER ADAPTOR, MALE-FEM, PLASTIC	10
			LOCK RING, SNAP LUER	10
			LABEL, ZEBRA, 4"X2", THERM WHT	8
			BAG, SEALTOP 2X3, 2 MIL, W/WHT	4
			SEAL, SPRING ENGERG .250D.187ID	2
			BAG, SEALTOP 3X5, 2 MIL, W/WHT	2
			BOX, 11X6.5X2 WITH CHERRY LOCKS	1
			CLIP, SYRINGE, LOWER, 30CC	1
			SCREW, M3 X 0.5 SOCKET X 6	2
			TIP CAP O BL 50	1
			ASSY, RECEIVER HEAD, 30CC, BLUE	1
			BAG, SEALTOP 4X6, 2 MIL, W/WHT	1
		46	TOOL, INSERT, SEAL, DV-7000	1
			TOOL, GUIDE, SEAL, DV-7000	1
			CLIP, SYRINGE, 30CC	1
			TUBING, PU, CLR 1/4"OD 1/8"ID	1.13
			FITT'G, 1/4"NPTF X 10-32 UNF, ELB/B	1
			WASHER, #8 .032 FLAT-NYLON	1
			FITTING, QUICK DISCONNECT MALE	1
			FITT'G, 1/8 BARB X 10-32 UNC	1
		31	CLIP, SYRINGE, 10CC	1
			SPRING, COMPR, 170 OD X.800L, .008W	1
		12	INSERT, BACKPLANE	1
			BUSHING, LOWER	1
			SPRING, COMP, .18OD, .014D, .075L	1
			RETAINER, NEEDLE, THREADED, LUER	1

Kit Part Number	Kit Name	Item Number	Part Description	Quantity
			PISTON O 30/55CC WH WIPER 50	1
			RETAINERNEEDLE, THREADED, MTLHUB	1
			BAG, SEALTOP 6 X 9, .002 MIL	2
196194	**KIT, CONSUMABLE, DV-7001**	**50**		
			LUER ADAPTOR, MALE-FEM, PLASTIC	50
			KIT, ELBOW, LUER	1
		52	SEAL, SPRING ENGERG .250D.187ID	1
			LUER, FEMALE, 10-32TPD, NYLON	50
196191	**KIT, CARTRIDGE, 6 OZ, DV-7000**			
			ELBOW, 1/4 NPT TO LUER, DISP	50
			STANDOFF RING, INTEL C4	1
			CAPTIVE METRIC FASTENER, 8MM	2
			CLIP, 6OZ/2.5OZ., DV-7000.LOWER	1
			CLIP, 6OZ., DV-7000 UPPER	1
			CARTRIDGE, 6OZ	1
			LOCK RING, SNAP LUER (PKG OF 50)	1
			RETAINER, 6OZ	1
			PLUNGER, CARTRIDGE	1
			SCREW, 6-32X1.00, SOCK HD,SST	1
			ASSY, RECEIVER HEAD,2.5/6 OZ	1
			LUER, FEMALE, 10-32TPD, NYLON	50

Figure 8-1 DV-7000 Exploded View (1 of 2)

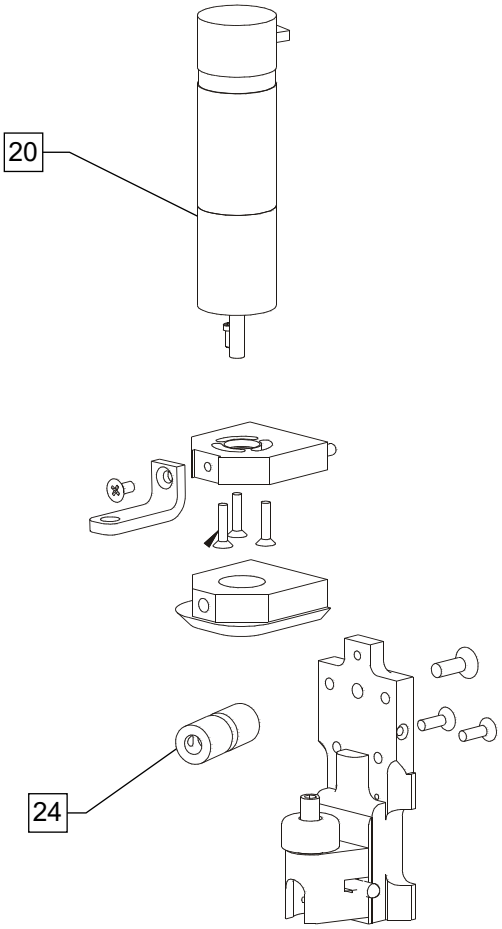


Figure 8-2 DV-7000 Exploded View (2 of 2)

Table 8-1 Assembly and Adjustment Tools (DV-7000)

Kit Part Number	Kit Name	Item Number	Part Description	Quantity
SOLD AS INDIVIDUAL PARTS				
			BASE MODEL, DV-7000	
			ASSY, CARTRDG, X442-CL9, RLVD	
			ASSY, CART/SCREW, X321-CL8	
			ASSY, CART/SCREW, X331-CL8	
			ASSY, CART/SCREW, X322-CL8	
		54	ASSY, CART/SCREW, X222-CL1	
			ASSY, CART/SCREW, X223-CP0LP	
			ASSY, CART/SCREW, X223-CP8LP	
		53	ASSY, CART/SCREW/X124-CP1	
		55	ASSY, CART/SCREW, X222-CP1	
			ASSY, CART/SCREW, X332-CP0LP	
			NEEDLE, 20GA, 1/2", SS (12)	
			NEEDLE, 18GA, 1/2", SS (12)	
			NEEDLE, 22GA, 1/2", SS (12)	
			NEEDLE, 23GA, 1/2", SS (12)	
			NEEDLE, 20GA, 1/4", SS (12)	
			NEEDLE, 27GA, 1/4", SS (12)	
			NEEDLE, 21GA, 1/4", SS (12)	
			NEEDLE, 25GA, 1/4", SS (12)	
			NEEDLE, 18GA, 1/4", SS (PKG OF 12)	
			NEEDLE, 22GA, 1/4", SS (12)	
			NEEDLE, NO FOOT, 23GA, .250HT	
			NEEDLE, 25GA, NO FOOT, .250HT	
			NEEDLE, 27GA, .25HT, NO FOOT	
			NEEDLE, 30GA, NO FOOT	
		24	COUPLING, MINI JOINT, 7/32X .158	
		20	MOTOR ASSY, 6 WATT W/ ENCODER 19:1	
			LUER, FEMALE, 10-32TPD, NYLON	
			LUER ADAPTOR, MALE-FEM, PLASTIC	
			SEAL, SPRING ENGERG .250D.187ID	
			BUSHING, LOWER	
			KIT, ELBOW, LUER	
			CARTRIDGE, 6OZ	
			ASSY, RECEIVER HEAD, 2.5/6 OZ	
		39	RECEIVER HEAD-35CC, DV-06	

MAIN OFFICE
2747 Loker Avenue West
Carlsbad, CA 92010-6603 USA
Tel: +1-760-431-1919
www.nordson.com/electronics