The JDX Valve Operation and Maintenance Procedures

The JDX Jet Valve is a high speed, non-contact dispenser that applies small shots of fluid as individual dots or in rapid succession.

Written By: Technical Writing
INTRODUCTION

Only three components come in contact with fluid: the feed tube, diaphragm, and nozzle plate. The unique diaphragm design allows for fast cycling of the jet, up to 300Hz for high speed line dispensing. The JDX is designed to dispense coatings, underfill, encapsulant, SMT glue, grease, and more with very fine control.

Personal Protective Equipment

Operators must use eye protection because material contents are under pressure. Always wear gloves when handling materials and solvents. Refer to MSDS sheets on the material being dispensed for other precautions.

Waste Disposal

Dispose of all used parts and materials in accordance with local laws and regulations.
Step 1 — JDX Valve Overview

- The syringe bracket is the bracket for 30cc syringe is one piece with jet body. Inserts are available for smaller syringe sizes.

- The jet body is the component that contains the pneumatic solenoid that controls the on/off function of the jet.

- The heater is built into jet body and the fluid is warmed at the point of dispense.

- The feed tube is a disposable tube with a female luer fitting. It supplies fluid from the syringe to the nozzle plate.

- The nozzle plate has the dispense port orifice in it and is connected to the syringe with the feed tube. The nozzle plate is available in multiple sizes and materials of dispense ports orifices.

- The diaphragm is a small component that fits into the heater and is held in position by the nozzle plate. It comes in three materials for dispense material compatibility.
Step 2 — How to Install the Diaphragm in the JDX Valve

The Jet Valve is shown removed from the workcell in this procedure. It is not necessary to remove the jet valve to do the procedure.

- Use a hex wrench to turn the two recessed screws in the JDX valve counterclockwise until they are loose. Then remove the nozzle plate.
- Remove the old diaphragm.
- Use the operator interface or the JDX controller box to set the valve to "Open".
- Align the ribs on top of the diaphragm to the groove features on the bottom of the heater block.
- Put the diaphragm on your finger tip and gently press it into the heater block with metal insert aligned with the center hole.
- Install the nozzle plate.
Step 3 — Install the Feed Tube and Nozzle Plate

- Align the feed tube with the barb inlet on the nozzle plate.
- Push the feed tube onto the barb inlet.
- Align the nozzle plate on the heater block with the barb inlet facing toward the syringe bracket. The heater block has two locating pins that will guide the nozzle plate onto the heater block.
- Make sure the nozzle plate faces the correct way.
Step 4 — Install the Syringe

- Use a hex wrench to tighten the recessed screws in the two holes shown. Turn the screws clockwise until they are tight and the nozzle plate does not move.
- Install the syringe into the holder.
- Push the feed tube into the end of the syringe.
- Turn the thumb screw clockwise until the fluid syringe is tight in holder.
Step 5 — Prime the Valve

- Set the jet to close with the operator interface or JDX controller box.
- Fill the syringe with material or solvent as necessary.
- Attach the air cap to the syringe.
- Set the supply pressure to 10 psi.
- Check the jet and syringe for fluid leaks.

Step 6 — How to Set the JDX Heater Temperature

- Turn on heater and wait 5-10 minutes for the temperature to stabilize.
- Examine the table shown below to find a good temperature to start with.
- Use trial and error to find the best temperature setting for your material. Fluid viscosity does not directly relate to the necessary temperature.

⚠️ If the temperature is set too high the material will cure in the nozzle plate.

<table>
<thead>
<tr>
<th>Fluid Type</th>
<th>Viscosity cps</th>
<th>Temperature °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hysol 3800</td>
<td>300</td>
<td>35</td>
</tr>
<tr>
<td>EMI3553</td>
<td>1K</td>
<td>40</td>
</tr>
<tr>
<td>EMI 17485-HTG-HV3</td>
<td>400K</td>
<td>45</td>
</tr>
<tr>
<td>Loctite 3621</td>
<td>50K</td>
<td>45</td>
</tr>
<tr>
<td>EMI 1768-VTG</td>
<td>65K</td>
<td>45</td>
</tr>
<tr>
<td>Alpha WS-619</td>
<td>100K</td>
<td>50</td>
</tr>
<tr>
<td>Norland 123 TKHGA</td>
<td>200K</td>
<td>50</td>
</tr>
<tr>
<td>Namics 8439</td>
<td>50K</td>
<td>55</td>
</tr>
<tr>
<td>Namics 8410</td>
<td>60K</td>
<td>55</td>
</tr>
</tbody>
</table>
Step 7 — Fluid Pressure

- Set the jet to open with the operator interface or JDX controller box.
- Start at 10 psi and increase the fluid pressure until a steady stream or a continuous flow of dots exit the nozzle. Fluids react differently, some may curl up or pool at the nozzle outlet.
- Set jet pressure at 45 psi to start.
- Dispense the material and examine the nozzle and surface that was dispensed on for buildup, splatter, or satellites.
- Adjust the jet pressure until the results are correct.

⚠️ Do not set jet pressure higher than 65 psi.
Step 8 — Remove the Air Cap and Loosen the Thumb Screw

- Decrease the system pressure to 0 psi.
- Shut off the heater and wait approximately five minutes for the heater block to cool.
- Turn the air cap counterclockwise to remove it.
- Turn the thumb screw counterclockwise to loosen the syringe.
Step 9 — Remove the Syringe, Nozzle Plate, and Diaphragm

- Loosen and remove the feed tube off of the syringe.
- Remove the syringe.
- Use a 3mm hex wrench to loosen the two recessed screws and remove the nozzle plate.
- Remove the diaphragm.
Step 10 — Clean all Material from the Valve Components

- Clean the diaphragm with cotton tipped swabs and solvent.
- Remove the feed tube from the nozzle plate and discard it.
- If necessary, soak the nozzle plate in ultrasonic cleaner for 5 minutes.
- Clean the nozzle plate with cotton tipped swabs and solvent.
- Examine the parts for wear, and replace them as necessary.
Step 11 — Replace the Orifice on the JDX

The example shown has a ceramic orifice; you may have an extended nozzle or a carbide orifice instead, but the procedure is the same.

- Carbide orifice
- Extended nozzle
- Nozzle plates have the part number and orifice size engraved on them.

Step 12

- Loosen the three screws in the nozzle plate.
- Remove the barb plate.
Step 13

- Remove the O-ring from the barb plate. Clean and replace as necessary.
- Remove the orifice (the orifice shown is ceramic; you may have a different orifice). You may have to turn the nozzle plate over and push on the orifice tip to remove the orifice.

There is an O-ring on the barb plate and one on the orifice. Make sure you keep them separate; the O-ring on the barb plate is slightly larger than the orifice O-ring and they are not interchangeable.

Step 14

- Clean the nozzle plate, barb plate, and O-ring if necessary.
- Install a new orifice. Make sure the orifice has an O-ring installed.
Step 15

- Install the barb plate. Make sure the nozzle plate screw holes are aligned.

- Turn the nozzle plate over and install the three screws. Make sure the screws are correctly tightened. Do not damage the screws when you tighten them.

- Install the barb plate O-ring.
Step 16 — Setup Mode for the JDX Valve

- In Portal, from the Cycle Stop screen, select Setup Mode.
- Select the Setup Tree tab.
- Select the + symbol next to a Parameter to expand the setup tree.
- Double click on any parameter to open an edit window.

Most settings for the Jet Valve are set with the PVA JDX Jet Valve Controller.

- Select the button shown to enable or disable an option. To adjust a value, use the arrows or type the necessary value in the value box shown.
- Select “Done” to keep the change or “Cancel” to exit without making any changes.
Step 17 — How to Use the JDX Valve in Manual Mode

- In Portal, from the Cycle Stop screen, select Manual Mode.
- Select the "Valves" tab.
- Click on the Select Valve drop down menu, and select the necessary JDX valve setting.
- Select the Valve Options tab.
- If there is a set of secondary tabs, select the JDX tab.
- Click on the Recipe drop down menu, and select the necessary recipe. A screen will show that the parameters are loading.
- Select the Clean Jetter button to the clean the valve orifice with the vacuum.

*Your portal screens might be different than those shown due to workcell configuration.*
Step 18 — PVA JDX Jet Valve Controller Functions

The PVA JDX Jet Valve Controller has the following options and functions.

- The **Power switch** turns the device power on/off.
- The **Fluid pressure gauge** shows the fluid delivery pressure.
- The **LCD display** shows the program parameters.
- The **Trigger LED** turns on when dispensing.
- The **Trigger switch** activates the current recipe shown on LCD display.
- The **Jet pressure gauge** shows the jet actuation pressure.
Step 19

- The **Jet pressure regulator** regulates the jet actuation pressure.
- The **Temperature controller** controls the temperature of the dispensing nozzle.
- The **Keypad** moves the cursor on the LCD display and changes the parameter values.
- The **Fluid pressure regulator** regulates the fluid delivery pressure.
- The **Air** switch turns on and off the fluid delivery pressure.
Step 20

- The **Air inlet port** connects to the source pressure with a 6mm diameter hose.

- The **Jet pressure outlet** provides air pressure for the jet dispenser and should be connected with a 6mm diameter hose.

- The **Fluid Pressure outlet** port provides fluid delivery air pressure and should be connect to the fluid syringe with a 4mm diameter hose.

- The **LCD contrast adjustment** changes the contrast level on the LCD display. Rotate the switch with a small screw driver to adjust the contrast.

- The **AC connector** with fuse is the power supply. One fuse is required. The controller can operate from 100 to 240 Vac. Use a locally acceptable power cord to operate in a different country.

- The **RS-232C** port is for the serial communication connector.

- The **Jet connector** connects to the jet electrical connector with the cable supplied with the system. This connector sends output trigger signals for the dispensing jet and heater settings.

- The **I/O connector** is used to trigger the dispensing recipes, outputs, busy flags, and error signals from the pressure gauges and heater controller.
Step 21 — To Change the Temperature

- Use the UP/DOWN arrows to increase or decrease the temperature.
- Press the ENTER key to save the change.
Step 22 — Turn the Heater On

- Press the INDEX key until you see the Run-Stop Output Control screen (r-5) on the top line of the display.

- Use the arrow keys to select the run setting to turn ON the heater as shown by the figure below.

- Then press the ENTER key to save the change. Now the heater is turned ON.

- Press ENTER key again to return to the main screen display.
Step 23 — Turn the Heater Off

- Press the INDEX key until you see the Run-Stop Output Control screen (r-5).
- Now use the arrow key to select Stop setting to turn OFF the heater.
- Then press the ENTER key to save the change. Now the heater is turned OFF.
- Press ENTER key again to return to the main screen display.

Step 24 — How the Trigger and Output Light Function

- Press the Trigger Button to immediately run the current recipe on the LCD screen. If there are multiple drops in the recipe, then multiple drops will dispense.
- The Output light is on when the valve cycles so you know a signal was sent to the valve. The light is off when the valve is idle.
Step 25 — Maintenance and Troubleshooting

- Additional content can be accessed through the links below.
  - Maintenance Table
  - JDX Valve Troubleshooting Table