



# Introduction

The 794 Auger Valve is a precision dispense valve specifically designed for metering controlled deposits of solder pastes, thick sealants and other particle-filled materials. By combining screw-feed principles with precise time, pressure and dispensing control, the 794 valve is able to provide accurate, repeatable deposits without damaging the metal particles of the solder. These features are not possible with any other type of conventional control valve. In addition, the 794 offers precise control of very small deposits through the use of a sliding head for machine over-travel and micro-adjustable gap control featuring a contacting foot.

Please spend a few minutes to become familiar with the controls and features. Follow our recommended testing procedures. Review the helpful information we have included, which is based on more than 30 years of industrial dispensing experience.

Most questions you will have are answered in this manual. However, if you need assistance, please do not hesitate to contact EFD or your authorized EFD distributor.

---

## The EFD Pledge

We pledge that you will be completely satisfied with our products. We endeavor to ensure that every EFD product is produced to our no-compromise quality standards.

If you feel that you are not receiving all the support you require, or if you have any questions or comments, I invite you to write or call me personally.

Our goal is to build not only the finest equipment and components, but also to build long-term customer relationships founded on superb quality, service, value and trust.

Peter Lambert, President

---

# Contents

Introduction . . . . .	2
General Information . . . . .	4
Installation . . . . .	6
Theory of Operation . . . . .	7
Setup (Sliding Head, Brushless/Brush Motor, Footed Tip Adapter) Fixed Head Versions . . . . .	8–9
Making Adjustments . . . . .	9
Changing Tips . . . . .	10
Changing the Auger Assembly . . . . .	10
Maintenance . . . . .	11
Troubleshooting Guide . . . . .	12–13
Repair Parts . . . . .	14
Specifications . . . . .	15

# General Information

It is intended that the 794 auger valve be rigidly mounted to and positioned by a suitable factory automation system and controlled by a suitable valve controller. See the “794 Auger Valve Specifications” section of this manual to select, install and configure the automation system and valve controller.

## Prohibited Uses

The 794 auger valve should not be operated in the following ways:

- Hand held
- In damp or wet conditions
- In explosive atmospheres
- Under conditions which violate limits set in the “Specifications” section
- Without all system guards, interlocks and other safety features in place and operational

## WARNING

It is the responsibility of the factory automation system designer, builder and/or installer to include safety features sufficient to prevent personal injury or loss of life during operation.

## Safety Precautions

The 794 auger valve should be installed, configured and operated only by qualified personnel who have read and understood all appropriate sections of this manual as well as the operating instructions supplied with the factory automation system onto which it is installed. Protective eyewear should always be worn while operating, adjusting and servicing the valve. Additional personal protection equipment should be used appropriate to the material being dispensed. An MSDS for all materials to be dispensed should be available at or near the operator’s station. The factory automation system should be designed and installed so as to allow the operator to be positioned at a safe distance while operating and adjusting the valve.

Please refer to the “EFD Product Safety Statement” packed with the valve literature.

## China RoHS Hazardous Material Declaration

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr6)	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
All brass fittings	<b>X</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<p><b>0</b>: Indicates that this toxic or hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-C is below the limit requirement in SJ/T11363-2006.</p> <p><b>X</b>: Indicates that this toxic or hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-C is above the limit requirement in SJ/T11363-2006.</p>						

# Packing List

The following items are included with the 794 auger valve:

Part #	Description	Qty.
1000Y5150-6	Adapter, 10cc, 6 ft	1
1000Y5152-6	Adapter, 30cc, 6 ft	1
6-460-A	8GR. Valve Purge Compound	1
794TK	794 Valve Tip Kit	1
794-MAN	Instruction Manual, 794	1
LIT-DOT	Dot Test Kit Sheet	3
LIT-MSDS	Valve Purge MSDM	1
LIT VALVE	Valve Combo Letter	1
LIT-VP	Valve Purge Instructions	1

## Valve Models

### 8-Pitch Auger

794-SB	Sliding Head, Brushless Motor, Footed Tip Adapter
794-FB	Fixed Head, Brushless Motor
794-SR	Sliding Head, Brush Motor, Footed Tip Adapter
794-FR	Fixed Head, Brush Motor

### 16-Pitch Auger

794-SB-16	Sliding Head, Brushless Motor, Footed Tip Adapter
794-FB-16	Fixed Head, Brushless Motor
794-SR-16	Sliding Head, Brush Motor, Footed Tip Adapter
794-FR-16	Fixed Head, Brush Motor
794-SB-16DL	Sliding Head, Brushless Motor, DL Tip
794-SR-16DL	Sliding Head, Brush Motor, DL Tip

# Installation-794-SB

## WARNING!

Disconnect the electrical power and inlet air pressure to the factory automation system and valve controller prior to proceeding.

1. Mount the valve securely to the Z-axis of the robot using the bracket provided for the Ultra® TT or another appropriate mounting bracket for other machines.
2. Connect the motor lead wire to the valve controller. The white wire connects to the (+) terminal and the brown wire to the (-) terminal.
3. Attach the barrel outlet fitting to the end of a barrel of material to be dispensed.
4. Insert the barrel into the barrel clamp, position as required and clamp securely.
5. Snap the auger assembly into the sliding head after first aligning the inlet fitting toward the front of the valve.
6. Trim a length of the supply hose provided to approximately 3-1/8" [80 mm] and push into the barrel outlet and auger assembly input fittings.
7. Attach the yellow end of the barrel adapter assembly to the end of the barrel. Connect the bayonet fitting to the valve controller air output.
8. Install an EFD 1/4" long dispensing tip of the appropriate gauge. (See the "Changing Tips" section on page 10.)

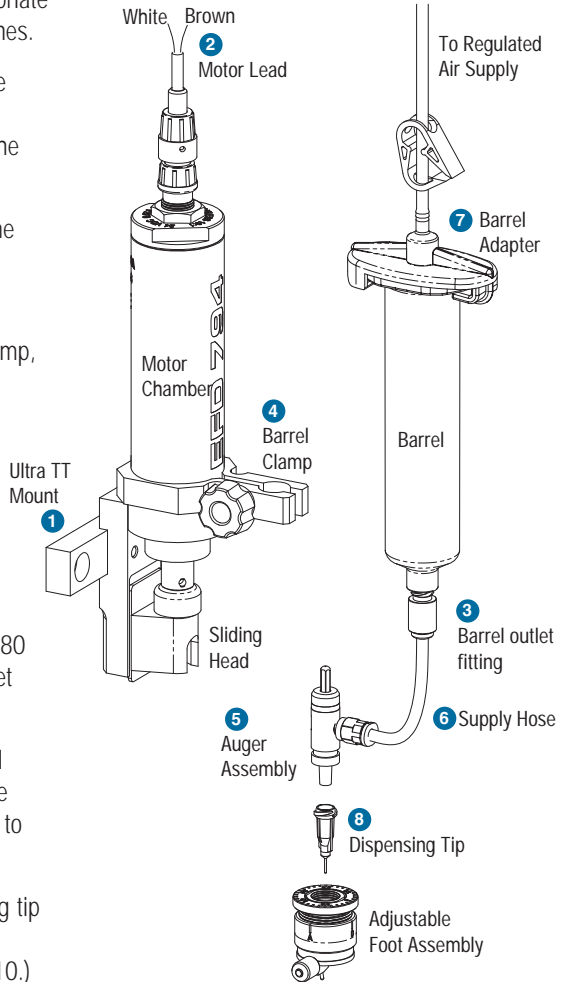


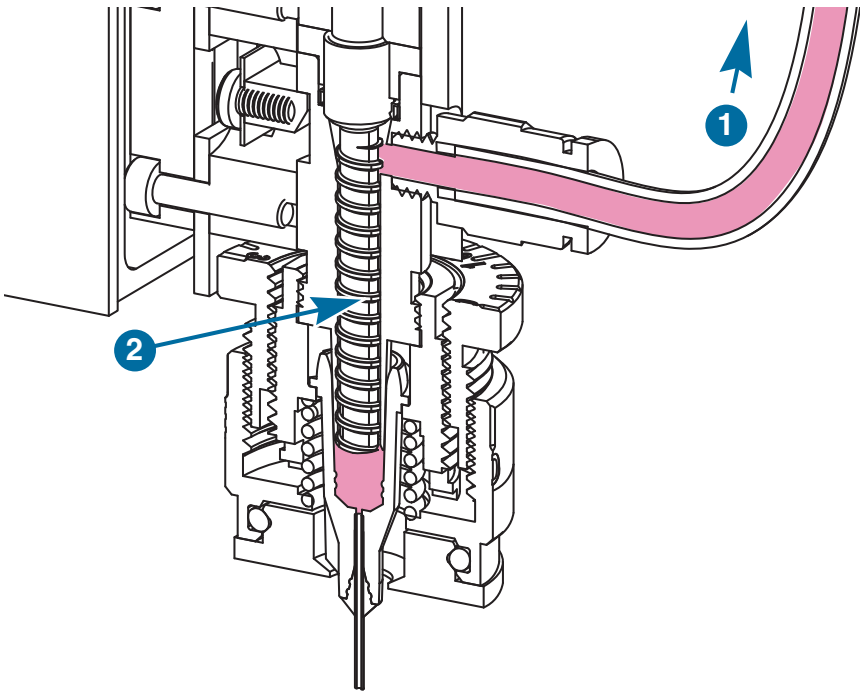
Figure 2. Valve Components  
 (Model 794-SB shown)

Note: For 794FB and 794FR Series (Fixed Head, Brushless/Brush Motor) refer to above installation instructions, steps 1 thru 8.

# Theory of Operation

Input air pressure at up to 30 psi (2.1 bar) is applied to the material reservoir (1), forcing fluid into the path of the auger. As the auger rotates, fluid moves along the auger flutes (2) and is forced out through the dispense orifice. The valve controller regulates the reservoir pressure, ensuring that there is enough pressure to keep the valve primed with fluid without forcing it past the auger. The duration of the dispensing time is controlled by adjusting the time control up or down until the required deposit size is established, at which point it is repeated with each initiate cycle.

Model 794-SB is shown



*Figure 3. Theory of Operation  
(Model 794-SB shown)*

# Setup for Model 794-SB Auger Valve

## CAUTION

Prior to setting up and operating this valve, please read and understand the operating instructions for all components of the dispensing system and become familiar with system programming techniques.

For Sliding Head, Footed Tip and Fixed Head versions.

1. Initiate a suitable purge routine to cause the valve to run continuously for several seconds. Repeat until all air has been purged from the delivery path.

Continue setup instructions for Sliding Head and Footed Tip versions only.

2. First loosen the thumb nut, push the foot all the way in and tighten the thumb nut. Then follow the procedure outlined in Figures 4 through 6 to "zero" the adjustable foot.

Figure 4. Setup 1. Following the three steps indicated, set the Z-axis stop of the motion control system such that the sliding head is approximately at the middle of its travel. For 20 gauge and larger tips, touch the tip only onto shim stock of about 1/4 of the outside diameter.

Figure 5. Setup 2. Zero the adjustable foot following the three steps indicated in Figure 5.

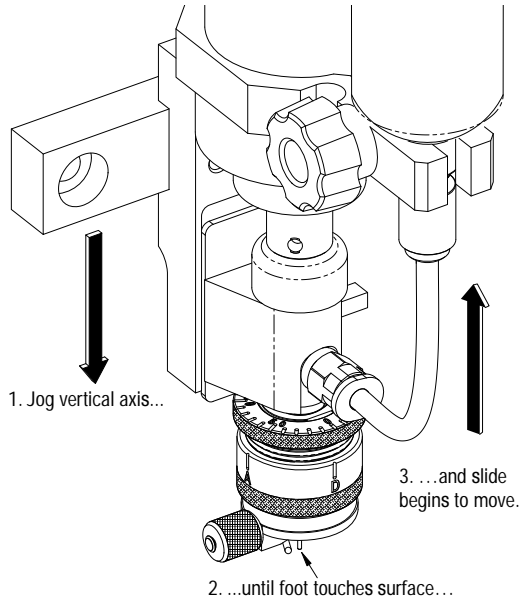


Figure 4. Setup 1

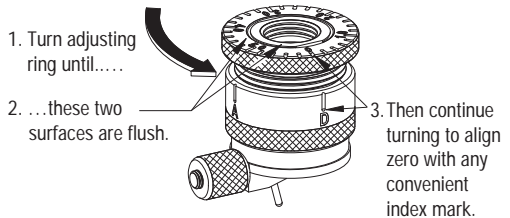


Figure 5. Setup 2

## Setup (continued)

Figure 6. Setup 3. Orient the foot, Figure 6, following steps 4, 5, 6 so it does not interfere with electrical components or other parts of the workpiece or fixture.

3. Follow the procedure outlined in Figure 5 to set the gap between the substrate and the tip. If a non-chamfered tip is being used, set the gap to approximately 25% of the outside tip diameter.

For chamfered tips, set to 25% of the inside diameter.

Each division on the adjustment dial is 2  $\mu\text{m}$ , or .000076". One revolution is 60  $\mu\text{m}$ , or .0024".

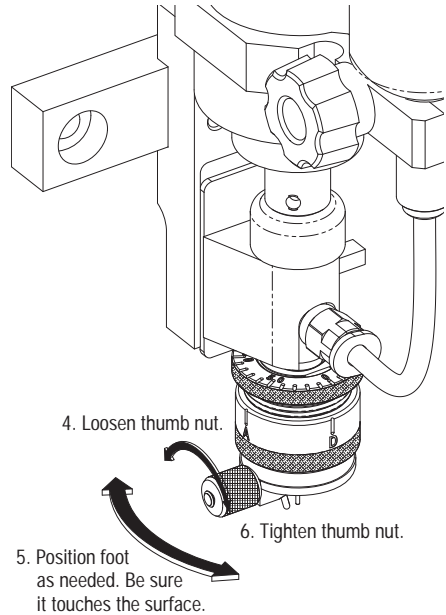


Figure 6. Setup 3

## Making Adjustments

Sliding Head, Footed Tip and Fixed Head versions

Dispense time is the primary method of making small adjustments in deposit size. In general, larger deposits require longer dispense times, larger diameter tips and larger gaps (See Figure 7). Be sure to allow settling time (before dispense) and dwell time (after dispense). Very small deposits may require chamfered tips. Air pressure should be set to a point just below where drooling occurs without the auger turning.

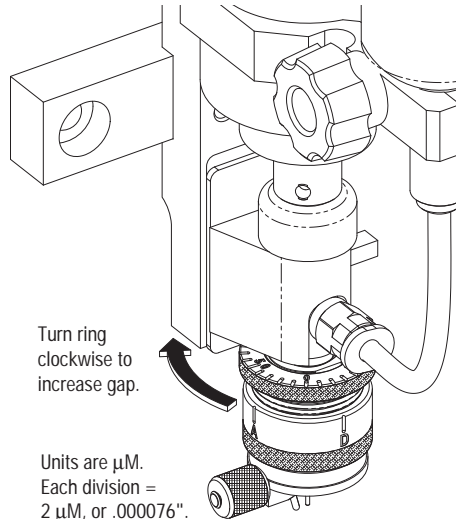


Figure 7. Adjusting Gap

# Changing Tips

Follow the directions in Figure 8 to change tips. To assure proper axial location of the tip, the cap on fine adjust assembly should be tightened until it bottoms out firmly against the end of the auger assembly. Use only EFD 1/4" long tips, tip sizes 5114-0.25-B through 5132-0.25-B. Refer to EFD Precision Dispense Tip Sheet for available gauge sizes and dimensions. Always re-zero the foot after changing tips.

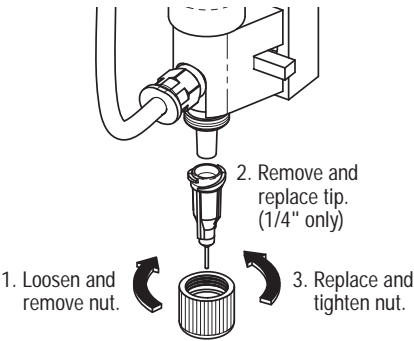


Figure 8a. Changing Tips—Fixed Head

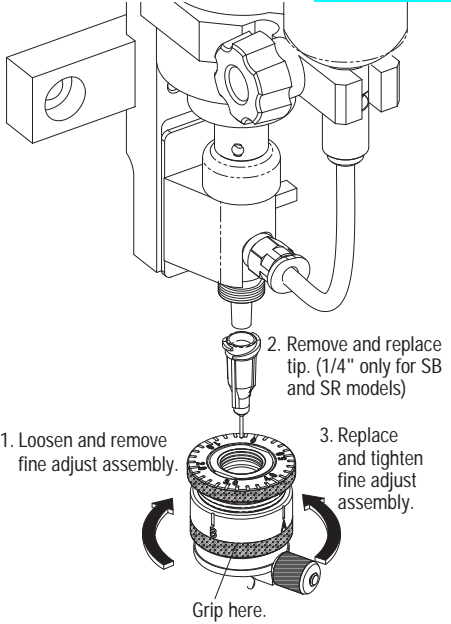


Figure 8b. Changing Tips—Footed Tip

# Changing the Auger Assembly

Footed Tip and Fixed Head versions.

Follow the directions in Figure 9 to change the auger assembly. To keep the delivery path intact, loosen the barrel clamp, raise the barrel, and pass the supply hose through the slot in the clamp. To replace the auger assembly, insert the hex drive into the body assembly, rotate the auger assembly until the hex engages, and then push up until the auger assembly snaps into place.

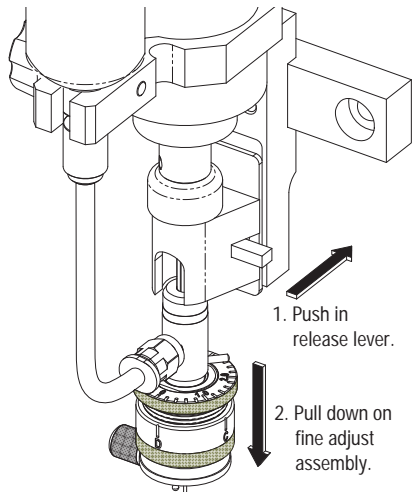


Figure 9. Changing Auger Assembly

# Maintenance (All models)

## CAUTION

Prior to servicing the valve, please read and understand the operating instructions for all components of the dispensing system, especially this manual. Perform a complete service shutdown of the motion control system before proceeding.

## Purging

The use of valve purge compound (#6-460-B) between production shifts or after every eight hours of run time is highly recommended. The compound cleans any material residue from the fluid path and conditions the valve for future use.

1. Install the barrel of valve purge compound on the fluid inlet fitting.
2. Apply reservoir pressure and cycle the valve until the valve purge compound has pushed all residual material from the valve. Leave the compound in the valve until future use.
3. To remove the valve purge compound, install material to be dispensed and cycle valve until all compound has been pushed from the valve.

## Cleaning the Auger Assembly

If the purging procedure detailed above is not sufficient to clean the valve, disassemble the auger assembly as follows (see Figure 10):

1. Pull the auger straight out of the fluid body being careful not to damage the seal.
2. Carefully pry the bearing out of the fluid body using a fingernail.

3. Remove the seal using a cotton swab.
4. Clean all parts using any suitable solvent and brushes or an ultrasonic cleaning device.
5. Inspect the seal and bearing for signs of wear or damage and replace if needed.
6. Insert the seal, spring side inward, into the fluid body using the bearing to gently push.
7. Fully press the bearing into the fluid body.
8. Insert the auger being careful not to damage the seal.

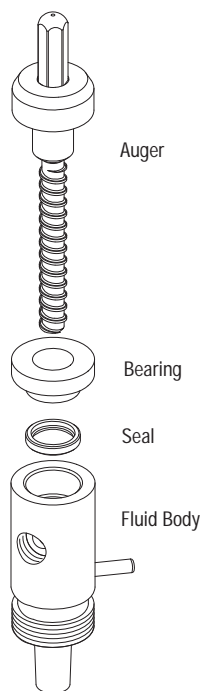


Figure 10. Auger Assembly

# Troubleshooting Guide

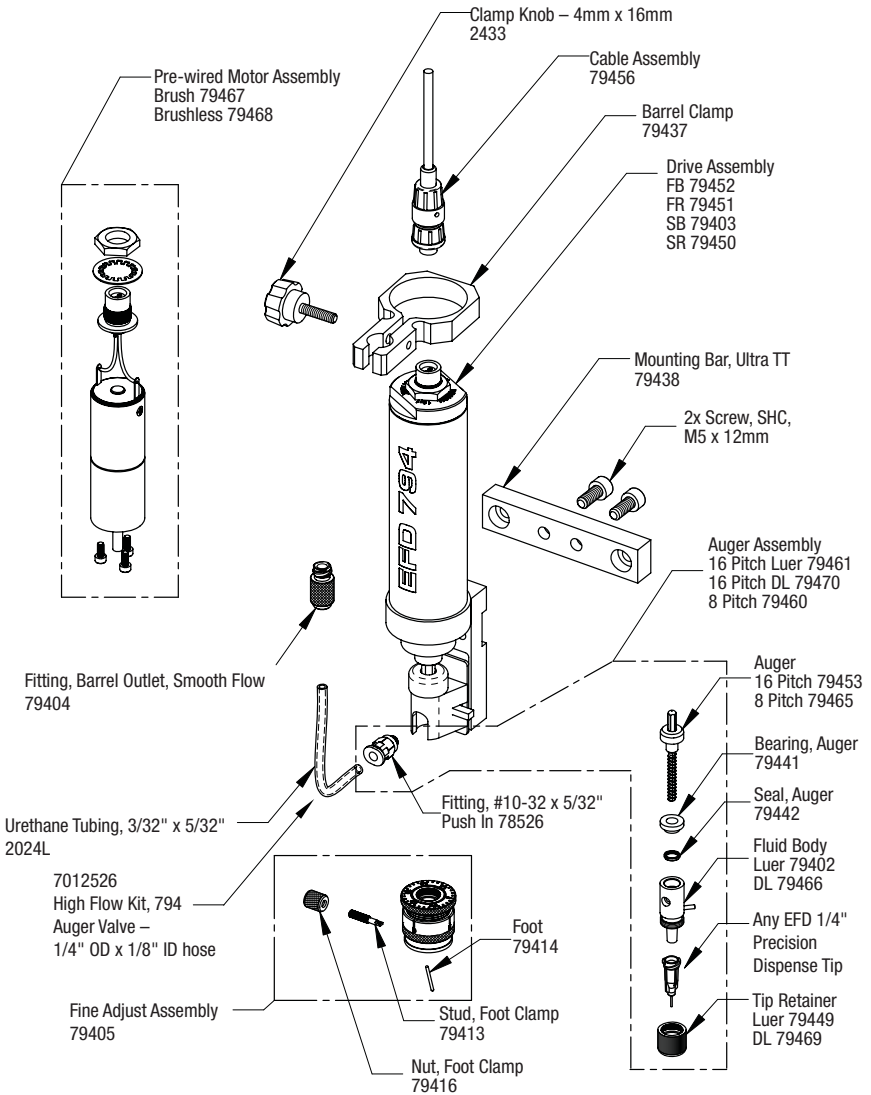
Trouble	Possible Cause	Solution
Auger not turning	Wiring fault	Check accuracy and tightness of all connections
	Cable damaged	Check cable for damage, replace if necessary p/n 79456
	Controller fault	Check controller output with voltmeter, refer to valve "Specifications" section
	Controller set incorrectly	Check settings of controller: motor voltage, direction, dispense duration, refer to "Specifications" section
		Return drive assembly for service, call 800-556-3484
	Motor fault	Replace pre-wired motor assembly assembly: brush motor p/n 79467, brushless motor p/n 79468
	Auger jammed	Clean auger assembly
	Coupling loose	Tighten set screws
No deposit	Motor turning in wrong direction (should be clockwise when viewed from above)	Check controller motor direction settings Reverse motor wires
	Depleted barrel	Replace with filled barrel
	No air pressure	Check controller input air and air settings
	Material cured or dried	Replace with fresh material
	Insufficient air pressure	Increase pressure
	Delivery path clogged	Run one or more purge routines Clean delivery path Replace tip, supply hose and/or fittings
Smeared deposits	Motion control system hunting for position	Tune motion control system
	Slide position not settled	Increase settling and/or dwell times Decrease velocity and/or acceleration rates
	Valve loose	Tighten mounting connections
	Motion control system fault	Service motion control system

If trouble cannot be corrected, or if you need further assistance, **please contact us.**

Trouble	Possible Cause	Solution
Skipped deposits	Material build-up on outside of tip	Add tip wiping routine to program Switch to chamfered tip
	Tip too small	Change to larger (smaller number) tip
	Gap too large	Decrease gap (Turn ring counter clockwise)
	Inconsistent material	Check and/or mix material
	Air in material	Run one or more purge routines De-air material (vacuum or centrifuge)
	Damaged tip	Replace tip
Inconsistent deposits	Poor material cut-off	Reverse motor briefly at end of deposit routine Switch to chamfered tip
	Tip too large	Change to smaller (larger number) tip
	Gap too small	Increase gap (Turn ring clockwise)
	Inconsistent material	Replace and/or mix material
	Air in material	Run one or more purge routines until cleared De-air material (vacuum or centrifuge)
	Premature retraction	Increase dwell time
	Process temperature changing	Install temperature control system, such as an EFD ProcessMate® 6500
	Damaged tip	Replace tip
Leaking at fittings	Fittings loose	Tighten fittings
	Hose loose on fittings	Replace hose
	Fitting(s) cracked	Replace barbed fitting(s) (p/n 79401 and/or 2162A)
	Material incompatibility	Replace fitting(s) with optional metal fittings (p/n 78526)
Leaking at auger	Worn or damaged auger seal	Replace auger seal p/n 79442
Material being damaged	Bent auger	Replace auger: 16 Pitch p/n 79453, 8 Pitch 79465
	Worn auger bearing	Replace auger bearing p/n 79441
Residual material at material change-over	Dead spots in material path at barbs	Switch to optional metal fittings (p/n 78526)

# Repair Parts

Figure 11 is an exploded view of the 794 auger valve with available repair parts noted.



# Specifications

**Size:** 237.4 mm x 31.7 mm diameter  
 (9.35" length x 1.25")

**Weight:** 544 grams (19.2 oz)

**Fluid chamber:** Type 440C hardened stainless steel

**Auger:** Type 440C hardened stainless steel

**"U" cup:** Filled PTFE, spring energized

**Liquid feed fitting:** Type 304SS  
 #10-32x5/32" (push-in optional: polypro)

**Motor Input Voltage:** 10-24 VDC  
 (<10% ripple)

**Auger speed:** (dry) 170-450 RPM

**Auger pitch:** 8 on 16 pitch auger thread models available

**Input Air:** 0-30 psi (0-2.07 bar) clean and dry

**Maximum Acceleration:** 2g

**Maximum Continuous Current:**  
 SR & FR – 240 mA, SB & FB – 670 mA  
 (Time delay fuse recommended)

