

Ultimus™ IV Series Dispensing System

User's Guide



**Ultimus IV-3cc
#7017178**

**Ultimus IV-5cc
#7017181**

**Ultimus IV-10cc
#7017177**

**Ultimus IV-30cc
#7017179**

Electronic pdf files of EFD manuals are also available at www.efd-inc.com/manuals



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Introduction

The Ultimus IV Dispensing System uses a patented positive displacement technology to provide precise, controlled fluid dispensing. This User's Guide will help you maximize the usefulness of your new dispensing system.

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 guide. However, if you need assistance, please do not hesitate to contact EFD or your authorized EFD distributor.

In the USA, call 800-556-3484 between 8:30 a.m. and 5:30 p.m. Eastern time.

In Europe, call +44 (0) 1582 666334.

In Asia, call +86 (21) 3866 9006.

In all other areas, call your authorized EFD distributor or +1-401-431-7000.

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

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Introduction

Read and follow these safety instructions. Task- and equipment-specific warnings, cautions and instructions are included in equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to persons operating or servicing equipment.

Qualified Personnel

Equipment owners are responsible for making sure that EFD equipment is installed, operated and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

Intended Use

Use of EFD equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Some examples of unintended use of equipment include:

- Using incompatible materials
- Making unauthorized modifications
- Removing or bypassing safety guards or interlocks
- Using incompatible or damaged parts
- Using unapproved auxiliary equipment
- Operating equipment in excess of maximum ratings

Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for EFD equipment will be voided if instructions for installation, operation and service are not followed.

Personal Safety

To prevent injury follow these instructions.


- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, doors or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- If you receive even a slight electrical shock, shut down all electrical or equipment immediately. Do not restart the equipment until the problem has been identified and corrected.
- Obtain and read Material Safety Data Sheets (MSDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

High-Pressure Fluids


High-pressure fluids, unless they are safely contained, are extremely hazardous. Always relieve fluid pressure before adjusting or servicing high pressure equipment. A jet of high-pressure fluid can cut like a knife and cause serious bodily injury, amputation, or death. Fluids penetrating the skin can also cause toxic poisoning.

If you suffer a fluid injection injury, seek medical care immediately. If possible, provide a copy of the MSDS for the injected fluid to the health-care provider. A copy of the hydraulic fluid used in this unit is included with this manual.

WARNING: Any injury caused by high pressure liquid can be serious. If you are injured or even suspect an injury:



- Go to an emergency room immediately.
- Tell the doctor that you suspect an injection injury.
- Show the doctor this note.
- Tell the doctor what kind of material you were dispensing.



MEDICAL ALERT – AIRLESS SPRAY WOUNDS: NOTE TO PHYSICIAN

Injection in the skin is a serious traumatic injury.

It is important to treat the injury surgically as soon as possible.

Do not delay treatment to research toxicity.

Toxicity is a concern with some exotic coatings injected directly into the bloodstream.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Shut down all equipment immediately if you notice static sparking or arcing. Do not restart the equipment until the cause has been identified and corrected.
- Do not smoke, weld, grind or use open flames where flammable materials are being used or stored.
- Provide adequate ventilation to prevent dangerous concentrations of volatile particles or vapors. Refer to local codes or your material MSDS for guidance.
- Do not disconnect live electrical circuits when working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves and fire extinguishers are located.
- Clean, maintain, test and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your EFD representative for parts information and advice.

Action in the Event of a Malfunction

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

- Disconnect and lock out system electrical power.
- Slowly unscrew barrel retainer and remove barrel from actuator.
- Identify the reason for the malfunction and correct it before restarting the system.

Disposal

Dispose of equipment and materials used in operation and servicing according to local codes.

RoHS标准相关声明 (China RoHS Hazardous Material Declaration)

产品名称 Part Name	有害物质及元素 Toxic or Hazardous Substances and Elements					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr6)	多溴联苯 Polybrominated Biphenyls (PBB)	多溴联苯醚 Polybrominated Diphenyl Ethers (PBDE)
金属转接头 All Brass Fittings	X	0	0	0	0	0
<p>0: 表示该产品所含有的危险成分或有害物质含量依照EIP-A, EIP-B, EIP-C的标准低于SJ/T11363-2006 限定要求。 0: 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>X: 表示该产品所含有的危险成分或有害物质含量依照EIP-A, EIP-B, EIP-C的标准高于SJ/T11363-2006 限定要求。 X: 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>						

IMPORTANT SAFETY INFORMATION

All EFD disposable components, including syringe barrels, cartridges, pistons, tip caps, end caps, and dispense tips, are precision engineered for one-time use. Attempting to clean and re-use components will compromise dispensing accuracy and may increase the risk of personal injury.

Always wear appropriate protective equipment and clothing suitable for your dispensing application.

Do not exceed maximum operating pressure of 100 psi (7.0kg/cm²).

Do not heat syringe barrels or cartridges to a temperature greater than 100°F (38°C).

Dispose of components according to local regulations after one-time use.

Do not clean components with strong solvents (e.g. MEK, Acetone, THF).

Cartridge retainer systems and barrel loaders should be cleaned with mild detergents only.

To prevent fluid waste, use EFD SmoothFlow™ pistons.

The Ultimus IV Dispensing System is designed to provide complete process control using a patented positive displacement technology.

There are four core variables to the system: Deposit Volume, Dispense Rate, Pause and Pullback. To achieve the ideal deposit size, adjust only one of these variables at a time, in small increments.

Key features include

- Repeatable, precise fluid control
- All electric; no requirement for compressed air
- Programmable Pullback to eliminate oozing
- Menu-driven touch pad
- 100 user-defined memory cells for storing barrel size, deposit volume, dispense rate, pause and pullback

The Ultimus IV Dispensing System provides consistent results, regardless of changes in fluid volume, viscosity or temperature. It is ideal for use with 2-part epoxies and other fluids with changing viscosities, or where a specific flow rate is needed.

First Steps

1. Unpack the dispenser.
2. For step-by-step setup instructions, see the Ultimus IV Quick Start Guide.
3. Now is a good time to ACTIVATE your Two Year Warranty. Please follow the instructions in the enclosed "Welcome" letter to register your warranty online. Or if you prefer, call the appropriate toll-free number listed below, provide the serial number of your dispensing system and respond to a few short questions.

In the USA, call 800-556-3484 between 8:30 a.m. and 5:30 p.m. Eastern time.

In Europe, call +44 (0) 1582 666334.

In Asia, call +86 (21) 3866 9006.

In all other areas, call your authorized EFD distributor or +1-401-431-7000.

Specifications

Cabinet size: 18.4 W x 8.1 H x 32.3 D cm (7.25 x 3.18 x 12.73")

Weight: 3.7 kg (8.2 lbs)

Flexible cable assembly length: 1.8 m (6 ft) to end of handset

Flexible cable assembly weight: .113 kg (4 oz)

Flexible cable assembly bend radius: 7.62 cm (3.0")

Internal power supply: Input voltage range, 100-240 VAC

Max inrush current: 50A/264 VAC

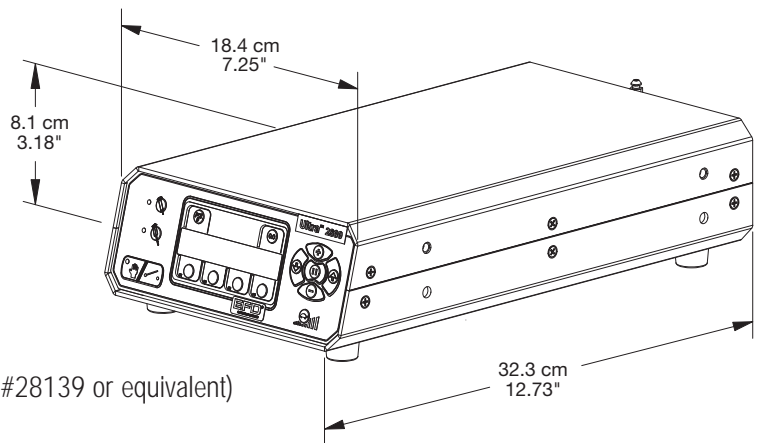
Input frequency range: 47-63 Hz

Output voltage: 24 VDC

Output current: 2.5A

Output power: 60W

Fuse rating: 1.0A/250 VAC (EFD part #28139 or equivalent)



Initiate circuit: Foot pedal, Cycle Start button or 5 to 24 VDC signal

Drive motor: 1.8° microstepping, 1,600 steps/rev

Control circuitry: CMOS microprocessor

Interface: Tactile keypad

Hydraulic fluid: Petroleum-based lubricant

Enclosure rating: NEMA 1

Dispense rate: Exceeds 20 cycles per minute

Minimum dispense volume: 0.1 microliters (with 3cc syringe barrel)

Meets or exceeds CE requirements

US Patent No. 6,575,331

Note: Specifications and technical details are subject to change without prior notification.
MSDS for hydraulic fluid enclosed separately. Contact EFD if extra copy is required.

The Ultimus IV Dispensing System uses a flexible hydraulic link to transfer linear force from the drive motor to the syringe barrel. The motor lead screw and drive shaft are also linked mechanically. This patented link allows the transfer of up to 200 pounds of force from the motor to the assembly fluid.

Once a dispense cycle is complete, a programmed mechanical pullback retracts the plunger, attached to the EFD piston. The combined action of the plunger with the unit's Forward steps, programmed Pause function and Pullback feature creates a consistent deposit and prevents fluid from oozing.

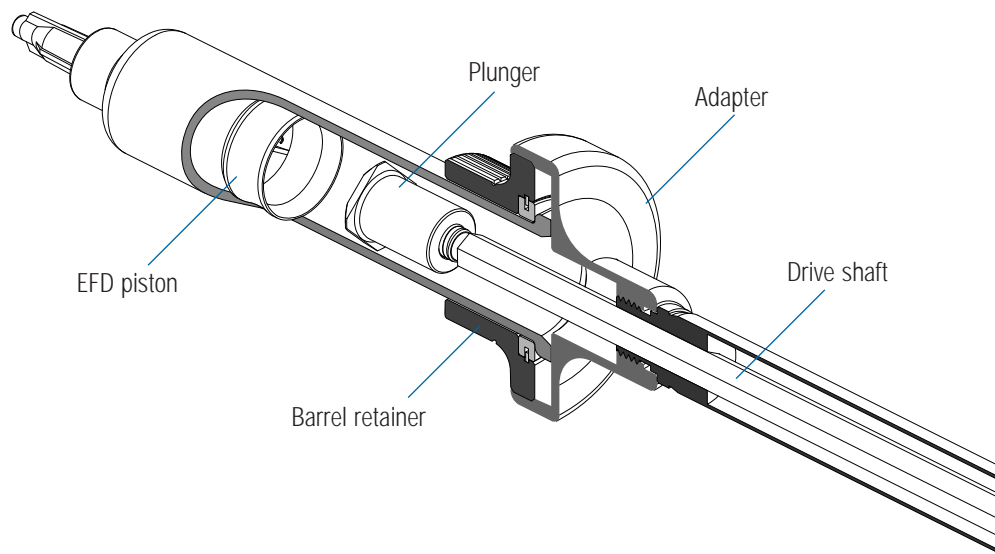
The bore and stroke of the syringe barrel are used to calculate deposit volume. For example, the inside diameter of a 5cc syringe barrel measures 1.27 cm. One step moves the plunger 0.00008 cm, resulting in 0.0001cc of fluid being displaced. With a 3cc barrel, it takes two steps to displace the same amount of fluid.

Flexible cable assembly

The force of the stepper motor is transferred to the syringe barrel by a flexible cable assembly.

The plunger, attached at the end of the cable, drives into the EFD piston inside the syringe barrel.

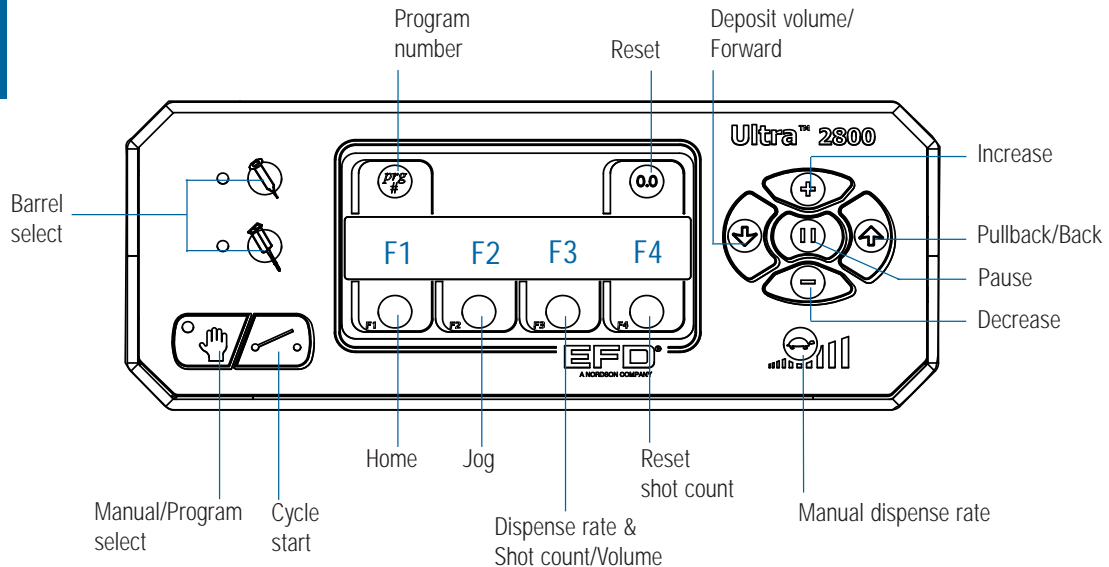
This action forces the fluid out to make the deposit.



Power Input Receptacle

The Ultimus IV features a universal power supply. It automatically adjusts for input voltages ranging from 100 VAC to 240 VAC. There is no adjustment required by the user.

Features & Controls



Manual/Programmed Dispense Select

- Each mode allows you to access different features on the menu-driven display. Press the “hand” icon to change from Manual mode to **PROGRAMMED DISPENSE** mode.
- In **MANUAL** mode, you can use the foot pedal to dispense a continuous bead of fluid. You are in **MANUAL** mode when the red light next to the “hand” icon is on.
- In **PROGRAMMED DISPENSE** mode, you can set several variables, including Program Number, Syringe Barrel Size, Deposit Volume, Dispense Rate, Pause and Pullback. You can also use the foot pedal or the Cycle Start button to dispense a single dot of fluid. You are in **PROGRAMMED SE** mode when the light next to the “hand” icon is off.

Cycle Start

Cycle Start in **PROGRAMMED DISPENSE** mode

- In **PROGRAMMED DISPENSE** mode, pressing the Cycle Start button once will return you to the Home screen. Pressing it a second time will dispense a single deposit.
- Note: pressing the Cycle Start button accidentally while already in a dispense cycle can abort your program. Therefore, we recommend that you use the foot pedal (instead of Cycle Start) to activate the dispense cycle.

Cycle Start in **MANUAL** mode

- In Manual mode, pressing the Cycle Start button once cancels the Manual selection and returns you to Programmed Dispense mode and the Home screen.

Program Number

In both **PROGRAMMED DISPENSE** and **MANUAL** mode, select the Program Number by pressing the **prg** button. The Program Number will flash. Use the (+) or (-) buttons to change or select the Program Number as needed. For more details, see the Program section on page 15.

Barrel Select

In both **PROGRAMMED DISPENSE** and **MANUAL** mode, pressing the top Single Barrel Select button activates the screen for the barrel size menu and pre-set dispense rates.

- Press the F1 button to set barrel size. Use the (+) or (-) buttons to scroll through the various size options.
- Press the F3 button to set Dispense Rate. Select Low, Medium, or High.

The dual barrel select button is not active.

Reset

In **PROGRAMMED DISPENSE** mode, press the Reset button to reset a range of variables, depending on the screen selected. Reset choices include syringe barrel volume level to 100%, Dispense Volume to Occ, Pause to 0 ms, Pullback to 0 steps, and Dispense Rate to the lowest minimum value possible, depending on the selected syringe barrel size. (Note: to reset Shot Count, use the F4 button.)

In **MANUAL** mode, the Reset button is not active.

Home (F1)

In both **PROGRAMMED DISPENSE** and **MANUAL** mode, pressing the F1 button activates the "Retract to Home" screen. This step is required to remove the syringe barrel and/or when you want to prepare the unit for storage or shipping.

- Choose Yes by pressing the F3 button. This will fully retract the plunger.
- Choose No by pressing the F4 button. This will return you to the Home screen.

Jog (F2)

In **PROGRAMMED DISPENSE** mode, pressing the F2 button activates the Jog screen. Jog allows you to make small adjustments to the position of the plunger as it extends forward. Press and hold F2 until the "g" of Jog is highlighted. Use the FORWARD and BACK buttons to move the plunger slightly in either direction as needed.

In **MANUAL** mode, the F2 button is not active.

Shot Count/Deposit Volume (F3)

In **PROGRAMMED DISPENSE** mode, pressing the F3 button lets you toggle between Shot Count and Deposit Volume.

- Shot Count displays and tracks the number of deposit cycles. You can reset the Shot Count display to 0 by pressing the F4 button.
- Deposit Volume displays the current volume programmed in cc's.

In **MANUAL** mode, the F3 button is not active.

Other F3 commands:

- From the Retract to Home screen, F3 allows you to select the Yes option.
- After you press the Barrel Select button, F3 allows you to set the Dispense Rate.
- From the Modify screen, F3 allows you to adjust the syringe barrel specification for diameter. (See MODIFY, page 17.)

F4 Button

In both **PROGRAMMED DISPENSE** and **MANUAL** mode, the F4 button is not active until you are in the screens noted below.

- From the Shot Count screen (F3), the F4 button allows you to reset the Shot Count to 0.
- From the Retract to Home screen (F1), F4 allows you to select the No option.
- From the Modify screen, F4 allows you to adjust the syringe barrel specifications for stroke. (See MODIFY, page 17.)

Deposit Volume/Forward

In **PROGRAMMED DISPENSE** mode, press the Forward button to activate the Deposit Volume screen. Use the (+) or (-) buttons to change the deposit volume as needed.

Deposit volume, measured in cc's, is automatically linked to Forward steps in the Ultimus IV stepper motor. When you increase the cc setting, it automatically increases the number of Forward steps. The maximum number of Forward steps is 65,534.

Deposit Volume is displayed when you press the F3/Shot Volume button.

In **MANUAL** mode, pressing and holding the Forward button will extend the plunger from the cable assembly.

Pause

The Pause function "pauses" the action of the plunger during a dispense cycle, acts as a settling period and allows the relief of back pressure between Forward and Pullback steps. Pause is helpful when you are dispensing a large amount of material with a very small tip. In most cases you will not need to use the Pause function.

In **PROGRAMMED DISPENSE** mode, press the Pause button to insert an end-of-cycle pause. Use the (+) or (-) buttons to set the Pause time.

In **MANUAL** mode, the Pause button is not active.

- Pause is measured in milliseconds. The maximum Pause is 60,000 ms (one minute).
- The default setting for Pause is 0 ms.

Pullback/Back

Pullback sets the number of steps that the plunger will retract into the cable assembly, in preparation for the next dispense cycle. Be conservative when setting the Pullback. With thick fluids, too much Pullback can disengage the plunger from the piston. With thin fluids, excess Pullback can introduce air into the syringe barrel.

In **PROGRAMMED DISPENSE** mode, press the Back button to activate the Pullback screen. Use the (+) or (-) buttons to change the number of Pullback steps as needed.

- Use Pullback to eliminate dripping and oozing. We recommend a minimum Pullback of 200 steps for low viscosity fluids.
- For thicker fluids, set the Pullback to 300 steps or more.
- In general, adjust Pullback in small increments of 50 steps at a time for best results. Press the foot pedal to dispense, and visually check the deposit. Adjust Pullback again if necessary. When setup is correct, there should be no oozing or dripping.
- The maximum number of Pullback steps is 20,000.
- The default setting for Pullback is 200 steps.

In **MANUAL** mode, press and hold the Back button to manually retract the plunger as needed.

Dispense Rate

In both **PROGRAMMED DISPENSE** and **MANUAL** mode, pressing the Turtle button allows you to manually set the Dispense Rate. Use the (+) or (-) buttons to change the speed manually if needed. In most cases, however, we recommend that you simply use one of the preset Dispense Rates.

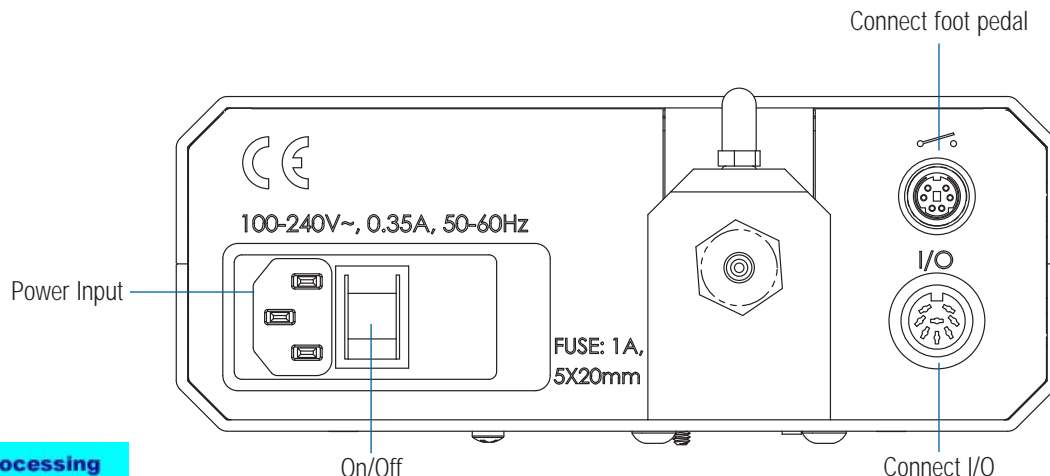
- Press the Single Barrel Select button.
- Press F3 to access the Dispense Rate options.
- Select Low, Medium or High.

Dispense Rate is based on cc's per second. For best results, use the slowest Dispense Rate practical to your application. In general, start with the preset default rate of Medium. Slower dispense rates give you better repeatability, since they create less fluid compression. This helps prevent oozing.

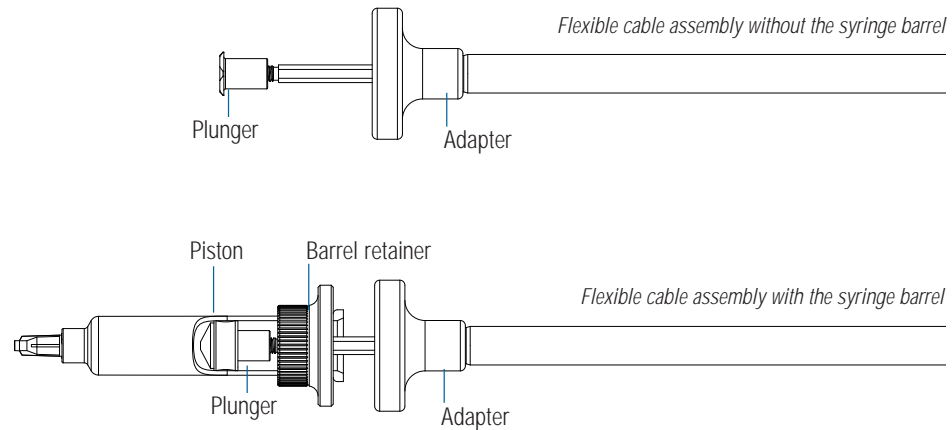
Increase and Decrease

In both **PROGRAMMED DISPENSE** and **MANUAL** mode, press the (+) or (-) button to change a number of variables, including Program Number, Deposit Volume, Dispense Rate, Pause milliseconds, Pullback steps and more.

When the (+) or (-) buttons are pressed briefly, the settings will adjust slowly. When the (+) or (-) buttons are pressed and held, the settings will adjust faster.



Attaching the Syringe Barrel



Attach Barrel/Purge Tip

Note: Stay in **MANUAL** mode for all steps to attach the barrel.

1. Unscrew and remove the barrel retainer from the adapter.
2. Put a tip cap on the syringe barrel and hold barrel next to the flexible cable assembly.
3. From **MANUAL** mode (hand icon light on), advance the plunger by pressing the Forward button, just until the plunger reaches past the piston.
4. By hand, insert the plunger into the barrel, pressing it snugly into the piston.
5. Press the Pullback button to retract barrel, until there is just a small gap between barrel and adapter.
6. Slide barrel retainer over the barrel and thread one turn onto the adapter.
7. Replace tip cap with dispense tip. Tighten barrel retainer.
8. Still in **MANUAL** mode, press the foot pedal to purge dispense tip. Press until fluid almost fills the tip and dispenses. Be sure not to overfill the tip since this results in excess back pressure, which can cause oozing.

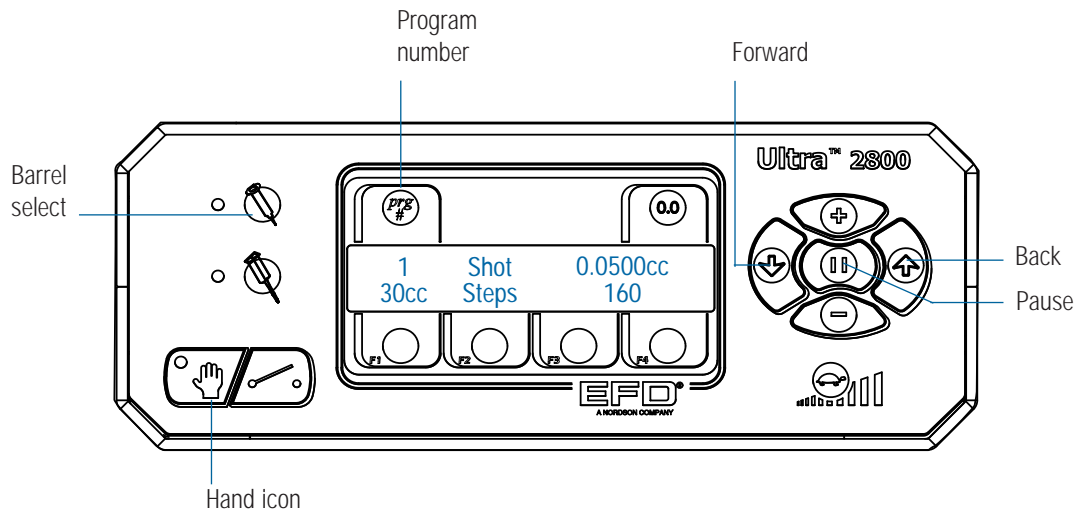


Caution: When the plunger fits into the piston, stop pressing Forward. If you continue, excess pressure can build inside the barrel and may cause it to burst, resulting in serious injury.

Note: See the handout provided with your Ultimus IV dispenser, Syringe Barrel Attachment Guide, for simple, step-by-step instructions.

Removing the syringe barrel

1. Press F1 to get the Retract to Home screen. Select Yes. This will retract the plunger into the cable assembly.
2. Unscrew the barrel retainer from the adapter.
3. Slide the syringe barrel off the plunger.
4. Discard the barrel, or if storing for later use, replace the dispense tip with a tip cap.
5. Screw the barrel retainer back onto the adapter.



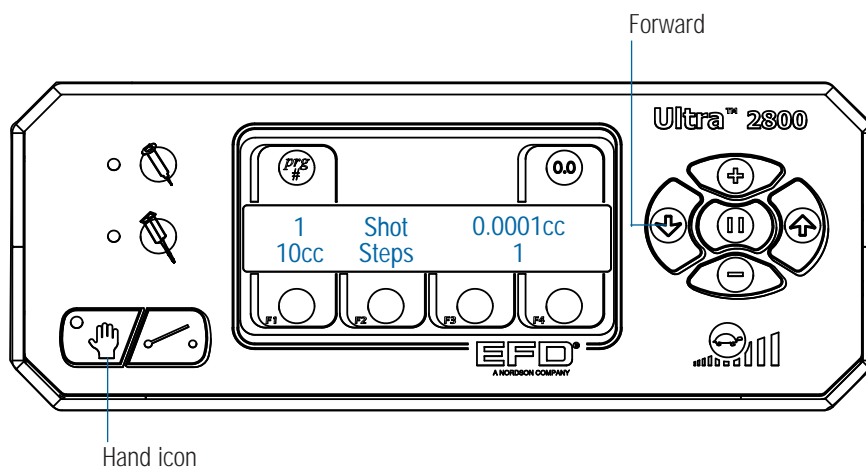
The Ultimus IV Dispensing System offers 100 user-defined memory programs, ranging from 0-99. The programs store the following information.

- Syringe barrel size
- Deposit volume
- Dispense rate
- Pause
- Pullback

Follow these steps to define a program

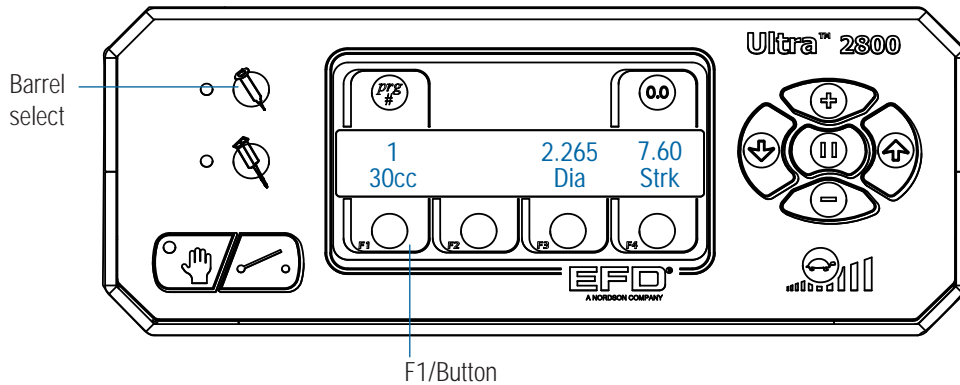
1. Select **PROGRAMMED DISPENSE** mode. (Press “hand” icon so red light is off.)
2. Press **prg** to highlight the program number. Use the (+) or (-) buttons to assign or select the program number.
3. Press the icon for Single Barrel Select. Set Dispense Rate from this screen by pressing F3 for Rate, then selecting Medium.
4. Select Deposit Volume by pressing the **FORWARD** button. Use the (+) or (-) buttons to set volume.
5. Select Pullback by pressing the **BACK** button. Use the (+) or (-) buttons to set Pullback.
6. Press the foot pedal once to return to the Home screen. The settings are automatically saved.
7. Press the foot pedal again to dispense the first deposit.

How to Make a Bead



To deposit a continuous bead of fluid, instead of a single dot, follow these steps.

1. Select **PROGRAMMED DISPENSE** mode. (Press "hand" icon so red light is off.)
2. Press Forward and use (+) or (-) buttons to set Dispense Volume to lowest setting.
3. As a beginning point, keep Pause set to 0 ms and Pullback at 200 steps, then adjust as needed to eliminate drooling.
4. For best results, set Dispense Rate to the preset of Lo, to minimize back pressure in the syringe barrel. (Press Single Barrel Select button, then Rate, then Lo.)
5. Select **MANUAL** mode. (Press "hand" icon so red light is on.)
6. Press and hold the foot pedal until the required amount is dispensed. (Note: the Cycle Start button is not active in Manual mode, so use the foot pedal to activate the dispense cycle.)



The Ultimus IV Dispensing System includes pre-set specifications based on industry-standard EFD syringe barrel dimensions. In most cases, you will want to use these pre-set specifications. However, you have the option to adjust the settings with the Modify function.

Follow these steps to use the Modify function

1. From either the **PROGRAMMED DISPENSE** mode or the **MANUAL** mode, press the Single Barrel Select button. The MOD (Modify) option will appear.
2. If needed, press F1 to highlight the syringe barrel size. Use the (+) or (-) buttons to select the correct barrel size — for example, 3cc, 5cc, 10cc, or 30cc.
3. Press F4. This activates the Modify screen.
4. Press F3 to highlight the specifications for the diameter of the syringe barrel. This is displayed in centimeters. The settings will vary according to the syringe barrel size you have selected. Use the (+) or (-) buttons to adjust as needed.
5. Press F4 to highlight the specifications for the stroke of the syringe barrel, also listed in centimeters. Again, the settings will vary depending on the syringe barrel size you have selected. Use the (+) or (-) buttons to adjust as needed.

Note: The stroke should reflect the distance the EFD piston will travel to dispense all of the fluid in the syringe barrel. For example, if the barrel is loaded half-full, a certain stroke length (measured in centimeters) will be required to empty it. By adjusting the stroke for a specific barrel fill level, you will ensure that the “Level” display on the Home screen provides an accurate reading.

6. When finished, press the foot pedal once to return to the Home screen.

Helpful Hints

- Faster dispense rates require more Pullback steps. That's because you are putting more pressure on the fluid, creating compression inside the syringe. For best results, use the preset default dispense rate of Medium.
- If you are making small deposits, you are likely creating a lot of pressure trying to force the fluid through a small dispense tip. Begin with the largest tip practical to your application, with a slow dispense rate. Depending on how thick your fluid is, you may also need to increase Pullback to relieve back pressure in the syringe barrel.
- Changing the dispense rate changes the deposit size. The Ultimus IV provides a metered deposit based on Forward steps at a specific dispense rate. When you change the dispense rate, the deposit size also changes, even though the number of Forward steps remains the same. For example, 25 Forward steps at the high dispense rate produces a smaller deposit than 25 Forward steps at the low rate. That's because the slower rate gives the fluid more time to dispense, while the faster rate compresses the fluid and restricts the flow path. For optimum consistency, stay at the same dispense rate once you have stabilized your deposit settings.

Setting up the First Shot

- Go through the steps outlined in the Ultimus IV Quick Start Guide to establish your initial deposit. Work first with the EFD test material, included with your dispensing kit.
- Check the Ultimus IV Settings Grid for recommended settings, including Forward steps, Pause, Dispense Rate and Pullback. The grid is included in your dispensing kit.
- Keep your Pullback setting low to reduce the risk of introducing air into your syringe barrel.
- Experiment with different values for each variable. Change only one value at a time and allow the deposit to stabilize before adjusting or changing another value.

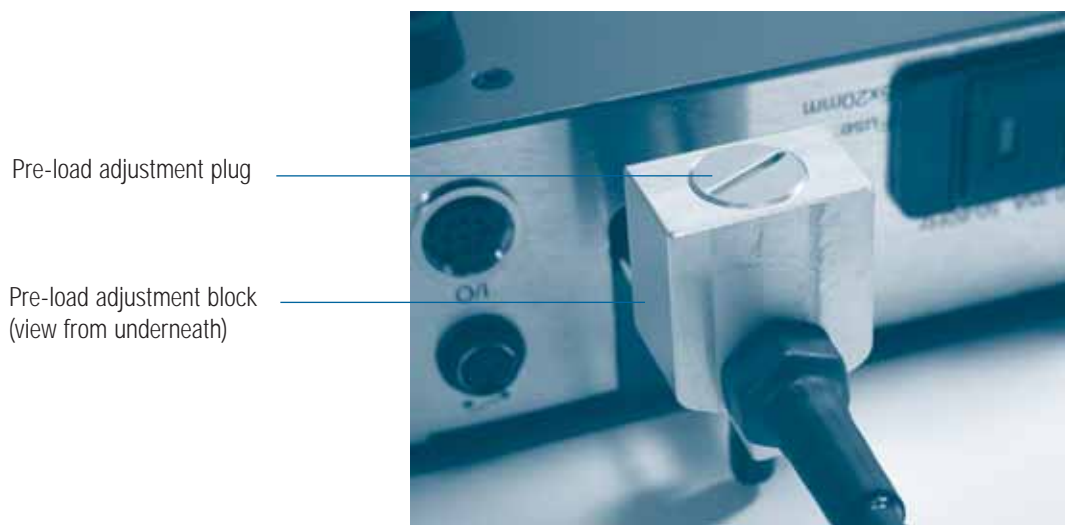
Components

- Always use new EFD barrels and tips. Carefully dispose of after use. This procedure ensures maximum cleanliness, prevents contamination and provides proper safety.
- You must use a piston with the Ultimus IV. Besides being required to connect with the plunger, the piston makes barrel loading, dispensing and fluid handling cleaner, safer and more accurate.
- Use the largest tip size possible. Smaller tips require more pressure, which can compress the fluid and cause oozing, and more time. For best results when working with thick fluids, use EFD tapered tips. Tapered tips are specially designed to reduce the amount of pressure needed and are available in a range of sizes. They also help prevent drooling and oozing.

Cycle Start & Abort

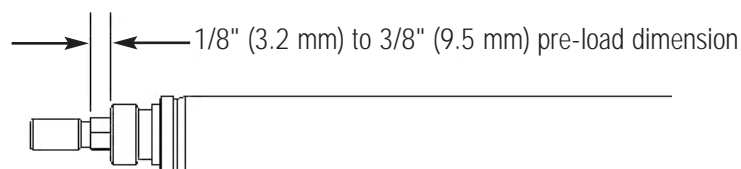
The Cycle Start button serves the same purpose as the foot pedal. Pressing either of these once will return you to Home. However, pressing the Cycle Start button twice can abort your program. Therefore we recommend that you use the foot pedal to dispense from Programmed mode. A dispense cycle can be stopped at any time by pressing the Cycle Start button.

The pre-load on the cable within the flexible cable assembly is preset at the factory. However, over time the cable may stretch slightly causing a change in performance. The pre-load adjustment block allows the user to make corrections to the pre-load due to cable stretch. If this happens, turn the pre-load plug clockwise to readjust the hex shaft to the 1/8" (3.2 mm) to 3/8" (9.5 mm) pre-load setting range. Do not exceed the 3/8" (9.5 mm) pre-load limit as damage to the unit may result. The pre-load adjustment block can compensate for approximately 1.5cc's of hydraulic fluid volume. However, only a small portion of this volume should ever need to be used. In addition, the pre-load typically needs to be adjusted just once during the early operation of the unit, and depending on use, may never be required.



Follow these steps to make the adjustment

1. Turn power off and detach power cord.
2. Turn unit over.
3. Use slotted screwdriver to turn plug clockwise.
4. Turn until the actuator extends to the 1/8" pre-load dimension, as shown in the figure below.



Avoid air in the syringe barrel

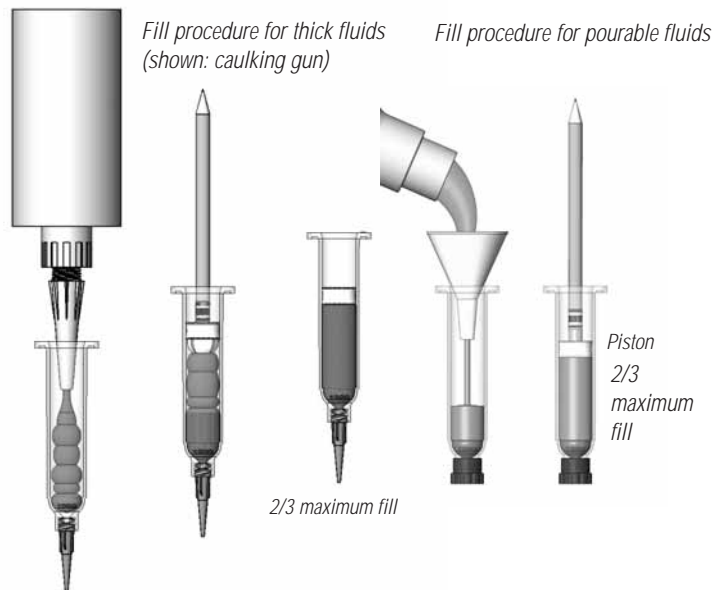
Air in the fluid is a critical issue with the Ultimus IV Dispensing System. It can create problems with inconsistent deposits and drooling. For best results, use an EFD barrel filling station or bottom fill the syringe barrel. Simply insert the red piston and push it all the way inside the barrel, flush to the dispense tip. Then fill through the tip, pushing the piston down as the fluid enters. This prevents air from entering the syringe barrel.

If needed, eliminate air in the syringe barrel by using centrifuge or a vacuum chamber.

If the fluid being dispensed is pourable, attach a blue tip cap to the syringe barrel and pour the fluid in. Insert the piston and carefully press it down until it contacts the fluid. The syringe barrel is now ready for use.

If the fluid is thick or non-leveling, it can be spooned into the barrel with a spatula. Or, if the fluid comes packed in a 1/10 gallon cartridge, the barrel can be loaded with a caulking gun. After loading, press in the piston to move the fluid to the bottom of the barrel and to remove trapped air.

Caution: Do not completely fill syringe barrels. The optimum fill is a maximum 2/3 of the barrel capacity. If you are working with assembly fluid: with a short pot life, you may want to fill to 1/2 of the syringe barrel.



EFD offers productive, air-free alternatives to traditional barrel loading methods. Here are a few suggestions that can help keep the work area clean, save time and reduce the chance of entrapped air in the fluid.

1. The EFD #7022068 Atlas Filling system provides consistent filling for all types of nonpourable assembly fluids. It features built-in flow controls to prevent spillage and air entrapment.
2. If you receive frozen epoxies or other fluids in medical type syringes with a manual plunger, request the EFD luer-to-luer fitting #7016862 to transfer the material from the original syringe to the EFD syringe barrel.
3. Another option is the EFD #7022445 Atlas Filling System. Pack the fluid into the 12-ounce cartridge. Place the pre-filled cartridge into the barrel filler. Using air pressure, the barrel loader fills the syringe barrel (with piston) from the bottom up.
4. If the fluid comes prepackaged in a 1/10 gallon (300 ml) caulking type cartridge, use the EFD #7022452 filling system.

For additional assistance please contact an EFD Fluid Application Specialist.

Voltage Initiate Circuit

The Ultimius IV workstation may be initiated with a 5 to 24 VDC signal across pins 1 and 2. These two input pins are current driven and optically isolated. From Programmed Dispense mode, this signal can be momentary (no less than 0.01 seconds) or maintained. In this mode, a new dispense cycle begins once the 5 to 24 VDC signal is removed and then applied again.

When this input circuit is activated in Manual mode, a continuous bead is dispensed until the signal is removed.

Mechanical Contact Initiate

The Ultimius IV can be initiated via the closure of mechanical contacts such as a relay or switch using pins 7 and 8. The timing and actuation rules for the contact closure input are identical to the voltage initiate input description.

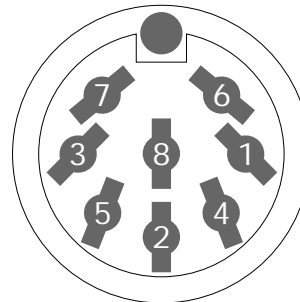
End-of-Cycle Feedback Circuit

Upon completion of a dispense cycle, a solid-state switch closes and remains closed until the next dispense cycle. This circuit is normally closed when a dispense cycle is not active. Pins 3 and 4 of this circuit can be used to signal back to a host computer, start another device in sequence or initiate other operations that need to be tied into the completion of the dispense cycle.

The circuit is an optically isolated transistor output designed to operate between 5 to 24 VDC, 100mA maximum.

Pin Function

1. Voltage initiate +, 5-24 VDC (22mA at 24 VDC)
2. Voltage initiate -
3. End-of-cycle feedback output +, 5-24 VDC (100mA maximum)
4. End-of-cycle feedback output -
5. 24 VDC supply + (100mA maximum)
6. 24 VDC supply - (ground)
7. Contact closure +, 10mA
8. Contact closure - (ground)



Notes

1. An 8-pin DIN connector and cable assembly is available. Order EFD part #7017143.
2. Ultimius iV operation is identical for dispense initiation from I/O inputs or the foot pedal.
3. Pins 6 & 8 of the I/O connector are internally connected to signal ground.

If you encounter a problem that you cannot readily solve, call EFD.

Trouble	Possible cause and correction
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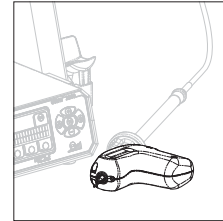


No power	<p>Check the fuses and replace as needed. Follow these steps:</p> <ol style="list-style-type: none"> 1. Disconnect the power to the unit prior to performing this service. 2. Locate the power entry module on the lower left corner of the rear panel. 3. If the electrical cord is still connected to the back of the unit, remove it now. 4. There is a small vertical slot just to the right of the red window on the power entry module. Insert a small screwdriver in the slot to pry latch open. Door swings open to the left. 5. Pull out the red fuse tray. Note the location and orientation of the fuses. 6. Pull both fuses out of the fuse tray and discard. 7. Replace both with 1.0A/250 VAC 5x20 mm fuses (EFD part #7017255 or equivalent). Orient the fuses in the same manner as the fuses that were removed. 8. Insert fuse tray back into power module, close fuse door and reconnect power.
Blow by	<p>If you are dispensing a watery-thin fluid, request the EFD yellow wiper piston, available for the Ultimuis IV 30cc Series model (#7017179) only. Specify EFD part #7022707.</p>
Oozing	<ol style="list-style-type: none"> 1. There is too much fluid compression in the syringe barrel. Change to a fresh dispense tip and start over. If needed, switch a slower dispense rate. 2. The plunger has become disengaged from the piston. To check, unscrew the retainer from the adapter and turn the syringe barrel upside down. If the syringe barrel falls off, the plunger is disengaged. See the handout, "Syringe Barrel Attachment Guide," for step-by-step instructions on how to properly engage the plunger and piston.
Inconsistent shot size	<ol style="list-style-type: none"> 1. There is air in the syringe barrel, either entering the barrel during filling, or from excessive Pullback. Eliminate air from the barrel, or adjust the Pullback. 2. The Dispense Rate may be too fast for the combination of fluid viscosity and dispense tip. Reduce the Dispense Rate. 3. The plunger is fouled. Remove the syringe and clean as needed. Also, check dispensing tip, barrel and material for possible clogging. For best results, change the dispense tip. 4. You may need to adjust the pre-load adjustment block. See page 19.
Dispense rate does not adjust	<p>If nothing seems to happen when you press the (+) or (-) button to manually the Dispense Rate, the rate may already be set to a very low speed. Try switching to the preset default for Medium.</p>
Service	<p>The interior mechanics of the Ultimuis IV system are not field serviceable. Attempting to repair or service the unit by removing the enclosure cover voids factory warranty. Please contact your EFD service representative for assistance.</p>

Choose from several optional productivity tools to maximize your Ultimius IV dispensing kit.

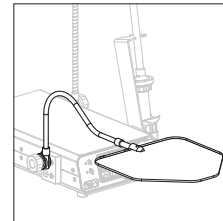
Barrel Hand Grip

Ergonomic hand grip is available for the Ultimius IV Series model (#7017179) only and easily holds 30cc syringe barrels. Specify EFD part #7017133.



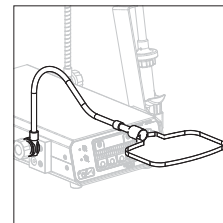
Safety Shield

Large, acrylic shield mounts on a flexible arm to either side of the Ultimius IV cabinet and provides splash guard protection when adhesives and toxic fluids are used. Specify EFD part #7017119 plus the assembly mount (#7017185).



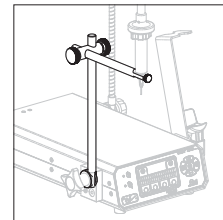
Magnifying Lens

1.7x magnification ensures more accurate deposit placement, improves repeatability and reduces operator strain. Mounts to either side of the Ultimius IV cabinet. Specify EFD part #7017135 plus the assembly mount (#7017185).



Syringe Barrel Production Stand

Holds syringe barrel in a fixed position for bringing the production part to the dispense tip. Specify EFD part #7017288.



Replacement Parts

Part #	Description
Barrel/Piston Sets	
7014103	3cc BP Kits Clr/Red (50)
7012098	5cc BP Kits Clr/Red (40)
7012116	10cc BP Kits Clr/Red (30)
7012138	30/55cc BP Kits Clr/Red (20)
Pistons	
7012168	3cc red pistons (50)
7012174	5cc red pistons (40)
7012180	10cc red pistons (30)
7012186	30/55cc red pistons (20)
7014596	30/55cc yellow wiper pistons (20)

Part #	Description
Flexible Cable Assembly	
7017205	3cc plunger
7017207	5cc plunger
7017204	10cc plunger
7017206	30cc plunger
7017210	3cc retainer
7017212	5cc retainer
7017209	10cc retainer
7017211	30cc retainer
7017183	3/5/10cc adapter
7017184	30cc adapter

Replacement Parts

7017092	Omnidirectional foot pedal
7017208	Power Supply Kit
7017194	Cylinder Kit
7017201	Front Panel Kit,-3cc/5cc
7017200	Front Panel Kit,-10cc/30cc

Productivity Tools

7017102	Replacement sleeve/5 pk
7017119	Safety Shield
7017133	Barrel Hand Grip (for Ultimius iV-30 only)
7017135	Magnifying Lens
7017143	8-pin Connector Assembly
7017288	Syringe Barrel Production Stand
7017185	Accessory Mount
7017187	Syringe Barrel Holder
7017493	Cable Guide Holder

IMPORTANT SAFETY NOTE: To accommodate smaller syringe barrels, the Ultimius IV 3cc (#7017178) and 5cc (#7017181) systems use a stepped-down motor. **Do not use 3cc or 5cc replacement parts or components with an Ultimius IV 10cc (#7017177) or 30cc (#7017179) system.**