



VARIAN

***VK 8000 for use with
Apparatus 3 / Apparatus 7
Operator's Manual***

**P/N 70-9039
January 2006
Revision D**

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Table of Contents

Chapter 1

Safety Practices and Hazards 9

Electrical Hazards 10

Other 10

General 13

WEEE Directive 14

Chapter 2

Introduction 15

VK 8000 with Peristaltic Pump 16

VK 8000 with Syringe Pump 17

Conventions Used in this Manual 17

Chapter 3	<i>Unpacking and Positioning Your System</i>	19
	Unpacking Your VK 8000	20
	Unpacking Your Peristaltic Pump	21
	Unpacking Your Syringe Pump	22
	Unpacking Your Filter Changer	23
	Setting Up Your Sampling System	24
Chapter 4	<i>Setting Up Your VK 8000 with Peristaltic Pump</i>	25
	Setting Up the Peristaltic Pump	25
	Cable Connections	26
	Sample Tubing Connections	28
Chapter 5	<i>Setting Up Your VK 8000 with Syringe Pump</i>	29
	Cable Connections	29
	Sample Tubing Connections	31
Chapter 6	<i>Setting Up Your VK 8000 with Syringe Pump and Filter Changer</i>	33
	Cable Connections	33
	Sample Tubing Connections	35
	Loading Filters into the Filter Changer	36
	Changing Filter Types	37
	Installing the Catch Basin	38

Chapter 7

Final Setup 39

- Power and Network Connections 39
- Installing the Sample Tray 41
- Installing the Media Rinse Reservoir 41
- Installing and Connecting the Autocalibration Block 42
- Hidden Key Functions 43

Chapter 8

Operating the VK 8000 45

- VK 8000 Keypad Options 45
- VK 8000 Main Menu 47
 - Main Menu Option 1 Set Clock/Alarms 51
 - Main Menu Option 2 Set BIO-DIS 53
 - Main Menu Option 3 Set Syringe Pump (Syringe Pump) 54
 - Main Menu Option 6 Control BIO-DIS 56
 - Main Menu Option 7 Manual Operation 57
- Printer Operation and Communications 60
- Programming the VK 8000 62
 - Program Option 2 Sample Time Points 66
- Start Program 67
 - BIO-DIS Options Screen 69
- Manual Sample 71
- Volumetric Calibration 73
 - Automatic Calibration 73
 - Manual Calibration 75
- Daisy Chaining 78

Chapter 9

Maintenance 81

- General Maintenance 81
- Clean System Function with Peristaltic Pump 82
 - Start Immediately 83
 - Programmed Clean 84
- Clean System Function with Syringe Pump 86
- Syringe Refurbishing 87
 - Removing a Leaking Syringe 87
 - Replacing the Seal 88
 - Replacing the Syringe 90
 - Cleaning the Syringes 91
- System Cleaning Program with Syringe Pump and Filter Changer (optional) 93
- Cleaning the Filter Changer Drip Tray 95
- Report Center Impact Printer 96
 - Installing the Cartridge Ribbon 96
 - Replacing a Paper Roll 97
 - Toggling Your Printer Online 98
 - Printer Self Test 99
 - Printer Configuration 99

Chapter 10

Service and Warranty 101

- Exclusions and Limitations 102
- Obtaining Warranty Service 102
- Warranty Limitations 102
- Exclusive Remedies 103

Index 105

Tell Us How We Are Doing 109

Figure List

- FIGURE 1. Cable Connections for VK 8000, Peristaltic Pump, and Apparatus 7 **27**
- FIGURE 2. Cable Connections for VK 8000, Syringe Pump, and Apparatus 3 **30**
- FIGURE 3. Cable Connections for the VK 8000, Syringe Pump, Filter Changer, and Apparatus 3 **34**
- FIGURE 4. VK 8000 Initial Status Screen **40**
- FIGURE 5. VK 8000 Ready Screen **40**
- FIGURE 6. VK 8000 Keypad **45**
- FIGURE 7. The Cleaning Process **83**

Figure List

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Chapter 1 ***Safety Practices and Hazards***

The VK 8000 and accessories have been carefully designed so that when used properly you have an accurate, fast, flexible, and safe instrument.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Operation of a VK 8000 and accessories involves the use of aqueous liquids. Unskilled, improper, or careless use of this instrument can create shock hazards, fire hazards, or other hazards which can cause death, serious injury to personnel, or severe damage to equipment and property.

Information on safety practices is provided with your instrument and operation manuals. Before using your instrument or accessories, you must thoroughly read these safety practices.

Observe all relevant safety practices at all times.

Electrical Hazards

The VK 8000 and accessories contain electrical circuits, devices, and components operating at dangerous voltages. Contact with these circuits, devices, and components can cause death, serious injury, or painful electric shock.

Panels or covers that are retained by fasteners which require the use of a tool for removal may be opened only by Varian-trained, Varian-qualified, or Varian-authorized service engineers. Consult the manuals or product labels supplied with the VK 8000 and accessories to determine which parts are operator-accessible.

Application of the wrong supply voltage, connection of the instrument to an incorrectly wired supply outlet, or lack of proper electrical grounding can create a fire hazard or a potentially serious shock hazard and could seriously damage the instrument and any attached ancillary equipment.

Always use a three-wire outlet with ground connection which is adequately rated for the load. The installation must comply with local, state, and federal safety regulations.

Do not connect the instrument to the main power supply until you have made sure that the operating voltage is correctly set for the main power supply in the specific outlet in your laboratory to which the equipment will be connected.

Other

Other specific warnings and cautions appear in the manuals where appropriate and detail the specific hazard, describe how to avoid it, and specify the possible consequences of not heeding the warning or caution.

Warning

A 'Warning' message appears in the manual when failure to observe instructions or precautions could result in death or injury. Symbols depicting the nature of the specific hazard are also placed alongside warnings.

These symbols are also used on warning labels attached to the instrument. When you see one of these symbols, you must refer to the relevant operation or service manual for the correct procedure referred to by that warning label.

The meaning of the symbols that appear alongside warnings in this manual are as follows:



Electrical shock



Pinch point



Caution

Refer to accompanying documents

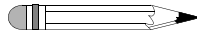
Read all warnings and cautions carefully and observe them at all times.

Caution

A 'Caution' message appears in the manual when failure to observe instructions could result in damage to equipment (Varian supplied and / or other associated equipment).



A 'Note' appears in the manual to give advice or information.



Information Symbols

I

Switches main power on

O

Switches main power off



Indicates single-phase alternating current



Indicates the product complies with the requirements of one or more European Union (EU) directives



Indicates specific equipment meets consensus-based standards of safety to provide assurance, required by OSHA, that these products are safe for use in the workplace for North America



Indicates that this product must not be disposed of as unsorted municipal waste (see "WEEE Directive" on page 14)

General

CE Compliant Products

The VK 8000 and accessories have been designed to comply with the requirements of the Electro-magnetic Compatibility (EMC) Directive and the Low Voltage Directive (LVD) of the EU.

Varian, Inc. has confirmed that each product complies with the relevant directives by testing a prototype against the prescribed European Norm (EN) standards.

Proof that a product complies with the directives is indicated by:

- the CE marking appearing on the rear of the product.
- the documentation package that accompanies the product containing a copy of the declaration of conformity. This declaration is the legal declaration by Varian, Inc. that the product complies with the directives and also shows the EN standards to which the product was tested to demonstrate compliance. The declaration of conformity is signed by the representative of the manufacturing plant.

cTUVus - U.S. and Canadian Product Approvals

The VK 8000 and accessories have been designed to comply with North American safety requirements.

These products have been tested and certified for the North American market by TUV Rheinland of North America, Inc. The TUVus mark signifies that these products have been tested to U.S. standards and certified for the U.S. market. The cTUV mark signifies that these products have been tested to Canadian standards and certified for the Canadian market. When the two marks are coupled, the cTUVus mark signifies that these products have been tested to standards and certified for both markets.

WEEE Directive

All Varian products that are subject to the WEEE directive shipped after August 13, 2005 are compliant with the WEEE marking requirements. Such products are marked with the “crossed out wheelie bin” WEEE symbol shown on page 12 in accordance with European Standard EN 50419.

This symbol on the product or on its packaging indicates that this product must not be disposed of as unsorted municipal waste. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.

For more information on collection, reuse, and recycling systems, please contact your local/regional waste administration, your local distributor, or Varian, Inc.

Chapter 2 ***Introduction***

The VK 8000 Dissolution Sampling Station is designed to work with USP Apparatus 3 and USP Apparatus 7. The primary difference between an Apparatus 3 and an Apparatus 7 is the length of the stroke when the instrument is dipping. The VK 8000 operates independent of this operating parameter.

The VK 8000 can store up to 15 different sampling programs. Apparatus 3 / Apparatus 7 parameters can be entered as part of the VK 8000 program. These parameters are downloaded to the instrument when you start a run with the VK 8000.

The VK 8000 fail-safe sample delivery uses either the peristaltic pump (see “VK 8000 with Peristaltic Pump” on page 16) or the VK 806 Syringe Pump optionally coupled with the automated VK 808 Filter Changer (see “VK 8000 with Syringe Pump” on page 17). Hard-copy documentation is provided by the built-in Report Center Printer, which prints all essential parameters for proof of proper operation and compliance with current GMPs. A remote printer can also be added.

The VK 8000 can fill pre-capped HPLC autosampler vials for direct transfer of samples to an HPLC system. Septa are pierced using the exclusive needle manifold, which lowers and raises at each sample timepoint. Sample trays are available in a variety of sizes to accommodate either vials or test tubes.

The VK 8000 is automation ready. An RS232 port permits integration with other automated systems. Sampling runs can be activated with an external switch closure or TTL signal. The VK 8000 has a programmable TTL output to control the instruments in the system.



Warning

The VK 8000 and accessories contain electrical circuits, devices, and components operating at dangerous voltages. Contact with these circuits, devices, and components can cause death, serious injury, or painful electric shock.

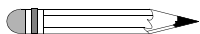


Caution

Panels or covers that are retained by fasteners which require the use of a tool for removal may be opened only by Varian-trained, Varian-qualified, or Varian-authorized service engineers.

VK 8000 with Peristaltic Pump

The VK 8000, when used in conjunction with the peristaltic pump, is capable of performing unattended sampling from an Apparatus 3 / Apparatus 7. All parameters of operation are controlled by the VK 8000. Sampling can be carried out automatically and takes into account all relevant variables in the sample flow path such as tubing diameter, length, and tension. Samples may be delivered into open test tubes or pre-capped autosampler vials.



Note

It is necessary to use the peristaltic pump with the 12-position, 12-row Apparatus 7. This configuration does not work with the syringe pump.

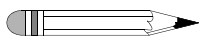
VK 8000 with Syringe Pump

The VK 8000 Dissolution Sampling Station, when used in conjunction with the VK 806 Syringe Pump with or without the VK 808 Filter Changer, is capable of performing unattended sampling from an Apparatus 3 / Apparatus 7. All parameters of operation are controlled by the VK 8000. Variables in the flow path such as tubing diameter and length are accounted for in the sampling process. Samples may be delivered into open test tubes or pre-capped autosampler vials.

The syringe pump incorporates the use of up to eight individual syringes housed in a single unit. The syringe pump provides syringe-driven accuracy of sampling. Introducing the filter changer into the system provides superior removal of particulates through the use of membrane filters.

Conventions Used in this Manual

- Items you are asked to press are in bold. For example, “press **H** on the keypad”.
- Key sequences you are asked to press appear like this: **MENU > 4**.



Note

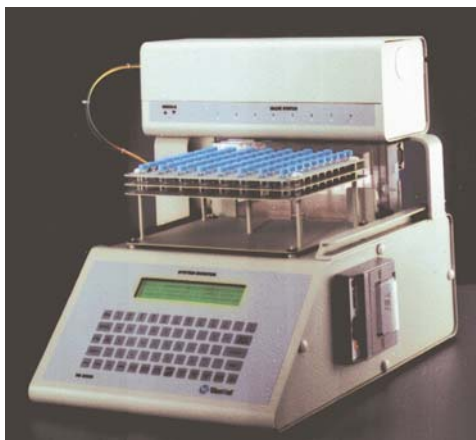
Remember to return the warranty card supplied with this manual. Completing and returning the card ensures your right to protection under the terms and conditions of your warranty. It also enables us to better assist you in the event of any problems. Additionally, it guarantees you will be informed of any issues that arise concerning your equipment, such as upgrades, retrofits, or regulatory changes.

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Chapter 3 ***Unpacking and
Positioning Your
System***

Check the contents for any damages due to shipping. The packaging used to ship your equipment ensures that damage rarely occurs, but if it does contact both the carrier who delivered the instrument and the Dissolution Systems Service Department. Though claims for damage should be filed with the carrier, we will be glad to help you file a claim and get you up and running as quickly as possible.

Unpacking Your VK 8000



The VK 8000 is shipped in foam-filled cartons. The number of cartons may vary depending on your configuration.

- Step 1. Carefully remove the VK 8000 and accessory kit from their shipping cartons. Remove all cushioning material and tape.
- Step 2. Place the VK 8000 on a clear, dry, level section of the benchtop close to the Apparatus 3 / Apparatus 7. The preferred placement of the VK 8000 is on the right side of the Apparatus 3 / Apparatus 7.



Caution

Unscrew and remove the two clamps which secured the VK 8000 dispensing arm during shipping. These clamps are located on both sides of the right dispensing support arm where it connects to the VK 8000 main body. Failure to remove the two clamps prior to powering up the VK 8000 will damage your unit.

Unpacking Your Peristaltic Pump



- Step 1. Carefully remove the peristaltic pump from its shipping carton. Remove all cushioning and tape.
- Step 2. Place the peristaltic pump on a clear, dry, level section of the benchtop between the VK 8000 and the Apparatus 3 / Apparatus 7.

Unpacking Your Syringe Pump



The syringe pump is shipped in individual packaging.

- Step 1. Carefully lift the unit out of the box.
- Step 2. Remove any cushioning material.
- Step 3. Place the unit on a clear, dry, level section of the benchtop between the VK 8000 and the Apparatus 3 / Apparatus 7.

Unpacking Your Filter Changer



The filter changer is shipped in individual packaging.

- Step 1. Carefully lift the unit out of the box.
- Step 2. Remove any cushioning material.
- Step 3. Place the unit on a clear, dry, level section of the benchtop between the VK 8000 and the syringe pump.

Setting Up Your Sampling System

This manual provides setup instructions for all configurations using the VK 8000 with an Apparatus 3 / Apparatus 7. All setup combinations are described in individual chapters. Refer to the following list and read the appropriate chapter for your system configuration:

- *Setting Up Your VK 8000 with Peristaltic Pump* on page 25.
- *Setting Up Your VK 8000 with Syringe Pump* on page 29.
- *Setting Up Your VK 8000 with Syringe Pump and Filter Changer* on page 33.



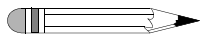
Warning

For all configurations, ensure the equipment is configured for the voltage supplied.

Chapter 4 **Setting Up Your VK 8000 with Peristaltic Pump**

Setting Up the Peristaltic Pump

- Step 1. Remove the two screws on top of the pump. Lift off the plastic cover and set it aside.
- Step 2. Remove the cartridges from the pump by pressing down the levers on the right side. Lift the cartridges up and away from the pump.
- Step 3. Loosely fit the peristaltic pump tubing along the inside groove of the first cartridge, locking the tubing clips on the outside notches.

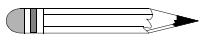


Note

Ensure that all pump cartridges are installed. It is not necessary to install tubing on any unused positions.

- Step 4. Refit the cartridge to the pump by hooking the clip on the bottom left of the cartridge into the groove on the left side of the pump.

- Step 5. Push down the right side of the cartridge, ensuring that the tubing remains under the cartridge, and pull up the lever to lock the cartridge in place. If desired, trim the excess tubing to within one inch of the tubing clips.



Note

The cover does not fit unless the cartridges are positioned with the levers on the right side.

- Step 6. Repeat steps 3 - 5 for each remaining cartridge.
- Step 7. Refit the cover and replace the two screws. If the cover is not replaced correctly, the pump will not operate.

Cable Connections



Warning

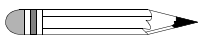
The electrical connection at the back of the VK 8000 is the primary disconnect for the instrument. The instrument should be positioned to allow accessibility to the power cords for easy disconnection.

Refer to the example diagram (see Figure 1, "Cable Connections for VK 8000, Peristaltic Pump, and Apparatus 7," on page 27) to correctly make cable connections for this configuration.

Sample Tubing Connections

The VK 8000 is shipped with all tubing attached to the valves in the dispensing arm.

Note



Do not remove the nylon tie wraps securing the tubing into bundles.

The direction of the peristaltic pump can be set via a switch on its rear panel. It does not matter at this point to which side the bundles go, as long as all lines in the bundle from the sampling cannulas are connected to one side, and all lines in the bundle from the valve inlets to the other.

Step 1. Connect the 72-inch multi-color Teflon lines from the Apparatus 3 / Apparatus 7 to the tubing on one side of the appropriate peristaltic pump cartridges.

Step 2. For the 6-row apparatus, connect the 32-inch multi-color Teflon lines between the remaining side of the peristaltic pump cartridges and the tubing coming from the left positions of the VK 8000 solenoid valves. Ensure each cartridge has identical color tubing connected at both the inlet and the outlet.

For the 12-row apparatus, connect the 32-inch multi-color Teflon lines between the remaining side of the peristaltic pump cartridges and the tubing coming from the top positions of the VK 8000 solenoid valves. Ensure each cartridge has identical color tubing connected at both the inlet and the outlet.

Step 3. Connect the tubing coming from the top positions of the VK 8000 solenoid valves to the 72-inch multi-color Teflon return lines on the Apparatus 3 / Apparatus 7. Ensure each line is attached to its identical color.



Caution

Do not tighten the plastic fittings on the ends of the tubing more than half a turn past finger-tight. Overtightening will damage the fittings.

Chapter 5 **Setting Up Your
VK 8000 with
Syringe Pump**

Cable Connections

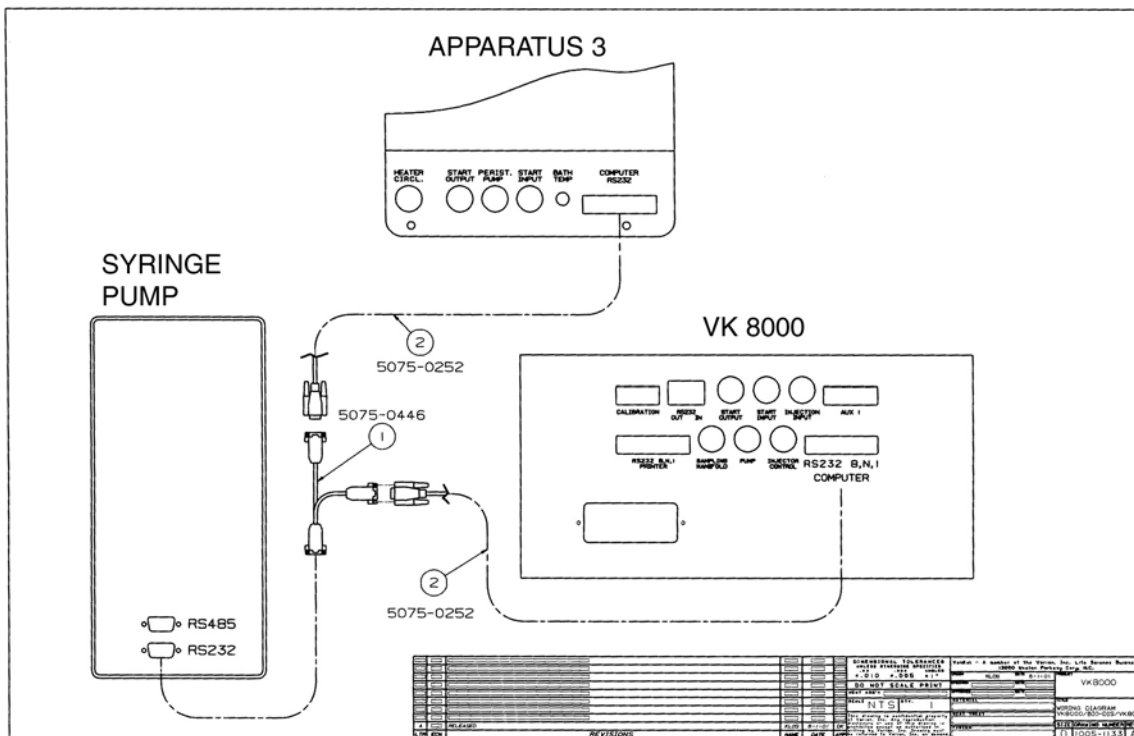


Warning

The electrical connection at the back of the VK 8000 is the primary disconnect for the instrument. The instrument should be positioned to allow accessibility to the power cords for easy disconnection.

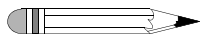
Refer to the example diagram (see Figure 2, “Cable Connections for VK 8000, Syringe Pump, and Apparatus 3,” on page 30) to correctly make cable connections for this configuration.

FIGURE 2. Cable Connections for VK 8000, Syringe Pump, and Apparatus 3



- Step 1. Connect the single end of the Y cable (#1, P/N 5075-0446) to the RS232 port on the syringe pump.
- Step 2. Connect an RS232 cable (#2, P/N 5075-0252) between the RS232 port on the VK 8000 and one extension of the Y cable attached to the syringe pump.
- Step 3. Connect a second RS232 cable (#2, P/N 5075-0252) between the remaining extension of the Y cable attached to the syringe pump and the RS232 port on the Apparatus 3 / Apparatus 7.

Sample Tubing Connections



Note

Do not remove the nylon tie wraps securing the tubing into bundles.

- Step 1. Connect the 72-inch multi-color Teflon lines from the Apparatus 3 / Apparatus 7 to the left port of each syringe starting with position 1.
- Step 2. Connect the 32-inch multi-color Teflon lines between the right port of each syringe to the tubing coming from the left positions of the VK 8000 solenoid valves. Ensure each line is attached to its identical color.
- Step 3. Connect the tubing coming from the top positions of the VK 8000 solenoid valves to the 72-inch multi-color Teflon return lines on the Apparatus 3 / Apparatus 7. Ensure each line is attached to its identical color.



Caution

Do not tighten the plastic fittings on the ends of the tubing more than half a turn past finger-tight. Overtightening can damage the fittings.

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Chapter 6

Setting Up Your VK 8000 with Syringe Pump and Filter Changer

Cable Connections

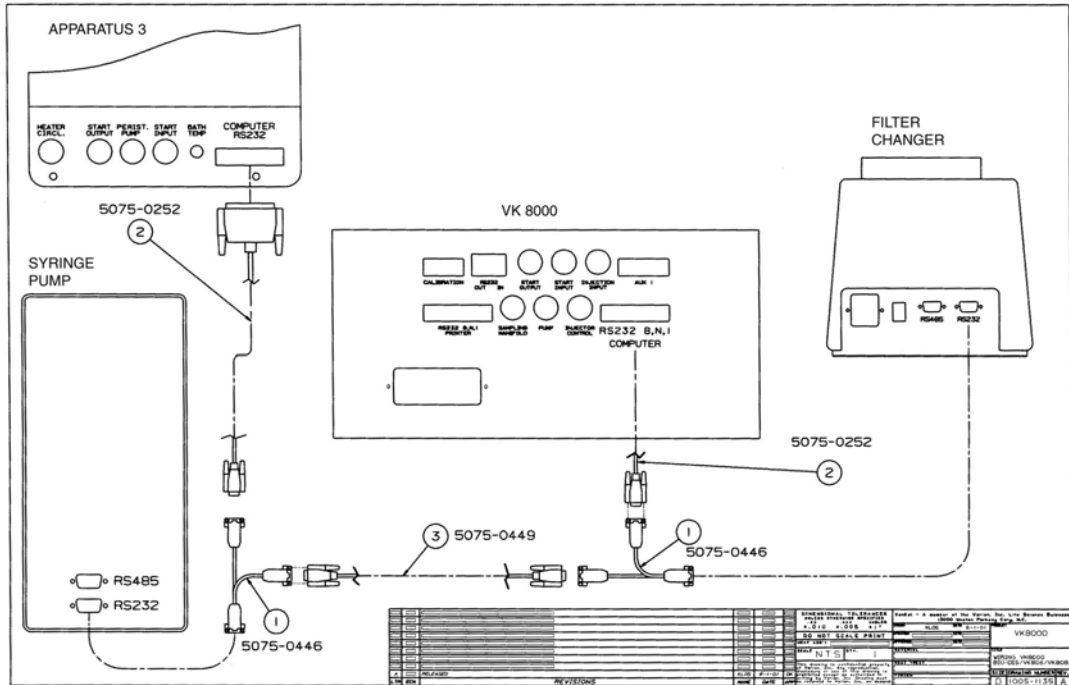


Warning

The electrical connection at the back of the VK 8000 is the primary disconnect for the instrument. The instrument should be positioned to allow accessibility to the power cords for easy disconnection.

Refer to the example diagram (see Figure 3, “Cable Connections for the VK 8000, Syringe Pump, Filter Changer, and Apparatus 3,” on page 34) to correctly make cable connections for this configuration.

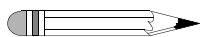
FIGURE 3. Cable Connections for the VK 8000, Syringe Pump, Filter Changer, and Apparatus 3



- Step 1. Connect the single end of a Y cable (#1, P/N 5075-0446) to the RS232 port on the filter changer.
- Step 2. Connect an RS232 cable (#2, P/N 5075-0252) between the RS232 port on the VK 8000 and one extension of the Y cable attached to the filter changer.
- Step 3. Connect a nine-pin cable (#3, P/N 5075-0449) to the remaining extension of the Y cable attached to the filter changer.
- Step 4. Connect the single end of a second Y cable (#1, P/N 5075-0446) to the RS232 port on the syringe pump.

- Step 5. Connect one extension of the second Y cable to the remaining end of the nine-pin cable attached to the filter changer (#3, P/N 5075-0449) from step 3.
- Step 6. Connect a second RS232 cable (#2, P/N 5075-0252) between the RS232 port on the Apparatus 3 / Apparatus 7 and the remaining extension of the Y cable attached to the syringe pump from step 4.

Sample Tubing Connections



Note

Do not remove the nylon tie wraps securing the tubing into bundles.

- Step 1. Connect the 72-inch multi-color Teflon lines from the Apparatus 3 / Apparatus 7 to the left port of each syringe starting with position 1.
- Step 2. Connect the 28-inch multi-color Teflon lines between the right port of each syringe and the top inlet ports of the filter changer starting with the port closest to the carousel.
- Step 3. Connect the 32-inch multi-color Teflon lines between the side ports of the filter changer and the tubing coming from the left positions of the VK 8000 solenoid valves. Ensure each line is attached to its identical color.

- Step 4. Connect the tubing coming from the top positions of the VK 8000 solenoid valves to the 72-inch multi-color Teflon return lines on the Apparatus 3 / Apparatus 7. Ensure each line is attached to its identical color.



Caution

Do not tighten the plastic fittings on the ends of the tubing more than half a turn past finger-tight. Overtightening can damage the fittings.

Loading Filters into the Filter Changer

- Step 1. Choose a tube of filters. Although you can load up to eight tubes of filters, only one tube is necessary for the filter changer to function properly.
- Step 2. Remove the cap from the end of the tube to expose the long, thin exit nozzle of the end filter.
- Step 3. Insert the tube, with the open end down, into the metal filter assembly in the filter changer carousel. Pivot the tube until it slides vertically into the white stabilizer slot.
- Step 4. Repeat steps 2 - 4 to load additional tubes of filters.



Caution

Use only Varian-certified filters or Millipore-equivalent types of filters. Other types of filters may not work properly in the filter changer and could damage the unit.

Changing Filter Types

To change filter types in the VK 808 Filter Changer, complete the following steps:

- Step 1. Remove all tubes of filters from the carousel of the filter changer.
- Step 2. From the VK 8000 Ready screen, press **MENU**. The Main Menu displays.
- Step 3. Select option **7**, Manual Operation. The Manual Operations screen displays.
- Step 4. Select option **6**, Syringe/Filter.
- Step 5. From the Operate Syringe/Filter Changer screen, select option **5**, Filter Changer. The Filter Changer Manual Control screen displays.
- Step 6. Select option **3**, Change Filters.
- Step 7. Enter **8** as the number of filters to change and press **ENTER**. The filters expel from the filter changer.
- Step 8. Repeat steps 6 and 7 until filters no longer expel from the filter changer. The following error message displays on the screen: FILTER CHANGER ROTOR ERROR. THE FILTER CHANGER IS EMPTY OR HAS FAILED TO LOAD PROPERLY. PRESS <1> TO CONTINUE OR <ESC> TO QUIT.
- Step 9. Press **ESC**. The Filter Changer Manual Control screen displays.
- Step 10. Load the new tubes of filters into the carousel of the filter changer. See "Loading Filters into the Filter Changer" on page 36.
- Step 11. Select option **3**, Change Filters.
- Step 12. Enter **8** as the number of filters to change and press **ENTER**. The filters expel from the filter changer.

- Step 13. When the filter changer stops expelling filters, select option **3**, Change Filters, again.
- Step 14. Enter **1** as the number of filters to change and press **ENTER**. The remaining filter of the previous type expels from the filter changer and is replaced with the new filter.
- Step 15. Press **ESC** four times to return to the Ready screen.

Installing the Catch Basin

Slide the side of the catch basin containing the opening over the screw mounted on the front of the filter changer.

Chapter 7 *Final Setup*

Power and Network Connections



Warning

The electrical connection at the back of the VK 8000 is the primary disconnect for the instrument. The instrument should be positioned to allow accessibility to the power cords for easy disconnection.

Ensure the VK 8000 and any coupled components are configured for the voltage supplied at the receptacle.

- If your system configuration includes the peristaltic pump, the power receptacle and power switch are located on the rear of the unit. Connect the power cord and turn on the peristaltic pump.
- If your system configuration includes the syringe pump, the power receptacle and power switch are located on the left side of the unit. Connect the power cord and turn on the syringe pump.
- If your system configuration includes the filter changer, the power receptacle and power switch are located on the rear of the unit. Connect the power cord and turn on the filter changer.

The VK 8000 has a dual voltage (115 V / 230 V) option on the power entry module. Ensure the voltage indicated on the fuse drawer matches the power outlet. Connect the power cord to the rear of the VK 8000. Turn on the VK 8000. The system monitor screen illuminates. The initial status screen displays and then changes to the Ready screen.

FIGURE 4. VK 8000 Initial Status Screen

VK 8000 FRACTION COLLECTOR PROGRAM REVISION x.xx INITIALIZING...PLEASE WAIT TIME: 08/29/04 21:56:40 ELAPSE: 000:00:00
--

The firmware version (program revision) displays. This is the only time the firmware version displays. Record the number below and refer to it if you need to call the Dissolution Systems Service Department.

Firmware version	
-------------------------	--

While the unit is powering up, the dispensing arm returns to its home position at the rear of the unit and the firmware program initializes. If the dispensing arm is already at the home position when the unit is powered up, the initial status screen displays for three seconds only. When the initial status screen disappears, the Ready screen displays. From the Ready screen, you can access the Main Menu or any of the manual functions.

FIGURE 5. VK 8000 Ready Screen

READY
PRG# 01 R-M: ENABLED VOLUME: 5 mL
TIME: 08/29/04 21:56:40 ELAPSE: 000:00:00

Installing the Sample Tray

Place the supplied sample tray on top of the unit. The sample tray has four grommeted corner holes which fit over the four locating pins.



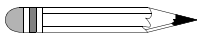
Caution

The sample tray must be securely mounted on the locating pins. Otherwise, damage can occur to the sampling needles and drive mechanism.

Installing the Media Rinse Reservoir

The media rinse reservoir fits in the rear of the unit between the metal brackets. The dispensing arm must be moved forward to put it in place.

- Step 1. From the Ready screen, press **MENU**.
- Step 2. Select option **7**, Manual Operation.
- Step 3. Select option **4**, Goto Rows.
- Step 4. Enter **4** to move the dispensing arm to row 4. The dispensing arm moves forward to allow access to the rear of the VK 8000.
- Step 5. Place the media rinse reservoir between the metal brackets directly behind the sample tray.



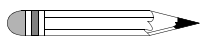
Note

The media rinse reservoir has two chambers—one for replacement media and one for rinsing. The replacement media chamber has two barbed fittings—one on each end of the tank. The rinse chamber has a single barbed fitting. Orient the reservoir with the rinse chamber toward the front.

- Step 6. Connect the six-foot length of clear tygon tubing to the barbed elbow fitting located on the rinse chamber of the reservoir. Place the other end in a sink, drain, or suitable waste container.
- Step 7. If your system configuration includes the syringe pump, press **H** to move the dispensing arm to the home position and press **ESC** three times to return to the Ready screen.

If you system configuration includes the peristaltic pump, complete the steps under "Installing and Connecting the Autocalibration Block" below.

Installing and Connecting the Autocalibration Block



Note

The autocalibration unit is available for use only if your system configuration includes the peristaltic pump.

- Step 1. With the dispensing arm forward, insert the autocalibration block behind the media rinse reservoir. Ensure the RS232 port is positioned to the right for a 6-row configuration and toward the back for a 12-row configuration.
- Step 2. Connect the nine-pin RS232 cable between the CALIBRATION port on the VK 8000 rear panel and the RS232 port on the side of the autocalibration block.
- Step 3. Press **H** to move the dispensing arm to the home position.
- Step 4. Press **ESC** three times to return to the Ready screen.

Hidden Key Functions

Key Sequence	Function
MENU > 0 > 0	Use this key sequence to select the system configuration. Select the option that corresponds to the number of valves on your VK 8000.
MENU > 0 > 8	Use this key sequence to select a fixed 1200 baud or a programmable baud. Select option 2 , Programmable Baud. Note: if you are using the VK 8000 with other Varian equipment, the baud rate must be set to 9600 baud (see "Printer Operation and Communications" on page 60).
MENU > 0 > A	Use this key sequence to set the drop volume before sampling. Enter the desired drop volume and press ENTER . The maximum acceptable value is 1. Note: the drop volume is an amount of sample that is dispensed through the VK 8000 needles prior to dispensing samples into the collection tubes to ensure the needles are purged completely.
MENU > 0 > B	Use this key sequence to enable or disable the moving alert. The asterisk (*) displays next to the current selection. If enabled, the alarm sounds when the dispensing arm is in motion.
MENU > 0 > C	Use this key sequence to enable or disable the delayed start alarm. The asterisk (*) displays next to the current selection. If the delayed start alarm is enabled, the alarm sounds prior to the start of the program. See "BIO-DIS Options Screen" on page 69.
MENU > 0 > D	Use this key sequence to enable or disable the multiple sample option. The asterisk (*) displays next to the current selection. Note: this option must be enabled to pull multiple samples from each row (see "2 Samples Per Row" on page 53).
MENU > 0 > E	Use this key sequence to select the printer type. Ensure the asterisk (*) displays next to option 1, Impact. If not, select option 1 to enable the impact printer. Note: select option 1, Impact, or the instrument will not operate properly.

Key Sequence	Function
MENU > 0 > F	Use this key sequence to select the date display style. The asterisk (*) displays next to the current selection. Select option 1 , MM/DD/YY, or option 2 , DD/MM/YY.
MENU > 0 > P	Use this key sequence to enable or disable the syringe pump. The asterisk (*) displays next to the current selection. If your system configuration includes the syringe pump, you must enable the syringe pump control options on the VK 8000 prior to setting the syringe pump parameters. See "Main Menu Option 3 Set Syringe Pump (Syringe Pump)" on page 54. Note: the syringe pump option is not available for use with the 12-row, 12-position Apparatus 7.
MENU > 0 > R	Use this key sequence to enable or disable media replacement for the syringe pump. Ensure the asterisk (*) displays next to option 2 , Disable. If not, select option 2 to disable the media replacement for the syringe pump. Note: the media replacement option is not available with the Apparatus 3 / Apparatus 7. Ensure the option is disabled or the instrument will not operate properly.

Chapter 8 *Operating the VK 8000*

VK 8000 Keypad Options

The keypad on the VK 8000 is similar to a personal computer keyboard. For example, it has a SPACE key, an ENTER key, and a SHIFT key. These keys function exactly like their counterparts on a personal computer or typewriter keyboard. See Figure 6, "VK 8000 Keypad," below. A discussion about each of the main function keys follows.

FIGURE 6. VK 8000 Keypad



The front panel options include the following:

Option	Function
ESC	<p>Press ESC to stop execution of a running program or calibration routine. Press ESC to move back one level to the previous menu or selection when moving through the multi-level menu.</p> <p>Be very careful when using ESC while a program is running. If a program or calibration is running and ESC is pressed, a prompt appears on the first line of the display asking if you want to stop the running program. The options are Y or N. Press Y to stop the running program. Press N to continue the running program.</p>
MENU	<p>Use this option to set the clock, alarms, Apparatus 3 / Apparatus 7 parameters, start output delay / syringe pump parameters, manual prime time / volume, manual purge time / volume as well as to remotely control the Apparatus 3 / Apparatus 7 and manually control the VK 8000. See "VK 8000 Main Menu" on page 47.</p>
PRINT	<p>Press PRINT to record the batch information, print the dip and drain times, enable or disable the Report Center Printer, select a local or remote printer, set the communication port identification number, and set the baud rate. See "Printer Operation and Communications" on page 60.</p>
CAL	<p>Use this option to calibrate the VK 8000 to ensure that sample volumes are accurately and precisely taken. See "Volumetric Calibration" on page 73.</p>
PROG	<p>Use this option to set program parameters. See "Programming the VK 8000" on page 62.</p>
START PROG	<p>Use this option to start a program. See "Start Program" on page 67.</p>
MANUAL SAMPLE	<p>Use this option to collect a sample from the dissolution vessels on command without a program. See "Manual Sample" on page 71.</p>
OPEN VALVES	<p>Press OPEN VALVES to open all valves simultaneously. This function keeps the valves open as long as the key on the keypad is pressed. To change the valve configuration, press MENU > 0 > 0 and select the appropriate configuration.</p>

Option	Function
PUMP OFF PUMP FWD PUMP REV	PUMP OFF, PUMP FWD, and PUMP REV work exclusively with the Varian peristaltic pump. When the syringe pump is connected, they are disabled.
CLEAN SYTEM	Use this option to keep the valves, needles, and fluid lines clean. See "Clean System Function with Peristaltic Pump" on page 82 or "Clean System Function with Syringe Pump" on page 86.
LOCK KBRD	Press LOCK KBRD to lock the keypad. Press LOCK KBRD again to unlock the keypad.

VK 8000 Main Menu

From the Ready screen, press **MENU**. The Main Menu displays. Options 3, 4, and 5 change depending on your system configuration.

When your system configuration includes the peristaltic pump, the following Main Menu displays:

MAIN MENU	4 MANUAL PRIME TIME
1 SET CLOCK/ALARMS	5 MANUAL PURGE TIME
2 SET BIO-DIS	6 CONTROL BIO-DIS
3 START OUTPUT DELAY	7 MANUAL OPERATION

When your system configuration includes the syringe pump with or without the filter changer, the following Main Menu displays:

MAIN MENU	4 MANUAL PRIME VOL.
1 SET CLOCK/ALARMS	5 MANUAL PURGE VOL.
2 SET BIO-DIS	6 CONTROL BIO-DIS
3 SET SYRINGE PUMP	7 MANUAL OPERATION

Following is a description of the Main Menu screen options:

Option	Function
1 Set Clock/Alarms	Use this option to set the clock and alarms. If your system configuration includes the syringe pump, the start output delay option also displays on this screen. See "Main Menu Option 1 Set Clock/Alarms" on page 51.
2 Set BIO-DIS	Use this option to set the Apparatus 3 / Apparatus 7 parameters. See "Main Menu Option 2 Set BIO-DIS" on page 53.
3 Start Output Delay (peristaltic pump)	<p>If your system configuration includes the peristaltic pump, use this option to set the delay from the start of a program until the TTL signal is sent from the START OUTPUT jack on the VK 8000 rear panel.</p> <p>Select option 3, Start Output Delay. Enter a delay length of up to 99:59 minutes for the VK 8000 TTL output and press ENTER. The Main Menu displays.</p> <p>Note: this output signal can be used to start other instrumentation, such as an Apparatus 3 / Apparatus 7, after the program on the VK 8000 is started. The default delay is 00:00, indicating that the signal will be sent at the moment a program starts. For example, a value of 10:00 delays the signal for ten minutes after the program starts. Set the value to 00:00 to eliminate the delay feature.</p> <p>When the syringe pump is enabled, Start Output Delay displays under the Set Clock and Alarms screen as option 6. See "6 Start Output Delay" on page 52.</p>
3 Set Syringe Pump (syringe pump)	If your system configuration includes the syringe pump, use this option to set the syringe pump parameters. See "Main Menu Option 3 Set Syringe Pump (Syringe Pump)" on page 54.

Option	Function
4 Manual Prime Time (peristaltic pump)	<p>If your system configuration includes the peristaltic pump, use this option to set the interval the peristaltic pump runs forward, drawing medium into the system, before the valves open to deliver samples. Select option 4, Manual Prime Time. Enter a value for the priming time from 1 to 99 seconds and press ENTER. The Main Menu displays.</p> <p>Note: at a minimum, the manual prime time should be long enough for medium to be seen dripping from the return cannulas. In general, the longer the tubing lengths, the longer the priming time required. This value is not used by sampling programs, which have their own individual priming time values. It is used only with the MANUAL SAMPLE, CAL, and CLEAN SYSTEM keys on the VK 8000.</p>
4 Manual Prime Vol. (syringe pump)	<p>If your system configuration includes the syringe pump, use this option to set the amount of drawn medium necessary to fill the sampling lines of the entire system. Select option 4, Manual Prime Vol. Enter a value for the priming volume and press ENTER. The Main Menu displays.</p> <p>Note: at a minimum, the manual prime volume should be large enough for medium to be seen dripping from the return cannulas. In general, the longer the tubing lengths, the larger the priming volume required. This value is not used by sampling programs which have their own individual priming volume values. It is used only with the MANUAL SAMPLE and CLEAN SYSTEM keys on the VK 8000.</p>

Option	Function
5 Manual Purge Time (peristaltic pump)	<p>If your system configuration includes the peristaltic pump, use this option to set the interval the peristaltic pump runs in reverse to return the uncollected medium in each line back into the vessel from which it was drawn.</p> <p>Select option 5, Manual Purge Time. Enter a value for the manual purge time from 1 to 99 seconds and press ENTER. The Main Menu displays.</p> <p>Note: purging also clears the sampling filters of particulate matter that may restrict successive samples. As with priming, the longer the tubing lengths, the longer the purge time required. This value is not used by sampling programs, which have their own individual purging time values. It is used only with the MANUAL SAMPLE, CAL, and CLEAN SYSTEM keys on the VK 8000.</p>
5 Manual Purge Vol. (syringe pump)	<p>If your system configuration includes the syringe pump, use this option to set the a purge volume that ensures all stranded medium is properly expelled.</p> <p>Select option 5, Manual Purge Vol. Enter a value for the purge volume that ensures at least two strokes of the plunger and press ENTER. The Main Menu displays.</p> <p>Note: the first stroke moves all medium from the sampling lines to the return lines. The second stroke draws air into the sampling lines and purges the remaining medium from the return lines. As with priming, the longer the tubing lengths, the larger the purge volume required. This value is not used by sampling programs which have their own individual purge volume values. It is used only with the MANUAL SAMPLE and CLEAN SYSTEM keys on the VK 8000.</p>
6 Control BIO-DIS	<p>Use this option to remotely control the Apparatus 3 / Apparatus 7 from the VK 8000. See "Main Menu Option 6 Control BIO-DIS" on page 56.</p>
7 Manual Operation	<p>Use this option to manually control the VK 8000. See "Main Menu Option 7 Manual Operation" on page 57.</p>

Main Menu Option 1 Set Clock/Alarms

From the Main Menu, select option 1, Set Clock/Alarms. The Set Clock and Alarms screen displays.

SET CLOCK AND ALARMS	
1 SET CLOCK	2 TIMER ALARM
3 ROW COMPL ALARM	4 CALIB. COMPL ALARM
5 PRG COMPL ALARM	6 START OUTPUT DELAY

Following is a description of the Set Clock and Alarms screen options:

Option	Function
1 Set Clock	Select option 1, Set Clock. Enter the date in the appropriate format and press ENTER . The time displays in 24-hour format. If the time is correct, press ENTER or ESC to return to the Main Menu. If the time is incorrect, enter the correct time in 24-hour format and press ENTER . The Set Clock and Alarms screen displays.
2 Timer Alarm	Use this option to set the elapsed timer alarm. The elapsed timer alarm is a simple timer you can use to time any interval from 1 minute to 99 hours. The alarm sounds when the time has expired. Once turned off, the timer does not operate again until you reset it. Select option 2, Timer Alarm. Enter a duration in hh:mm format and press ENTER . The Set Clock and Alarms screen displays. Press any key to silence the alarm after it sounds.
3 Row Compl Alarm	Use this option to set an alarm to indicate the completion of each sample timepoint. This alarm is useful when the samples must be checked or removed for immediate analysis. Select option 3, Row Compl Alarm. Select option 1 to enable or option 2 to disable the alarm. The Set Clock and Alarms screen displays. Press any key to silence the alarm after it sounds.

Option	Function
4 Calib. Compl Alarm	<p>Use this option to set an alarm to sound when autocalibration is complete and all lines are purged.</p> <p>Select option 4, Calib. Compl Alarm. Select option 1 to enable or option 2 to disable the alarm. The Set Clock and Alarms screen displays.</p> <p>Press any key to silence the alarm after it sounds.</p> <p>Note: this option is only available if your system configuration includes the peristaltic pump.</p>
5 Prg Compl Alarm	<p>Use this option to set an alarm to sound at the end of the program. It is a useful reminder that the program is complete.</p> <p>Select option 5, Prg Compl Alarm. Select option 1 to enable or option 2 to disable the alarm. The Set Clock and Alarms screen displays.</p> <p>Press any key to silence the alarm after it sounds.</p>
6 Start Output Delay	<p>Note: option 6 displays only when the syringe pump is enabled.</p> <p>If the syringe pump is enabled, use this option to set the delay from the start of a program until the TTL signal is sent from the START OUTPUT jack on the VK 8000 rear panel.</p> <p>Select option 6, Start Output Delay. The Start Output Delay screen displays. Enter a delay length of up to 99:59 minutes for the VK 8000 TTL output and press ENTER. The Set Clock and Alarms screen displays.</p> <p>Note: this output signal can be used to start other instrumentation, such as an Apparatus 3 / Apparatus 7, after the program on the VK 8000 is started. The default delay is 00:00, indicating that the signal will be sent at the moment a program starts. For example, a value of 10:00 delays the signal for ten minutes after the program starts. Set the value to 00:00 to eliminate the delay feature.</p> <p>When the syringe pump is disabled, this option displays under the Main Menu. See "3 Start Output Delay (peristaltic pump)" on page 48.</p>

Main Menu Option 2 Set BIO-DIS

From the Main Menu, select option **2**, Set BIO-DIS. Enter a program number and press **ENTER**. The Set BIO-DIS Parameters screen displays.

SET BIO-DIS PARAMETERS	
1 DIPPING SPEED (DPM)	2 SAMPLES PER ROW
3 HOLD DIP TIME	4 SET BATH TEMP
5 COM PORT ID	6 PRINT FREQUENCY

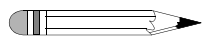
Following is a description of the Set BIO-DIS Parameters screen options:

Option	Function
1 Dipping Speed (DPM)	Select option 1 , Dipping Speed (DPM). Enter the desired DPM and press ENTER . The Set BIO-DIS Parameters screen displays.
2 Samples Per Row	Select option 2 , Samples Per Row. Enter the desired number of samples to be taken from each row and press ENTER . The Set BIO-DIS Parameters screen displays.
3 Hold Dip Time	Select option 3 , Hold Dip Time. Enter a hold dip time and press ENTER to advance to each remaining row. After a hold dip time is entered for the final row, the Set BIO-DIS Parameters screen displays.
4 Set Bath Temp	Select option 4 , Set Bath Temp. Enter the desired water bath temperature and press ENTER . The Set BIO-DIS Parameters screen displays.
5 Com Port ID	Select option 5 , Com Port ID, to change the communication port identification number. Your system was shipped with the communication port identification number set to 01. You can set the identification number to any number between 1 and 99. The identification number is used when multiple units are connected in series so that the controlling or master VK 8000 can start individual units. Enter a communication port identification number and press ENTER . The Set BIO-DIS Parameters screen displays.

Option	Function
6 Print Frequency	<p>The Apparatus 3 / Apparatus 7 status prints at each sample timepoint. Select option 6, Print Frequency, to set additional times to print the Apparatus 3 / Apparatus 7 status between sample timepoints. This option should be reserved for use when there is more than 30 minutes between sample timepoints.</p> <p>Enter a print frequency and press ENTER. The Set BIO-DIS Parameters screen displays.</p> <p>The print frequency timer resets after each sample timepoint.</p> <p>Note: the status does not print if the specified print frequency time falls within three minutes of the sample timepoint; the sample timepoint takes precedence.</p>

Once all values have been entered, press **ESC**. A confirmation screen displays. Press **Y** to send the newly entered parameters to the Apparatus 3 / Apparatus 7 and override the existing settings.

Main Menu Option 3 Set Syringe Pump (Syringe Pump)



Note

Ensure the syringe pump is enabled prior to setting the syringe pump parameters (see MENU > 0 > P under "Hidden Key Functions" on page 44).

From the Main Menu, select option **3**, Set Syringe Pump. Select option **2** to disable the syringe pump or select option **1** to enable the syringe pump. Once enabled, the Set Syringe Pump Parameters screen displays.

SET SYRINGE PUMP PARAMETERS	
1 SYRINGE SIZE	2 PLUNGER SPEED
3 PRIME LOSS VOLUME	4 ASPIRT. DWELL TIME

Following is a description of the Set Syringe Pump Parameters screen options:

Option	Function
<p>1 Syringe Size</p>	<p>Use this option to set the syringe size.</p> <p>Select option 1, Syringe Size. Select the syringe size that corresponds with the Kloehn syringes loaded into the syringe pump. The Set Syringe Pump Parameters screen displays.</p>
<p>2 Plunger Speed</p>	<p>Use this option to configure the syringe pump plunger to operate at a specific speed.</p> <p>Select option 2, Plunger Speed. Enter a plunger speed between 100 and 1500 motor steps per second (sps) and press ENTER. The recommended value is 500. The Set Syringe Pump Parameters screen displays.</p>
<p>3 Prime Loss Volume</p>	<p>Use this option to configure the prime loss volume. Prime loss volume compensates for the volume of medium used to fill the tubing between the sampling cannulas and sampling valves during the priming cycle. When sampling, an amount of sample equal to the prime loss volume flows past the valves in the VK 8000 before the valves open to collect sample. The program also restricts this volume to be less than or equal to the syringe size volume.</p> <p>Select option 3, Prime Loss Volume. Enter a prime loss volume based on the sample tubing length, inner diameter, and system dead volumes and press ENTER. The Set Syringe Pump Parameters screen displays.</p> <p>If the tubing length between the sampling cannulas and sampling valves is changed, adjust the prime loss volume accordingly.</p>
<p>4 Aspirt. Dwell Time</p>	<p>Use this option to configure the aspiration dwell time. Aspiration dwell time is the time the syringe plunger pauses at the bottom of a stroke to allow the medium being drawn to overcome the vacuum generated by the drawn plunger.</p> <p>Select option 4, Aspirt. Dwell Time. Enter an aspiration dwell time between 1 and 10 seconds and press ENTER. The recommended time is 10 seconds. The Set Syringe Pump Parameters screen displays.</p>

Option	Function
5 Full Stroke (hidden option)	<p>Use this option to configure the number of steps the stepper motor makes to draw the syringe plunger its maximum stroke length.</p> <p>Select option 5, Full Stroke. Enter a full stroke value between 0 and 19999 and press ENTER. The recommended value is 19300. The Set Syringe Pump Parameters screen displays.</p> <p>If the volume dispensed by the syringe is outside of the required specifications based on a 10 mL syringe size, the full stroke value can be adjusted using the following calculation and solving for x:</p> $\frac{\text{target volume (mL)}}{x} = \frac{\text{avg volume dispensed (mL)}}{19300}$
6 Pump Current (hidden option)	<p>Use this option to configure the pump current. The use of more viscous media requires a higher pump current.</p> <p>Select option 6, Pump Current. Enter a pump current between 0 and 8 and press ENTER. The recommended value is 4. The Set Syringe Pump Parameters screen displays.</p>

Main Menu Option 6 Control BIO-DIS

From the Main Menu, select option **6**, Control BIO-DIS. The BIO-DIS Control/Monitor screen displays.

BIO-DIS CONTROL/MONITOR			
1 DIP	2 STOP	3 GO TO ROW	4 HOME
SET RPM: 50		ACTUAL RPM: 000.0	
SET BATH TEMP: 37.5		ACTUAL TEMP: 37.2	

The following options are commands communicated from the VK 8000 to the Apparatus 3 / Apparatus 7:

Option	Function
1 Dip	Select option 1 , Dip, to begin dipping.
2 Stop	Select option 2 , Stop, to stop dipping and raise the cannulas.

Option	Function
3 Go To Row	Select option 3, Go To Row, to move the drive unit to a specific row. Enter a row number and press ENTER . The Apparatus 3 / Apparatus 7 drive unit moves to the indicated row.
4 Home	Select option 4, Home, to move the drive unit to the home position.

Press **ESC** to return to the Main Menu.

Main Menu Option 7 Manual Operation

From the Main Menu, select option 7, Manual Operation.

The following Manual Operations screen displays when your system configuration includes the peristaltic pump:

MANUAL OPERATIONS	
1 LIFT VALVES	2 LOWER VALVES
3 OPEN/CLOSE VALVES	4 GOTO ROWS
5 TURN ON (OFF) R-M PUMP	

The following Manual Operations screen displays when your system configuration includes the syringe pump with or without the filter changer:

MANUAL OPERATIONS	
1 LIFT VALVES	2 LOWER VALVES
3 OPEN/CLOSE VALVES	4 GOTO ROWS
5 TURN ON (OFF) R-M PUMP	6 SYRINGE/FILTER

All functions execute immediately without pressing ENTER. Press **ESC** to return to the Main Menu.

Following is a description of the Manual Operations screen options:

Option	Function
1 Lift Valves	Select option 1, Lift Valves, to raise the valve needles if lowered.
2 Lower Valves	Select option 2, Lower Valves, to lower the valve needles if raised.
3 Open/Close Valves	Select option 3, Open/Close Valves, to toggle the valves open and closed.
4 Goto Rows	Select option 4, Goto Rows, to move the VK 8000 dispensing arm to a specific row. Enter a row number. The dispensing arm moves to the indicated row and stops. If the moving alert is enabled, the alarm sounds when the dispensing arm moves. To disable the alert, see MENU > 0 > B under "Hidden Key Functions" on page 43.
5 Turn On (Off) R-M Pump	Ensure TURN ON R-M PUMP displays as option 5. This indicates the replacement media option is disabled. If TURN OFF R-M PUMP displays, select option 5. TURN ON R-M PUMP displays. Note: the replacement media option must be disabled or the instrument will not operate properly.
6 Syringe/Filter (syringe pump only)	Use this option to manually control the syringe pump and filter changer as applicable. See "Manual Operation Option 6 Syringe/Filter" below.

Manual Operation Option 6 Syringe/Filter

From the Manual Operations screen, select option 6, Syringe/Filter. The Operate Syringe/Filter Changer screen displays.

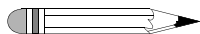
OPERATE SYRINGE/FILTER CHANGER	
1 VALVE TO INPUT	2 VALVE TO OUTPUT
3 SYRINGE FILL	4 SYRINGE DISPENSE
5 FILTER CHANGER	6 SYRINGE PARAMETERS

Following is a description of the Operate Syringe/Filter Changer screen options:

Option	Function
1 Valve to Input	<p>The syringe pump contains a valve to control the direction of the flow of medium. Use this option to move the valve to the input position to manually input or fill the syringe with medium.</p> <p>Select option 1, Valve to Input, to move the valve to the input position. The valve emits a loud click when it moves. If you hear no sound, the valve is already in the input position.</p>
2 Valve to Output	<p>The syringe pump contains a valve to control the direction of the flow of medium. Use this option to move the valve to the output position to manually output or purge the syringe of medium.</p> <p>Select option 2, Valve to Output, to move the valve to the output position. The valve emits a loud click when it moves. If you hear no sound, the valve is already in the output position.</p>
3 Syringe Fill	<p>Use this option to draw a specific amount of medium into the syringes. Ensure the valve is in the input position before drawing the medium (see "1 Valve to Input" above).</p> <p>Select option 3, Syringe Fill. Enter the desired percentage of each syringe to fill and press ENTER. The syringes draw the specified amount of medium.</p>
4 Syringe Dispense	<p>Use this option to dispense medium from the syringes.</p> <p>Select option 4, Syringe Dispense. The syringes dispense the previously drawn medium (see "3 Syringe Fill" above).</p>
5 Filter Changer	<p>Use this option to manually operate the filter changer.</p> <p>Select option 5, Filter Changer. The Filter Change Manual Control screen displays.</p> <p>To open the filter clamp, select option 1, Open Clamp.</p> <p>To close the filter clamp, select option 2, Close Clamp.</p> <p>To change the filters, select option 3, Change Filters. Enter the number of filters to change and press ENTER. The specified number of filters are expelled and replaced.</p> <p>Press ESC to return to the Operate Syringe/Filter Changer screen.</p>

Option	Function
6 Syringe Parameters	Use this option to configure the syringe pump. Select option 6, Syringe Parameters. The Set Syringe Pump Parameters screen displays. For a description of the screen options, see "Main Menu Option 3 Set Syringe Pump (Syringe Pump)" on page 54. Note: the syringe pump parameters are global. These parameters can be entered under option 3 of the Main Menu or option 6 of the Operate Syringe/Filter Changer screen.

Printer Operation and Communications



Note

Ensure the printer type is set to impact for the instrument to operate properly (see MENU > 0 > E under "Hidden Key Functions" on page 43).

Use print options to

- print batch information and sample times for each of the 15 stored programs.
- control the built-in Report Center Printer and the remote printer (if one is connected).
- set the communication port identification number and the baud rate.

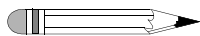
Press **PRINT**. Enter a program number and press **ENTER**. The Print Selections screen displays.

```
***PRINT SELECTIONS***  
1 BATCH INFORMATION          2 SAMPLE TIMES  
3 TURN ON (OFF) REP CENTER   4 SET COM PORT ID  
5 SET BAUD RATE
```

Following is a description of the Print Selections screen options:

Option	Function
1 Batch Information	Select option 1, Batch Information, to immediately print the previously entered batch information, if any, for the selected program. This printed data is the header information you can enter via option 4, Headers, on the Program Variables screen (see "4 Headers" on page 63).
2 Sample Times	Select option 2, Sample Times, to immediately print the sampling times for each row of the selected program. This is the complete listing of all timepoints entered in option 2, Sample Time Points, under the Program Variables screen (see "Program Option 2 Sample Time Points" on page 66).
3 Turn On (Off) Rep Center	Select option 3, Turn On (Off) Rep Center, to enable or disable the Report Center Printer. This option always reflects the opposite of the current state of the Report Center Printer. For example, if it is currently disabled, TURN ON REP CENTER displays next to option 3. Note: the state of the Report Center Printer is not unique to an individual program. It is global. When you enable or disable it, the Report Center Printer stays enabled or disabled until you change it again, even if you switch programs.
4 Set Com Port ID	Select option 4, Set Com Port ID, to enter a new communication port identification number. Your system was shipped with the communication port identification number set to 01. You can set the identification number to any number between 1 and 99. The identification number is used when multiple units are connected in series so that the controlling or master VK 8000 can start individual units. Enter the communication port identification number and press ENTER . The Print Selections screen displays.
5 Set Baud Rate	Select option 5, Set Baud Rate, to set the baud rate for your system. If you are using the VK 8000 with other Varian equipment, set the baud rate to 9600 baud (option 4). Select the desired baud rate from the menu. The Print Selections screen displays. Note: in order to set the baud rate from this option, the baud rate must be set to programmable baud (see MENU > 0 > 8 under "Hidden Key Functions" on page 43).

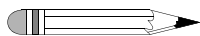
Programming the VK 8000



Note

Programs are not write-protected. Check with other users before proceeding.

- Step 1. From the Ready screen, press **PROG** to program the VK 8000.
- Step 2. Enter a program number and press **ENTER**. The Program Variables screen displays, as shown below.



Note

The VK 8000 can store up to 15 programs in non-volatile memory. Valid program numbers are 1 to 15. If 0 (zero) or a number larger than 15 is entered, the system continues to prompt you until a valid number is entered.

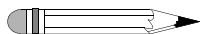
The following Program Variables screen displays when your system configuration includes the peristaltic pump:

PROGRAM VARIABLES	4 HEADERS
1 SET BIO-DIS PARAMETERS	5 PRIME TIME
2 SAMPLE TIME POINTS	6 PURGE TIME
3 SAMPLE VOLUME	7 R-M

The following Program Variables screen displays when your system configuration includes the syringe pump with or without the filter changer:

PROGRAM VARIABLES	4 HEADERS
1 SET BIO-DIS PARAMETERS	5 PRIME VOLUME
2 SAMPLE TIME POINTS	6 PURGE VOLUME
3 SAMPLE VOLUME	7 FILTER CHG or R-M

Note



Option 7 displays as Filter Chg when your system configuration includes the syringe pump and filter changer. See “7 Filter Chg (syringe pump and filter changer)” on page 65.

If your system configuration includes the syringe pump but not a filter changer, option 7 displays as R-M. See “7 R-M (syringe pump)” on page 65.

Following is a description of the Program Variables screen options:

Option	Function
1 Set BIO-DIS Parameters	Use this option to set the Apparatus 3 / Apparatus 7 parameters. Select option 1, Set BIO-DIS Parameters. The Set BIO-DIS Parameters screen displays. See “Main Menu Option 2 Set BIO-DIS” on page 53 for a description of the Set BIO-DIS Parameters screen options.
2 Sample Time Points	Use this option to enter the sample timepoints. See “Program Option 2 Sample Time Points” on page 66.
3 Sample Volume	Select option 3, Sample Volume. Enter the sample volume in milliliters and press ENTER . The Program Variables screen displays. You can enter the volume with up to three digits (for example 13.5) so that fractional milliliters can be collected. Verify the collection tubes can hold the requested volume. Note: the maximum volume accepted is 14 mL.
4 Headers	Select option 4, Headers. The Batch # Selections screen displays. For each option, enter the desired information and press ENTER . The Program Variables screen displays. Note: the Batch # Selections screen displays options for the report header information. The print field accepts ten characters. Characters can be letters, numbers, special characters, or spaces. The information entered for each selection prints in the header of each printout. The entries made from this menu are attached to the active program. Since there are 15 programs, there can be a different set of entries for each. All are stored in the battery-protected memory and remain until changed via this menu.

Option	Function
5 Prime Time (peristaltic pump)	<p>If your system configuration includes the peristaltic pump, use this option to set the interval the peristaltic pump runs forward, drawing medium into the system, before the valves open to deliver samples.</p> <p>Select option 5, Prime Time. Enter a value for the priming time from 1 to 99 seconds and press ENTER. The Program Variables screen displays.</p> <p>Note: at a minimum, the prime time should be long enough for medium to be seen dripping from the return cannulas. In general, the longer the tubing lengths, the longer the priming time required.</p>
5 Prime Volume (syringe pump)	<p>If your system configuration includes the syringe pump, use this option to set the amount of drawn medium necessary to fill the sampling lines of the entire system.</p> <p>Select option 5, Prime Volume. Enter a value for the priming volume and press ENTER. The Program Variables screen displays.</p> <p>Note: at a minimum, the prime volume should be large enough for medium to be seen dripping from the return cannulas. In general, the longer the tubing lengths, the larger the prime volume required.</p>
6 Purge Time (peristaltic pump)	<p>If your system configuration includes the peristaltic pump, use this option to set the interval the peristaltic pump runs in reverse to return the uncollected medium in each line back into the vessel from which it was drawn.</p> <p>Select option 6, Purge Time. Enter a value for the purge time from 1 to 99 seconds and press ENTER. The Program Variables screen displays.</p> <p>Note: purging also clears the sampling filters of particulate matter that may restrict successive samples. As with priming, the longer the tubing lengths, the longer the purge time required.</p>

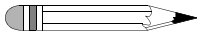
Option	Function
<p>6 Purge Volume (syringe pump)</p>	<p>If your system configuration includes the syringe pump, use this option to set a purge volume that ensures all stranded medium is properly expelled.</p> <p>Select option 6, Purge Volume. Enter a value for the purge volume that ensures at least two strokes of the syringe plunger and press ENTER. The Program Variables screen displays.</p> <p>Note: the first stroke moves all medium from the sampling lines to the return lines. The second stroke draws air into the sampling lines and purges the remaining medium from the return lines. As with priming, the longer the tubing lengths, the larger the purge volume required.</p>
<p>7 R-M (peristaltic pump)</p>	<p>If your system configuration includes the peristaltic pump, select option 7, R-M. The Replacement Media Option screen displays. Select option 2, Disable. The Program Variables screen displays.</p> <p>Note: the replacement media option is not available for use with the Apparatus 3 / Apparatus 7. The replacement media option must be disabled or the instrument will not operate properly.</p>
<p>7 Filter Chg (syringe pump and filter changer)</p>	<p>If your system configuration includes the syringe pump and filter changer, select option 7, Filter Chg. Enter the desired number of samples each filter should process before being discharged and press ENTER. The recommended value is 1. The Program Variables screen displays.</p> <p>Note: if your system configuration includes the syringe pump and filter changer, ensure the syringe pump option is enabled. From the Ready screen, press MENU. Select option 3, Set Syringe Pump. Select option 1, Enable. Also press MENU > 0 > P and select option 1, Enable.</p> <p>The replacement media option is not available with this system configuration. Ensure the RM option for the syringe pump is disabled using the hidden key function MENU > 0 > R.</p>
<p>7 R-M (syringe pump)</p>	<p>If your system configuration includes the syringe pump but not the filter changer, select option 7, R-M. The Replacement Media Option screen displays. Select option 2, Disable. The Program Variables screen displays.</p> <p>Note: the replacement media option is not available for use with the Apparatus 3 / Apparatus 7. The replacement media option must be disabled or the instrument will not operate properly.</p>

Program Option 2 Sample Time Points

From the Program Variables screen, select option **2**, Sample Time Points. The following screen displays:

```
SAMPLE TIME POINT: 000:02
  ENTER hhh:mm UP TO 999:59 HOURS
PROG #: 1 ROW: 0 VOLUME: 5ml
TIME:08/29/04 09:37:14      ELAPSE:000:00:00
```

Note



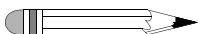
This screen accepts sampling times and saves them for execution when the program is run. Timepoints are requested in order of execution starting with collection row number 0 on the sample tray. The sample time is entered as hours and minutes. Once you enter a time, the row number increments and another sample timepoint is requested.

The following conventions are used with this screen:

- Review previously entered sample timepoints by pressing **ENTER** to scroll through the entries.
- After all desired sample timepoints have been entered, enter **000:00** for the last sample timepoint and press **ENTER**. If the maximum of ten sample timepoints are entered, you do not have to enter 000:00 for the last sample timepoint.
- To add additional sample timepoints, press **ENTER** until a new row time displays. Enter the additional sample timepoint.
- If more than ten sample timepoints are needed, use the link program feature. See "Start Program" on page 67.
- To correct an entry, press **BACKSPACE** to go to the previous character position and re-enter the correct value.
- If a shorter sample timepoint than the previous one is entered for a given row, the row number will not increment. Times must increase from one row to the next.

- To shorten a saved program, enter **000:00** for the first sample timepoint you wish to discard. All successive timepoints are eliminated.
- Press **ESC** to save all new values and return to the Program Variables screen.

Note



Sample timepoints should be at least five minutes apart to allow adequate time for priming and purging the sampling lines. If your system configuration includes the syringe pump and filter changer, ensure the sample timepoints are at least six minutes apart.

Start Program

- Step 1. From the Ready screen, press **START PROG** to start a program or modify a program already operating.
- Step 2. Enter a program number between 1 and 15 and press **ENTER**. The Link Program Option screen displays.

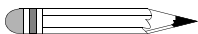
LINK PROGRAM OPTION

1 RUN SINGLE PROG 2 LINK ANOTHER PROG

TIME: 08/29/04 15:02:30 ELAPSE: 000:00:04

- Step 3. To run a single program, select option 1.

Note

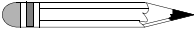


If more than ten rows are required to collect samples, linking a program allows you to run two programs with identical test parameters back to back. To link identical programs, link the program to itself.

To link another program to the one previously selected, select option **2**.
The following screen displays:

LINK PROG #: (1-15):__
TIME: 08/29/04 15:02:30 ELAPSE: 000:00:04

Enter the program number to link to the current program and press **ENTER**.

	Note
<p>When running two programs, it is necessary to replace the full sample tray with an empty one between programs. Enable the program completion alarm (see “5 Prg Compl Alarm” on page 52) to alert the analyst when the first program completes and the second program begins.</p>	

Step 4. The Select Start Mode screen displays. Options 1 - 3 start the collection program. Option 4 allows you to change or review the program before beginning.

SELECT START MODE	
1 START NOW	2 DELAYED START
3 REMOTE START	4 MODIFY PROGRAM
PROG#: 1 R-M: DISABLED	VOL: 5 ml

Following is a description of the Select Start Mode screen options:

Option	Function
1 Start Now	Select option 1 , Start Now. The BIO-DIS Options screen displays. See “BIO-DIS Options Screen” on page 69.
2 Delayed Start	Select option 2 , Delayed Start. The BIO-DIS Options screen displays. See “BIO-DIS Options Screen” on page 69.

Option	Function
3 Remote Start	This option is designed for use with the VK 8000 coupled with non-Varian instruments. Contact the Dissolution Systems Service Department for information about this function.
4 Modify Program	Select option 4, Modify Program, to modify or review the selected program. See "Programming the VK 8000" on page 62 to review programming options. All program variable items can be viewed or changed. Press ESC to return to the Select Start Mode screen. Selecting option 4 again repeats the modify program operation. When the program is verified or changed to the correct settings, select the desired start mode (option 1 - 3) to start the program.

BIO-DIS Options Screen

BIO-DIS OPTIONS	
1 LOAD & RUN BIO-DIS	2 RUN WO/ LOADING
3 RUN VK 8000 ONLY	4 SET BIO-DIS
TIME: 08/29/04 08:09:51	ELAPSE: 000:00:00

Following is a description of the BIO-DIS Options screen options:

Option	Start Now Function	Delayed Start Function
1 Load & Run BIO-DIS	Select option 1, Load & Run BIO-DIS, to upload all saved parameters to the Apparatus 3 / Apparatus 7 and start the program.	Select option 1, Load & Run BIO-DIS, to upload all saved parameters to the Apparatus 3 / Apparatus 7. Enter the start time in 24-hour format and press ENTER . Enter the start date and press ENTER . If the delayed start alarm is enabled, enter the duration before the start of the program you would like the alarm to sound. To disable the alarm, see MENU > 0 > C under "Hidden Key Functions" on page 43. At any time prior to the scheduled start of the program, press ESC to cancel the delayed start.

Option	Start Now Function	Delayed Start Function
<p>2 Run WO/ Loading</p>	<p>Select option 2, Run WO/ Loading, to start the program and run the VK 8000 without loading and overriding the Apparatus 3 / Apparatus 7 settings.</p>	<p>Select option 2, Run WO/ Loading, to run the VK 8000 without loading and overriding the Apparatus 3 / Apparatus 7 settings.</p> <p>Enter the start time in 24-hour format and press ENTER. Enter the start date and press ENTER.</p> <p>If the delayed start alarm is enabled, enter the duration before the start of the program you would like the alarm to sound. To disable the alarm, see MENU > 0 > C under "Hidden Key Functions" on page 43.</p> <p>At any time prior to the scheduled start of the program, press ESC to cancel the delayed start.</p>
<p>3 Run VK 8000 Only</p>	<p>Select option 3, Run VK 8000 Only, to immediately start the VK 8000 only. The VK 8000 executes the program currently selected.</p> <p>This option is used when other instrumentation, such as an Apparatus 3 / Apparatus 7, is connected to the VK 8000 through the START OUTPUT jack on the rear of the instrument.</p>	<p>Select option 3, Run VK 8000 Only, to start the VK 8000 only.</p> <p>Enter the start time in 24-hour format and press ENTER. Enter the start date and press ENTER. Once the start date and time are reached, the VK 8000 executes the program currently selected.</p> <p>If the delayed start alarm is enabled, enter the duration before the start of the program you would like the alarm to sound. To disable the alarm, see MENU > 0 > C under "Hidden Key Functions" on page 43.</p> <p>At any time prior to the scheduled start of the program, press ESC to cancel the delayed start.</p>
<p>4 Set BIO-DIS</p>	<p>Use this option to modify or review the current program parameters. Select option 4, Set BIO-DIS. The Set BIO-DIS Parameters screen displays. See "Main Menu Option 2 Set BIO-DIS" on page 53 for a description of the Set BIO-DIS Parameters screen options.</p>	

Manual Sample

From the Ready screen, press **MANUAL SAMPLE** to collect a sample from the outer media tubes on command without a program. These options are only for manual sampling and have nothing to do with the stored program parameters for purge volume, prime volume, and so on.

When your system configuration includes the peristaltic pump, the following Manual Sampling screen displays:

MANUAL SAMPLING			
1 START	2 SET ROW #	3 SET VOLUME	
4 PRIME TIME	5 PURGE TIME	6 R-M OPTION	
ROW 3	VOLUME 5ml	PRIME 60	PURGE 60

When your system configuration includes the syringe pump with or without the filter changer, the following Manual Sampling screen displays:

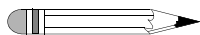
MANUAL SAMPLING			
1 START	2 SET ROW #	3 SET VOLUME	
4 PRIME VOL.	5 PURGE VOL.	6 R-M OPTION	
ROW 3	VOLUME 5ml	PRIME 10	PURGE 20

Following is a description of the Manual Sampling screen options:

Option	Function
1 Start	Select option 1, Start, to start the manual sampling procedure using the values you enter for options 2 through 6 on the Manual Sampling screen. The display screen details each step of the manual collection as it takes place. Note: select this option last.
2 Set Row #	Select option 2, Set Row #. Enter the row number between 0 and 9 where you want the samples deposited in the sample tray and press ENTER . The Manual Sampling screen displays.

Option	Function
3 Set Volume	Select option 3 , Set Volume. Enter a sample volume between 0 and 14 mL and press ENTER . The Manual Sampling screen displays. Note: the volume can contain a decimal point so that fractional milliliters can be collected. Be sure not to enter a volume larger than the collection tubes can contain.
4 Prime Time (peristaltic pump)	Select option 4 , Prime Time. Enter a value for the priming time and press ENTER . The Manual Sampling screen displays. Note: the priming time is the interval the peristaltic pump runs forward, drawing medium into the system, before the valves open to deliver samples.
4 Prime Vol (syringe pump)	Select option 4 , Prime Vol. Enter a value for the priming volume and press ENTER . The Manual Sampling screen displays. Note: the priming volume is the amount of drawn medium necessary to fill the sampling lines of the entire system.
5 Purge Time (peristaltic pump)	Select option 5 , Purge Time. Enter a value for the purging time and press ENTER . The Manual Sampling screen displays. Note: the purging time is the interval the peristaltic pump runs in reverse to return the uncollected medium in each line back into the vessel from which it was drawn. Purging also clears the sampling filters of particulate matter that may restrict successive samples.
5 Purge Vol (syringe pump)	Select option 5 , Purge Vol. Enter a value for the purging volume that ensures at least two strokes of the syringe plunger and press ENTER . The Manual Sampling screen displays. Note: the first stroke moves all medium from the sampling lines to the return lines. The second stroke draws air into the sampling lines and purges the remaining medium from the return lines. This ensures all stranded medium is properly expelled.
6 R-M Option	Select option 6 , R-M Option. The Replacement Media Option screen displays. Select option 2 to disable media replacement. The Manual Sampling screen displays. Note: the media replacement option is not available with the Apparatus 3 / Apparatus 7. Ensure this option is disabled or the instrument will not operate properly.

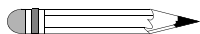
Volumetric Calibration



Note

The **CAL** key on the VK 8000 can be used only if the peristaltic pump is installed on your system. To calibrate the syringes in the VK 806 Syringe Pump, see “5 Full Stroke (hidden option)” under “Main Menu Option 3 Set Syringe Pump (Syringe Pump)” on page 56.

It is critical that sample volumes are accurately and precisely taken. Calibration of your system ensures this by recording in memory the time required to deliver a nominal 10 mL of medium into the graduated calibration tubes. Refer to “Automatic Calibration” below or “Manual Calibration” on page 75 for specific operating procedures necessary to calibrate your VK 8000.



Note

Ensure the cannula filters are in place during calibration.

Automatic Calibration

To perform automatic calibration, complete the following steps:

- Step 1. Place 300 mL outer media tubes filled with tap water in a row on the Apparatus 3 / Apparatus 7.
- Step 2. Ensure the correct prime and purge times have been entered via the Main Menu options 4 and 5, Manual Prime Time and Manual Purge Time, respectively (see “4 Manual Prime Time (peristaltic pump)” on page 49 and “5 Manual Purge Time (peristaltic pump)” on page 50).
- Step 3. Ensure the supplied autocalibration block is firmly in place and connected to the rear panel jack labeled AUTO CALIBRATION.
- Step 4. From the Ready screen, press **CAL**. The dispensing arm moves forward to allow you to check the autocalibration block.

Manual Calibration

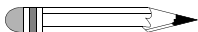
To perform the calibration yourself, complete the following steps:

- Step 1. Remove the sample tray.
- Step 2. Fill a row of outer media tubes with tap water.
- Step 3. Ensure the correct prime and purge times have been entered via the Main Menu option 4 and 5, Manual Prime Time and Manual Purge Time, respectively (see “4 Manual Prime Time (peristaltic pump)” on page 49 and “5 Manual Purge Time (peristaltic pump)” on page 50).
- Step 4. Press **MENU**.
- Step 5. Select option **7**, Manual Operation.
- Step 6. Select option **4**, Goto Rows.
- Step 7. Enter **4** to move the dispensing arm to row 4.
- Step 8. Remove the media rinse reservoir.
- Step 9. Press **H** to return to the home position.
- Step 10. Press **ESC** three times to return to the Ready screen.
- Step 11. From Ready screen, press **CAL**. The dispensing arm moves forward to allow you to check the autocalibration block.
- Step 12. Remove the top portion of the autocalibration block and place it on its side to prevent damage.
- Step 13. Place clean, empty 10 mL calibration tubes in the bottom portion of the autocalibration block.
- Step 14. Move the Apparatus 3 / Apparatus 7 drive unit to the row which contains the tap water and begin dipping.

- Step 15. Select option **1**, Manual. The dispensing arm moves over the autocalibration block and primes the lines according to the manual prime settings.
- Step 16. Upon completion of the priming cycle, the following screen displays:

PRESS <OPEN VALVES> TO START
PRESS AGAIN WHEN 10 ML IS REACHED
MANUAL CALIBRATION OF VALVE # 1
TIME: 08/29/04 21:56:40 ELAPSE: 000:00:00

- Step 17. Press **OPEN VALVES**. The first calibration tube begins filling.
- Step 18. Observe the first calibration tube and press **OPEN VALVES** again when 10 mL is reached.
- Step 19. Repeat steps 17 and 18 for the remaining calibration tubes. When the last valve is calibrated, the pump reverses and the lines are purged. The calibration completion alarm, if enabled, sounds when the calibration sequence is finished.
- Step 20. Press any key to silence the alarm.
- Step 21. After the dispensing arm moves forward, remove and clean the calibration tubes.
- Step 22. Reconnect the top and bottom portions of the autocalibration block.
- Step 23. Press **ESC**.



Note

If you press **ESC** before all the valves are calibrated, you cancel the calibration and return to the previously saved values for each valve. None of the new calibration results are saved. The calibration must be allowed to finish before the new calibration values are saved.

- Step 24. Press **MENU**.
- Step 25. Select option **7**, Manual Operation.
- Step 26. Select option **4**, Goto Rows.
- Step 27. Enter **4** to move the dispensing arm to row 4.
- Step 28. Replace the media rinse reservoir in front of the autocalibration block.
- Step 29. Press **H** to return to the home position.
- Step 30. Press **ESC** three times to return to the Ready screen.

Checking the Calibration

Check the calibration by running a short sampling procedure and dispensing the requested volume into calibrated test tubes:

- Step 1. Place an appropriate number of 10 mL calibration tubes in row 9 of the VK 8000 sample tray.
- Step 2. Move the Apparatus 3 / Apparatus 7 drive unit to the row containing the outer media tubes and start dipping.
- Step 3. From the Ready screen, press **MANUAL SAMPLE**.
- Step 4. Enter the following parameters:

Selection	Response
2 Set Row #	Enter 9 and press ENTER .
3 Set Volume	Enter 10 and press ENTER .
4 Prime Time	Enter 60 and press ENTER .
5 Purge Time	Enter 60 and press ENTER .
6 RM Option	Ensure the RM option is disabled.

- Step 5. Verify the values for each parameter which are shown at the bottom of the display screen for this manual program.
- Step 6. If the values are correct, select option 1, Start, to start the sampling procedure. The VK 8000 dispenses 10 mL into the calibration tubes in row 9 of the sample tray.
- Step 7. Check the volume in each tube to ensure the VK 8000 is dispensing 10 mL \pm 0.5 mL from each position.
- Step 8. If the volumes are not correct, repeat the calibration of the VK 8000 according to the procedure described on page 73 for "Automatic Calibration" or page 75 for "Manual Calibration" as appropriate.

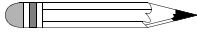
If the volumes are correct, you are ready to use the VK 8000 to collect samples.

Daisy Chaining

A series of Apparatus 3 / Apparatus 7 testers and VK 8000s can be started at the same time using one VK 8000 as the master unit. To set up a daisy chain, complete the following steps:

- Step 1. Connect the master VK 8000 START OUTPUT jack to the START INPUT jack of its dedicated Apparatus 3 / Apparatus 7 using a four-pin cable. Connect the START OUTPUT jack of the first Apparatus 3 / Apparatus 7 to the START INPUT jack of a second VK 8000. Connect the START OUTPUT jack of the second VK 8000 to the START INPUT jack of the second Apparatus 3 / Apparatus 7. Daisy chain successive units using the same technique.
- Step 2. Set the desired program for each VK 8000 independently.

Step 3. For each of the remote units:



Note

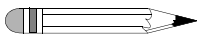
Ensure the communication port identification number for each linked VK 8000 increases incrementally (see "4 Set Com Port ID", under "Printer Operation and Communications" on page 61).

- Press **START PROG.**
- Enter the desired program number and press **ENTER.**
- Select option **1**, Run Single Prog.
- Select option **3**, Remote Start.
- Select option **1**, Load & Run BIO-DIS. The program loads and the Ready screen displays.

Step 4. For the master VK 8000:

- Press **START PROG.**
- Enter the desired program number and press **ENTER.**
- Select option **1**, Run Single Prog.
- Select option **1**, Start Now.
- Select option **1**, Load & Run BIO-DIS. The program starts.

Each unit starts running the program you entered.



Note

Ensure no start output delays have been set on any of the VK 8000s. See "3 Start Output Delay (peristaltic pump)" under "VK 8000 Main Menu" on page 48 or "6 Start Output Delay" under "Main Menu Option 1 Set Clock/Alarms" on page 52 depending on your system configuration.

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Chapter 9 ***Maintenance***

General Maintenance



Warning

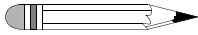
The VK 8000 and accessories contain electrical circuits, devices, and components operating at dangerous voltages. Contact with these circuits, devices, and components can cause death, serious injury, or painful electric shock.

Perform the following maintenance when necessary.

Clean System Function with Peristaltic Pump

Use the clean system function often to keep the valves, needles, and sample lines clean. The timing of the valves opening and closing with the pump rotations creates cavitation in the valves. Cleaning the system dislodges any particulate matter that may affect the operation of the system.

Note



Prior to beginning the clean system function, verify an appropriate manual prime value and purge value have been entered via the Main Menu. See “4 Manual Prime Time (peristaltic pump)” on page 49 and “5 Manual Purge Time (peristaltic pump)” on page 50.

To clean the system, complete the following steps:

- Step 1. Place the appropriate number of outer media tubes in row 1 of the Apparatus 3 / Apparatus 7.
- Step 2. Fill each outer media tube with an appropriate cleaning solution, usually water.
- Step 3. From the Main Menu, select option **6**, Control BIO-DIS. See “Main Menu Option 6 Control BIO-DIS” on page 56.
- Step 4. Select option **3**, Goto Row.
- Step 5. Enter **1** and press **ENTER** to move the drive unit to row 1 which contains the outer media tubes filled with cleaning solution.
- Step 6. Select option **1**, Dip, to lower the agitator shafts and begin dipping. A slow dipping speed, such as 5 DPM, is recommended. See “1 Dipping Speed (DPM)” on page 53 for information about how to set the dipping speed.

- Step 7. Once dipping has started, press **CLEAN SYSTEM** on the VK 8000. The Cleaning Systems Selections screen displays.

```
***CLEANING SYSTEMS SELECTIONS***  
1 START CLEAN           2 ENABLE AUTO CLEAN  
  
TIME: 08/29/04 08:28:46  ELAPSE: 000:00:00
```

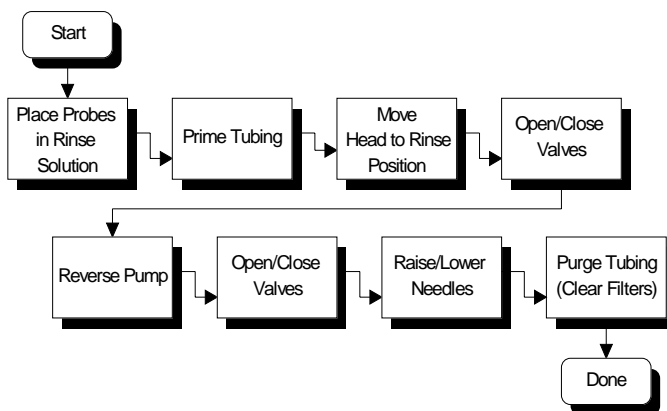
To start the cleaning process immediately, see “Start Immediately” below. To program the auto clean function, see “Programmed Clean” on page 84.

Start Immediately

From the Cleaning Systems Selections screen, select option **1**, Start Clean. The VK 8000 immediately starts to clean the system by priming the lines. Once the system completes the priming, the needle manifold jogs up and down while opening and closing the valves. This motion rinses the needles in the VK 8000 rinse chamber. Then the system purges the cleaning solution from the sample lines.

The following figure is a generalized flow diagram of the clean cycle (see Figure 7, “The Cleaning Process,” below). *You should use this function often.*

FIGURE 7. The Cleaning Process



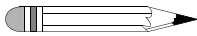
Programmed Clean

To run a program concurrently with the sampling program which rinses the needles in a predetermined cleaning solution contained in the rinse chamber, complete the following steps:

- Step 1. Ensure the rinse chamber of the media rinse reservoir is filled with the cleaning solution.
- Step 2. From the Cleaning Systems Selections screen, select option **2**, Enable Auto Clean. Option 3, Disable Auto Clean, displays on the Cleaning Systems Selections screen and option 2 changes to Program Auto Clean.

CLEANING SYSTEMS SELECTIONS	
1 START CLEAN	2 PROGRAM AUTO CLEAN
3 DISABLE AUTO CLEAN	
TIME: 08/29/04	ELAPSE: 000:00:00

Note

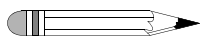


Select option **3**, Disable Auto Clean, to escape the automatic clean function and return to the original Cleaning Systems Selections screen. Select option **1**, Start Clean, from either screen to escape the automatic clean function and immediately start the cleaning process.

- Step 3. Select option **2**, Program Auto Clean. The Program Auto Clean Variables screen displays.

PROGRAM AUTO CLEAN VARIABLES		
1 CLEAN FREQUENCY	2 DRAWING MEDIA TIME	
3 PUSH FORWARD TIME		
TIME: 08/29/04	08:28:46	ELAPSE: 000:00:00

Note

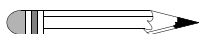


Since the cleaning program runs concurrently with the sampling program, the value entered for the clean frequency should be smaller than the sample timepoint.

Step 4. Select each option and enter the appropriate parameters as necessary based on tubing length, tubing diameter, and system dead volumes.

Option	Function
1 Clean Frequency	Select option 1, Clean Frequency. Enter an interval of up to 99 minutes and press ENTER . The cleaning begins at this time. Note: ensure the clean frequency is set earlier than the first sample timepoint.
2 Drawing Media Time	Select option 2, Drawing Media Time. Enter an interval of up to 999 seconds to control the length of time the cleaning solution is drawn from the rinse tank and press ENTER .
3 Push Forward Time	Select option 3, Push Forward Time. Enter an interval of up to 999 seconds to indicate the length of time the cleaning solution is moved through the return lines and press ENTER .

Note



Appropriate parameters for each of the above options depends on the length and diameter of the tubing as well as the needle volume. Do not allow the cleaning solution to reach the Apparatus 3 / Apparatus 7. Once the pump reverses, the cleaning solution is expelled in the rinse chamber.

At the time set for the clean frequency (see “1 Clean Frequency” above), the VK 8000 drive unit moves to the rinse chamber and lowers the needles. The peristaltic pump draws the cleaning solution into the needles and sample lines for the length of time defined as the drawing media time (see “2 Drawing Media Time” above). The valves close and the pump pushes the cleaning solution into the return lines for the programmed push forward time (see “3 Push Forward Time” above). Ensure the length of time entered for the push forward time does not push the cleaning solution far enough to reach the Apparatus 3 / Apparatus 7 or sample contamination can occur. The peristaltic pump reverses and the cleaning solution is pulled back through the sample lines. The pump

reverses again, the valves open, and the cleaning solution is expelled into the rinse chamber. The VK 8000 activates the valves several times to clean the valves and needles.

Clean System Function with Syringe Pump

To clean the system, immerse all sampling cannulas into a cleaning solution, usually water. Complete the following steps:

- Step 1. Fill one row of outer media tubes with the appropriate cleaning solution, usually water.
- Step 2. On the Apparatus 3 / Apparatus 7, press **START DIP**.
- Step 3. Select option **3**, Goto Row.
- Step 4. Enter the row number which contains the cleaning solution and press **ENTER**. The drive unit moves to the selected row.
- Step 5. Select option **2**, Set Speed (DPM).
- Step 6. Enter **5** DPM and press **ENTER**.
- Step 7. Select option **1**, Start. The agitator shafts lower and begin dipping.
- Step 8. On the VK 8000, press **CLEAN SYSTEM**. The Cleaning Systems Selections screen displays and the cleaning procedure begins immediately.

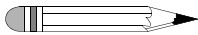
Upon completion of the cleaning process, the VK 8000 dispensing arm and the Apparatus 3 / Apparatus 7 drive unit return to the home position.

Syringe Refurbishing

The following instructions are for the Syringe Refurbishing Kit (P/N 15-5900) for use with Luer syringes (P/N 1003-0145).

The refurbishing kit contains

- white seal
- O-ring



Note

Ensure the white seal remains clean. Keep the seal free from dirt and dust.

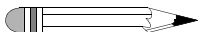
Removing a Leaking Syringe

Complete the following instructions to remove the leaking syringe from the syringe pump:

- Step 1. Lay the syringe pump on its back.
- Step 2. From the VK 8000 Ready screen, press **MENU > 7** to display the Manual Operations screen.
- Step 3. Select option **6**, Syringe/Filter. The Operate Syringe/Filter Changer screen displays.
- Step 4. Select option **3**, Syringe Fill.
- Step 5. Enter **100** and press **ENTER**. The syringe plungers move to their lowest position. The menu remains on the VK 8000 display screen for later use.
- Step 6. Unscrew the locking screw at the base of the leaking syringe.
- Step 7. Remove the screw and gently remove the plunger from the syringe barrel.

- Step 8. Unscrew the syringe barrel by turning the metal fitting on top of the syringe barrel counterclockwise until the syringe comes free.

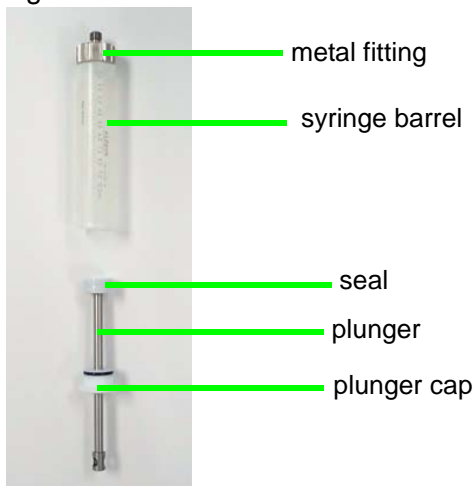
Replacing the Seal



Note

The seal and O-ring can be replaced up to ten times before the glass syringe needs to be replaced.

- Step 1. If necessary, pull back the plunger and carefully remove it from the syringe barrel.



- Step 2. Remove the old seal from the plunger by carefully cutting into the seal until the seal peels easily away. Discard the old seal.



- Step 3. Remove and discard the O-ring.
- Step 4. Place the new O-ring from the refurbishing kit onto the plunger.
- Step 5. Place the new seal on a hard, flat surface.
- Step 6. Push the plunger into the seal.

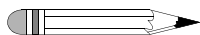


- Step 7. Ensure the seal is tight at all points around the plunger.
- Step 8. Replace the plunger (see “Replacing the Syringe” on page 90).
- Step 9. Clean the syringe (see “Cleaning the Syringes” on page 91).

Replacing the Syringe

Complete the following steps to replace the syringe:

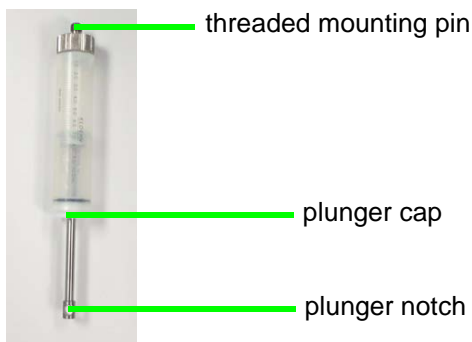
- Step 1. *Wet the plunger seal* and insert the seal into the syringe barrel (see photo on page 88). Ensure the plunger cap is firmly in place inside the syringe barrel.



Note

If the plunger seal is not wetted before it is inserted into the syringe, it does not seal properly and will leak.

- Step 2. Pull back the plunger after it is inserted.



- Step 3. Align the plunger notch with the pin drive.
- Step 4. Turn the metal fitting on top of the syringe barrel clockwise so the threaded mounting pin screws into place under the solenoid valve.
- Step 5. Screw in the locking screw at the base of the plunger.
- Step 6. Use pliers to firmly tighten the metal fitting at the top of the syringe barrel.
- Step 7. Press **4** to dispense the syringes and move the syringe plungers to their highest position.
- Step 8. Press **ESC** until the Ready screen displays.

Cleaning the Syringes

To clean the syringes, use the appropriate cleaning solution based on the product being tested. Move the Apparatus 3 / Apparatus 7 drive unit to the row of outer media tubes which contain the cleaning solution and begin dipping.

Syringes should be cleaned after each test using one of the following procedures:

50% Methanol or 10% Bleach Cleaning Procedure

- Step 1. From the VK 8000 Ready screen, press **MENU** > **7**. The Manual Operations screen displays.
- Step 2. Select option **6**, Syringe/Filter. The Operate Syringe/Filter Changer screen displays.
- Step 3. Select option **1**, Valve to Input, to ensure the valve is set to input.
- Step 4. Select option **3**, Syringe Fill.
- Step 5. Enter **100** and press **ENTER**. The syringes fill completely with cleaning solution.
- Step 6. Allow the solution to remain in the syringes for ten minutes.
- Step 7. Select option **4**, Syringe Dispense. The cleaning solution expels from the syringes.
- Step 8. Replace the cleaning solution in the outer media tubes with ultrapure water.
- Step 9. Repeat steps 3 - 7 a minimum of ten times to flush the syringes thoroughly.
- Step 10. When the cleaning procedure is complete, press **ESC** until the Ready screen displays.

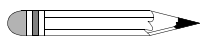
Acid / Base Cleaning Procedure

- Step 1. Fill one row of outer media tubes with 0.1N NaOH.
- Step 2. Move the Apparatus 3 / Apparatus 7 drive unit to the row containing the cleaning solution and begin dipping.
- Step 3. From the VK 8000 Ready screen, press **MENU > 7**. The Manual Operations screen displays.
- Step 4. Select option **6**, Syringe/Filter. The Operate Syringe/Filter Changer screen displays.
- Step 5. Select option **1**, Valve to Input, to ensure the valve is set to input.
- Step 6. Select option **3**, Syringe Fill.
- Step 7. Enter **100** and press **ENTER**. The syringes fill completely with cleaning solution.
- Step 8. Allow the solution to remain in the syringes for ten minutes.
- Step 9. Select option **4**, Syringe Dispense. The cleaning solution expels from the syringes.
- Step 10. Replace the cleaning solution in the outer media tubes with ultrapure water.
- Step 11. Repeat steps 6 - 10 to flush the syringe.
- Step 12. Change the cleaning solution in the outer media tubes to 0.1N HCl and repeat steps 6 - 10.
- Step 13. Replace the cleaning solution in the outer media tubes with ultrapure water.

- Step 14. Repeat steps 6 - 10 a minimum of ten times to flush the syringes thoroughly.
- Step 15. When the cleaning procedure is complete, press **ESC** until the Ready screen displays.

System Cleaning Program with Syringe Pump and Filter Changer (optional)

To clean the VK 8000, syringe pump, and filter changer system, use the appropriate cleaning solution based on the product being tested. Remove the inner tube assemblies from the adapter shafts. Use a row of 300 mL outer media tubes on the Apparatus 3 / Apparatus 7 to hold the cleaning solution and ensure the sampling cannulas are submerged into the cleaning solution. Complete the following steps to set up the cleaning procedure:



Note

Ensure the RM option is disabled using the hidden key function MENU > 0 > R.

- Step 1. From the Ready screen, press **PROG** to program the VK 8000.
- Step 2. Enter a program number (1 - 15) to use for this cleaning program and press **ENTER**. The Program Variables screen displays.
- Step 3. Select option **1**, Set BIO-DIS Parameters.
- Step 4. Enter the following parameters:

Selection	Response
1 Dipping Speed (DPM)	Enter 10 and press ENTER for all rows.
2 Samples Per Row	Enter 3 and press ENTER . Enter 0 and press ENTER for all remaining rows.
3 Hold Dip Time	Enter 00:00 and press ENTER for all rows.

Selection	Response
4 Set Bath Temp	Enter 37.3 and press ENTER .
5 Com Port ID	Enter 01 and press ENTER .
6 Print Frequency	Enter 000 and press ENTER .

Step 5. Press **ESC > Y**. The Program Variables screen displays.

Step 6. Enter the following parameters:

Selection	Response
2 Sample Time Points	Row 0: Enter 000:05 and press ENTER . Row 1: Enter 000:10 and press ENTER . Row 2: Enter 000:15 and press ENTER . Row 3: Enter 000:00 and press ENTER .
3 Sample Volume	Enter a sample volume based on the size vial used in the VK 8000 sample tray and press ENTER . Ensure rows 0 - 2 in the sample tray contain empty vials.
4 Set Headers	Enter the requested information as applicable. Press ESC to return to the Program Variables screen.
5 Prime Volume	Enter 10 and press ENTER .
6 Purge Volume	Enter 15 and press ENTER .
7 Filter Chg	This option is only applicable if your system configuration includes a filter changer. Set the number of samples per filter to 1 and press ENTER .

Step 7. Press **ESC** until the Ready screen displays.

Step 8. Press **START PROG**.

Step 9. Enter the program number for this cleaning program and press **ENTER**.

Step 10. Press **1 > 1 > 1** to start the cleaning program.

After the VK 8000 pulls three rows of samples for cleaning purposes, complete the following steps to ensure the needles are completely purged of cleaning solution:

- Step 1. From the Ready screen, press **MENU** > **7** > **4** > **R**.
- Step 2. Press **ESC**. The Manual Operations screen displays.
- Step 3. Select option **3**, Open/Close Valves, to open the valves.
- Step 4. Select option **2**, Lower Valves, to lower the needles.
- Step 5. Select option **1**, Lift Valves, to raise the needles.
- Step 6. Repeat steps 4 and 5 a minimum of four times to completely expel the cleaning solution from the needles.
- Step 7. Select option **3**, Open/Close Valves, to close the valves.
- Step 8. Select option **4**, Goto Rows.
- Step 9. Press **H** to move the dispensing arm to the home position.
- Step 10. Press **ESC** until the Ready screen displays.

Cleaning the Filter Changer Drip Tray

- Step 1. Slide up and remove the filter catch basin from the screw mount on the front of the filter changer.
- Step 2. Pull the drip tray forward completely to remove it from under the filter changer.
- Step 3. Empty any accumulated liquid from the tray and wipe it clean.
- Step 4. Replace the tray under the filter changer by sliding it forward along the tracks until it stops.

- Step 5. Replace the filter catch basin.

Report Center Impact Printer

The following is helpful information for using your impact printer.

Installing the Cartridge Ribbon

If the printer is used infrequently, the print impression sometimes becomes weak because the ribbon dries out. If the printed material is difficult to read and you suspect this is the cause of the problem, advance to a properly inked portion of the ribbon by pressing the printer toggle switch into the *Paper feed* position. If the printing is still faint, replace the cartridge.

To install the cartridge, complete the following steps:

- Step 1. Toggle the printer off line by pressing the printer toggle switch to the *OnLine / Off Line* position. When the printer is off line, the Ready LED does not illuminate.

- Step 2. Four small grooves are embossed on the printer cover. Gently push on these grooves to tilt the cover. When the printer cover is tilted up, you can lift it off completely.

- Step 3. Push down on the right side of the ribbon cartridge (marked PUSH) and remove the old cartridge.

- Step 4. Install the new cartridge. If there is already paper in the printer, hold the cartridge between your thumb and index finger, slide it over the paper and into the printer compartment. Ensure the paper is between the ribbon cartridge and the ink ribbon. Ensure the ink cartridge is inserted firmly to prevent weak or irregular printing. The cartridge must be properly seated and aligned for the best printing.

- Step 5. Turn the cartridge knob (marked by an arrow) clockwise to stretch the ribbon taut.
- Step 6. Replace the cover.
- Step 7. Toggle the printer online by pressing the printer toggle switch to the *OnLine / Off Line* position. The Ready LED illuminates.
- Step 8. Replace the paper, if necessary.

If you get ribbon ink on the printer's plastic cover, remove it immediately. Once dried, it is difficult to remove.

Replacing a Paper Roll

- Step 1. Toggle the printer off line by pressing the printer toggle switch to the *OnLine / Off Line* position. When the printer is off line, the Ready LED does not illuminate.
- Step 2. Grasp the paper roll cover firmly by the grooves on the side and the front edge. Pull outward to remove the cover.
- Step 3. Press the printer toggle switch to *Paper feed* to advance the paper approximately one inch beyond the paper cutter.
- Step 4. Remove the paper roll.
- Step 5. Using scissors, cut the paper feeding to the printer.
- Step 6. Pull the remaining paper through the printer mechanism. *Pull the paper from the front (paper cutter side)*. Pulling the paper out of the back of the printer will damage the print mechanism.
- Step 7. Unroll several inches of paper on the new roll.
- Step 8. If it is jagged, cut a straight edge on the paper roll to facilitate the entry of the paper into the printer.

- Step 9. Slide the paper through the slot connecting the paper compartment and the printer compartment. You can slide it in approximately 1/4 inch before it stops.
- Step 10. While holding the paper in place, press the printer toggle switch to the *Paper feed* position and hold until approximately one inch of paper has emerged from the top of the printer.



Caution

Ensure the roll of paper feeds squarely. If it does not, the paper can jam and possibly damage the printer mechanism.

- Step 11. Release the printer toggle switch.
- Step 12. Turn the paper roll to take up any slack in the paper feeding to the printer. Place the paper roll in the paper compartment.
- Step 13. Replace the paper roll cover. If the cover is difficult to remove or replace, the left and right edges can be trimmed or shaved with a utility knife allowing the cover to slide easier.
- Step 14. Toggle the printer online by pressing the printer toggle switch to the *OnLine / Off Line* position. The Ready LED illuminates.

Toggle Your Printer Online

Complete these steps to toggle your printer online:

- Step 1. Toggle the printer online by pressing the printer toggle switch to the *OnLine / Off Line* position. When the printer is off line, the Ready LED does not illuminate.
- Step 2. Release the switch and it returns to the center position. The ready LED illuminates and a READY message prints if the PRINT READY command has not been turned off. See "Printer Configuration" on page 99 for instructions on turning on and off the PRINT READY command. When you

first turn on the instrument, it prints a READY message to assure you that the built-in microprocessor is operating properly.

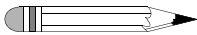
When you turn off the printer, wait at least three seconds before turning it on again.

Printer Self Test

You can test the print head and ribbon only *after* inserting paper. Do not attempt to print without paper. Follow these steps to perform a printer self test:

- Step 1. Turn off the VK 8000.
- Step 2. Press and hold the printer toggle switch in the *Paper feed* position.
- Step 3. Turn on the VK 8000.
- Step 4. Hold the printer toggle switch until printing begins. The printer prints a list of the current configuration settings and a continuous print test.
- Step 5. Press the printer toggle switch to the *OnLine / Off Line* position to stop the printing operation.
- Step 6. The printer is ready to resume normal operation.

Printer Configuration



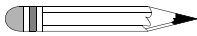
Note

The printer configuration is set by the factory. This procedure should be performed only if the printer displays erroneous characters. Contact the Dissolution Systems Service Department for assistance, if necessary.

- Step 1. Turn off the VK 8000.
- Step 2. Press and hold the printer toggle switch in the *OnLine / Off Line* position while turning the VK 8000 back on. Hold the printer toggle switch in the

OnLine / Off Line position for six seconds after the instrument is turned on, then release the switch.

- Step 3. The printer should print: ***** SETUP MENU ***** and **CONFIGURE... . [NEXT/OK]**. If this message does not print, repeat steps 1 through 3.
- Step 4. The printer toggle switch is used to complete the configuration. Pressing the left side of the toggle switch selects **NEXT** to advance to the next menu item. Pressing the right side of the toggle switch selects **OK** to accept what is stated on the current line of the menu item. Each time the switch is pressed, another part of the menu prints. Allow the printer to finish printing before pressing the switch again. See the table of commands below.



Note

The printout is easier to read if the print cover is removed.

*** SETUP MENU***		
CONFIGURE	[NEXT/OK]	Press NEXT to avoid configuration.
CUSTOM	[NEXT/OK]	Press OK to enter custom mode.
CUSTOM MENU		
PRINT CUSTOM SETUP	[NEXT/OK]	Press NEXT
AUTO SEQ = NO	[NEXT/OK]	Press OK
ZERO = Ø	[NEXT/OK]	Press OK
POUND SIGN = #	[NEXT/OK]	Press OK
_(UNDERScore)	[NEXT/OK]	Press OK
ONLINE/OFFLINE=YES	[NEXT/OK]	Press OK
EXT CH SET = NO	[NEXT/OK]	Press OK
PRINT READY = YES	[NEXT/OK]	Press NEXT
PRINT READY = NO	[NEXT/OK]	Press OK
READY..		

Your printer is now configured correctly.

Chapter 10 ***Service and Warranty***

The warranty is provided by Varian, Inc. or one of its authorized representatives.

Service and Warranty Information

Varian dissolution products carry a one-year warranty on parts and labor. The Dissolution Systems Service Department (or one of its representatives) will, at its option, either repair or replace any mechanical and electrical components in your instrument which prove to be defective. During the first year of warranty coverage, there is no charge for the labor to repair your unit. The Dissolution Systems Service Department (or one of its representatives) will determine the best site to repair the unit, either onsite or returned to Varian, Inc. Any onsite warranty services are provided only at the initial installation point. Installation and onsite warranty services are available only in Dissolution Systems service travel areas.

Exclusions and Limitations

Excluded from this warranty are expendable or consumable items such as, but not limited to, paddles, baskets, vessels, and acrylic water baths. Also excluded are defects from improper or inadequate maintenance by the customer, user-induced chemical action or contamination, unauthorized modification or misuse, and improper site preparation and maintenance.

Operation of software is not warranted to be uninterrupted or error-free.

Obtaining Warranty Service

To obtain warranty service in the United States, contact the Dissolution Systems Service Department at 800.229.1108 to obtain authorization to return units for repair. At the option of the customer, onsite warranty service is available, but travel charges may be incurred. The customer should prepay all shipping charges for products returned to the Dissolution Systems Service Department (unless otherwise authorized), and Varian, Inc. will pay all charges for return to the customer.

Warranty Limitations

Varian, Inc. makes no other warranty, either express or implied, with respect to this product. Specifically disclaimed are any implied warranties of merchantability and fitness for a particular use. In no event will Varian, Inc. be liable for any indirect, incidental, or consequential damages arising from the use of this product. This warranty gives you specific legal rights which may vary from state to state or province to province, so you may have other rights and some of these exclusions may not apply to you.

Exclusive Remedies

The remedies provided herein are the customer's sole and exclusive remedies. In no event shall Varian, Inc. or its representatives be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory. Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

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Index

a

aspir. dwell time 55
autocalibration block 42
automatic calibration 73

b

batch information 61

c

cable connections 26, 29, 33
calib compl alarm 52
calibration, checking 77
change filters 37
clean frequency 85
clean system 82
com port id 53
connections
 cable 26, 29, 33
 power and network 39
control bio-dis 56
conventions 17

d

dipping speed 53
drawing media time 85
drop volume 43
dual voltage option 40

e

exclusions 102
exclusive remedies 103

f

filter changer
 change filters 59
 filters 36
 operate 58
 power connections 39
 unpacking 23
final setup 39

g

general maintenance 81
goto rows 58

h

hazards 9
hidden key functions 43

i

introduction 15

k

keypad
 manual sample 71
 options 45
 start prog 67

l

lift valves 58
limitations 102
linking programs 68
load & run bio-dis 69
lower valves 58

m

main menu 47
maintenance 81
manual calibration 75
manual operation 57
manual sample 71, 77
maximum volume 63
modify program 69

o

obtaining warranty service 102
online/off line 98
open valves 76
open/close valves 58
operating the vk 8000 45

p

peristaltic pump 25
 main menu 47
 power connections 39
 setting up 25
 unpacking 21
plunger speed 55
positioning your system 19
prg compl alarm 52
prime loss volume 55
prime time 64, 72
prime volume 64, 72
printer
 cartridge ribbon 96
 operation 60
 replacing paper roll 97
 self test 99
 toggling online 98
program variables screen 62

purge time 64, 72
purge volume 65, 72
push forward time 85

r

ready screen 40
replacement media (rm) option 72
replacing paper roll 97
report center printer operation 60
row compl alarm 51
rs232 30
run vk 8000 only 70
run wo/ loading 70

s

safety practices 9
sample timepoints 66
sample times 61
sample tray 41
sample tubing connections 28, 31, 35
screens
 initial status 40
 ready 40
 system monitor 40
service 101
set alarms 51
set baud rate 61
set bio-dis 53
set clock 51
set com port id 61
set dipping speed 53
set row number 71
set syringe pump 54
set volume 72
setting up 24
start clean 83
start mode 68
start program 67
syringe pump
 enabling 44
 fill syringe 59
 operate 58
 power connections 39
 set syringe size 55
 setting 54
 syringe dispense 59
 syringe parameters 55
 unpacking 22

t

teflon lines 35, 36
tie wraps 28, 31, 35
timer alarm 51

Index

u

unpacking 19

v

valve to input 58

valve to output 58

vk 8000

 clamp removal 20

 unpacking 20

volumetric calibration 73

w

warranty 101

warranty limitations 102

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VARIAN

Tell Us How We Are Doing

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