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VK 8020 Sample Collector / HPLC Autoinjector Station Operator's Manual

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Revision E**

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Chapter 1 Safety Practices and Hazards

The VK 8020 has 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 8020 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 8020 contains 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 8020 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 these symbols is as follows:



Electrical shock



Pinch point



Caution
Refer to accompanying
documents

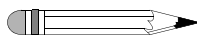
Read all warnings and cautions carefully and observe them at all times.

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 8020 has been designed to comply with the requirements of the Electro-magnetic Compatibility (EMC) Directive and the Low Voltage (electrical safety) 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 8020 has 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 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 8020 provides an easy way to collect samples from a dissolution apparatus and inject them onto an HPLC column.



Varian, Inc.

The VK 8020 is compatible with most HPLC systems and consists of two main modules:

- A sample collector with Peristaltic Pump which incorporates all the features of the VK 8000 Sample Collector.
- An autoinjector station which handles the injection of sample aliquots onto the HPLC column.

Sample volumes from 1 to 14 mL can be taken from the vessels, with up to eight sampling points per run. In addition, sampling programs can be set up to run for up to 999 hours. The automated sampling cannulas lower and raise at each sample point automatically. Microprocessor-controlled valves ensure accurate volume transfer of the sample from vessel to collector, and the sample collector's autocalibration feature makes periodic calibration of the valves quick and easy. The unique needle manifold allows samples to be delivered into either open tubes or pre-capped HPLC vials, eliminating any concerns about evaporation or contamination.

The autoinjector station incorporates a quality Rheodyne 7710 injector valve and a syringe pump, which pulls samples into the injection loop prior to each injection and flushes the lines afterward. Injection intervals are allowed from 1 to 99 minutes, and multiple injections can be made from each tube or vial. You can independently program the number of standard injections to meet the USP system suitability criteria. Standard injections can be programmed before, after, or bracketing the sample injections.

Both VK 8020 modules communicate intelligently with each other and with the HPLC system, allowing the autoinjector station to make as many injections as possible between sample timepoints. During a sample timepoint, the autoinjector station goes into standby mode, returning to its task only when the sample timepoint is complete. Consequently, efficiency is maximized and samples subject to evaporation and degradation do not sit for long periods of time before injection. The autoinjector station sends a TTL signal to the HPLC at each injection, signaling the beginning of a run. It can also be programmed to wait for a signal before injecting, ensuring the HPLC system is ready to start the next cycle.

The flexible design of the VK 8020 permits the use of either module as a stand-alone component at any time.

Introduction to the HPLC Autoinjector

The sample collector is available in a modified format to interface with the HPLC autoinjector station allowing direct on-column injection of sample aliquots immediately after they are collected from the dissolution vessels. In this model, there are two primary differences:

- A sipper needle is included in the sampling valve head. This needle moves from side-to-side and up-and-down to pull aliquots from the collection tubes or vials for transfer. Using the autoinjector station, samples are loaded into the Rheodyne valve housed in the VK 8020.
- Two additional options display on the sample collector Main Menu:
 1. Option 3, Injct Options, allows you to set values for all relevant injection parameters.
 2. Option 6, Injection Control, allows you to manually control the Rheodyne injector valve and the syringe pump.

When coupled with the autoinjector station, the sample collector can be used to collect samples and inject samples either separately or in tandem.



Warning

The VK 8020 contains 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.



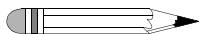
Caution

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.

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 > 7**.

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.

Chapter 3 Setting Up the VK 8020

Unpacking Your VK 8020

Complete the following steps to unpack your VK 8020:

- Step 1. Open each carton and check the contents for damage which may have occurred during shipping. Shipping damage rarely occurs, but if it does contact both the carrier who delivered the instruments and the Dissolution Systems Service Department. Though claims for damage should be filed with the carrier, we can help you file a claim.
- Step 2. Carefully remove the VK 8020, HPLC autoinjector station, accessory kit, and pump from their shipping cartons.
- Step 3. Remove as much cushioning material and tape as possible.

- Step 4. Place the equipment on a clear, dry, level section of the bench top close to the dissolution apparatus. The preferred placement of the VK 8020 and HPLC autoinjector station is on the right side of the dissolution apparatus with the Peristaltic Pump between the dissolution apparatus and the VK 8020.

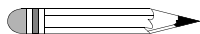


Warning

The electrical connection at the back of the collector and autoinjector station is the primary disconnect for the instruments. The instruments should be positioned to allow accessibility to the power cords for easy disconnection.

Setting Up the Peristaltic Pump

- Step 1. Remove the two thumb screws on top of the plastic pump cover. Lift off the plastic cover and set it aside.
- Step 2. Locate the pump cartridges shipped with the unit and remove the cartridges from the pump by pressing down the levers on the right side and lifting 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.
- 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 on 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. The excess pump tubing can be trimmed to within one inch of the colored 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 thumb screws. If the cover is not replaced correctly, the pump will not operate.

Cable Connections

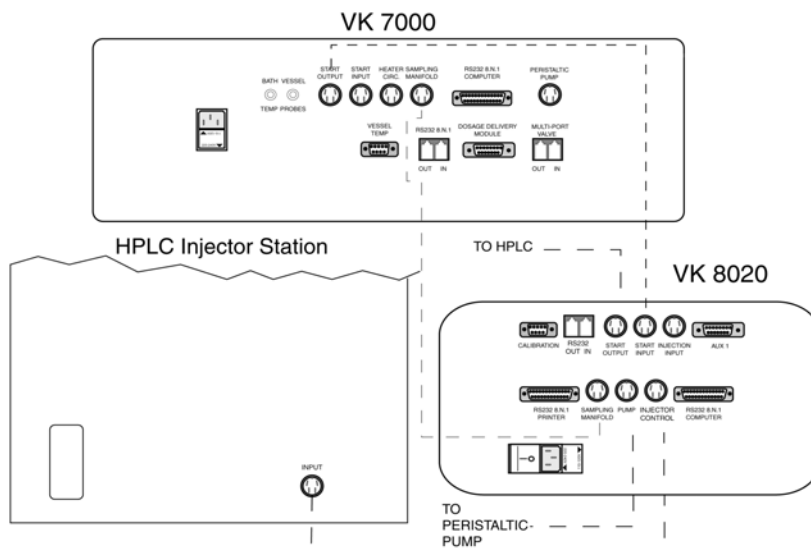


Warning

The electrical connection at the back of the collector and autoinjector station is the primary disconnect for the instruments. The instruments should be positioned to allow accessibility to the power cords for easy disconnection.

Refer to this diagram to correctly make cable connections for the VK 8020, HPLC autoinjector station, Peristaltic Pump, and dissolution apparatus.

FIGURE 1. VK 8020 Cable Connections



- Step 1. Locate the five-pin DIN cable in the accessory kit.
- Step 2. Plug one end into the five-pin female connector on the Peristaltic Pump rear panel and the other into the female five-pin connector on the VK 8020 rear panel (labeled PUMP).
- Step 3. Connect a power cord to the rear of the peristaltic pump and plug it into an outlet of the appropriate voltage.
- Step 4. Turn on the pump.



Warning

Ensure the pump is configured for the voltage supplied at the receptacle.

- Step 5. Plug one end of the four-pin cable into the SAMPLING MANIFOLD jack on the VK 8020 rear panel (see Figure 1, "VK 8020 Cable Connections," on page 21) and the other end into the corresponding jack on the dissolution apparatus rear panel.
- Step 6. Plug one end of the four-pin cable into the INJECTOR CONTROL jack on the VK 8020 rear panel (see Figure 1, "VK 8020 Cable Connections," on page 21) and the other end into the INPUT jack on the VK 8020 HPLC Autoinjector Station rear panel.
- Step 7. Plug one end of the four-pin cable with the two free wires on one end into the START OUTPUT jack on the VK 8020 rear panel. Connect the black wire to the positive closure on the HPLC and the other wire to the negative closure on the HPLC.
- Step 8. Plug one end of the four-pin cable into the START INPUT jack of the VK 8020 and the other end into the START OUTPUT jack of the dissolution apparatus.

- Step 9. Connect power cords to the VK 8020 and the HPLC autoinjector station and plug them into outlets of the appropriate voltage.



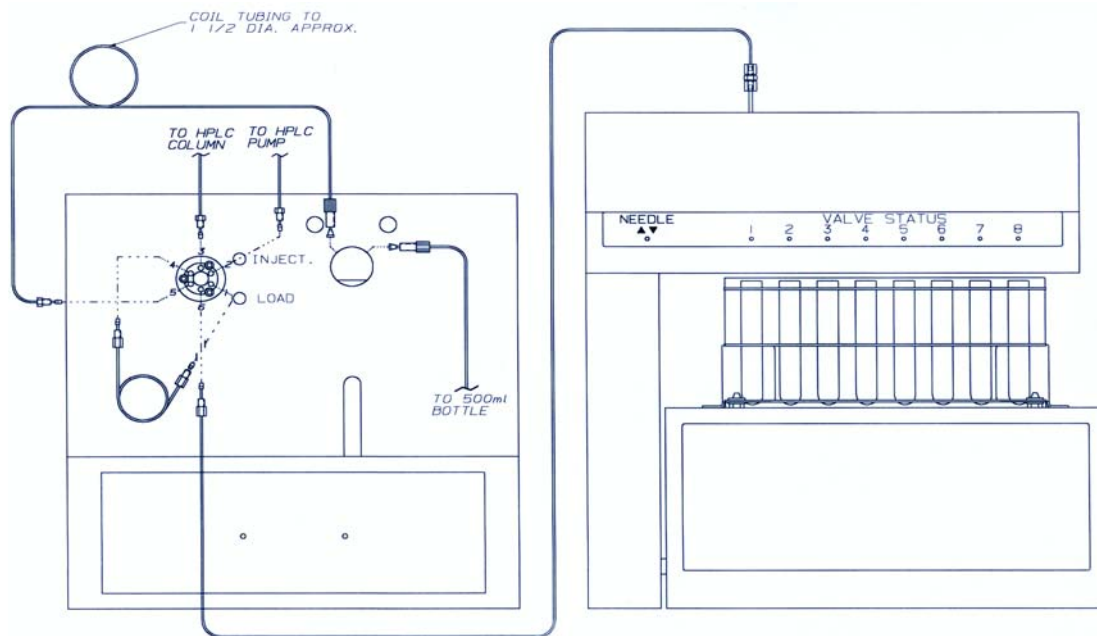
Warning

Before plugging the VK 8020 into any power outlet, ensure the instrument is configured for the voltage provided. Check the serial number tag on the rear panel to confirm the voltage requirement.

Connecting the VK 8020 Autosampler to HPLC

Refer to this diagram to connect the sample collector to the autoinjector station:

FIGURE 2. Connecting the Autosampler to the HPLC



- Step 1. Connect the sample loop to the Rheodyne valve at positions 1 and 4.
- Step 2. Connect the three-foot tubing from the sipper needle to the Rheodyne valve at position 6.
- Step 3. Connect the tubing from the HPLC pump to position 2 of the Rheodyne valve.
- Step 4. Connect the four-foot (0.042-inch ID) tubing to the Rheodyne valve at position 5 and to the left side of the two-way syringe valve.
- Step 5. Remove the small screw located on the piston on the autoinjector station and secure the 500 μ L syringe to the two-way syringe valve. Align the hole in the syringe plunger to the hole in the piston. Replace the screw.
- Step 6. Connect the 18-inch tubing to the right side of the two-way syringe valve and place the free end into a 500 mL bottle containing ultrapure water.
- Step 7. Connect the tubing from the HPLC column to position 3 of the Rheodyne valve.

VK 8020 Initial Power Up



Warning

The VK 8020 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.

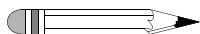
The electrical connection at the back of the apparatus is the primary disconnect for the instrument.

Turn on the VK 8020 by pressing the switch located on the rear panel AC power connector. The system monitor illuminates. The system monitor displays the initial status screen (see Figure 3, "Initial Status Screen," on page 25) and then changes to the Ready screen (see page 25). From the Ready screen, you can access the Main Menu or any of the manual functions.

FIGURE 3. Initial Status Screen

VK 8020 FRACTION COLLECTOR
PROGRAM REVISION X.XX
INITIALIZING....PLEASE WAIT
TIME: 06/05/03 21:56:40 ELAPSE: 000:00:00

Note



This is the only time the firmware revision level displays.
Record the number here and refer to it if you need to call the
Dissolution Systems Service Department.

Sampling station
serial number: _____

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 is initialized. 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 (see Figure 4, "Ready Screen," below).

Turn on the HPLC autoinjector by pressing the switch located on the rear panel AC power connector. The autoinjector initializes.

FIGURE 4. Ready Screen

READY

PRG# 01 R-M: ENABLED VOLUME: 5 mL
TIME: 11/10/00 21:56:40 ELAPSE: 000:00:00

Installing the Sample Tray

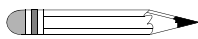
- Step 1. Place the supplied sample tray on top of the unit. The sample tray has four grommated corner holes which fit over the four locating pins.



Caution

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

- Step 2. Place sample tubes or autosampler vials in the sample tray. Note that although the VK 8020 can fill eight rows of tubes or vials with each row corresponding to a programmed sample point, it is not necessary to fill all rows. For example, if three sample points are programmed, only rows 1 through 3 need to be filled.



Note

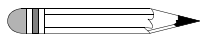
The first sample always moves into row 1.

Installing the Autocalibration Block and the Media Rinse Reservoir

The autocalibration block and media rinse reservoir fit in the rear of the unit between the metal brackets. The dispensing arm must be moved forward to put them in place.

- Step 1. Press **MENU > 7 > 4 > 9** to move the dispensing arm forward to row 9. The autocalibration block is placed in the rear-most position and the media rinse reservoir is placed in front of it. Both items fit between the metal brackets.

Note



The replacement media portion of the reservoir has two barbed fittings—one on each end of the tank. The rinse tray portion of the reservoir has a single barbed fitting. Orient the reservoir with the rinse tray portion towards the front.

- Step 2. Press **H** to return the dispensing arm to its home position.
- Step 3. Press **ESC** three times to return to the Ready screen.
- Step 4. Connect a nine-pin cable from the right side of the autocalibration block to the port labeled CALIBRATION in the rear of the VK 8020.
- Step 5. Connect the six-foot length of clear tygon tubing to the barbed elbow fitting located on the rinse tank portion of the reservoir. Place the other end in a sink, drain, or suitable waste container.

Sipper Needle Installation

Remove the needle from the storage box and check it for damage. Ensure the needle support carriage is in the up position by completing the following steps:

- Step 1. Press **MENU**.
- Step 2. Select option **6**, Injection Control. The Sipper Needle Position screen displays.

SIPPER NEEDLE POSITION	
1-8---ROW 1 TO 8	R---RINSE POSITION
S---ROW S1	N---ROW S2
TIME: 06/05/03 14:45:41	ELAPSE: 000:00:0

- Step 3. Enter **1** for row 1. The HPLC Module Control screen displays.

HPLC MODULE CONTROL		
1-6---VIAL 1 TO 6	S---SYRINGE CONTROL	
V---INJ VALVE	I---INJECT	P---PRIMING
F---FILTER CHANGER	R---RAISE NEEDLE	

- Step 4. If RAISE NEEDLE displays on the screen, press **R**, Raise Needle. When the needle is in the up position, the system monitor displays LOWER NEEDLE.
- Step 5. Place the metal ferrule and nut over the needle and slide the needle into the needle support carriage.
- Step 6. Loosely secure the nut around the sipper needle so the needle can be moved up or down with the support carriage.
- Step 7. Press **L**, Lower Needle, and adjust the needle height so it is approximately one to two millimeters from the bottom of a glass vial.

- Step 8. Raise the needle support carriage and firmly secure the nut around the sipper needle. Do not to over-tighten the nut. Raise and lower the needle support carriage repeatedly to ensure the sipper needle holds its position.

Hidden Key Functions

To access the hidden key functions, enter the following key sequences:

Key Sequence	Function
MENU > 0 > 0	Select 6, 7, or 8 valves.
MENU > 0 > A	Select standard or minimum drop volume before sampling.
MENU > 0 > B	Enable or disable the beeper for moving alert.
MENU > 0 > E	Select Impact or Thermal printer. <i>Note: ensure this option indicates Impact.</i>

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Chapter 4 *Operating the VK 8020*

VK 8020 Keypad Options

The keypad on the VK 8020 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 5, "VK 8020 Keypad," below. A discussion about each of the main function keys follows.

FIGURE 5. VK 8020 Keypad



The front panel options include the following:

Option	Function
ESC	Press ESC to stop execution of a running collection, injection program, or calibration routine. Press ESC to move back one level to the previous menu or selection when moving through the multi-level menu. 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.
MENU	Use this option to set the clock, alarms, injection options, manual prime time, manual purge time as well as to control the injection and manually control the sipper needle and the VK 8020. See "Main Menu" on page 33.
PRINT	Press PRINT to record the batch information, print the sample 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 "Report Center Printer Operation and Communications" on page 46.
CAL	Use this option to calibrate the VK 8020 to ensure that sample volumes are accurately and precisely taken. See "Volumetric Calibration" on page 67.
PROG	Use this option to set program parameters. See "Programming the VK 8020" on page 48.
START PROG	Use this option to start a program or modify a program already operating. See "Start Program" on page 51.
MANUAL SAMPLE	Use this option to collect a sample from the dissolution vessels on command without a program. See "Manual Sample" on page 52.
OPEN VALVES	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.
 (PROBES UP / DOWN)	Press  (PROBES UP / DOWN) to raise or lower the sampling probes on the VK 8020.

Option	Function
PUMP OFF PUMP FWD PUMP REV	PUMP OFF, PUMP FWD, and PUMP REV keys are used to control the pump attached to the system. Pressing either PUMP FWD or PUMP REV causes the pump to operate in the indicated direction. PUMP OFF stops the pump, no matter in which direction it was operating. It is best to stop the pump before changing the direction of rotation.
CLEAN SYTEM	Use this option to keep the valves, needles, and fluid lines clean. See "Clean System Function" on page 56.
LOCK KBRD	Press LOCK KBRD to lock the keypad. Press LOCK KBRD again to unlock the keypad.

Main Menu

Press **MENU** to access the Main Menu. The Main Menu displays. Set all parameters before starting a program because the Main Menu cannot be accessed if a program is running. Press **ESC** from the Main Menu to return to the Ready screen. The following sections describe in detail the use of each of the seven options available from the Main Menu.

MAIN MENU	4 MANUAL PRIME TIME
1 SET CLOCK	5 MANUAL PURGE TIME
2 SET ALARMS	6 INJECTION CONTROL
3 INJCT OPTIONS (M)	7 MANUAL OPERATION

Following is a description of the Main Menu screen options:

Option	Function
1 Set Clock	Use this option to set the clock. Select option 1 , Set Clock. Enter the correct date and press ENTER . Enter the correct time and press ENTER . The Main Menu displays.

Option	Function
2 Set Alarms	Use this option to set the elapsed timer as well as the row sample completion alarm, program completion alarm, and calibration completion alarm. See "Main Menu Option 2 Set Alarms" on page 35.
3 Injct Options (M)	Use this option to set up the autoinjector station. See "Main Menu Option 3 Injection Options" on page 36.
4 Manual Prime Time	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. 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 8020.
5 Manual Purge Time	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. 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. 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 8020.
6 Injection Control	Use this option to control the sipper needle. See "Main Menu Option 6 Injection Control" on page 42.
7 Manual Operation	Use this option to manually control the VK 8020. See "Main Menu Option 7 Manual Operation" on page 45.

Main Menu Option 2 Set Alarms

Select option **2**, Set Alarms, from the Main Menu. The Activate / Deactivate Alarms screen displays.

ACTIVATE/DEACTIVATE ALARMS	
1 ELAPSED TIMER	2 ROW SAMP COMPLETION
3 PRG COMPLETION	4 CALIB. COMPLETION
TIME: 06/05/03 00:00:00	ELAPSE:000:00:00

Following is a description of the Activate / Deactivate Alarms screen options:

Option	Function
1 Elapsed Timer	The elapsed timer alarm is a simple timer you can use to time any interval from 1 minute to 99 hours. The system beeps when the time has expired. It continues to beep until any key is pressed. Once turned off, the timer does not operate again until you reset the timer. To activate the timer alarm, complete the following steps: Step 1. Select option 1, Elapsed Timer. Step 2. Enter a time in hh:mm format and press ENTER. Step 3. Press any key to silence the alarm after it sounds.
2 Row Samp Completion	The alarm beeps to indicate the completion of each sample point. This alarm is useful when the samples must be checked or removed for immediate testing. To activate the row sampling completion alarm, complete the following steps: Step 1. Select option 2, Row Samp Completion. Step 2. Select option 1 to enable or select option 2 to disable the alarm. Step 3. Press any key to silence the alarm after it sounds.

Option	Function
3 Prg Completion	This alarm beeps at the end of the program to alert you that the test is finished. It is a useful reminder that the program is complete. The alarm must be acknowledged and can be deactivated by pressing any key. To activate the program completion alarm, complete the following steps: Step 1. Select option 3, Prg Completion. Step 2. Select option 1 to enable or select option 2 to disable the alarm. Step 3. Press any key to silence the alarm after it sounds.
4 Calib. Completion	The alarm beeps when autocalibration is complete and all lines are purged. To activate the calibration completion alarm, complete the following steps: Step 1. Select option 4, Calib. Completion. Step 2. Select option 1 to enable or select option 2 to disable the alarm. Step 3. Press any key to silence the alarm after it sounds.

Main Menu Option 3 Injection Options

Select option **3**, Injct Options, from the Main Menu. The HPLC Injection Options screen displays.

HPLC INJECTION OPTIONS	
1 DISABLE (ENABLE) INJECTION	2 INJECT INTERVAL
3 INJECT STANDARDS	4 MULTI-INJECTION
5 ON (OFF) WAIT FOR SIGNAL	6 SET PARAMETERS

Following is a description of the HPLC Injection Options screen options:

Option	Function
1 Disable / Enable Injection	Select option 1 to toggle between ENABLE INJECTION and DISABLE INJECTION. The option displayed is the opposite of the current setting. For example, if DISABLE INJECTION displays, the injector functions are enabled. Disabling the HPLC injector functions allows you to use the system only as a collector.
2 Inject Interval	Select option 2 , Inject Interval, to specify the time between injections. Enter the desired time from 1 to 99 minutes and press ENTER . If the unit is in the Wait for Signal mode (see "5 On / Off Wait for Signal" on page 38), the time specified is the minimum time interval. For example, if the external signal is received <i>after</i> the time interval, the injection cycle starts immediately. However, if the external signal is received <i>before</i> the end of the interval, the system waits until the end of the interval to begin the next cycle.
3 Inject Standards	Select option 3 , Inject Standards, to specify the regularity of standard injections during a sequence, choose sample rows to be analyzed and specify placement of standard solutions. See "Injection Option 3 Inject Standards" on page 38.
4 Multi-Injection	Select option 4 , Multi-Injection, to program up to nine replicate injections from each vial. The specified number of injections that will be made from each vial, including standards, displays on the screen.

Option	Function
5 On / Off Wait for Signal	Select option 5, to toggle between ON WAIT FOR SIGNAL and OFF WAIT FOR SIGNAL. To make injections only when both an external signal is received by the system and a minimum time interval has passed, ensure option 5 indicates ON WAIT FOR SIGNAL. In the Wait for Signal mode, the time interval specified under Main Menu option 3 will be the minimum time interval. For example, if the external signal is received after the time interval, the injection cycle starts immediately. However, if the external signal is received before the end of the interval, the system waits until the end of the interval to begin the next cycle.
6 Set Parameters	Select option 6 to set the fill volume, flush volume, fill speed, dispense speed, inject delay, and load delay, as well as to enable or disable the filter changer. Values for options 1 - 5 on the HPLC Injection Options screen are individually set for each program. The values for option 6, Set Parameters, are global, meaning they pertain to <i>all</i> programs and manual actions. See "Injection Option 6 Set Parameters" on page 39.

Injection Option 3 Inject Standards

From the HPLC Injection Options screen, select option **3**, Inject Standards, to specify the regularity of standard injections during a sequence, choose sample rows to be analyzed and specify placement of standard solutions. The Inject Standards screen displays.

INJECT STANDARDS	
1 BEFORE	2 AFTER
3 BRACKET	4 NONE *
TIME: 06/05/03 00:00:00 ELAPSE: 000:00:00	

Following is a description of the Inject Standards screen options:

Option	Function
1 Before	Select option 1 , Before, to inject the standard for each row of samples <i>before</i> the samples in each row are injected.
2 After	Select option 2 , After, to inject the standard for each row <i>after</i> the samples in each row have been injected.
3 Bracket	Select option 3 , Bracket, to inject the standard for each row <i>before</i> and <i>after</i> each row of samples has been injected.
4 None	Select option 4 , None, to not inject any standards.

Placement of Standard Vials

The two rows at the front of the sample tray are reserved for standards. Row S1 holds standards to be injected before each row, and row S2 holds standards to be injected after each row. Standards are positioned from left-to-right, corresponding to the sample rows to which they relate. For example, the standard vial in row S1, position 3, will be injected at the beginning of row 3. The standard vial in row S2, position 5, will be injected after the samples in row 5. If rows are to be bracketed by a standard, a vial containing the same standard must be placed in *both* rows S1 and S2.

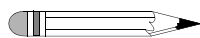
Multilevel standards may be used by placing a different standard concentration in each position. If standards are not being injected, then rows S1 and S2 should remain empty.

Injection Option 6 Set Parameters

From the HPLC Injection Options screen, select option **6**, Set Parameters. The HPLC Parameters screen displays.

HPLC PARAMETERS	4 DISPENSE SPEED
1 FILL VOLUME	5 INJECT DELAY
2 FLUSH VOLUME	6 LOAD DELAY
3 FILL SPEED	7 FILTER CHANGE

Following is a description of the HPLC Parameters screen options:



Note

The values for these parameters pertain to *all* programs and manual actions.

Option	Function
1 Fill Volume	Select option 1, Fill Volume, to specify the volume to be withdrawn to fill the loop. Since larger or smaller syringes may be used in the system, this feature allows you to change syringes without changing the firmware. The standard syringe supplied with the VK 8020 has a volume of 500 μl. Therefore, entering 50% causes the syringe to withdraw approximately 250 μl to fill the loop for each injection. Note: even though the loop itself may have a volume of only 20 μl several times that volume must be withdrawn due to the length of the tubing between the sipper needle and the loop, as well as the need to overfill the loop to flush it thoroughly.
2 Flush Volume	Select option 2, Flush Volume, to specify the flush volume and the number of flush cycles. After each injection, the connecting tubing and the inside of the sipper needle need to be flushed to minimize carryover between injections. The two-way valve at the top of the syringe switches to the right to bring the flush solvent bottle online and the syringe withdraws to fill with flush solvent. Then the valve switches back to the left, toward the injector valve, and the syringe pushes the flush solvent back through the valve and sipper needle into the waste section of the media rinse reservoir. As with filling, flush volumes are entered as a percentage of the syringe volume. At the appropriate screen, specify the number of <i>extra</i> consecutive flush cycles. Each extra flush cycle is 90% of a full syringe volume. Multiple flush cycles ensure all sample is removed from the lines before filling for the next injection. Some applications may require a single flushing cycle, while others may require several. The nature of the compounds and the sensitivity of the HPLC assay determine this value.

Option	Function
3 Fill Speed	Select option 3 , Fill Speed, to enter the filling speed. Enter the time for a full syringe stroke, from 4 seconds (fastest) to 99 seconds (slowest). This time value is used for all operations which involve filling the syringe. A withdrawal rate that is too rapid can cause outgassing in the syringe or can create excessive back pressure when trying to pull viscous materials. On the other hand, a rate that is too slow adds to the cycle time for each injection.
4 Dispense Speed	Select option 4 , Dispense Speed, to specify the dispensing speed. Enter a dispense speed between 4 seconds (fastest) and 99 seconds (slowest). As with fill speed, you may want to vary the dispensing speed of the syringe. Viscous materials, for example, could require a slower dispensing speed than less viscous ones.
5 Inject Delay	Select option 5 , Inject Delay, to specify a delay, in seconds, before the valve moves to the Inject position. The delay is the amount of time elapsed between when the syringe starts filling and the valve moves to the Inject position. Enter a value between 0 seconds (no delay) and 99 seconds. If the entered delay time is less than the duration required to fill the loop, time automatically extends until the loop is completely filled. For example, with an inject delay of 20 seconds, the valve moves to the Inject position 20 seconds after the syringe begins to draw sample into the loop.
6 Load Delay	Select option 6 , Load Delay, to specify the duration between the injection point and the valve returning to the Load position. After injecting, the valve remains in the Inject position for most of the run. This ensures all sample is swept from the loop and minimizes carryover. However, at some point before the next injection, the valve must return to the load position so the loop can be filled again. The valve should return to the Load position just prior to the end of the run leaving enough time for the loop to be filled before the next injection. The delay interval can be specified from 00:00 (immediate return) to 99:59 minutes.
7 Filter Change	Select option 7 , Filter Change. The Filter Change Function screen displays. Ensure option 2, disable, is selected. Note: An asterisk (*) indicates the current setting.

After all parameters have been set, press **ESC** to return to the Main Menu.

Main Menu Option 6 Injection Control

Most of the VK 8020 components, such as the syringe pump and injector valve, can be operated manually. Use injection control to check proper operation for duplicate programmed operations, such as filling the sample loop manually.

From the Main Menu, select option **6**, Injection Control. MOVING TO RINSING POSITION displays. The Sipper Needle Position screen displays.

SIPPER NEEDLE POSITION	
1-8 ---ROW 1 TO 8	R---RINSE POSITION
S---ROW S1	N---ROW S2
TIME: 06/05/03 14:45:41	ELAPSE: 000:00:0

Following is a description of the Sipper Needle Position screen options:

Option	Function
1-8 ---ROW 1 TO 8	Pressing a number (1 - 8) indicates which row to move the sipper needle for a manual injection. See "Selecting the Vial Position" on page 43.
R---RINSE POSITION	Press R to move the dispensing arm to the rinse chamber of the media rinse reservoir.
S---ROW S1	Press S to move the dispensing arm to row 0 or the first row of standards.
N---ROW S2	Press N to move the dispensing arm to row 9 or the second row of standards.

Selecting the Vial Position

From the Sipper Needle Position screen, enter a row number to move the sipper needle for a manual injection. The HPLC Module Control screen displays.

HPLC MODULE CONTROL		
1-6---VIAL 1 TO 6		S---SYRINGE CONTROL
V---INJ VALVE	I---INJECT	P---PRIMING
F---FILTER CHANGER		L---LOWER NEEDLE

Following is a description of the HPLC Module Control screen options:

Option	Function
1-6---VIAL 1 TO 6	Enter the vial number (between 1 and 6) to be injected. The sipper needle moves left or right to the appropriate position. Note: it is not necessary to specify a vial position unless you want to make an injection.
S---SYRINGE CONTROL	For manual control of the syringe pump, see "Syringe Control" on page 44.
V---INJ VALVE	For manual operation of the injection valve, press V . The Operate Injection Valve screen displays. Select option 1 , Load Position, to move the injection valve to the loading position. Optionally, select option 2 , Injection Position, to move the injection valve to the injecting position.
I---INJECT	Press I to begin a single injection cycle.
P---PRIMING	Before starting a series of injections, prime the sample flow path. Fill the rinse bottle with ultrapure water or the selected rinse medium. From the HPLC Module Control screen, press P to begin the priming cycle using the parameter values (speed, volume, and number of cycles) entered earlier.
F---FILTER CHANGER	No operator input required. Note: the filter changer option does not display if the filter changer is disabled under the HPLC set parameters. See "7 Filter Change" on page 41.

Option	Function
L---LOWER NEEDLE / R---RAISE NEEDLE	Lower or raise the sipper needle on demand by selecting L or R from the HPLC Module Control screen. If the needle is currently in the raised position, L-LOWER NEEDLE displays. If the needle is currently in the lowered position, R-RAISE NEEDLE displays.

Syringe Control

For manual control of the syringe pump, complete the following steps:

- Step 1. From the HPLC Module Control screen, press **S**, Syringe Control. The following screen displays:

SELECT VALVE DIRECTION		
1 RIGHT SIDE	2 LEFT SIDE	
TIME:06/05/03	14:45:41	ELAPSE: 000:00:00

- Step 2. Select option **1** to pull from or dispense to the right (toward the rinse reservoir) or option **2** to pull from or dispense to the left (toward the injection valve). The following screen displays:

SELECT SYRINGE WORKING MODE		
1 FILL	2 DISPENSE	
TIME:06/05/03	14:45:41	ELAPSE: 000:00:00

- Step 3. Select option **1** to fill the syringe or option **2** to dispense from the syringe.

Main Menu Option 7 Manual Operation

From the Main Menu, select option 7, Manual Operation, to display six options that can be used to check the functionality of the VK 8020 or to duplicate programmed operations manually. All functions are executed immediately without pressing **ENTER**. Each option is discussed below. Press **ESC** to return to the Main Menu.

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

Following is a description of the Manual Operations screen options:

Option	Function
1 Lift Valves	Select option 1 , Lift Valves, to raise the needles from the lowered position.
2 Lower Valves	Select option 2 , Lower Valves, to lower the needles from the raised position.
3 Open/Close Valves	Select Option 3 , Open/Close Valves, to open or close the valves.
4 Goto Rows	Select option 4 , Goto Rows. Enter a row number. The dispensing arm moves to the specified row and stops.
5 Turn On R-M Pump	Select option 5 , Turn On R-M Pump, to enable the replacement media pump, if installed.
6 R-M Pump Off	Select option 6 , R-M Pump Off, to disable the replacement media pump, if installed.

Report Center Printer Operation and Communications

From the Main Menu, press **ESC**. The Ready screen displays. Press **PRINT** on the keypad. PRINT is used to print batch information and sample times for each of the 30 stored programs, to control the Report Center Printer (if one is connected), and to set the communication port identification number.

Enter the desired 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 CHANGE TO REMOTE (LOCAL)
5 SET COM PORT ID	6 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. The batch information is the header information that can be entered via option 4 of the Program Variables screen. See "4 Headers" on page 49.
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 via option 2 of the Program Variables screen. See "Program Variables Option 2 Sample Time Points" on page 50.

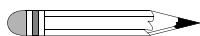
Option	Function
3 Turn On / Off Rep Center	Select option 3, Turn On / Off Rep Center, to turn on or off the Report Center Printer. If the Report Center Printer is on, it is turned off when you select this option. If it is off, it is turned on. This option always reflects the opposite of the current state of the Report Center. For example, if it is currently disabled, then TURN ON REP CENTER displays. 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 on or off until you change it again, even if you switch programs.
4 Change to Remote / Local	Select option 4, Change to Remote / Local, to select either the built-in Report Center Printer (local) or a remote printer, if one is connected. This option reflects the opposite of the current state. For example if it is currently set to the local printer, CHANGE TO REMOTE displays.
5 Set Com Port ID	Select option 5, Set Com Port ID, to enter a new communication port identification number. The system default is communication port 01. The communication port identification number can be a value from 1 to 99. The communication port identification number is used when multiple units are linked together in a network so that the controlling computer can address individual units.
6 Set Baud Rate	Select option 6, Set Baud Rate. The Com Port Baud Rate Selection screen displays. Select the desired baud rate and press ENTER. The recommended baud rate for the VK 8020 is 9600 baud (option 4). Note: an asterisk (*) indicates the current setting.

Programming the VK 8020

From the Ready screen, press **PROG**. Enter a program number and press **ENTER**. The Program Variables screen displays.

PROGRAM VARIABLES	4 HEADERS
1 HPLC INJECT OPTIONS	5 PRIME TIME
2 SAMPLE TIME POINTS	6 PURGE TIME
3 SAMPLE VOLUME	7 R-M OPTIONS

Note



The VK 8020 can store up to 30 programs in non-volatile memory. Valid program numbers are 1 to 30. If zero or a number larger than 30 is entered, the system continues to prompt you until a valid number is entered. A leading zero is optional for programs 1 through 9.

Following is a description of the Program Variables screen options:

Option	Function
1 HPLC Inject Options	Select option 1 , HPLC Inject Options. The HPLC Injection Options screen displays. The HPLC Injection Options screen can also be accessed via option 3, Injct Options, on the Main Menu for non-programmed injections. For a full description of these options, see "Main Menu Option 3 Injection Options" on page 36.
2 Sample Time Points	Select option 2 , Sample Time Points, to enter the sample timepoints. See "Program Variables Option 2 Sample Time Points" on page 50.
3 Sample Volume	Select option 3 , Sample Volume. Enter a volume up to 14.0 mL and press ENTER . The volume can be up to three digits with a decimal point (for example 13.5). Verify the collection tubes can hold the requested volume.

Option	Function
4 Headers	Select option 4, Headers. The Batch # Selections screen displays six options: operator name, product name, batch number, lot number, group number, and notation. Each selection on this screen accepts 19 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 screen are attached to the active program. Since there are 30 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 screen. Note: the Report Center Printer is limited to ten characters for each entry. Characters 11 - 19 are kept in memory and printed to the remote printer port and shown on the display.
5 Prime Time	Select option 5, Prime Time. The Prime Time screen displays. Enter a value for the priming time from 1 to 99 seconds and press ENTER. The priming time is the interval the Peristaltic Pump runs forward drawing media into the system before the valves open to deliver samples. This ensures a continuous liquid head in all lines. The priming time should be long enough to completely fill the sampling lines with liquid. At a minimum it should be long enough for liquid to be seen dripping from the return probes. In general, the longer the tubing from the sampling probes to the valves, the longer the priming time required. Note: prime time is unique to each program number and is independent of the manual prime time or the prime time in other programs.

Option	Function
6 Purge Time	Select option 6 , Purge Time. The Purge Time screen displays. Enter a value for the purge time from 1 to 99 seconds and press ENTER . The purge 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 the successive samples. As with priming, the longer the tubing lengths, the longer the purge time required. Note: purge time is unique to each program number and is independent of the manual purge time or the purge time in other programs.
7 R-M Options	Select option 7 , R-M Options. The Replacement Media Option screen displays two options: enable and disable. Ensure the asterisk displays next to option 1, Disable, if the media replacement option is not installed. Note: the current setting is indicated with an asterisk (*).

Program Variables Option 2 Sample Time Points

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

```
SAMPLE TIME POINT: 000:02
ENTER hh:mm UP TO 999:59 HOURS
PROG #: 1 ROW: 0 VOLUME: 5ml
TIME:06/05/03 09:37:14 ELAPSE:000:00:00
```

This menu 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 zero. 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 menu:

- Review previously entered sample timepoints by pressing **ENTER** to scroll through the entries.
- After all sample timepoints have been entered, enter 000:00 for the last sample timepoint and press **ENTER**.
- To add additional sample timepoints, press **ENTER** until a new row time displays. Enter the additional sample timepoint.
- 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.

Start Program



Caution

Do not leave the cover on the dispensing arm open when the VK 8020 is operating.

From the Ready screen, press **START PROG**. Enter a program number between 1 and 30 and press **ENTER**. The Select Start Mode screen displays.

SELECT START MODE

1 START NOW	2 DELAYED START
3 INJECTION ONLY	4 MODIFY PROGRAM
PRG#: 1	VOL: 2 ml
HPLC: ON	R-M: OFF

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

Option	Function
1 Start Now	Select option 1 , Start Now, to immediately start the selected program. A screen displays indicating the printer is documenting the start of the program. If enabled, the printer prints the date, time, and header information for the program initiated. When the printout is complete, MOVING TO RINSING POSITION displays. When the pump lines begin to prime, the time to next sample and the elapsed time of the test display.
2 Delayed Start	Select option 2 , Delayed Start. Enter a start time in 24-hour format and press ENTER . At any time prior to the scheduled start of the program, press ESC to abort the delayed start.
3 Injection Only	Select option 3 , Injection Only, to inject vials automatically from another source (either another dissolution system or a non-dissolution source). Place the vials into the sample tray and specify the first and last rows. The VK 8020 begins injecting the samples and standards according to the parameters set in the previous section, HPLC Injection Options.
4 Modify Program	Select option 4 , Modify Program, to modify or review the selected program. The Program Variables screen displays (see the Program Variables screen on page 48). The seven program variable options can be viewed or changed. Once the program is verified or changed to the correct configuration, press ESC to return to the Select Start Mode screen. Select the desired start mode to start the program. Press ESC twice to abort the complete operation and return to the Main Menu.

Manual Sample

Press **MANUAL SAMPLE**. The 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 4	VOLUME 5 ml	PRIME 60 PURGE 60

The Manual Sampling screen options are specific to manual sampling and are independent of the stored program parameters for purge time, prime time, volume, etc.

Following is a description of the Manual Sampling screen options:

Option	Function
1 Start	Select option 1 , Start. The following options display: • Option 1, Start with HPLC, begins the sequence by priming the sample lines. Next, the appropriate volume of sample is pulled, followed by purging of the sample lines. After purging, the autoinjector station begins the injection cycle. The syringe is primed and the samples are injected according to the parameters set under injection options (see "Main Menu Option 3 Injection Options" on page 36). This option uses the values entered under options 2, 3, 4, 5, and 6 for manual sampling. The display screen keeps the operator informed as each step of the manual collection takes place. • Option 2, Start without HPLC, begins the sequence by priming the sample lines. Next, the appropriate volume of sample is pulled, followed by purging of the sample lines. • Option 3, Modify HPLC Setting, allows the operator to change any of the HPLC Injection options, such as inject standards, number of injections and time between injections. See "Main Menu Option 3 Injection Options" on page 36. Note: select this option last.
2 Set Row #	Select option 2 , Set Row #. Enter a row number between 1 and 8 and press ENTER . The Manual Sampling screen displays.
3 Set Volume	Select option 3 , Set Volume. Enter a volume between 0 and 14 and press ENTER . The volume can contain a decimal point so that fractional milliliters can be collected. Do not request more volume than the tubes or vials can contain.
4 Prime Time	Select option 4 , Prime Time. Enter a duration between 1 and 99 seconds that the pump will run in the forward direction with the valves in the bypass position and press ENTER . The time should be set to a value large enough to completely fill the sample lines with liquid.

Option	Function
5 Purge Time	Select option 5 , Purge Time. Enter a duration between 1 and 99 seconds that the pump will run in the reverse direction with the valves in the bypass position and press ENTER . The time should be set to a value large enough to completely empty the liquid in the sample lines back into the vessels. The volume in the lines is not part of the sample volume.
6 R-M Option	Select option 6 , R-M Option. An asterisk indicates the current setting. Ensure the asterisk displays next to option 1, Disable, if the media replacement option is not installed.

Chapter 5 *Maintenance and Troubleshooting*

General Maintenance



Warning

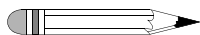
The VK 8020 and accessories contain electrical circuits, devices, and components operating at dangerous voltages. Contact with these circuits, devices, and components can cause death, serious injury, or painful electric shock.

Perform the following maintenance when necessary.

Clean System Function

Use the clean system function often to keep the valves and needles 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 time and purge time have been entered. See "4 Manual Prime Time" on page 34 and "5 Manual Purge Time" on page 34.

To clean the system, complete the following steps:

- Step 1. Place the cleaning tray on the vessel plate of the dissolution apparatus.
- Step 2. Fill the cleaning tray with an appropriate cleaning solution, usually water.
- Step 3. Lower the sampling cannulas.
- Step 4. On the VK 8020, press **CLEAN SYSTEM**. The Cleaning Systems Selections screen displays.

To start the cleaning process immediately, see "Start Immediately" on page 57. To program the auto clean function, see "Programmed Clean" on page 57.

CLEANING SYSTEMS SELECTIONS

1 START CLEAN 2 ENABLE AUTO CLEAN

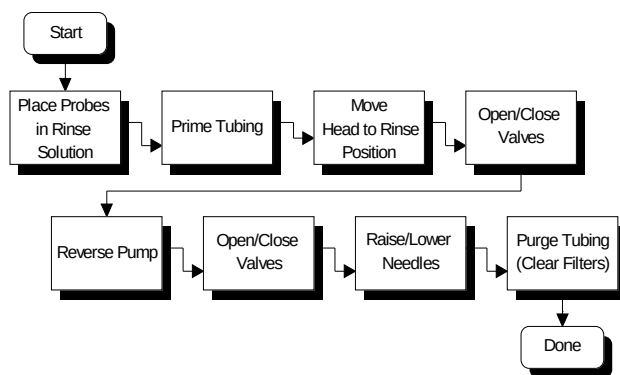
TIME: 06/05/03 08:28:46 ELAPSE: 000:00:00

Start Immediately

From the Cleaning Systems Selections screen, select option **1**, Start Clean. The VK 8020 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 8020 rinse tank. Then the system purges the water from the sample lines.

The following figure is a generalized flow of the clean cycle (see Figure 6, “The Cleaning Process,” below). *You should use this function often.*

FIGURE 6. The Cleaning Process



Programmed Clean

To run a program which rinses the needles in a predetermined cleaning solution contained in the media rinse reservoir, complete the following steps:

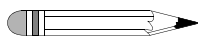
- Step 1. Fill the media rinse reservoir with the cleaning solution.

- 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: 06/05/03	ELAPSE: 000:00:00

Note



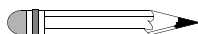
Select option **3**, Disable Auto Clean, to escape the auto clean function and return to the original Cleaning Systems Selections screen. Select option **1**, Start Clean, from either screen to escape the automatic clean function and immediately start the cleaning process.

- 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: 06/05/03 08:28:46	ELAPSE: 000:00:00

Note

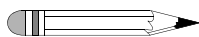


The value entered for the clean frequency should be smaller than the sample timepoint.

Step 4. Select each option and enter the appropriate parameters as necessary due to tubing length and diameter.

Option	Function
1 Clean Frequency	Select option 1 , Clean Frequency. Enter an interval of up to 99 minutes. 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 media rinse reservoir.
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 solution is moved through the return lines.

Note



Appropriate parameters for each of the above options depends on the length and diameter of the tubing. Do not allow the cleaning solution to reach the dissolution apparatus. Once the pump reverses, the cleaning solution is expelled into the rinse reservoir.

Step 5. At the time set for the clean frequency (see option 1, Clean Frequency, above), the VK 8020 drive unit moves to the media rinse reservoir 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 option 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 option 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 dissolution apparatus or sample contamination can occur. The Peristaltic Pump reverses and the cleaning solution is pulled back through the supply lines. The pump reverses again, the valves open and the cleaning solution is expelled into the rinse reservoir. The VK 8020 activates the valves several times to clean the valves and needles.

Cleaning Tips for the VK 8020

We suggest the following tips to clean and maintain your VK 8020:

- The cannulas and needles on your VK 8020 are constructed of 316 stainless steel. Although stainless steel is practically immune to rust and corrosion, these can still occur if the equipment is not properly cleaned after each use.
- Be sure to rinse cannulas and remove the filters after each use.
- Although purified water is generally used to rinse the system, warm water may be used to dissolve buffer salts. Weak alcohol solutions of less than 25% can also be used.
- Avoid the use of strong organic solvents which would damage the rinse tray.

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 new section of the ribbon by pressing the printer toggle switch to the *Paper feed* position. If the printing is still faint, replace the cartridge.

To install the cartridge:

- 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 the 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. Using scissors, cut the paper feeding to the printer and remove the paper roll.

- Step 5. 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 6. Unroll several inches of paper on the new roll.
- Step 7. If it is jagged, cut a straight edge on the paper roll to facilitate the entry of the paper into the printer.
- Step 8. 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 9. 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. Make sure the roll of paper feeds squarely. If it does not, the paper will jam and possibly damage the printer mechanism.
- Step 10. Release the printer toggle switch.
- Step 11. Turn the paper roll to take up any slack in the paper feeding to the printer.
- Step 12. Place the paper roll into 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.

Toggling 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 64 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.

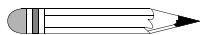
Printer Self Test

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 8020.
- Step 2. Press and hold the printer toggle switch in the *Paper feed* position.
- Step 3. Turn on the VK 8020.
- Step 4. Hold the printer toggle switch until printing begins. The printer prints a list of the current configuration settings and performs 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

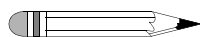
Note



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 8020.
- Step 2. Press and hold the printer toggle switch in the *OnLine / Off Line* position while turning on the instrument. 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 printer toggle switch selects NEXT to advance to the next menu item. Pressing the right side of the printer toggle switch selects OK to accept what is stated on this 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 on the following page.

Note



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

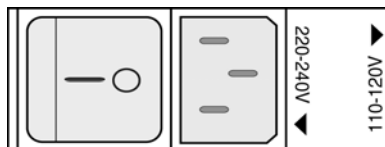
*** SETUP MENU***		
CONFIGURE	[NEXT/OK]	Press NEXT to avoid configuration
CUSTOM	[NEXT/OK]	Press OK to enter custom mode
CUSTOM MENU		
PRINT CUSTOM SETUP	[NEXT/OK]	Press NEXT
AUTO SEQ = NO	[NEXT/OK]	Press OK
ZERO = Ø	[NEXT/OK]	Press OK
POUND SIGN = #	[NEXT/OK]	Press OK
_(UNDERScore)	[NEXT/OK]	Press OK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

Fuse Replacement

The fuse is located in the left section of the female line cord socket on the rear of the VK 8020. Complete the following steps in order to replace the fuse:

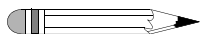
- Step 1. Remove the line cord from the VK 8020.
- Step 2. Insert a tiny screw driver into the release slot on the left side of the fuse compartment closest to the power switch. A slight application of pressure to the left will release the compartment.



- Step 3. Pull the fuse compartment out of the line cord socket. The fuse is located in the removable holder. The fuse is a 2.0 amp metric (5 x 20 mm) standard fuse.
- Step 4. Replace the fuse in the holder and insert it back into the fuse compartment.
- Step 5. Insert the fuse compartment into the line cord socket. The compartment is keyed and can only be inserted one way.
- Step 6. Push the fuse compartment into the line cord socket until both sides snap into position. Replace the line cord.

Volumetric Calibration

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 68 for specific operating procedures necessary to calibrate your VK 8020.



Note

Ensure filters are in place during calibration.

Automatic Calibration

To perform automatic calibration, complete the following steps:

- Step 1. 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 screens, respectively.
- Step 2. Ensure the supplied autocalibration block is firmly in place on top of the autocalibration block and connected to the rear panel connector marked AUTO CALIBRATION.
- Step 3. From the Ready screen, press **CAL**. The dispensing arm moves forward to allow you to check the autocalibration block.
- Step 4. Fill the cleaning tray with tap water and lower the sampling cannulas to immerse the filters in the liquid. The system monitor displays a reminder to ensure the tubing and pump are ready. The Calibrate Base Station screen displays.

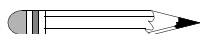
***CALIBRATE BASE STATION ***

CHECK PUMP & TUBING. IF AUTO CALIBRATION
INSTALL CALIB FIXTURE BEFORE STARTING!

1 MANUAL

2 AUTOMATIC

- Step 5. Select option **2**, Automatic. The dispensing arm moves over the autocalibration block and primes the lines according to the manual prime settings. At the end of the priming cycle, all valves lower and open simultaneously and begin to fill the autocalibration block. As the 10 mL point is reached in each well, the valve closes and the time value is recorded in memory. When the last valve closes, the pump reverses and purges the lines and the dispensing arm returns to its home position. The calibration completion alarm, if enabled, sounds when the calibration sequence is finished.



Note

Because of intrinsic variations in tubing diameters, internal valve passages, and pump tubing tensions, some valves must stay open longer than others to deliver their nominal 10 mL calibration volumes. This is normal operation.

- Step 6. Once the calibration procedure is completed, remove and clean the autocalibration block.

Manual Calibration

If you do not have an autocalibration block or prefer to perform the calibration yourself, complete the following steps:

- Step 1. Remove the sample tray.
- Step 2. Press **MENU**.
- Step 3. Select option **7**, Manual Operation.
- Step 4. Select option **4**, Goto Rows.
- Step 5. Enter **4** to go to row 4.
- Step 6. Remove the media rinse reservoir.

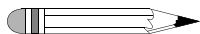
- Step 7. Remove the top portion of the autocalibration block and place it on its side to prevent damage.
- Step 8. Place clean, empty 13 mL calibration tubes in the bottom portion of the autocalibration block.
- Step 9. Press **H** to return to the home position.
- Step 10. Press **ESC** three times to return to the Ready screen.
- Step 11. Fill the cleaning tray with tap water and lower the sampling cannulas to immerse the filters in the liquid.
- Step 12. Press **CAL**.
- Step 13. Select option **1**, Manual.
- Step 14. Press **OPEN VALVES**. The following screen displays:

PRESS <OPEN VALVES> TO START PRESS AGAIN WHEN 10 ML IS REACHED MANUAL CALIBRATION OF VALVE # 1 TIME: 06/05/03 21:56:40 ELAPSE: 000:00:00
--

- Step 15. Observe the first calibration tube and press **OPEN VALVES** again when 10 mL is reached.
- Step 16. Repeat steps 14 and 15 for the remaining calibration tubes.
- Step 17. The calibration completion alarm, if enabled, sounds when the calibration sequence is finished.
- Step 18. Press **MENU**.
- Step 19. Select option **7**, Manual Operation.
- Step 20. Select option **4**, Goto Rows.

- Step 21. Enter **4** to go to row 4.
- Step 22. Remove and clean the autocalibration block and tubes.
- Step 23. Reconnect the top and bottom portions of the autocalibration block and place them in the rear-most position between the metal brackets.
- Step 24. Replace the media rinse reservoir in front of the autocalibration block.

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 25. Press **H** to return to the home position.
- Step 26. Press **ESC** three times to return to the Ready screen.

Troubleshooting

The Dissolution Systems Service Department can assist you if you experience problems or have questions concerning your VK 8020. Many problems can be traced to simple sources and are easily solved.

Following is a troubleshooting guide which may help you. The Dissolution Systems Service Department can be reached at 800.229.1108 (inside the US) or 919.677.1108 (outside the US). Optionally, you can send a fax to 919.677.1138. You can also e-mail the Dissolution Systems Service Department at dissolution.service@varianinc.com.

Problem	Possible Cause	Possible Solution
HPLC does not inject.	• HPLC is disabled. • Improper connection to the HPLC. • Improper inject time interval entered.	• Enable the HPLC. • Ensure the connections to the HPLC are correct. • Enter a proper inject time interval. See "2 Inject Interval" on page 37.
Active peak is smaller than expected.	• Injector loop is not filled completely. • Sipper needle height is incorrect.	• Ensure the injector loop fills completely. See "1 Fill Volume" on page 40. • Set the sipper needle to the correct height. See "Sipper Needle Installation" on page 28.
Sample is not injected.	• Pump tubing is not connected to position 3. • Sample tubing is not connected to position 6. • Sipper needle height is incorrect. • HPLC option is disabled. • Incorrect fill volume set.	• Connect the pump tubing to position 3. • Connect the sample tubing to position 6. • Set the sipper needle to the correct height. See "Sipper Needle Installation" on page 28. • Enable the HPLC option. See "1 Disable / Enable Injection" on page 37. • Set the correct fill volume. See "1 Fill Volume" on page 40.

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Chapter 6 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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Tell Us How We Are Doing

We listen to our customers. We work hard to make our technical documentation user friendly and to make the information in our manuals easy to retrieve and use. We'd like you to tell us the kinds of additional information you'd find helpful in our documentation. Your feedback will be carefully considered when we prepare future editions of this manual.

This manual should contain the following additional information:

The most useful thing about this book is:

This manual would be more helpful if:

My general impressions of this book are:

May we contact you regarding your comments? ____ YES ____ NO (If yes, please write your name, address, and telephone number here.)

Please return this form via mail to: Technical Writing / Dissolution Systems, Varian, Inc., 13000 Weston Parkway, Cary, North Carolina 27513-2250 USA. Optionally, you can return this form via fax at 1.919.677.1550. Always, feel free to telephone us to discuss your comments at 1.800.229.1108.