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Friability Tester Operator's Manual

P/N 70-9008
November 2010
Revision G

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Friability Tester Operator's Manual
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Chapter 1 Safety Practices and Hazards

The Friability Tester 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 Friability Tester involves the use of solid dosage forms. 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 Friability Tester 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 Friability Tester 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 may be 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

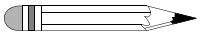
Caution
Refer to accompanying documents

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
0	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 11)

General

CE Compliant Products

The Friability Tester has 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 Friability Tester has been designed to comply with North American safety requirements.

This product has been tested and certified for the North American market by TUV Rheinland of North America, Inc. The TUVus mark signifies that this product has been tested to U.S. standards and certified for the U.S. market. The cTUV mark signifies that this product has been tested to Canadian standards and certified for the Canadian market. When the two marks are coupled, the cTUVus mark signifies that this product has 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 10 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.

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Chapter 2 Introduction

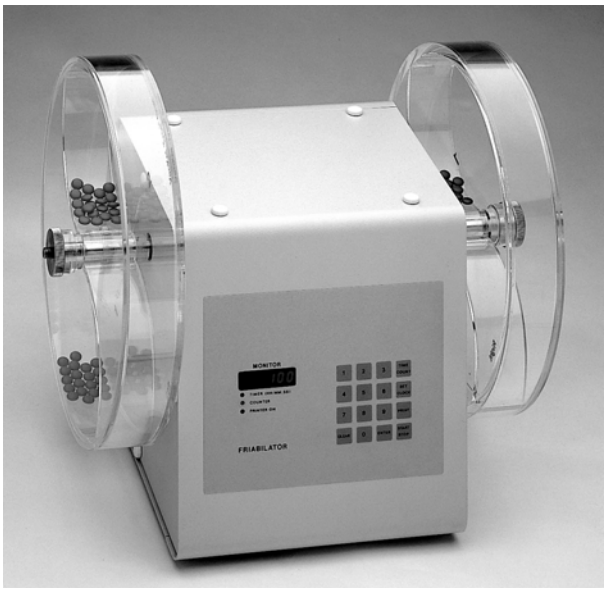
Your Friability Tester provides a standardized, reproducible method for measuring the tendency of a tablet or its coating to chip or powder when subjected to the mechanical stresses of the coating as well as the shipping and handling processes. The Friability Tester drums turn at a constant 25 RPM with precision and accuracy ensured by the use of a synchronous motor. Speed is linked to the AC line frequency, usually either 50 or 60 Hz, depending on your geographic location. As the product in the drum tumbles against the drum's internal vane, its loss due to breakage or chipping can be measured. The Friability Tester is available in a single-drum and dual-drum model.

An optional Report Center Printer provides documentation of instrument operation including test start time, operating mode, and set duration in either number of rotations or elapsed time. On units equipped with the Report Center Printer, you can enter the starting and ending weights of the tablets and the percentage loss is calculated per USP.

Warning

The Friability Tester 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.

FIGURE 1. Dual-drum Friability Tester



Caution

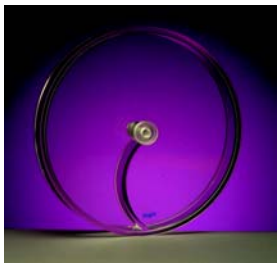
Panels or covers that are retained by fasteners which require the use of a tool for removal may be opened only by Varian-trained, Varian-qualified, or Varian-authorized service engineers.

Available Configurations

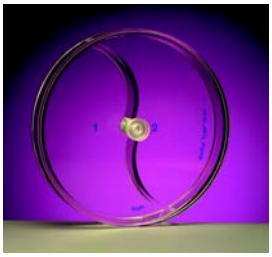
The Friability Tester is available in a single-drum or dual-drum configuration. The dual-drum configuration turns synchronously on opposite ends of the same shaft. This option allows two tests to run simultaneously.

Three types of drums are available:

- Traditional Roche-type USP drum with a single-chamber design.



- Varian USP drum with two arched bridges which saves time by allowing for two tests in one drum.



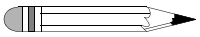
- Abrasion drum with internal baffles to agitate the product inside—for applications requiring a high degree of mechanical stress.

Contact the Dissolution Systems Service Department for any special drum needs you may have.

Conventions Used in this Manual

- Items you are asked to press are in bold. For example, "press **START STOP** on the keypad" or "Press **ENTER**".
- Key sequences you are asked to press appear like this: **CLEAR** > **1**.

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 Installation and Setup

Unpacking Your Equipment

Complete these steps to safely unpack and set up your equipment:

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 Friability Tester base unit from the shipping carton. Place it on a clean, dry, level area of your benchtop within four feet (122 cm) of a grounded electrical outlet.

Warning

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

Step 3. Ensure the Friability Tester is turned off.

Warning

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

Step 4. Connect the power cord (found in the instrument accessory kit) between the receptacle on the rear panel and an electrical outlet of the appropriate voltage.

Step 5. Turn on the Friability Tester. The LED screen on the front panel illuminates. If not, ensure the unit is securely plugged in and there is power at the outlet. If the unit still fails to respond, see "Troubleshooting" on page 38 or call the Dissolution Systems Service Department.

Connecting the Report Center Printer

If your tester is equipped with the optional Report Center Printer, complete the following steps:

Step 1. Remove the printer from the shipping carton.

Step 2. Place it on a clean, dry, level area of your benchtop to the right of your Friability Tester.

Step 3. Connect the printer cable between the rear of the printer and the port on the right side panel of the Friability Tester.

Step 4. Connect the AC power adapter between the jack on the rear of the printer and an electrical outlet of the appropriate voltage.

Step 5. Toggle the printer online by pressing the printer toggle switch to the *OnLine / Off Line* position. The Ready LED illuminates. If not, ensure the printer is securely plugged in and there is power at the outlet. If the device still fails to respond, see "Troubleshooting" on page 38 or call the Dissolution Systems Service Department.

Setting the Date and Time

The Friability Tester comes equipped with a battery-backed up clock which stores the date and time. If your unit is equipped with the Report Center Printer, the date and starting time print on the report. If applicable, complete the following steps to set the date and time:

Step 1. Press **SET CLOCK**. The current date (in mm/dd/yy format) and time (in 24-hour format) display alternately.

Step 2. To accept the current date and time, press **CLEAR**. The test duration displays and no further action is required.

To change the date and time, press **SET CLOCK** again. The date displays in mm/dd/yy format.

Step 3. To accept the date as it displays, press **ENTER**. The time displays in 24-hour format.

To change the date, enter the new value and press **ENTER**. The time displays in 24-hour format.

Step 4. To accept the time as it displays, press **ENTER**. The test duration displays.

To change the time, enter the new value and press **ENTER**. The test duration displays.

Hidden Key Functions

Hidden keys can be accessed only when the Printer On LED is not illuminated, indicating that the printer is disabled, and the motor is running. Press **PRINT** to enable or disable the printer. To enable the PRINT key, press **CLEAR** > **9**. In the following table, **CLEAR** > **(function)** indicates you should press **CLEAR** and then the function key.

Key Sequence	Function
CLEAR > **1**	Use this key sequence to indicate one chamber.
CLEAR > **2**	Use this key sequence to indicate two chambers.
CLEAR > **3**	Use this key sequence to indicate three chambers.
CLEAR > **4**	Use this key sequence to indicate four chambers.
CLEAR > **6**	Use this key sequence to enable the PCB display.
CLEAR > **8**	Use this key sequence to indicate the Friability Tester.
CLEAR > **9**	Use this key sequence to enable the PRINT key.
CLEAR > **0**	Use this key sequence to disable PRINT key.

Chapter 4 Operation

Operating the Friability Tester without a Printer

If your unit is equipped with a Report Center Printer, see “Operating the Friability Tester with a Printer” on page 24.

Running a Test

Complete the following steps to run a test using a Friability Tester not equipped with a Report Center Printer:

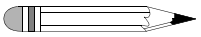
Step 1. Ensure the PRINT key is disabled. See “Hidden Key Functions” on page 20 for instructions on how to disable the PRINT key.

Step 2. Select the mode of operation, either timer or counter, by pressing **TIME COUNT**. This key toggles the unit between the two operating modes. The Timer LED illuminates to indicate the timer option is selected. The Counter LED illuminates to indicate the counter option is selected.

Step 3. Enter either the number of rotations (up to 999,999) or the time duration (in hh:mm:ss format) as applicable and press **ENTER**. Once entered, the test duration is saved by the unit and does not need to be reset unless you want to change it. To change the duration, enter the new value and press **ENTER**.

Step 4. Locate the drums supplied with your unit. Hold the drums firmly so the covers do not fall off. Place the drums on the benchtop and carefully remove the covers and set them aside.

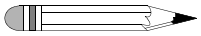
Note



The right- and left-side drums are *not* interchangeable. The vanes curve in opposite directions. Be sure to identify them properly before mounting. Drums supplied with dual-drum units have right- and left-side configurations. Check the label on the cover of each to identify them. Left-side drums mount on the left side of the unit as viewed from the front. Right-side drums mount on the right side as viewed from the front.

Step 5. Brush away any loose dust from the tablets to be tested.

Note



Follow USP guidelines or applicable test procedures to determine the number of tablets to be tested. Generally, a minimum of 20 tablets should be used in testing. For tablets weighing over 650 mg each, 10 tablets are usually sufficient.

Step 6. Accurately weigh the tablets.

Step 7. Load the tablets to be tested into the drums and replace the covers.

Step 8. For each drum, hold the cover firmly in place and slide the drum body onto the shaft. There are two pins at the end of the shaft which hold the drum while the shaft turns. Match the pins with the slots in the hub.

Step 9. For each drum, place the locking nut on the end of the shaft and tighten. Do not overtighten or damage to the drum may result.

Step 10. Press **START STOP** to begin. The time duration or number of rotations count down on the display screen and the test stops automatically when 0 is reached. The display automatically resets to the original set value preparing the instrument for the next test.

Step 11. At the conclusion of the test, remove the drums.

Step 12. Remove the tablets and brush away any loose dust. Per the USP, if obviously cracked, cleaved, or broken tablets are present in the tablet sample after tumbling, the sample fails the test.

Step 13. Re-weigh the tablets. Calculate the percentage of weight loss using the following formula:

$$\% \text{ weight loss} = \frac{\text{initial weight - final weight}}{\text{initial weight}} \times 100\%$$

Stopping a Test

When running a test on a Friability Tester without a printer, you can stop the test by pressing **START STOP**. The drums stop immediately and the display returns to the original test length setting.

Operating the Friability Tester with a Printer

If your unit is not equipped with a Report Center Printer, see "Operating the Friability Tester without a Printer" on page 21.

Configuring for the Number of Chambers or Drums Used

Complete the following steps to configure your printer-equipped Friability Tester for the number of chambers or drums in use:

Step 1. Ensure the Printer On LED is not illuminated. If the LED is illuminated, press **PRINT** to disable the printer.

Step 2. Press **START STOP**. The drums rotate.

Step 3. Press the following keystroke combinations depending on the number of chambers you wish to specify:

- **CLEAR** > **1** - one chamber
- **CLEAR** > **2** - two chambers
- **CLEAR** > **3** - three chambers
- **CLEAR** > **4** - four chambers

Step 4. Press **START STOP**. The drums stop rotating.

Step 5. Press **PRINT** to enable the printer. The Printer On LED illuminates. The next time you press **START STOP**, with the printer enabled, the appropriate number of initial and final weights are requested based on the number of chambers specified.

Running a Test

If your unit is equipped with the optional Report Center Printer, you can print a report at the end of each test to document the date, starting time, mode selected, and the set duration. If the Printer On LED is illuminated, the printer is enabled. Press **PRINT** to enable or disable the printer.

Complete the following steps to operate your Friability Tester with Report Center Printer:

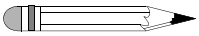
Step 1. Ensure the printer is enabled. When enabled, the Printer On LED illuminates.

Step 2. Toggle the printer online by pressing the printer toggle switch to the *OnLine / Off Line* position. The Ready LED illuminates.

Step 3. Select the mode of operation, either timer or counter, by pressing **TIME COUNT**. This key toggles the unit between the two operating modes. The Timer LED illuminates to indicate the timer option is selected. The Counter LED illuminates to indicate the counter option is selected.

Step 4. Enter either the number of rotations (up to 999,999) or the time duration (in hh:mm:ss format) as applicable and press **ENTER**. Once entered, the test duration is saved by the unit and does not need to be reset unless you want to change it. To change the duration, enter the new value and press **ENTER**.

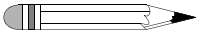
Step 5. Locate the drums supplied with your unit. Hold the drums firmly so the covers do not fall off. Place the drums on the benchtop and carefully remove the covers and set them aside.



Note

The right- and left-side drums are *not* interchangeable. The vanes curve in opposite directions. Be sure to identify them properly before mounting. Drums supplied with dual-drum units have right- and left-side configurations. Check the label on the cover of each to identify them. Left-side drums mount on the left side of the unit as viewed from the front. Right-side drums mount on the right side as viewed from the front.

Step 6. Brush away any loose dust from the tablets to be tested.



Note

Follow USP guidelines or applicable test procedures to determine the number of tablets to be tested. Generally, a minimum of 20 tablets should be used in testing. For tablets weighing over 650 mg each, 10 tablets are usually sufficient.

Step 7. Accurately weigh the tablets.

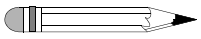
Step 8. Load the tablets to be tested into the drums and replace the covers.

Step 9. For each drum, hold the cover firmly in place and slide the drum body onto the shaft. There are two pins at the end of the shaft which hold the drum while the shaft turns. Match the pins with the slots in the hub.

Step 10. For each drum, place the locking nut on the end of the shaft and tighten. Do not overtighten or damage to the drum may result.

Step 11. Press **START STOP**. You are prompted to enter the initial weight (in grams) of the product in the drum. Up to four weights can be entered depending on the number of chambers or drums used (see "Configuring for the Number of Chambers or Drums Used" on page 24). The following is a summary of what displays after pressing **START STOP** but before the drums begin to turn:

- The number 1 displays on the display screen alternating with the last initial weight entered for the product in chamber or drum 1. Press **ENTER** to accept the displayed value or enter the new initial weight and press **ENTER**. If configured for one chamber or drum, the drum begins to turn.
- If configured for two chambers or drums, the number 2 flashes on the display screen alternating with the last initial weight entered for the product in chamber or drum 2. Press **ENTER** to accept the displayed value or enter the new initial weight and press **ENTER**. If configured for two chambers or drums, the drums begin to turn.
- If configured for three chambers, the number 3 flashes on the display screen alternating with the last initial weight entered for the product in chamber 3. Press **ENTER** to accept the displayed value or enter the new initial weight and press **ENTER**. If configured for three chambers, the drums begin to turn.
- If configured for four chambers, the number 4 flashes on the display screen alternating with the last initial weight entered for the product in chamber 4. Press **ENTER** to accept the displayed value or enter the new initial weight and press **ENTER**. If configured for four chambers, the drums begin to turn.



Note

When the drums have stopped turning at the conclusion of the test, the screen prompts you to enter ending weights for the products in each chamber or drum as it did for starting weights.

Step 12. At the conclusion of the test, remove the drums.

Step 13. Remove the tablets and brush away any loose dust. Per the USP, if obviously cracked, cleaved, or broken tablets are present in the tablet sample after tumbling, the sample fails the test.

Step 14. Re-weigh the tablets and enter the requested values.

Step 15. After the ending weight for the last chamber or drum has been entered, the Report Center prints a test report including the calculated percentage of weight loss for all samples.

Stopping a Test

Step 1. When running a test on a Friability Tester equipped with a printer, you can stop the test by pressing **START STOP**. The drums stop immediately and the display prompts you to enter the ending weights for the products as described above.

Step 2. Enter the ending weights and press **ENTER** for each chamber as applicable. The printer prints a test report and calculates the percentage of weight loss for the products even though the test was stopped prematurely.

Chapter 5 Maintenance and Troubleshooting

Maintenance

Warning

The Friability Tester 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.

Periodic Maintenance

Periodic maintenance needs may vary depending on frequency of instrument usage.

- Immediately wipe all spills or errant materials from the exterior of the instrument or any exposed part using a clean cloth and plain water.
- Do not use cleaners containing ammonia or organic solvents, such as alcohol, on the acrylic drums. These compounds can attack the plastic, causing cracks and fractures which will not be covered by the warranty.
- Store all Friability Tester drums properly.

Monthly Maintenance

- Check the drums for cracks or chips.
- Wipe the shaft clean.
- Ensure the pins which hold the drums while the shaft turns are not bent.
- Clean the outside of the tester with a damp cloth.

Annual Maintenance

Warning

The Friability Tester 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.

- Inspect all electrical connections for corrosion and damage.
- Clean the inside and outside of the tester with a damp cloth.
- Check belt tension—total deflection should not exceed 1/2 inch (1.3 cm).

Acrylic Care

Caution

Do not use cleaning compounds containing ammonia or abrasive cleaners on your drums.

1. the Friability Tester drums are fabricated of commercial grade acrylic. Be sure to rinse them thoroughly with deionized water after each use, and dry thoroughly with a soft towel or cloth.

2. Do not clean with abrasive cleansers or cloths. Use deionized water whenever possible. If you must use a cleanser or solvent, be sure that it is as mild as possible,

non-abrasive, and fully compatible with PETG and acrylic before use. If in doubt, call the service department for advice before proceeding.

3. Do not use ammonia, window-cleaning sprays, kitchen scouring compounds, or solvents such as acetone, gasoline, benzene, alcohol, carbon tetrachloride, or lacquer thinner. These can scratch the material's surface and / or weaken it causing small surface cracks called "crazing".

4. Our recommendations include but are not limited to the following:
   - Hot water:< 150 °F
   - Vinegar (5% Glacial Acetic Acid)
   - Ethyl alcohol: maximum 10%
   - Isopropyl alcohol: maximum 25%

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 ribbon 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.

Caution

Ensure the roll of paper feeds squarely. If it does not, the paper can 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 power up your printer:

Step 1. Toggle the printer online by pushing the printer toggle switch to the *OnLine / Off Line* position.

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 35 for instructions on turning on and off the PRINT READY command. When you first turn on the printer, 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. Unplug the AC power adapter from the electrical outlet.

Step 2. Press and hold the printer toggle switch in the *Paper feed* position.

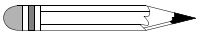
Step 3. Plug the AC power adapter into the electrical outlet.

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

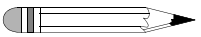
The printer configuration is set by the factory. This procedure should be performed only if the printer displays erroneous characters. Contact the Dissolution Systems Service Department for assistance, if necessary.

Step 1. Unplug the AC power adapter from the electrical outlet.

Step 2. Press and hold the printer toggle switch in the *OnLine / Off Line* position while plugging the AC power adapter into the electrical outlet. Hold the printer toggle switch in the *OnLine / Off Line* position for six seconds after the AC power adapter is replaced, 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 and 2.

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

Warning

The Friability Tester 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.

Follow these steps to replace the main power fuse:

Step 1. Before checking or attempting to replace a fuse, unplug the Friability Tester and remove the power cord from the unit.

Step 2. Press the release tab on the fuse holder located in the power entry module with the blade of a small screwdriver or equivalent.

Step 3. Upon release, slide the holder out of the power entry module.

Step 4. Remove the old fuse and insert the new fuse.

Step 5. Slide the holder back into the power entry module and push until it locks into place.

Step 6. Replace the power cord.

Warning

Never replace a fuse with one of a higher amperage rating. Doing so may compromise the safety margin and could result in damage to the instrument or personal injury.

Troubleshooting

The Dissolution Systems Service Department can assist you if you experience problems or have questions concerning your Friability Tester. 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 (within the USA) or 919.677.1108 (outside the USA). 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	Suggested Solution
The LED on the front panel display screen does not illuminate.	There is no power at the outlet.	Ensure the outlet has power going to it.
	The unit is not plugged in.	Ensure the unit is securely connected to an electrical outlet.
	The fuse is blown (open).	Replace the fuse. See "Fuse Replacement" on page 37.
The drums do not turn.	Program was not started.	Press **START STOP**.
	The drive belt is broken.	Replace the drive belt.
The test length is incorrect.	The wrong operating mode is selected.	Set the proper mode (counter or timer). See "Running a Test" on page 21 and page 25.
The optional Report Center Printer does not function.	The printer is disabled.	Enable the printer. See "Hidden Key Functions" on page 20.
	There is no power at the outlet.	Ensure the outlet has power going to it.
	The printer is not plugged in.	Ensure the printer is securely connected to an electrical outlet.
	The printer is off line.	Toggle the printer toggle switch online. See "Toggling Your Printer Online" on page 34.

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.