

614VET

Operator's Manual









 **Drucker Diagnostics**

TABLE OF CONTENTS

Symbols.....	1
Caution and Warning Statements.....	2
Model Description	4
Intended Use.....	4
Warranty.....	4
Supplied Equipment.....	4
Features	4
General Specifications	5
Setup Location	6
Initial Setup Procedure	6
Control Panel	8
Verifying The Preset Time.....	9
Changing The Preset Time	9
Operation.....	10
Spinning Balanced Loads	11
Rotor Removal And Installation.....	11
To remove the rotor	11
To install the rotor.....	11
Care And Preventative Maintenance.....	12
Cleaning and Disinfection	13
Troubleshooting.....	14
Emergency Rotor Chamber Entry	15
Calibration Testing.....	16
Safety	16
Replacement Parts.....	17

Symbols

Symbol	Definition	Use
	Caution	Caution to safety hazard. Potential risk of personal injury or damage to the instrument if improperly handled. Consult the manual before proceeding.
	Manufacturer	Manufacturer of record
	Electrical and electronic products recycling symbol	Recycle only as electronic waste. Do not dispose in normal waste
	MET Listing	Denotes conformity to specific safety standards and regulations.
	CE Mark	Denotes conformity to specific European directives and regulations.
FDA LISTED	FDA Listed	Denotes that the product has been properly listed with the FDA.
	ISO Certification	Denotes conformity to quality standards and quality management systems.

CAUTION AND WARNING STATEMENTS



This device is intended to be operated by properly trained personnel who have carefully read the operating manual and are familiar with the function of the device. Users should also comply with the specimen receptacle manufacturer's specific instructions for use, in addition to any other protocols established by the testing organization.



WARNING: For the safety of both the operator and service personnel, care should be taken when using this centrifuge if handling substances that are known to be toxic, radioactive or contaminated with pathogenic microorganisms. Use appropriate personal protection equipment (PPE). When Risk Group II materials are used, (as identified in the World Health Organization "Laboratory Bio-Safety Manual"), a Bio- Seal should be employed. In the event that materials of a higher risk group are being used, more than one level of protection must be provided. The use of flammable or explosive materials as well as those materials which have a vigorous chemical reaction is prohibited.



Unplug the centrifuge before cleaning or performing maintenance.



WARNING: Inspect centrifuge for cracks or physical damage to cabinet, lid, rotor, or tube holders. Damage may result in unsafe operation. Discontinue use until repairs have been performed.



The use of flammable or explosive materials as well as those materials which have a vigorous chemical reaction is prohibited.



For your safety and durability of the machine, never transport or store centrifuge with tube holders inside the machine.



WARNING: “Universal precautions”¹ should be followed in handling all items contaminated with blood or other bodily fluids.



This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with this operator manual, may cause interference to radio communications.



Operation of this equipment in a residential area may cause interference, in which case the user will be required to correct the interference at his own expense.



Operation of this equipment in a manner not specified by the manufacturer may impair the protection provided by the equipment.



Electrical Safety protection is provided by properly connecting the centrifuge to earth ground. Use only the manufacturer provided line cord and ensure that it is connected to a properly grounded power receptacle. Failure to do so will result in an electrical hazard.



WARNING: Do not make modifications to or remove any hardware from rotor without prior authorization from Drucker Diagnostics.



WARNING: Only use Drucker Diagnostics components in this centrifuge.



Due to the lack of the possibility of human exposure, all Drucker centrifuges and accessories sold by Drucker Diagnostics, Inc. are compliant without any special labeling required by the California Safe Drinking Water and Toxic Enforcement Act (Proposition 65).

¹ Recommendations for Prevention of HIV Transmission in Health Care Settings. MMWR 1987; 36 (Supplement #2S)

MODEL DESCRIPTION

The Model 614VET is a continuous-duty, electronically controlled Fixed Angle centrifuge with a lid safety interlock system. The unit is controlled by an electronic push-button timer that has been preset for two (2) minutes, for precise spin times and ease of use. Samples can be safely viewed through the transparent lid. Entry into the machine is restricted during operation by the safety interlock system. The Model 614VET features a lighted control panel that displays the status of the machine, easily viewable from a distance.

INTENDED USE

General purpose laboratory centrifuge, intended for the density-based separation of fluids through centripetal acceleration.

WARRANTY

Drucker Diagnostics warranties that this centrifuge is free from defects in workmanship and parts for 2 years.

SUPPLIED EQUIPMENT

One (1) six-place Fixed Angle rotor	P/N 7786047
Six (6) 125mm Tube Holder, Black	P/N 7713032

The rotor and accessories are rated for a rotation frequency of 3,500 RPM.

FEATURES

- Fixed Angle rotor design, incorporating a unique test tube holder that produces angle separated samples while requiring no additional parts
- Cool-Flow air flow design that prevents overheating of samples
- Heavy gauge steel construction for safety and durability
- Lid safety switch that prevents the centrifuge from operating unless the lid is closed and latched
- Removable rotor for easy cleaning
- Locking lid that allows entry into the centrifuge only after the rotor has completely stopped

- Brushless permanent split capacitor AC motor
- Clear lid for safe observation of samples and optical calibration of speed
- Electronically controlled timed operation (see pg. 8)
- Push-button operation
- Indicator lights:

	Color	Status
'RUNNING'	Green	Power is applied to the motor
'LATCHED'	Yellow	Lid is closed and latched
'UNLOCKED'	Red	Lock system is deactivated

GENERAL SPECIFICATIONS

Nominal Speed (Fixed Angle)	1,750 (+ 50 / - 10) RPM
Nominal RCF (Fixed Angle)	370 xg
<i>(RCF calculated at a rotor radius of 4.23 in. with 7713032 tube holders)</i>	
Maximum capacity (Fixed Angle)	90 mL (6 x 15 mL)
Overall Dimensions (H x W x D)	9 in. x 12 in. x 14 in.
Centrifuge Motor:	Brushless P.S.C. motor
Maximum Acceleration Time	10 seconds
Protection Breaker	5 Amp. re-settable
Timer	Electronic, 1 to 30 minutes preset to 2 minutes, +/- 2%
Current Requirement	1.9 Amps
Voltage Requirement	115 (+/- 10) Volts
Frequency	60 Hz
Weight	11 lbs
Altitude	Up to 2500 m above sea level
OverVoltage category	Category II
Pollution Degree of the intended Environment	Degree 2
Environmental Conditions	
Set-up Site	Indoor Use Only
Altitude	Up to 2,000m from Sea Level
Ambient Temperature	5 °C to 40 °C
Humidity	Maximum relative humidity 80% for temperatures up to 31 °C, decreasing linearly to 50% relative humidity at 40 °C

Overvoltage Category	II
Pollution Degree	2

Any use other than those specified by the Manufacturer is explicitly prohibited.
Maximum sample density is 1.15 grams / mL (water density = 1.0 grams / mL)

SETUP LOCATION

1. Unpack the centrifuge and verify that all supplied equipment is present.
2. Choose a setup location which meets the following criteria:
 - a. A clearance height of 20" is required to open the lid.
 - b. The clearance envelope is the space around the centrifuge which is required for safety. Choose a setup location which will allow for a clearance envelope of at least 24" x 24", (with the centrifuge at the center). No person or hazardous material shall be permitted in the clearance envelope during operation. The operator time within the envelope shall be limited to the time necessary for loading, unloading and centrifuge operation only.
 - c. Proper ventilation is necessary to prevent the overheating of samples as well as premature failure of the centrifuge. Choose an area which will allow unencumbered air flow.
 - d. The centrifuge is designed to secure to the operating surface by four suction feet. No adjustment is necessary for leveling the centrifuge; however, the surface should be flat and level.
 - e. Be sure the outlet is always within reach as the line cord is the means of emergency disconnection!

INITIAL SETUP PROCEDURE

If any problems are found during the initial setup procedure, refer to the troubleshooting section on page 14. For further assistance, contact Drucker Diagnostics at 814-692-7661.

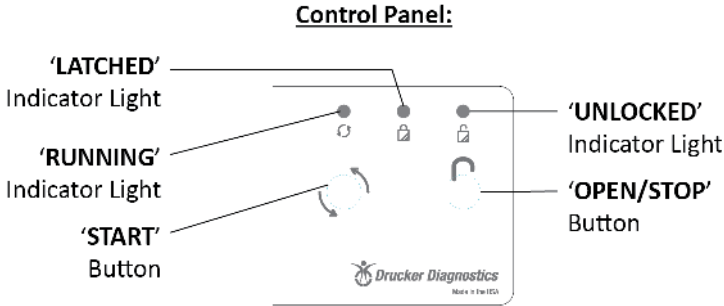
1. Plug the centrifuge in to an approved electrical outlet. For electrical safety, the unit must always be properly grounded.
2. For safety purposes, the locking system is always activated. To deactivate the system to insert or retrieve samples, press the 'OPEN / STOP' button on the control panel. The 'UNLOCKED' indicator light should illuminate. If it does not, refer to

Troubleshooting section. The lid will be unlocked for 15 seconds after pushing the 'OPEN / STOP' button.

3. Turn the latch counterclockwise and open the lid.
4. Spin the rotor by hand; check for free and level rotation. If the rotor does not spin freely, refer to Troubleshooting section.
5. Place the six test tube holders inside the rotor and verify that they are seated properly.
6. Close the lid. Rotate the lid knob clockwise to its complete top position. The 'LATCHED' indicator light should be illuminated. If it is not, make sure that the lid is latched properly. The centrifuge will not run unless the lid is latched and that the 'LATCHED' light is on.
7. Turn the centrifuge on by pushing the 'START' button.
8. The 'RUNNING' indicator light will illuminate.
9. The test tube holders will slide up into the Fixed Angle position and the unit will accelerate to full speed.
10. Listen to the sound of the centrifuge. A smooth whirring sound should be heard. If there are any loud or unusual sounds, stop the centrifuge by pushing the 'OPEN / STOP' button immediately and refer to Troubleshooting section.
11. While the machine is running, try to turn the latch counterclockwise. Power may be cut to the motor, but you should be unable to fully turn the latch. If it is possible to turn the latch and open the lid while the unit is running, contact Drucker Diagnostics for assistance. Close and latch the lid.
12. Push the 'OPEN / STOP' button. The 'RUNNING' indicator light should go out and the motor should slow to a stop.
13. The lid should remain locked until the rotor has nearly stopped. If the machine unlocks prematurely, contact Drucker Diagnostics for assistance.
14. Once the rotor has stopped, the interlock system will become disengaged for sixty (60) seconds. The 'UNLOCKED' indicator light will illuminate during this time.
15. To gain entry into the centrifuge after this period has ended, simply press the 'OPEN / STOP' button. The lid will unlock for fifteen (15) additional seconds.

After the centrifuge has passed this procedure, it is ready for operation.

CONTROL PANEL



<p>'RUNNING'</p>	<p>Lights up when the machine is in operation, (power is being applied to the motor).</p>	<p>'START'</p>	<p>Begins a new run, (the lid must be closed, see pg. 6).</p>
<p>'LATCHED'</p>	<p>Lights up when the lid has been closed and latched properly.</p>	<p>'OPEN/STOP'</p>	<p>Allows for access into the rotor chamber by disengaging the locking mechanism. Entry is only permitted when the rotor is stopped. Pressing this button during operation will terminate the run and unlock the lid after the rotor has come to a stop.</p>
<p>'UNLOCKED'</p>	<p>Lights up to indicate that the locking mechanism has been deactivated, allowing access to the rotor chamber.</p>		

VERIFYING THE PRESET TIME

NOTE: Your centrifuge must be plugged in.

- a. Push the 'OPEN/STOP' button to disengage the lock and then open the lid.
- b. Push and hold the 'START' button for approximately three (3) seconds. The Yellow 'LATCHED' indicator light will begin to flash, indicating program mode.
- c. When you release the 'START' button, the 'RUNNING' indicator light will begin to flash. Each flash represents one minute of run time.
- d. Press the 'START' button to verify the brake setting. When you release the 'START' button, the 'RUNNING' indicator light will begin to flash. Each flash represents the brake setting, from 1 to 10.

CHANGING THE PRESET TIME

NOTE: Your centrifuge must be plugged in.

- a. Push the 'OPEN/STOP' button to disengage the lock and then open the lid.
- b. Push and hold the 'START' and 'OPEN' buttons for approximately three (3) seconds. The yellow 'LATCHED' indicator light will begin to flash slowly, indicating that you can now program run time.
- c. Press 'START' one time for each minute of run time desired, from a minimum of 1 minute to a maximum of 30 minutes. The green 'START' indicator light will flash each time you press the 'START' button.
- d. Press 'OPEN' to enter the run time. You will now begin to adjust the brake setting.
- e. Press 'START' to adjust the brake setting, from a minimum of 1 to a maximum of 10. The green 'START' indicator light will flash each time you press the start button.
- f. When you are finished, press the 'OPEN' button to exit. Use the above procedure to verify the run time and brake setting change.

OPERATION

NOTE: Follow the initial setup procedure on page 6 before initial operation.

1. Plug the centrifuge into an approved 115 Volt A.C., 60 Hz. outlet.
2. Push the 'OPEN/STOP' button and then open the lid.
3. Place the test tube samples into the tube holders. Be sure to follow the rules for balanced loads.
4. Close the lid and turn the lid knob clockwise to its complete stop position. The 'LATCHED' indicator light should turn on to indicate that the latch is closed properly. If the lid knob is not completely latched, the 'LATCHED' indicator light will not turn on and the centrifuge will not operate!
5. The timer has been set to a preset time of two (2) minutes. To display or change this time setting, refer to page 9.
6. Turn on the machine by pushing the 'START' button on the control panel.
7. The centrifuge should begin to spin. The 'RUNNING' indicator light should illuminate.

IF A PROBLEM IS FOUND DURING A SPIN THAT REQUIRES THE CENTRIFUGE TO SHUT DOWN, PRESS THE 'OPEN / STOP' BUTTON!

8. The 'RUNNING' indicator light will begin to flash when one minute remains.
9. After time has elapsed, the 'RUNNING' indicator light will extinguish and the rotor will slow to a complete stop.
10. The 'UNLOCKED' indicator light will illuminate, and the locking mechanism will disengage allowing entry into the rotor chamber. If it does not, refer to page 14 on troubleshooting.
11. Turn the lid knob counterclockwise and open the lid.
12. Remove the samples.
13. If the machine re-locks before the samples are removed, press the 'OPEN/STOP' button to unlock the lid for an additional fifteen (15) seconds.

SPINNING BALANCED LOADS

Your centrifuge must contain a balanced load in order to work properly. Use the following rules when loading the rotor.

Spinning balanced loads will extend the life of the machine and produce better results.

1. Opposing tube holders must be identical and must contain the same cushion, or none at all.
2. Opposing tube holders must be empty or loaded with equally weighted samples.
3. If an odd number of samples is to be spun, fill a tube with water to match the weight of the unpaired sample and place it across from this sample.

ROTOR REMOVAL AND INSTALLATION

TO REMOVE THE ROTOR

1. Unlock the centrifuge by pushing the 'OPEN / STOP' button and unlatch and open the lid.
CAUTION: Unplug the centrifuge from the electrical outlet to eliminate the possibility of electrical shock or other injury.
2. Remove the test tube holders.
3. Remove the nut in the center of the rotor by turning it counterclockwise (a tool may be required).
4. The rotor is sitting on a cone-shaped adapter. Pull the rotor up and off of this adapter.

TO INSTALL THE ROTOR

1. Place the rotor back onto the cone-shaped adapter. You may need to turn the rotor slightly to line it up properly.
2. The rotor should slide onto the rotor cone freely.
3. Once a proper fit has been achieved, replace the nut and turn it until it is hand-tight, (a tool may be required).
4. Replace the tube holders and verify that they are seated properly.
5. It is recommended that the initial setup procedures be performed to ensure that the rotor has been installed correctly and that no damage has been done to the centrifuge during either the rotor installation or possible rotor chamber cleaning. See page 6 for this procedure.

CARE AND PREVENTATIVE MAINTENANCE

With proper care and maintenance your centrifuge will provide years of laboratory service. For proper care, the following steps should be taken:

1. **Provide Adequate Ventilation:** For cooling purposes, the Model 614VET draws in ambient air through the air intake cover on the top of the lid and exhausts this air in the rear of the base. The centrifuge should be placed on a hard smooth surface for good air circulation.
2. **Always Spin Balanced Loads:** Make certain that you are always spinning a balanced load. The Model 614VET has a unique counter balanced motor mounting design which, along with its rubber suction feet, produces excellent vibration dampening. However, out-of-balance loads may break glass test tubes and may produce unsatisfactory separation results. Proper load balancing will improve sample separation and extend the life of the centrifuge. Refer to page 11 on balanced loads for additional information on balancing the load.
3. **Keep the Tube Holders Clean:** NOTE: Always follow the safety guidelines of your laboratory to properly clean up and/or dispose of materials in the event that a substance known to be potentially toxic, radioactive or contaminated with a pathogenic microorganism is spilt in or on the centrifuge. Small glass fragments left in the tube holder after a tube breakage may adhere to the next test tube inserted in that holder. When this tube is handled, these fragments may puncture protective gloves and lacerate the operator's fingers or hand. Remaining fragments may provide stress points on subsequent tubes and result in additional breakage. If a tube breakage occurs, carefully remove the tube holder. Properly dispose of the sample and tube fragments and thoroughly clean both the inside and outside of the tube holder. Insert a new tube cushion (if necessary) and replace the tube holder in the rotor.
4. **Motor and Electrical Maintenance:** The Model 614VET uses a brushless permanent split capacitor AC motor. It should not need routine servicing for the life of the centrifuge. The electrical components are selected for high reliability and should not need routine service.
5. **Tube Holder Replacement:** It is recommended that the tube holders be replaced after 24 months of use. Inspect tube holders regularly for cracks. If cracks are discovered, replace immediately.

6. **Remove Accessories Before Moving:** All tube holders, samples, and caps must be removed from the rotor chamber before transporting or storing the centrifuge to prevent damage and injury.

CLEANING AND DISINFECTION

To prolong the life of the centrifuge cleaning and disinfection is recommended every six months, or whenever there is a spillage or tube breakage. Contaminants must be removed immediately, or corrosion and premature degradation of components can occur.

Before using any cleaning or decontamination methods except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment.



Cleaning and Decontamination may be necessary as a safeguard before laboratory centrifuges, rotors, and any accessories are maintained, repaired, or transferred. Manufacturers may provide a format for users to document that such treatment has been carried out.

1. Unplug the centrifuge before cleaning.
2. Apply Cleaning solutions with a dampened towel or cloth ONLY. Do not spray or pour cleaning solution directly onto or into the centrifuge. Do not saturate or submerge the centrifuge in water or other cleaning solutions as this will cause damage, create a safety risk, and void the warranty.
3. ONLY isopropyl alcohol, soap and water, or a 10% (5500 PPM) bleach solution should be used for cleaning and disinfection of the centrifuge and accessories.
4. All surfaces must be dried immediately after cleaning and disinfecting.



TBQ Germicidal products shall not be used, as they will cause damage to the centrifuge and void the warranty.

5. The use of fully/partially halogenated hydrocarbons, ketones, esters, ethers, benzyls, ethyl benzenes, and all other chemicals not prescribed by the manufacturer shall not be used as they

- may cause damage to the rotor chamber, rotor, tube holders, accessories and centrifuge exterior and void the warranty.
6. It may be necessary to remove the rotor and clean the rotor chamber. Follow the instructions on page 11 to remove and reinstall the rotor.

TROUBLESHOOTING

Note: The latch must be turned completely clockwise to its stop position in order for the centrifuge to operate.

<p>The rotor does not spin freely.</p>	<ul style="list-style-type: none"> ○ Make sure nothing has fallen into the rotor chamber. ○ If there is nothing obstructing the rotor, the rotor may be damaged. contact Drucker Diagnostics for further assistance.
<p>Excessive noise when the machine is running.</p>	<ul style="list-style-type: none"> ○ Check to see that the load is balanced. ○ Make sure that nothing has fallen into the rotor chamber. ○ Make sure that the nut in the center of the rotor is tight. ○ Have a technician test the motor and replace it if necessary.
<p>The centrifuge does not run.</p>	<ul style="list-style-type: none"> ○ Check the electrical outlet. ○ Make sure the lid latch is turned completely clockwise to its stop position. When the lid is closed properly, the latch light on the control panel will illuminate. ○ Check the circuit breaker switch at the bottom left of the machine. If the switch is white, the breaker has tripped. Contact Drucker Diagnostics for further assistance. ○ The printed circuit board may be damaged. Have a technician test and replace the circuit board if necessary.

<p>The latch light does not come on when the lid is closed.</p>	<ul style="list-style-type: none"> ○ Make sure that the unit has power. ○ Make sure the lid latch is turned completely clockwise to its stop position. The latch makes contact with a switch underneath the front top of the cabinet. If this switch is not activated, the light will not turn on and the machine will not run.
<p>The machine does not unlock after a run has completed.</p>	<p>The lid should remain locked until the rotor has nearly come to a complete stop and then unlock for 60 seconds. If additional unlock time is needed, press the 'OPEN/STOP' button with the machine plugged in and the rotor stopped. If the lid remains locked after this and will not unlock, the electronics may have been damaged. Contact Drucker Diagnostics for assistance. To access the rotor chamber, follow the procedure on this page, "Emergency Rotor Chamber Entry".</p>
<p>The run time is not set to the desired length.</p>	<p>Check the run preset by following the instructions on page 9. If the preset is not the desired length, follow the procedure on the same page to change the run preset time.</p>

EMERGENCY ROTOR CHAMBER ENTRY

In the event of power failure, it may be impossible to unlock the lid by conventional means. In this case, entry into the rotor chamber may be made by removing the latch label and using a pen to manually disengage the locking mechanism (see photo). Pull the mechanism towards the control panel and then unlatch and open the lid. If the unit is damaged, contact your authorized dealer or Drucker Diagnostics.



CALIBRATION TESTING

It is recommended that the top speed be tested every two years for continued safe operation. Contact Drucker Diagnostics for further information or testing availability.

SAFETY

The Model 614VET complies with US, Canadian, and European Safety standards.

Lid Safety Switch: The Model 614VET lid is secured to the top of the cabinet by a latching knob and pawl system. When the knob is rotated clockwise, the pawl grips the underside of the cabinet opening and prevents the lid from opening. A mechanical stop positions the pawl and prevents it from rotating completely. When rotated to the stop position, the pawl makes contact with a micro-switch mounted underneath the cabinet top. The lid safety switch prevents the centrifuge from operating while the lid is open. An indicator light on the front of the machine will light up when the lid has been latched properly.

Lid Safety Interlock System: In addition to the Lid Safety Switch, the Model 614VET has a true “0 RPM” lid locking system. The lid safety locking system keeps the lid locked at all times, (even during power failure), and requires that the rotor be at rest in order to unlock the lid. The centrifuge will not allow entry into the rotor chamber unless the centrifuge has power and the rotor is stopped. To open the lid, make sure that the centrifuge is plugged in and, with the rotor stopped, press the ‘OPEN/STOP’ button.

Note: After the centrifuge has started spinning, it may be possible to rotate the lid knob enough to cause the pawl to lose contact with the lid safety switch. If this happens, the centrifuge motor may lose power, but the lid will still remain locked. If the knob is accidentally moved and this situation should occur, rotate the knob fully clockwise to its stop position and the centrifuge will resume operation.

Circuit Breaker: The Model 614VET is protected with a 5 Amp circuit breaker located at the rear of the machine mounted to the base. Any electrical short circuit will cause the breaker to cut power to the machine.

REPLACEMENT PARTS

Part No.	Description
7724037K	Foot, rubber (Pack of 4)
7751068	Switch, lid safety
7786047	Rotor, six-place, Fixed Angle
03-1-0006-0010	Motor, Half Speed, PSC
7729009	Capacitor, 5uF, 250V A.C.
7717051	Electronic timing and locking board
7751043	Circuit Breaker
7760002	Power cord
03-1-0008-0016	Pawl, latch, lid
03-1-0008-0009	Knob, latch, lid
7724071K	Hinge, friction (Pack of 2)
7732018	Seal, lid gasket
7713032K	125mm Tube Holder, Black (Pack of 6)
02-002-1-0027	Lid Assembly
03-0-0003-0664	Front Panel Label

This operator's manual is part number 03-0-0002-0229 Rev.F

FDA LISTED



Designed, built, and supported in the USA



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Patents Pending