

Replacement Parts:

Part No.	Description
7724037	Foot, rubber
7751068	Switch, lid safety
7786021	Rotor, 6-place, horizontal
7735014	Motor, 1/30 HP, 115 VAC permanent split capacitor
7729006	Capacitor, 4µF, 250 VAC
7717036	Electronic timing and locking board 230 V
7751043	Circuit Breaker
7760005	Type F Power Cord
7714101	Pawl, latch, lid
7714103	Knob, latch, lid
7712316	Lid
7724071	Hinge, friction
7732018	Seal, lid gasket
7713031	100 mm tube holder, red
7713033	75 mm tube holder, green

Available Accessories:

	100 mm Tube Holder p/n 7713040		75 mm Tube Holder p/n 7713043		6-Place Horizontal Rotor p/n 7786021
	1" Tube Cushion p/n 1525		0.25" Tube Cushion p/n 9150		Tube Holder Caps p/n 7713011

WARRANTY:

The Drucker Company warrants that this centrifuge is free from defects in workmanship and parts for 12 months.



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Programmable Run Time
 is Factory Preset to
10 Minute 3,800 RPM
5 Minute 1,800 RPM
 See Page 5



Operator's Manual

Protected by U.S. patent # 6,811,531

Rev. C

Model 642VFD-Plus • Laboratory Centrifuge

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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. 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.

Model Description:

The 642VFD-Plus is a continuous-duty, electronically-controlled horizontal centrifuge with a lid safety interlock system. The unit is controlled by two electronic push-button timers that have been preset for ten (10) minutes 3,800RPM & five (5) minutes 1,800 RPM, 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 642VFD Plus features a lighted control panel that displays the status of the machine, easily viewable from a distance. For warranty information, turn to page 12.

Intended Use

General purpose laboratory centrifuge for sample separation.

Supplied Equipment*:

The following items come standard with each 642VFD Plus Horizon centrifuge:

1. Operator’s manual
2. One (1) six-place horizontal rotor p/n 7786021
3. Six (6) 100mm tube holders p/n 7713031
4. Six (6) 75mm tube holders p/n 7713033



Optional Accessories:
 0.25” tube cushions, p/n 9150
 1.0” tube cushions, p/n 1525

* The rotor and rotor accessories are rated for a rotation frequency of 4,000 RPM.

Safety:

Lid Safety Switch: The 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 Plus Interlock System: In addition to the Lid Safety Switch, the 642VFD-Plus has a true “0 RPM” lid locking system. The lid safety interlock 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 642VFD-Plus is protected with a 4 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.

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 authorised dealer or The Drucker Company.



Calibration and Earth Ground Testing:

It is recommended that the top speed, ground continuity and line leakage be tested every two years for continued safe operation.

Contact The Drucker Company for further information or testing availability.



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

Troubleshooting:

1. Problem: The rotor does not spin freely.
Solutions: – Make sure nothing has fallen into the rotor chamber. – If there is nothing obstructing the rotor, <i>contact The Drucker Company for further assistance.</i>
2. Problem: Excessive noise when the machine is running.
Solutions: – 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.
3. Problem: The centrifuge does not run.
Solutions: – Check the electrical outlet. – Make sure the lid latch is turned completely clockwise to its stop position. When the lid is closed properly, the locked light on the control panel will illuminate. – If the unit is getting power, make sure that the lid latch is closed properly. The latch is closed properly when the yellow 'LATCH' indicator light is illuminated. – Check the circuit breaker switch at the bottom left of the machine. If the switch is white, the breaker has tripped. Contact The Drucker Company for further assistance. – The printed circuit board may be damaged. Have a technician test and replace the circuit board if necessary.
4. Problem: The latch light does not come on when the lid is closed.
Solutions: – 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.
5. Problem: The machine does not unlock after a run has completed.
Solutions: – 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. <i>Contact The Drucker Company for assistance.</i> To access the rotor chamber, follow the procedure on page 11, "Emergency Lid Removal".
6. Problem: The run time is not set to the desired length.
Solutions: – Check the run preset by following the instructions on page 5. If the preset is not the desired length follow the instruction on the rear of the machine to change the run preset time.

For servicing information or additional technical support, contact The Drucker Company or your authorized distributor.

Features:

- Swing-out horizontal rotor design (patent-pending), incorporating a unique test tube holder that produces horizontally 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. 5)
- Push-button operation
- Indicator lights:

'RUN 1'	Green	– lights when power is applied to the motor
'RUN 2'	Green	– lights when power is applied to the motor
'LATCH'	Yellow	– lights when the lid is closed and latched
'UNLOCKED'	Red	– lights when the locking system is deactivated

Specifications:

Nominal Speed (RUN 1):	3,800 (+/- 100) RPM
Nominal RCF (RUN 1):	2,000 (+/- 90) xg
Nominal Speed (RUN 2):	1,800 (+/- 100) RPM
Nominal RCF (RUN 2):	450 (+/- 70) xg
Maximum capacity (Horizontal):	60 mL (6 x 10 mL)
Overall Dimensions (H x W x D):	9.0 in. x 11 in. x 12.5 in. (22 cm x 28 cm x 32 cm)
Centrifuge Motor:	1/30 HP, p.s.c. motor
Nominal Acceleration Time:	30 seconds
Protection Breaker:	4 Amp. re-settable
Timer:	Electronic, 1 to 30 minutes preset to 10 minutes, +/- 1%
Current Requirement:	1.9 Amps
Voltage Requirement:	115 (+/- 10) Volts
Frequency:	60 Hz
Weight:	18.5 lbs. (8.4kgs)

Permitted Environmental Conditions:

Ambient Temperature During Operation:	2 °C - 35 °C
Maximum Relative Air Humidity:	90%

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)

* Check the serial number badge for your model specific voltage requirements

Setup Location:

1. Unpack the centrifuge and verify that all of the supplied equipment is present.
2. Choose a setup location which meets the following criteria:
 - a) A bench top clearance height of 20" is required in order 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 10.

1. Plug the female end of the line cord into the rear of the centrifuge. Plug the male end into 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, (in order 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 page 10 on troubleshooting. 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 the section on troubleshooting.
5. Place the six test tube holders inside the rotor (as shown to the right), and verify that they are seated properly.
6. Close the lid. Rotate the lid knob clockwise to its complete stop position. The 'LATCH' 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 the 'LATCH' indicator light is illuminated.
7. Turn the centrifuge on by pushing the desired 'START' button; either PRP or PRFM.
8. The appropriate 'RUN' indicator light will illuminate.
9. The test tube holders will slide up into the horizontal 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 pressing the 'OPEN / STOP' button immediately and refer to the section on troubleshooting.
11. Push the 'OPEN / STOP' button. The 'RUN' indicator light should go out and the motor should slow to a stop.
12. The lid should remain locked until the rotor has nearly stopped. If the machine unlocks prematurely, contact The Drucker Company for assistance. Once the rotor has stopped, the interlock system will become disengaged for sixty (60) seconds. The 'UNLOCKED' indicator light will illuminate during this time.
13. 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.



Horizontal Rotor Shown

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

Care and Preventative Maintenance:

With proper care and maintenance your 642VFD-PLUS centrifuge will provide years of laboratory service. For proper care, the following steps should be taken:

1. **Provide Adequate Ventilation:** For cooling purposes, the 642VFD-PLUS 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 642VFD-PLUS 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. See page 6 for information on balancing the load.
3. **Keep the Tube Carriers / 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 spilled 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 642VFD-PLUS uses a brushless permanent split capacitor AC motor. It should not need servicing for the life of the centrifuge. The electrical components are selected for high reliability and should not need service.
5. **Keep the Rotor Chamber Clean:** Every six months, or whenever there is a tube breakage, (refer to the note in #3), it may be necessary to remove the rotor and clean the rotor chamber. Follow the instructions on page 7 to remove and reinstall the rotor.

CAUTION: Once the lid has been opened, unplug the line cord from the electrical outlet to eliminate the risk of electric shock during cleaning.

The rotor chamber, rotor and accessories shall be thoroughly cleaned using either isopropyl alcohol, soap and water, or bleach. The use of Fully/Partially Halogenated Hydrocarbons, Ketones, Esters and all other chemicals not prescribed by the manufacturer may cause damage to the rotor and tube holders and shall not be used.
6. **Tube Holder Replacement:** It is recommended that tube holders be replaced after 24 months of use.

Tube Holder Configurations

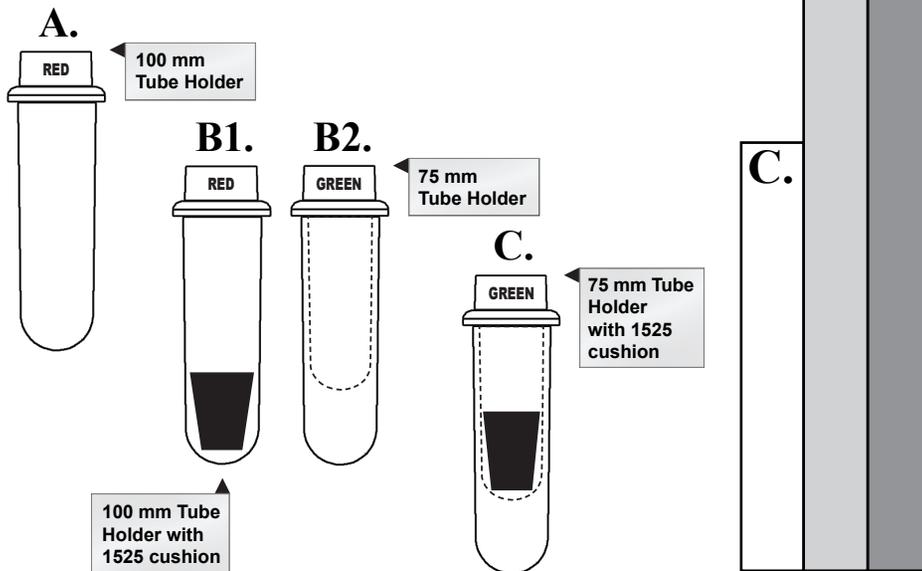
The 642VFD-Plus is capable of spinning test tubes up to 17 mm x 100 mm with its horizontal rotor. Use the following chart and drawing to determine which tube holder and cushion combination should be used with your application.

Your centrifuge must contain a balanced load in order to work properly. To ensure that the load is balanced, keep these rules in mind when inserting test tube samples into the six position horizontal rotor:

1. Opposing tube holders must be identical.
2. Opposing tube holders must be empty or loaded with equally weighted samples.
3. If an odd number of samples is to be spun, use a water-filled tube with the unpaired one.

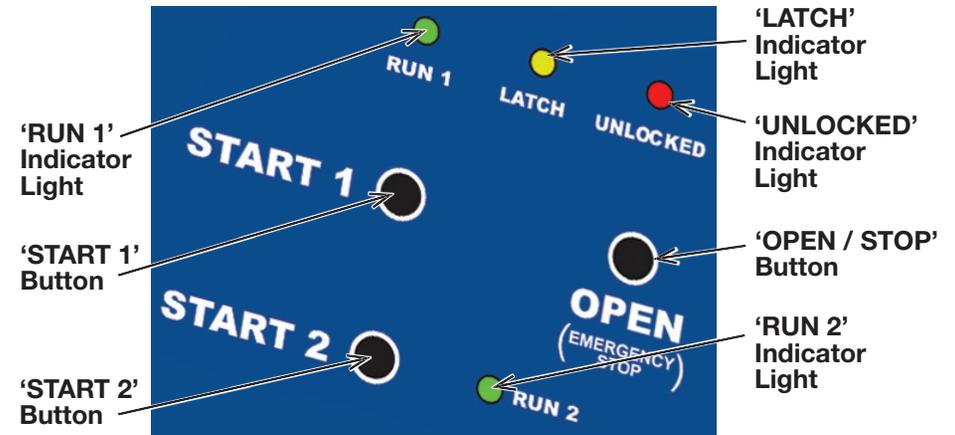
DIRECTIONS:

1. Compare the tube to be spun with the boxes shown here.
2. Find the box that most closely matches the tube's length.
NOTE: The tube length with its stopper or cap must be shorter than the chosen box.
3. Match the letter from the chosen box with one of the configurations shown. For Example: A tube as long as box B. Accordingly, we can use a 100 mm tube holder with a 1525 cushion or a 75 mm tube holder with no cushion, (configurations B1 or B2).



* This part is available as an accessory. Contact The Drucker Company for assistance.

Control Panel:



'START 1'
Begins a new 10 minute run.
NOTE: The lid must be closed.

'START 2'
Begins a new 5 minute run.
NOTE: The lid must be closed.

'LATCH'
Lights up when the lid has been closed properly.

'UNLOCKED'
Lights up to indicate that the locking mechanism has been deactivated, allowing access to the rotor chamber.

'START 1'
Lights up when the machine is operating for a 10 minute run. Power is being applied to the motor.

'START 1'
Lights up when the machine is operating for a 5 minute run. Power is being applied to the motor.

'OPEN / STOP'
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.

To verify the preset run time, RPM and brake settings:

1. Plug in the line cord.
2. Press the OPEN button to unlock the lid.
3. Open the lid.
4. Press and hold a START button until the latched light begins to flash, then release.
5. The unit will indicate the settings for the START button you selected with audible "beeps". Count the number of beeps, they indicate the run-time setting in minutes.
6. Press the same START button again, count the beeps, this time they indicate the RPM setting (one beep = 100 RPM).
7. Press the START button again counting the beeps, they indicate the brake setting magnitude (1=off, 10=Maximum).
8. Press STOP/OPEN to return to the idle state.
9. If you have a two speed model, you can check the second preset run time, RPM and brake settings by using the second START button.

To change the preset run time, RPM and brake settings:

1. Plug in the line cord.
2. Press the OPEN button to unlock the lid.
3. Open the lid.
4. Press and hold a START button along with the STOP/OPEN button until the latched light begins to flash (approximately 1 second on, 1 second off), then release.
5. Press the same START button once for each minute of run time desired. The time may be set from 1 to 30 minutes.
6. Press the STOP/OPEN button to assign the settings. The latched LED will begin to flash at an increased rate (~1/2 second on, ~1/2 second off).
7. Press the START button to program the RPM, each press adds 100 RPM. (i.e. pressing 10 times is a setting of 1000 RPM). Minimum RPM = 500, Maximum = 3,800
8. Press the STOP/OPEN button to save the setting. The RPM is now programmed.
9. Press the START button to set the brake level (1 press=off, 10=MAX).
10. Press STOP/OPEN to exit programming mode.
11. If you have a two speed model, you can assign the second runtime, RPM and brake settings by using the second run button.
12. NOTE: The maximum setting for runtime, RPM and braking cannot be exceeded, however if it is attempted, an error buzzer will sound to indicate that the limit has been reached, if you hear the error buzzer, you are at the maximum setting.

Operation:

NOTE: Follow the initial setup procedure on page 4 before initial operation.

1. Plug the centrifuge into an approved A.C. outlet. (Refer to the instrument's Serial Number Badge and see page 3 for details).
2. Push the 'OPEN / STOP' button and then open the lid.
3. Insert cushions (if needed) into the tube holders for the tube size you are using. Refer to 'Tube Holder Configurations' (page 8) for assistance.
4. Place the test tube samples into the tube holders. Be sure to follow the rules for balanced loads.
5. Close the lid and turn the lid knob clockwise to its complete stop position. The 'LOCKED' indicator light should turn on to indicate that the latch is closed properly. If the lid knob is not completely latched, the 'LOCKED' indicator light will not turn on and the centrifuge will not operate!
6. The timers have been set to a preset times of 10 minutes @ 3,800RPM and 5 minutes @ 1,800RPM. To display or change this time setting, refer to page 5.
7. Turn on the machine by pushing the appropriate 'START' button on the control panel.
8. The centrifuge should begin to spin. The corresponding 'RUN' indicator light should illuminate.

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

9. The run indicator light will begin to flash when one minute remains.
10. After time has elapsed, the 'RUN' indicator light will extinguish and the rotor will slow to a complete stop.
11. 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 10 on troubleshooting.
12. Turn the lid knob counterclockwise and open the lid.
13. Remove the samples.
14. 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.

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.*

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.

The rotor chamber, rotor and accessories shall be thoroughly cleaned using either isopropyl alcohol, soap and water, or bleach. The use of Fully/Partially Halogenated Hydrocarbons, Ketones, Esters and all other chemicals not prescribed by the manufacturer may cause damage to the rotor and tube holders and shall not be used.

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 at this time 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 .5" nut driver 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 rotor 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, (as shown on page 4).
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 4 for this procedure.

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