

HORIZON








Model 24 Flex

Operator's Manual

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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.
	RoHS Compliant	Compliance with RoHS environmental standards.
	CE Mark	Denotes conformity to specific European directives and regulations.
	MET Listing	Denotes conformity to specific safety standards 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.

MODEL DESCRIPTION

Satisfy your lab's most diverse processing requirements with the HORIZON 24 Flex. Customize settings and check every detail on the digital display. Select a single pre-programmed cycle or program up to 9 additional custom cycles to produce high-quality samples.

This general-purpose laboratory centrifuge may also be used to spin approved containers with biologics, chemicals (non-flammable, non-explosive, non-volatile, and non-highly reactive), and environmental samples.

FEATURES

- The first cycle is conveniently pre-set and labeled for your lab's most common applications. Use the default cycles or customize them as needed.
- A time and speed/g-force can be quickly entered for a single use cycle. The cycle will be retained in memory and can be easily edited later.
- If desired, the control panel can be temporarily locked on one cycle, ideal for standardization to a single spin.
- A Preset Lock can be turned on to allow users to run only the selected cycle.
- Up to nine (9) additional cycles can be programmed for time, speed, and braking and labeled with a custom name. Cycles can be programmed by g-force (RCF) or speed to facilitate matching validated cycles and tube manufacturers' IFUs.
- A digital cycle counter tracks the number of cycles the centrifuge has run.
- Lid lighting indicates the centrifuge's status (ready, running, done), informing the operator when tubes are ready for the analyzer and preventing tubes from being left in the centrifuge longer than necessary (patent pending).
- A traditional audible alert indicates the completion of the cycle.
- Cool-Flow design prevents overheating of samples by using ambient air to keep specimens at room temperature.
- A clear lid permits safe observation of samples and optical calibration of speed.
- The lid safety system prevents the centrifuge from operating unless the lid is closed and latched.
- The lid safety system only allows entry into the centrifuge after the rotor has completely stopped.
- The high-power brushless motor provides years of operation with no routine maintenance.

INTENDED USE

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

WARRANTY

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

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. [Refer to the clinical laboratory method specified by the specimen receptacle manufacturer or established by the medical technology for the products applications.]
- ⚠ **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.
- ⚠ 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.
- ⚠ **WARNING:** Only use Drucker Diagnostics components in this centrifuge.

INITIAL SETUP

- Unpack and verify that all the following are included:
 - Centrifuge
 - Power cord
 - Buckets
 - Tube Inserts
 - Quick Start Guide
- Setup the centrifuge on flat and level surface. A bench top clearance height of 21" (54 cm) is required to open the lid.
- The centrifuge should have 6" (15 cm) of clear space around the centrifuge. Proper ventilation is necessary to prevent the overheating of samples as well as premature failure of the centrifuge. Choose an area which allows unencumbered air flow, and where the temperature remains between 16°C and 32°C.
- No 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.
- Plug the line cord into the centrifuge.
- Plug the line cord into an approved electrical outlet.

 **BE SURE THE ELECTRICAL OUTLET IS ALWAYS ACCESSIBLE AS THE LINE CORD IS THE MEANS OF EMERGENCY DISCONNECTION!**

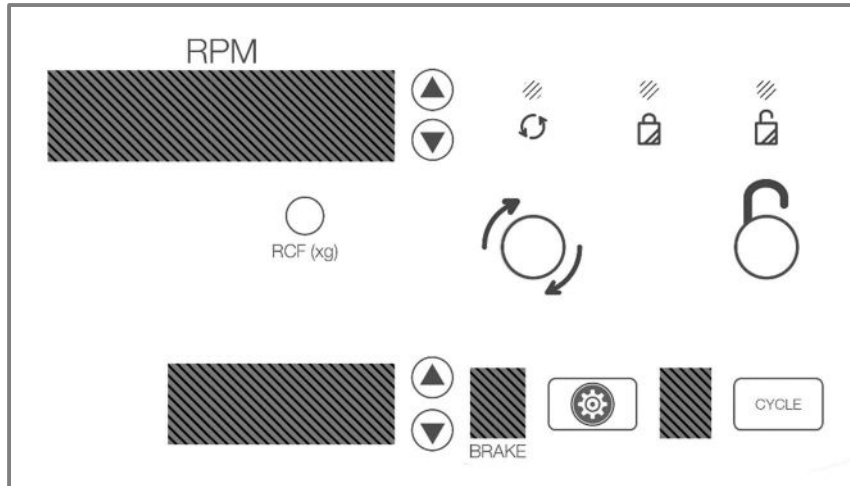
OPERATION

- Place the tubes into the buckets. Be sure to follow the rules for balanced loads as listed on page 11.
- Close the lid and turn the lid knob clockwise to its complete stop position.
- The digital screen shows the currently selected cycle. To select another cycle, press the CYCLE button in succession until the desired cycle is selected.
- Pushing the START button on the control panel will start the spin cycle.
- When the cycle is completed, the rotor will slow to a complete stop and the lid light will flash.
- The unlocking mechanism will engage for 60 seconds allowing entry into the rotor chamber. To unlock after more than 60 seconds have elapsed, press the UNLOCK button. The lid will unlock for another 15 seconds.
- Turn the lid knob counterclockwise and open the lid. The lid light will turn off.
- You may now safely remove the samples.

QUICK START

The top screen display alternates between the name of the currently selected speed. The bottom screen displays the time setting. For convenience, the first cycle is preset as shown and can be reprogrammed to your validated cycles:

Cycle 1 This setting is factory preset to 4,000 RPM @ 4 minutes






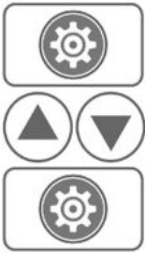
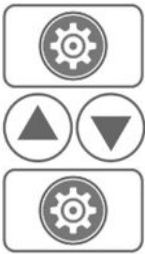
	Start	Begins running the cycle displayed on the screen. The lid must be closed.
	Unlock	Allows access into the rotor chamber by engaging the unlocking mechanism. Entry is only possible when the rotor is stopped.
	Stop	Pressing the UNLOCK button during operation will terminate the run and unlock the lid after the rotor has come to a stop.
	Cycle Selection	Press the CYCLE button to select the desired saved cycle.

QUICK PROGRAM A CYCLE WITHOUT SAVING

Time and speed for a cycle can be quickly set without entering the programming mode. While quick, this method does not allow the cycle to be saved in memory after programming.










If saving or locking the cycle is desired, follow the instructions in the section on Setting or Modifying a Saved Cycle.

The cycle can be programmed by speed (RPM) or g-force (Best practice).



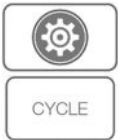
	<p>Setting Speed</p>	<p>To change the speed (RPM) shown on the top display, use the up and down buttons next to that screen. The CYCLE number is replaced with a "--" in the display, and the top screen displays the speed.</p>
	<p>Setting by G-Force</p>	<p>Press and hold the RCF (xg) button while changing the displayed setting on the top screen, using the up and down buttons next to it. The RPM will automatically adjust.</p>
	<p>Setting Time</p>	<p>Press the up and down buttons next to the TIME display.</p>
	<p>Change Brake Values</p>	<p>Enter the Settings mode by pressing the GEAR button.</p> <p>Press the down key next to the top screen until it shows "Brake". To change the value shown on the BRAKE display, use the up and down buttons next to the BRAKE screen.</p> <p>Press the GEAR button again to save.</p>
	<p>Turn Beeper On or Off</p>	<p>Enter the Settings mode by pressing the GEAR button.</p> <p>Press the up and down keys next to the upper screen until "Beeper" shows on the upper screen. Switch ON or OFF with the keys next to the lower screen. This setting will apply to all cycles.</p> <p>Press the GEAR button again to save.</p>

SETTING OR MODIFYING A SAVED CYCLE

Up to 10 cycles can be named, programmed for time, speed, and braking, and saved in memory. The top screen alternates between cycle name and speed when not in programming mode.


	Cycle Selection	Press the CYCLE button until the number for the cycle to be programmed or changed is displayed.
	Enter Settings Mode	Press the GEAR button. The word "Speed" appears on the top screen.
	Setting by g-Force (Recommended)	While the top screen displays SPEED, press and hold the RCF (xg) button while changing the displayed setting, using the up and down buttons next to the bottom screen. The RPM will automatically adjust.
	Setting Speed (Alternate)	If the g-force is set correctly, the speed does not need to be set separately. To change the speed (RPM) shown on the bottom display, use the up and down buttons next to it. The G-force will adjust automatically and can be verified by pressing the RCF button.
	Setting Time	Navigate with the down key next to the top screen until it shows "Time". Press the up and down buttons next to the bottom TIME display to adjust time.
	Change Brake Values	Navigate with the down key next to the top screen until it shows "Brake". To change the value shown on the BRAKE display, use the up and down buttons next to the BRAKE screen.
	Turn Beeper On or Off	Press the up and down keys next to the upper screen until "Beeper" shows on the upper screen. Switch ON or OFF with the keys next to the lower screen. This setting will apply to all cycles.
	Naming the Cycle	Navigate to the cycle name with the UP and DOWN arrows. The current name of the cycle is displayed and can now be changed. Press the START button. The * indicates the character selected. Change it to the desired character with the up and down buttons, then move to the next character with the right arrow >. Repeat. Press the GEAR button to get back to the main programming menu. A beep indicates that the name has been saved.
	Save and Exit Settings Mode	Press and hold the CYCLE button you hear a double beep. The new parameters will be saved to the cycle number displayed on the screen to the right. Note: if the GEAR button is pressed before the CYCLE button, all changes will be lost.

DELETING A CYCLE

	<p>Enter the Advanced Menu</p>	<p>With the desired cycle selected, access the menu and enter the advanced menu.</p>
	<p>Navigate to Delete</p>	<p>Using the UP and DOWN buttons, navigate to DELETE. Exit the menu. WARNING: CYCLE WILL BE DELETED IF MENU IS EXITED WITH DELETE SELECTED</p>
	<p>Confirm Deletion</p>	<p>Press the CYCLE button to Delete the cycle</p>

RESET TO FACTORY SETTINGS

These actions will reset to the cycles preset at the factory. All other cycles will be erased.



	<p>Power off</p>	<p>Wait until the screens go dark.</p>
	<p>Reset to Factory Settings</p>	<p>Start with the power off. While pressing the GEAR and CYCLE buttons, power the unit. Hold the GEAR and CYCLE buttons until "RESET" appears on the upper screen. The unit will be restored to factory settings only.</p>

CYCLE LOCK




To ensure repeatability, the centrifuge can be locked either on one cycle (Single Cycle Lock) or restricted to the saved cycles (Presets Lock). The Single Cycle Lock also prevents making changes to the selected cycle parameters.

The Preset Lock allows selection of any saved cycle and prevents changing the parameters of saved cycles.

SINGLE CYCLE LOCK

	Lock on Single Cycle	Select desired cycle. With lid open, press and hold the UNLOCK button for 5 seconds. Two beeps and a flash of the lid light will confirm that cycle selection is locked.
	Cancel Single Cycle Lock	To re-enable cycle selection, with lid open, press and hold the UNLOCK button for 5 seconds. Two beeps and a flash of the lid light will confirm that cycle selection is now unlocked.

PRESETS ONLY MODE

	Enter Settings Mode	Press the GEAR button.
	Lock Saved Cycles	With lid open, press and hold the UNLOCK button for 5 seconds. Two beeps and a flash of the lid light will confirm that the Preset Lock is active. The cycle screen will now only show the numbers for programmed cycles.
	Cancel Preset Lock	With lid open and while not in Settings mode, press and hold the UNLOCK button for 5 seconds until two beeps are heard. Saved cycles can again be edited or programmed.

SETTINGS

	RPM	Time	G-Force
Cycle 1	4,000	4 minutes	3,000 xg

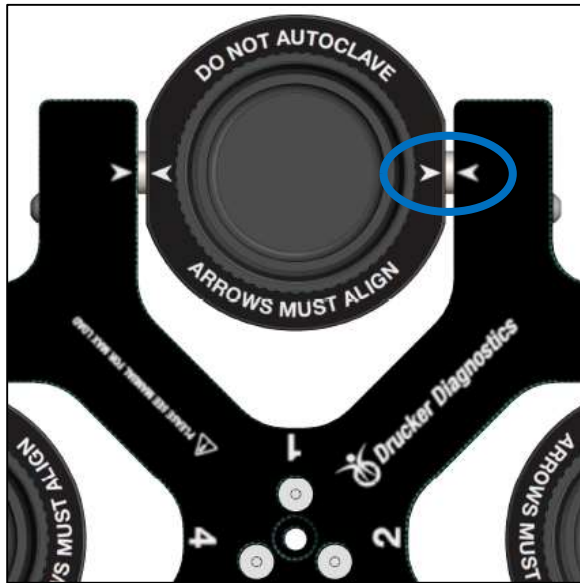
LOADING

CARRIER ALIGNMENT

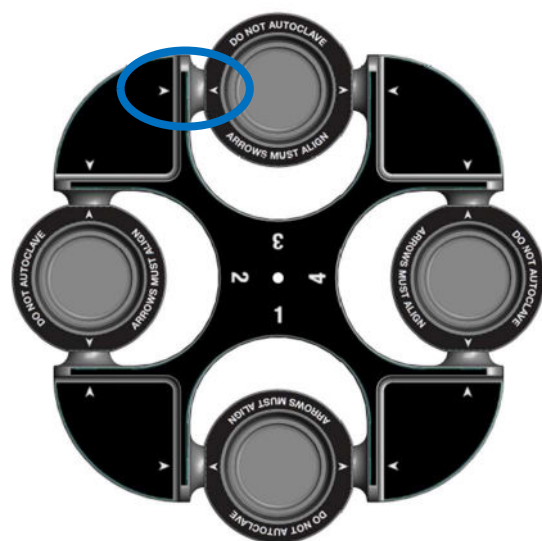
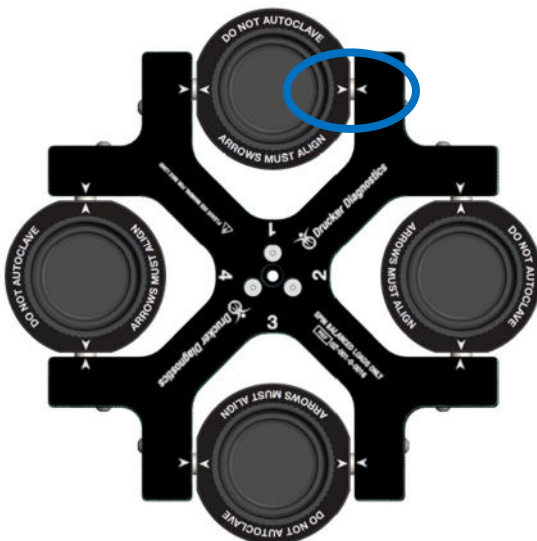
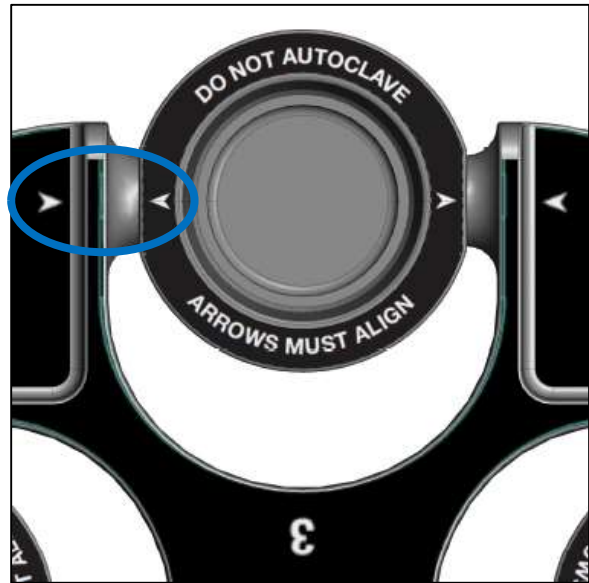
To ensure proper operation, align carriers and rotor utilizing the arrows indicated below.

Verify that carriers are hanging from the rotor pins and swing freely into the horizontal position.

Rotor P/N 02-001-0-0016



Rotor P/N 03-1-0001-0138

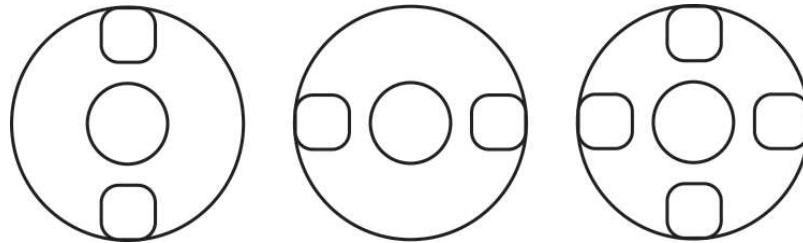


BALANCING LOADS



Your centrifuge must contain a balanced load to work properly. Spinning balanced loads will extend the life of the centrifuge and produce better results. Use the following rules when loading the rotor. 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.

Opposing buckets must be equally loaded or empty or loaded with equally weighted samples.



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:

- **Always Spin Balanced Loads:** Make certain that you are always spinning a balanced load, as shown in the previous section. These centrifuges have a unique counter balanced motor mounting design which 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.
- **Motor and Electrical Maintenance:** The highest quality electrical components have been selected for the centrifuges and should not need maintenance or servicing for the life of the centrifuge.
- **Bucket Replacement:** It is recommended that the buckets be replaced after 24 months of use. Inspect buckets regularly for cracks. If cracks are discovered, replace immediately.
- **Remove Accessories Before Moving:** All buckets, samples, and accessories 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 other than those recommended by the manufacturer, users should verify with the manufacturer that the proposed method will not damage the equipment.

- Unplug the centrifuge before cleaning.
- Use appropriate personal protective equipment (PPE).
- Apply cleaning solutions with a towel or cloth. Do not submerge the centrifuge in water or other cleaning solutions as this will cause damage and void the warranty.
- ONLY isopropyl alcohol or a 10% (5500 PPM) bleach solution should be used to disinfect the centrifuge and its accessories.
- All surfaces must be dried immediately after cleaning and disinfecting.



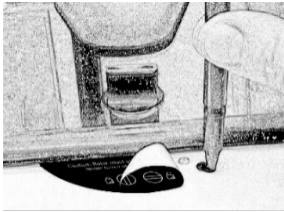
TBQ Germicidal products are not recommended as they may cause damage to the centrifuge. Refrain from using to prevent voiding the warranty.

- 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, buckets, accessories and centrifuge exterior and void the warranty.

TROUBLESHOOTING

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

<p>The centrifuge does not run</p>	<ul style="list-style-type: none"> ○ Verify that the centrifuge is powered. One of the LED lights should be on. ○ If “Lid not closed” message is displayed, make sure the lid latch is turned completely clockwise to its stop position. ○ If the centrifuge still does not run, contact Customer Service.
<p>The rotor does not spin freely</p>	<ul style="list-style-type: none"> ○ Make sure nothing has fallen into the rotor chamber, following the procedure above. ○ If nothing obstructs the rotor, the rotor may be damaged. Contact Customer Service for further assistance.
<p>The centrifuge makes a rattling noise when running</p>	<ul style="list-style-type: none"> ○ Stop the centrifuge. Open the lid. ○ Wearing PPE, remove tubes and buckets and look for fallen objects or debris. Carefully reach inside the rotor chamber with a tool to remove them. ○ Inspect the rotor and buckets for damage. ○ If the buckets have any damage, even slight, safely dispose of them and replace them. ○ If the rotor appears damaged, contact Customer Service for further assistance.
<p>Excessive noise or vibration when the centrifuge is running</p>	<ul style="list-style-type: none"> ○ Verify that all four centrifuge feet are properly seated on a flat surface. ○ Insure that the load is balanced according to instructions in the “Balancing Loads” section of this manual. ○ Make sure that nothing has fallen into the rotor chamber.
<p>“Abort” is displayed on the top screen</p>	<p>The centrifugation cycle has been interrupted.</p>
<p>The centrifuge stops and beeps continuously</p>	<p>The load is not balanced. Press the UNLOCK button, open the lid, and balance the load as recommended elsewhere in this manual.</p>
<p>The centrifuge is stuck on one of the settings</p>	<p>Cycle selection is locked. Press the UNLOCK button for 5 seconds.</p>
<p>Only a few cycles can be accessed</p>	<p>The Preset Lock is active. To deactivate it, press the UNLOCK button for 5 seconds, until you hear 2 beeps, then again until the next 2 beeps. All cycles can now be accessed and/or amended.</p>
<p>The cycle time and speed are not set to the desired value</p>	<p>Check the setting by following the instructions in the section on Setting or Modifying a Saved Cycle. If the preset is not the desired length, follow the procedure on the same page to change the preset time.</p>

<p>Cycle parameters cannot be changed</p>	<ul style="list-style-type: none"> ○ If cycle selection is locked on one cycle, press the UNLOCK button for 5 seconds. Then, press the GEAR button and follow the instructions elsewhere in this manual. ○ If different saved cycles can be selected but not modified, the centrifuge is in Preset Lock mode. Press the UNLOCK button for 5 seconds until two beeps are heard, then again until the next two beeps. You should now be able to change cycle parameters.
<p>The centrifuge does not unlock after a run is completed</p>	<ul style="list-style-type: none"> ○ Wait until the rotor has come to a complete stop. If the lid knob still cannot be rotated, press the UNLOCK button and try again. <ul style="list-style-type: none"> ○ If no LED light is on, the unit is not powered, and the lid will not unlock by conventional means. Remove the latch label and use a pen to manually disengage the locking mechanism. Pull the mechanism towards the control panel and then unlatch and open the lid. ○ If the unit is damaged, contact Customer Service for assistance. 
<p>The lid does not open</p>	<ul style="list-style-type: none"> ○ Insure that the lid knob is turned fully counterclockwise. ○ If the knob cannot be turned counterclockwise, turn it fully clockwise, press UNLOCK, and turn counterclockwise. ○ If the lid remains locked after this and will not unlock, the electronics may have been damaged. Contact customer service for assistance.
<p>Clicking noise during braking gets loud</p>	<ul style="list-style-type: none"> ○ Make sure that the screw in the center of the rotor is tight.
<p>Lid does not stay up</p>	<ul style="list-style-type: none"> ○ Tighten the center screw on the lid hinge.

GENERAL SPECIFICATIONS

The rotor and accessories are rated for the maximum rotation frequency shown in the table below.

Tube Capacity	4 tubes (140 mL) (Up to diameter of 4.6 cm / 1.81 in) (Up to length of 13.0 cm / 5.12 in)
Dimensions (H x W x D)	15 in x 17 in x 9 in (38 cm x 43 cm x 23 cm)
Weight	39 lbs. (17 kg)
Sound Level	75 dB A
Environmental Range	16 – 32° C
Voltage	95 -253 VAC
Frequency	50/60 Hz
Power Requirement	350 Watts
Centrifuge Motor	½ H.P. Brushless
Max g-Force	4,000 RPM (+/- 100)
Max Speed	3,000 xg
Max Carrier Load	140.0 grams
Cycle Time	.5 to 99 minutes (+/- 2%)

CALCULATING THE G-FORCE

The I.F.U.s of tube manufacturers recommend cycles at a minimum G-Force, which can be calculated if you know the RPM and the radius. Use the formula below or go to www.druckerdiagnostics.com/g-force-calculator/.

$$\begin{aligned} &\text{In Centimeters:} \\ \text{RCF or G-force} &= 0.00001118 \times \\ &\text{Rotor Radius (cm)} \times (\text{RPM})^2 \end{aligned}$$

$$\begin{aligned} &\text{In Inches:} \\ \text{RCF or G-force} &= 0.0000284 \times \\ &\text{Rotor Radius (in)} \times (\text{RPM})^2 \end{aligned}$$

Radius 6.6 in (16.7 cm)

Product Family: HORIZON Series (HORIZON 12 Flex, 24 Flex)

Complies with UL61010-1/CSA C22.2 No. 61010-1 and IEC61010-2-020

Protected by U.S. Patents #6,811,531, # 7,422,554, #D718,463, & #D734,489. Other Patents Pending

[Revision C](#)

FDA LISTED



E112532



INSTRUCTIONS FOR DISPOSAL OF WEEE BY USERS IN THE EUROPEAN UNION



This product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. 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 about where you can drop off your waste equipment for recycling, please contact your local city office, waste disposal service, or where you purchased the product.



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