Drucker Diagnostics BOOST 2 Plus Flex Centrifuge Machine Instruction Manual

Contents

Drucker Diagnostics BOOST 2 Plus Flex Centrifuge Machine

Product Specifications

- Model: BOOST 2+ Flex
- Intended Use: General purpose laboratory centrifuge for density-based separation of fluids
- Customizable settings and digital display
- Programmable cycles: Up to 10 custom cycles for time, speed, and braking
- Compatible with approved containers for biologics, chemicals, and environmental samples
- Warranty: 2 years

Product Usage Instructions

Initial Setup

- Unpack and verify all included components: Centrifuge, Power cord, Carriers, Quick Start Insert
- Place the centrifuge on a flat and level surface with a bench top clearance height of 21″ (54 cm)
- Avoid hazardous materials in the clearance envelope during operation
- Plug the line cord into the centrifuge and then into an approved electrical outlet

Operation

- Place tubes into carriers ensuring the maximum weight limit is not exceeded
- Follow balanced load rules as specified in the manual
- Program cycles as needed for desired centrifugation
- Observe lid lighting indicators for centrifuge status (ready, running, done)

Frequently Asked Questions (FAQ)

- **Q: Can I program custom cycles on the BOOST 2+ Flex centrifuge?**
  A: Yes, you can program up to 10 custom cycles for time, speed, and braking with personalized labels.
- **Q: What is the warranty period for the BOOST 2+ Flex centrifuge?**
  A: The centrifuge comes with a warranty of 2 years against defects in workmanship and parts.

BOOST
2+ Flex Operator's Manual

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.
	UK Mark	Denotes conformity to specific UK directives and regulations.
	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 BOOST 2+ Flex. Customize settings and check every detail on the digital display. Program up to 10 custom cycles.

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

- A time and speed/g-force can be quickly entered for a single use cycle. The cycle will not be retained in memory.
- If desired, the control panel can be temporarily locked on one cycle for error-free reproducibility.
- A Preset Lock can be turned on to prevent changes from being made accidentally to programmed cycles.
- Up to 10 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. The audible alert can be muted.
- Cool–Flow design prevents overheating of samples by using ambient air to keep specimens at room temperature.
- The carriers are fiber reinforced for high strength, durability, and years of trouble-free use. (Autoclave-compatible carriers are also available as an alternative option. Contact Drucker Diagnostics Customer Service for more information.)
- 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 carriers. 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.
- 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).
- WARNING: Only use Drucker Diagnostics components in this centrifuge.
- WARNING: Do not make modifications to or remove any hardware from rotor without prior authorization from Drucker Diagnostics.
- Users of centrifuge should validate the processing of their disposable for their specific application prior to use.
- The maximum combined weight allowed to be loaded into each carrier (including Drucker provided components) shall not exceed maximum specification. Refer to General Specifications section for maximum carrier load specification.

INITIAL SETUP

- Unpack and verify that all the following are included:
    - Centrifuge
    - Power cord
    - Carriers
    - Quick Start Insert
- 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.

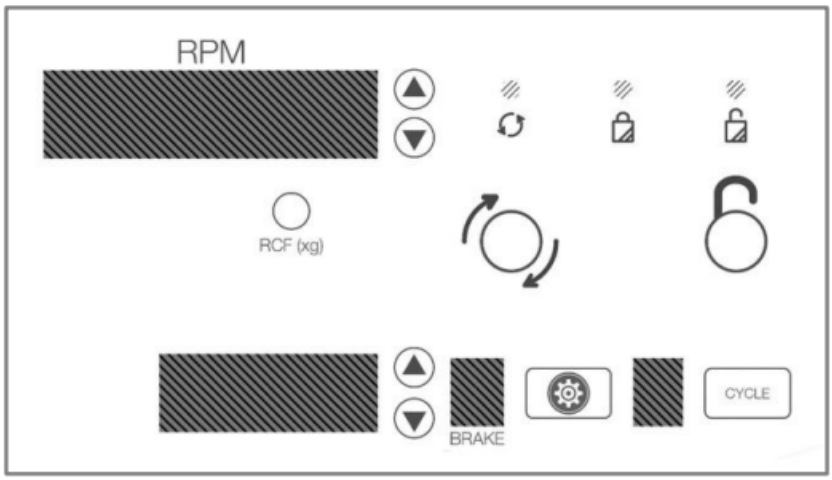
BE SURE THE ELECTRICAL OUTLET IS ALWAYS ACCESSIBLE AS THE LINE CORD IS THE MEANS OF EMERGENCY DISCONNECTION!

OPERATION

- Place the tubes into the carriers.
    - The maximum combined weight allowed to be loaded into each carrier (including Drucker provided components) shall not exceed maximum specification. Refer to General Specifications section for

maximum carrier load specification.
    - 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 UP or DOWN 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 and speed of the currently selected cycle. The bottom screen displays the time setting.



	**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.

SETTINGS

QUICK ADJUST TIME AND SPEED
Change time, speed (RPM) or g-force (RCF) for a single cycle.

	**Setting Speed**	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.
	**Setting by G-Force**	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.
	**Setting Time**	Press the up and down buttons next to the TIME display.

ADJUSTING THE BRAKE SETTING

	**Enter the Advanced Menu**	Press the GEAR button to enter the advanced menu.
	**Change Brake Values**	While in the advanced menu, navigate to "Brake". Use the UP and DOWN buttons next to the TIME screen to adjust brake to the desired value between 0 (no brake applied) and 9 (maximum braking force applied).
	**Exit the Menu**	Press the GEAR button.

CHANGING THE AUDIBLE BEEPER

	**Enter the Advanced Menu**	Press the GEAR button to enter the advanced menu.
	**Turn Beeper On or Off**	While in the advanced menu, navigate to "Beeper". Switch ON or OFF with the UP and DOWN buttons next to the TIME display. This setting will apply to all cycles.
	**Exit the Menu**	Press the GEAR button.

CREATE NEW CYCLE

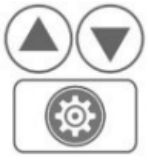
	**Change Settings**	Refer to previous table (Quick Adjust Time and Speed) to change speed and time to desired values.
	**Save Cycle**	Hold the CYCLE button until you hear a double beep.

DISPLAY CYCLE COUNT

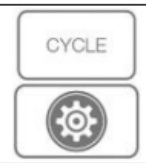
	**Display Cycle Count**	With the lid open and the unit powered, press and hold the START button. The cycle count will be displayed until the START button is released.

MODIFYING A PRESET

Save up to 10 custom cycles. The top screen alternates between cycle name and speed.

	**Select Preset Setting**	Press the CYCLE button to select the Preset Setting you would like to modify
	**Access the Menu**	Hold the CYCLE button until you hear a double beep. The cycle number should begin flashing.
	**Setting by G-Force (Recommended)**	Press and hold the RCF (xg) button while changing the setting, using the UP and DOWN buttons next to the display. The RPM will automatically adjust.
	**Setting Speed (Alternate)**	To change the speed (RPM), use the UP and DOWN buttons next to the display. The g-force will adjust automatically and can be verified by pressing the RCF button.
	**Setting Time**	Press the UP and DOWN buttons next to the TIME display.
	**Enter the Advanced Menu**	Press the GEAR button to enter the advanced menu.
	**Change Brake Values**	While in the advanced menu, navigate to “Brake”. Use the UP and DOWN buttons next to the TIME screen to turn brake on and off.
	**Turn Beeper On or Off**	While in the advanced menu, navigate to “Beeper”. Switch ON or OFF with the UP and DOWN buttons next to the TIME display. This setting will apply to all cycles.
	**Naming the Cycle**	While in the advanced menu, navigate to the cycle name with the UP and DOWN arrows. Press the START button. The * indicates the space selected. Use the UP and DOWN buttons to change characters, then move to the next space with the right arrow >. Press the GEAR button to return to the main programming menu.
	**Save and Exit Settings Mode**	Press the GEAR button, followed by the CYCLE button to exit the menu.

DELETING A CYCLE

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

CYCLE LOCK

To ensure repeatability, the centrifuge can be locked either on one cycle (Single Cycle Lock) or restricted to the saved cycles (Preset 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.

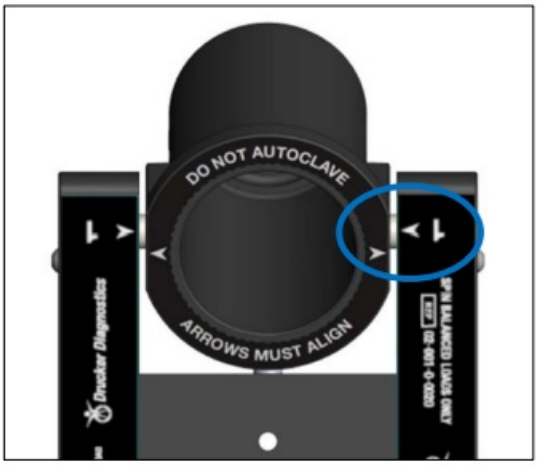
	**Enter Preset Lock**	Select desired cycle. With lid open, press and hold the UNLOCK button. One beep will confirm that cycle selection is locked.
	**Enter Single Cycle**	Continue holding the UNLOCK button to enter Single Cycle Lock Two beeps will confirm that cycle selection is now locked. **NOTE: If preset lock is set, it must be canceled before Single Cycle lock can be set**
	**Cancel Lock**	Hold the UNLOCK button. Three beeps will confirm that the cycle selection is now unlocked.

LOADING

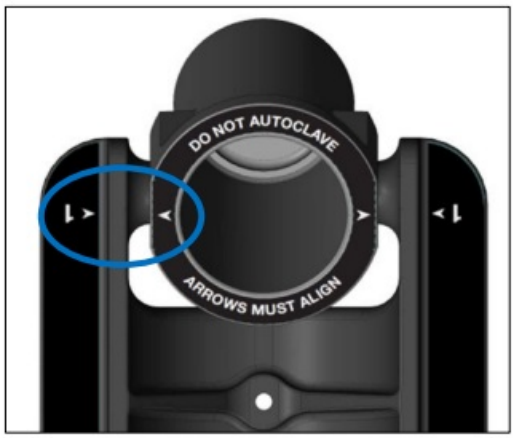
CARRIER ALIGNMENT

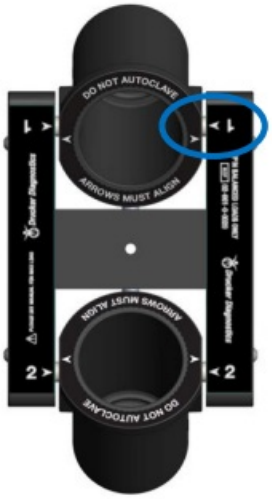
To ensure proper operation, align carriers and rotor utilizing the arrows indicated below.
Verify that carriers are hanging from the rotor pins and swing freely into the horizontal position.

Rotor p/n 02-001-0-0020



Rotor p/n 03-1-0001-0137



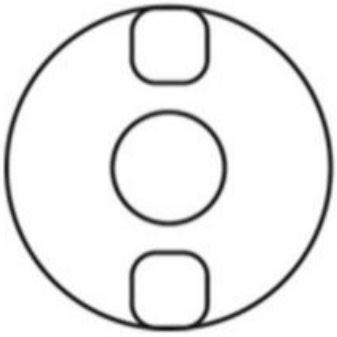


BALANCING LOADS

Your centrifuge must contain a balanced load to work properly. Spinning balanced loads will extend the life of the centrifuge and produce better results. 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 carriers must be equally loaded, or empty, or loaded with equally weighted samples.

All buckets in rotor must be from the same manufacturing lot.



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.
- Carrier Replacement: It is recommended that the carriers be replaced after 24 months of use. Inspect carriers regularly for cracks. If cracks are discovered, replace immediately.
- Remove Accessories Before Moving: All carriers, 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 other than those recommended by the manufacturer, users should verify with the manufacturer that the proposed method will not damage the equipment.

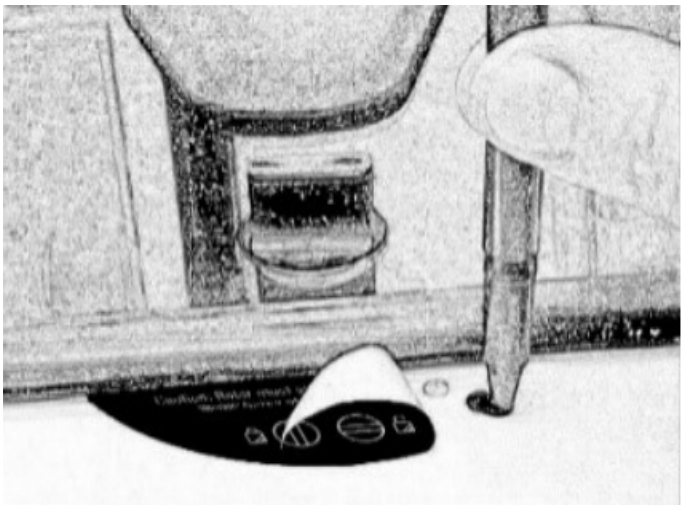
- Unplug the centrifuge before cleaning.
- Use appropriate personal protective equipment (PPE).
- Apply cleaning solutions with a towel or cloth. Do not submerge the centrifuge in water or other cleaning solutions as this will cause damage and void the warranty.
- ONLY isopropyl alcohol or a 10% (5500 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. WIPE OFF THOROUGHLY AFTER USE 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, carriers, 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.

The centrifuge does not run	• Verify that the centrifuge is powered. One of the LED lights shoul d be on. • If “Lid not closed” message is displayed, make sure the lid latch i s turned completely clockwise to its stop position. • If the centrifuge still does not run, contact Customer Service.

The rotor does not spin freely	• 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.
The centrifuge makes a rattling noise when running	• Stop the centrifuge. Open the lid. • Wearing PPE, remove tubes and carriers and look for fallen objects or debris. Carefully reach inside the rotor chamber with a tool to remove them. • Inspect the rotor and carriers for damage. • If the carriers have any damage, even slight, safely dispose of them and replace them. • If the rotor appears damaged, contact Customer Service for further assistance.
Excessive noise or vibration when the centrifuge is running	• Verify that all four centrifuge feet are properly seated on a flat surface. • Ensure 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.
“Abort” is displayed on the top screen	The centrifugation cycle has been interrupted.
The centrifuge continuously stops and beeps	The load is not balanced. Press the UNLOCK button, open the lid, and balance the load as recommended elsewhere in this manual.
The centrifuge is stuck on one of the settings	Cycle selection is locked. Press the UNLOCK button for 5 seconds.
Only a few cycles can be accessed	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.
The cycle time and speed are not set to the desired value	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 .

Cycle parameters cannot be changed	• 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.
The centrifuge does not unlock after a run is completed	• 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. • 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.
The lid does not open	• Ensure 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.
Clicking noise during braking gets loud	Make sure that the screw in the center of the rotor is tight.
Lid does not stay up	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 2 tubes – up to 1.9” (W) x 5.4” (L)
- Dimensions (H x W x D) 13 in x 15 in x 9 in (33 cm x 38 cm x 23 cm)
- Weight 34 lbs. (15 kg)
- Sound Level 70 dB A
- Environmental Range 16 – 32 degree C
- Voltage 95 -253 VAC
- Frequency 50/60 Hz
- Power Requirement 280 Watts
- Centrifuge Motor ½ H.P. Brushless
- Max g-Force 3,000 xg
- Max Speed 4,400 RPM
- 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/**.

In Centimeters:
RCF or G-force = 0.00001118 x Rotor Radius (cm) x (RPM)2

In **Inches**:
RCF or G-force = 0.0000284 x Rotor Radius (in) x (RPM)2

Radius
5.47 in (13.9cm)
(Displayed RCF is calculated at 13.9cm radius)

This operator’s manual is part number 03-0-0002-0223 Rev. D
To access previous manuals, please click relevant link below.
Revision C
Revision D
Product Family: BOOST Series (BOOST 2+ 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.

FDA LISTED CE MET c us E112532 UK CA RoHS COMPLIANT

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.
Designed, built and supported in the USA

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Documents / Resources

	Drucker Diagnostics BOOST 2 Plus Flex Centrifuge Machine [pdf] Instruction Manual BOOST 2 Plus Flex Centrifuge Machine, BOOST 2 Plus, Flex Centrifuge Machine, Centrifuge Machine, Machine

References

- User Manual