

# SERO 12

*Operator's Manual*



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## MODEL DESCRIPTION

The SERO 12 is a compact, highly versatile centrifuge for use in blood banks and clinical laboratories. It is specifically designed to minimize centrifugation time and simplify many basic test procedures, such as blood typing, manual cell washing, cross-matching, genotyping, Coombs testing, and Ant-Rh titers.

## FEATURES

- 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.
- 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 and 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.

## APPLICATIONS

The SERO 12 has been designed to facilitate blood testing procedures involving centrifugation, incubation, and cell washing with minimal tube handling. Many procedures can be performed entirely without removing tubes from the centrifuge rotor, thus reducing the possibility of errors in transferring tubes. The following notes on use of the SERO 12 are intended to set practical guidelines for the technologist. When possible, refer to the manufacturer's I.F.U.

## AGGLUTINATION TESTS

Whenever possible, it is important that the anti-serum manufacturer's instructions be followed on recommended time periods for centrifuging cells with their sera in the SERO 12.

**NOTE:** It is recommended that the optimum centrifugation period be determined by controlled reactions using known cells. This method is the easiest way to determine time necessary to produce the desired tightness of agglutination.

## INCUBATION

Many blood testing procedures require incubation at 37°C before and after centrifugation. The SERO 12 rotor has been designed to allow the incubation of these reactions without removing the tubes. You may lower the entire rotor into a water bath for the test being performed. When the rotor is removed, water will drain through the perforations in its base. Allow the water to drain completely prior to transporting tubes.

## CELL WASHING

The SERO 12 rotor may be conveniently used for many tests that require single or multiple blood cell washings. Because the tubes are maintained at an angle of 45° during centrifugation, the centrifuge is highly efficient in washing cells. The cells are deposited quickly after sliding down the angled tubes.

After the button is formed, the supernatant solution can be readily poured off all tubes simultaneously. This is done by removing the rotor from the drive spindle immediately after it stops spinning, placing the retainer ring around the tubes, and inverting the rotor.

## WARRANTY

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

- ⚠ **WARNING:** “Universal precautions”<sup>1</sup> should be followed in handling all items contaminated with blood or other bodily fluids.
- ⚠ **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, or rotor. 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.

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

## INTENDED USE

General purpose laboratory Centrifuge intended for safe and rapid density based separation of fluids, including physiologic fluids, in approved specimen receptacles for qualitative or quantitative test procedures. As a general purpose laboratory centrifuge, it is designed to also run other approved containers filled with chemicals (non-flammable, non-explosive, non-volatile, and non-highly reactive only), environmental samples, and other non-human body samples. 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.]

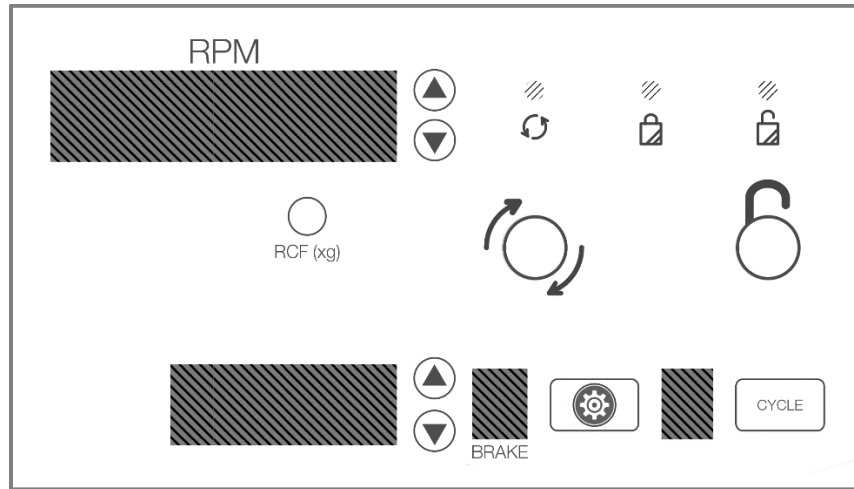
## INITIAL SETUP

- Unpack and verify that all the following are included:
  - Centrifuge
  - Power cord
  - Operating manual
- 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!**

## QUICK START

The screen display alternates between the name of the currently selected cycle and its parameters.





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


# SETTINGS

## ACCESS THE MENU

### FROM PRESET



|   |                                |   |
|---|--------------------------------|---|
|  | <b>Access the Menu</b>         | Hold the CYCLE button until you hear a double beep. The cycle number should begin flashing. |
|  | <b>Enter The Advanced Menu</b> | Press the GEAR button to enter the advanced menu.   |

### FROM FREE MODE


|   |                        |                        |
|---|------------------------|------------------------|
|  | <b>Access the Menu</b> | Press the GEAR button. |
|---|------------------------|------------------------|

## EXIT THE MENU

### FROM PRESET

|  |                      |  |
|--|----------------------|--|
| <br> | <b>Exit the Menu</b> | Press the GEAR button, followed by the CYCLE button. |
|--|----------------------|--|





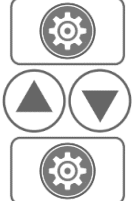
### FROM FREE MODE

|   |                      |                        |
|---|----------------------|------------------------|
|  | <b>Exit the Menu</b> | Press the GEAR button. |
|---|----------------------|------------------------|





## FREE MODE


Change time, RPM or g-force for a single cycle.

|  |                                     |  |
|--|-------------------------------------|--|
|   | <p><b>Setting Speed</b></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><b>Setting by G-Force</b></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><b>Setting Time</b></p>          | <p>Press the up and down buttons next to the TIME display.</p>   |
|   | <p><b>Change Brake Values</b></p>   | <p>Access the menu.<br/>Press the down key next to the top screen until it shows "Brake". To turn brake on and off, use the up and down buttons next to the TIME display.<br/>Exit the menu.</p>   |
|  | <p><b>Turn Beeper On or Off</b></p> | <p>Access the menu.<br/>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.<br/>Exit the menu.</p> |

## CREATE NEW CYCLE









|   |                               |  |
|---|-------------------------------|--|
|  | <p><b>Change Settings</b></p> | <p>Refer to previous table (Free Mode) to change speed and time to desired values.</p> |
|  | <p><b>Save Cycle</b></p>      | <p>Hold the CYCLE button until you hear a double beep.</p>                             |

## DISPLAY CYCLE COUNT

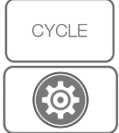


|   |                                   |   |
|---|-----------------------------------|---|
|  | <p><b>Display Cycle Count</b></p> | <p>With the lid open and the unit powered, press and hold the START button. The cycle count will be displayed until the START button is released.</p> |
|---|-----------------------------------|---|

## MODIFYING A PRESET

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




|   |   |   |
|---|---|---|
|    | <b>Access the Menu</b>                  | With desired cycle selected, access the menu.   |
|    | <b>Setting by G-Force (Recommended)</b> | 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.  |
|    | <b>Setting Speed (Alternate)</b>        | 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.   |
|    | <b>Setting Time</b>                     | Press the UP and DOWN buttons next to the TIME display.   |
|    | <b>Change Brake Values</b>              | 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.  |
|   | <b>Turn Beeper On or Off</b>            | 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.  |
|  | <b>Naming the Cycle</b>                 | 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. |
|  | <b>Save and Exit Settings Mode</b>      | Press the GEAR button, followed by the CYCLE button to exit the menu.   |

## DELETING A CYCLE

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

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

## OPERATION

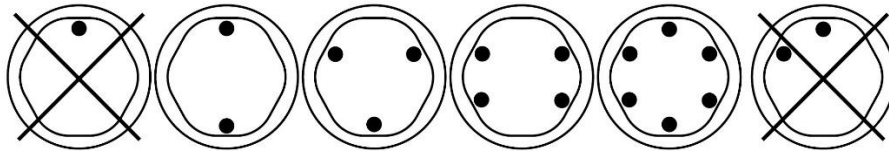
- Place the tubes into the rotor. Be sure to follow the rules for balanced loads as listed in the next section.
- Close the lid and turn the lid knob clockwise to its complete stop position.
- The digital display indicates the currently selected cycle. To select another cycle, press the CYCLE button 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.

## BALANCING LOADS

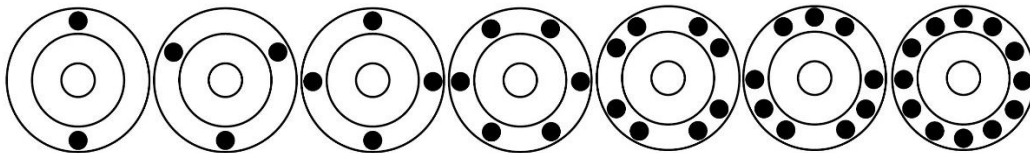


**Your centrifuge must contain a balanced load to work properly.** Spinning balanced loads will extend the life of the centrifuge and produce better results. Use the following rules when loading the rotor. If an odd number of samples is to be spun, fill a tube with water to match the weight of the unpaired sample and place it across from this sample.

### 6 Tubes



### 12 Tubes



## 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/](http://www.druckerdiagnostics.com/g-force-calculator/).

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

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

**Radius**                      2.8 in (7.1 cm)

## 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.
- **Remove Accessories Before Moving:** All tubes, 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, 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><b>The centrifuge does not run</b></p>                                 | <ul style="list-style-type: none"> <li>○ Verify that the centrifuge is powered. One of the LED lights should be on.</li> <li>○ Make sure the lid latch is turned completely clockwise to its stop position.</li> <li>○ If the centrifuge still does not run, contact Customer Service.</li> </ul>   |
| <p><b>The rotor does not spin freely</b></p>                              | <ul style="list-style-type: none"> <li>○ Make sure nothing has fallen into the rotor chamber, following the procedure above.</li> <li>○ If nothing obstructs the rotor, the rotor may be damaged. Contact Customer Service for further assistance.</li> </ul>   |
| <p><b>The centrifuge makes a rattling noise when running</b></p>          | <ul style="list-style-type: none"> <li>○ Stop the centrifuge. Open the lid.</li> <li>○ Wearing PPE, remove tubes and look for fallen objects or debris. Carefully reach inside the rotor chamber with a tool to remove them.</li> <li>○ Inspect the rotor for damage.</li> <li>○ If the tubes have any damage, even slight, safely dispose of them and replace them.</li> <li>○ If the rotor appears damaged, contact Customer Service for further assistance.</li> </ul>   |
| <p><b>Excessive noise or vibration when the centrifuge is running</b></p> | <ul style="list-style-type: none"> <li>○ Verify that all four centrifuge feet are properly seated on a flat surface.</li> <li>○ Insure that the load is balanced according to instructions in the “Balancing Loads” section of this manual.</li> <li>○ Make sure that nothing has fallen into the rotor chamber.</li> </ul>   |
| <p><b>The centrifuge stops and beeps continuously</b></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><b>The centrifuge is stuck on one of the settings</b></p>              | <p>Cycle selection is locked. Press the UNLOCK button for 5 seconds.</p>  |
| <p><b>The centrifuge does not unlock after a run is completed</b></p>     | <ul style="list-style-type: none"> <li>○ 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.</li> <li>○ 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.</li> <li>○ If the unit is damaged, contact Customer Service for assistance.</li> </ul>  |

|  |   |
|--|---|
| <b>The cycle time and speed are not set to the desired value</b> | <ul style="list-style-type: none"> <li>○ Check the setting by following the instructions in the section on Changing Cycle Settings. If the preset is not the desired length, follow the procedure on the same page to change the preset time.</li> </ul>  |
| <b>The lid does not open</b>                                     | <ul style="list-style-type: none"> <li>○ Ensure that the lid knob is turned fully counterclockwise.</li> <li>○ If the knob cannot be turned counterclockwise, turn it fully clockwise, press UNLOCK, and turn counterclockwise.</li> <li>○ If the lid remains locked after this and will not unlock, the electronics may have been damaged. Contact customer service for assistance.</li> </ul> |
| <b>Clicking noise during braking gets loud</b>                   | <ul style="list-style-type: none"> <li>○ Make sure that the screw in the center of the rotor is tight.</li> </ul>   |
| <b>Lid does not stay up</b>                                      | <ul style="list-style-type: none"> <li>○ Tighten the center screw on the lid hinge.</li> </ul>  |

## GENERAL SPECIFICATIONS

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

|                               |   |
|-------------------------------|---|
| <b>Tube Capacity</b>          | 6 capped tubes, 13 x 75 mm<br>12 uncapped tubes, 13 x 75 mm |
| <b>Dimensions (W x D x H)</b> | 13 in x 15 in x 9 in<br>(33 cm x 38 cm x 23 cm)             |
| <b>Weight</b>                 | 27 lbs. (12.3 kg)   |
| <b>Sound Level</b>            | 61 dB A   |
| <b>Environmental Range</b>    | 16 – 32°C   |
| <b>Voltage</b>                | 115 VAC (± 10%)   |
| <b>Frequency</b>              | 50/60 Hz  |
| <b>Power Requirement</b>      | 220 Watts   |
| <b>Centrifuge Motor</b>       | ½ H.P. Brushless  |
| <b>Max G-Force</b>            | 1,040 xg  |
| <b>Max Speed</b>              | 3,550 RPM   |
| <b>Min Cycle Time</b>         | 15 seconds  |
| <b>Max Cycle Time</b>         | 99 minutes and 45 seconds                                   |

Complies with UL61010-1/CSA C22.2 No. 61010-1, IEC61010-2-020, and IEC61326-1

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

**FDA LISTED**



**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.



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