

Cardinal Health™ Benchtop Centrifuge HORIZON 6 Flex

Instructions for Use Manual

REF CA376009



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WARNING:

Use universal precautions when handling laboratory specimens. All human specimens of blood, blood compounds, or bodily fluids are potentially biohazardous and may contain Hepatitis B virus, Hepatitis C virus, Human immunodeficiency virus or other disease causing agents. For the safety of both the operator and service personnel, care should be taken when handling substances that are known to be toxic, radioactive, or contaminated with pathogenic microorganisms when using this centrifuge. When Risk Group II materials are used (as identified in the World Health Organization "Laboratory Bio-Safety Manual") the use of a Bio-Seal should be employed. More than one level of protection must be provided in the case of materials of a higher group. The use of flammable or explosive materials as well as those materials which chemically react vigorously is prohibited. Any use of the equipment in a manner not specified in these instructions may impair the level of protection provided by the equipment.

Model Description:

The HORIZON 6 Flex is continuous-duty, electronically controlled, variable-speed, laboratory centrifuge equipped with a lid safety interlock system. HORIZON offers the user control over many parameters, including variable runtime, speed control, and deceleration. The exclusive horizontal rotor allows for quick and easy sample loading and complete horizontal separation. Samples can be viewed safely through the transparent lid. Entry into the centrifuge is restricted during operation by the safety interlock system.

The HORIZON 6 Flex centrifuge features five electronic push buttons and a backlit display, for easily controlling centrifugation parameters. Up to 10 commonly used settings can be saved and recalled at the touch of a button.

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.]

Supplied Equipment*:

The following items come standard with each HORIZON 6 Flex centrifuge:

1. One (1) six-carrier horizontal rotor*
2. Six (6) universal 75-100 mm tube holders
3. One (1) operator's manual
4. One (1) 10 ft. line cord

The use of any line cord other than what is supplied by the manufacturer may not carry an adequate rating and is therefore prohibited.

*The rotor and rotor accessories are rated for rotational frequency of 5,000 RPM.

Features:

- The first three (3) cycles are conveniently pre-set and labeled for your lab's most common applications. Use the default cycles or customize them as needed.
- If desired, the control panel can be temporarily locked on one cycle for error-free reproducibility.
- 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) rather than speed to facilitate matching validated cycles and manufacturers IFUs.
- 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 tube holders are fiber reinforced for high strength, durability, and years of trouble-free use.
- 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.

Specifications:

General Specifications for the Cardinal Health™ HORIZON 6 Flex

Maximum Speed	3,800 RPM
Maximum RCF	2,000 xg
Maximum Capacity	6 tubes (3-10 mL)*
Overall Dimensions (H x W x D)	9 in. x 12 in. x 14 in. (23 cm x 30 cm x 36 cm)
Weight	12 lbs. (5.4 kg)
Centrifuge Motor	1/2 HP Brushless
Nominal Acceleration Time	20 seconds
Protection	4 Amp, resettable circuit breaker (x2)
Timer	Electronic, 1 to 30 minutes +/- 2%
Power Rating	220 Watts
Voltage Requirements	95 -253 VAC
Frequency	50/60 Hz

Factory Settings	RPM	Time	G-Force
(1) Chemistry	3,600	10 min	1,800 xg
(2) Coag (PPP)	3,300	15 min	1,500 xg
(3) Urine	1,900	5 min	500 xg

Permitted Environmental Conditions:

Ambient Temperature During Operation: 60°F - 90°F (16°C - 32°C)

Maximum Relative Air Humidity: 90%

* Maximum sample density is 1.15 grams / mL, (water density = 1.0 grams / mL)

Any use other than those specified by the Manufacturer is explicitly prohibited.

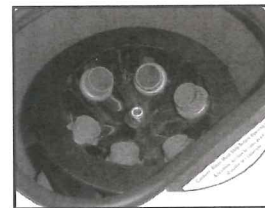
Setup Location:

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 21" (54 cm) required in order to open the lid.
 - b) The clearance envelope is the space around the centrifuge which is required for safety. The centrifuge should have 6" (15 cm) of clear space around the centrifuge (with the centrifuge at the center). Do not position the centrifuge in such a way that it would be difficult to disconnect the power in the case of emergency. 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 and where the temperature remains between 16°C and 32°C.
 - 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 7.

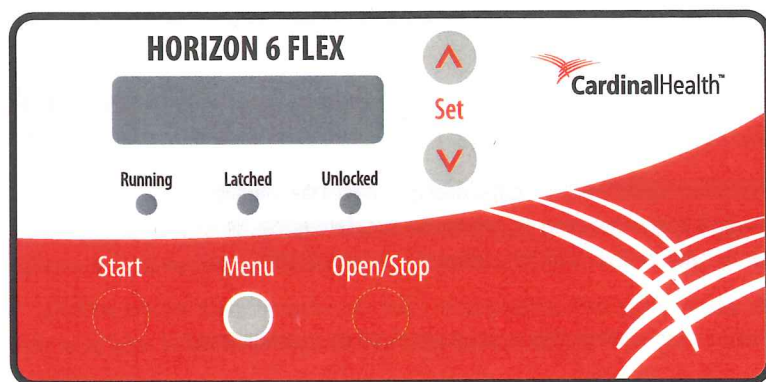
For further assistance, contact Cardinal Health customer service.



1. Plug the female end of the supplied line cord into the power input module located on 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. Flip the switch on the power input module located on the rear of the centrifuge to the ON (|) position.
3. 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 7 on troubleshooting. The lid will be unlocked for 15 seconds after pushing the OPEN/STOP button.
4. Turn the latch counterclockwise and open the lid.
5. Spin the rotor by hand; check for free and level rotation. If the rotor does not spin freely, refer to page 7 on troubleshooting.
6. Place the six test tube holders inside the rotor (as shown to the right), and verify that they are seated properly.
7. Close the lid. Rotate the lid knob clockwise to its complete stop position. The 'LATCHED' indicator light should be illuminated. If it is not, make sure that the lid is latched properly. The centrifuge will not run unless the lid is latched and the 'LATCHED' light is illuminated.
8. Start a centrifugation cycle by pushing the START button.
9. The 'RUNNING' indicator light will illuminate.
10. The test tube holders will slide up into the horizontal position and the unit will accelerate to full speed.
11. Listen to the sound of the centrifuge. A smooth whirring sound should be heard. If there are any loud or unusual sounds, stop the centrifuge by pushing the OPEN/STOP button immediately and refer to page 7 on troubleshooting.
12. Push the OPEN/STOP button. The 'RUNNING' indicator light should go out and the motor should slow to a stop.
13. The lid should remain locked until the rotor has nearly stopped. If the machine unlocks prematurely, contact Cardinal Health 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.
14. To gain entry into the centrifuge after this period has ended, simply press the OPEN/ STOP button. The lid will unlock for fifteen (15) additional seconds.

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

Control Panel:



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 parameters of the selected cycle. The Preset Lock allows selection of any saved cycle, but prevents changing the parameters of saved cycles.

Single Cycle Lock

1. To lock on a single cycle, press and hold the OPEN/STOP button for 5 seconds while the desired cycle is selected. Two beeps will confirm that the cycle is locked.
2. To re-enable cycle selection, press and hold the OPEN/STOP button for 5 seconds. Three beeps will confirm that the cycle selection is now unlocked.

Preset Lock

1. Press the MENU button to enter Settings mode.
2. Press and hold the OPEN/STOP button for 5 seconds to lock saved cycles. Two beeps will confirm that the Preset Lock is active.
3. To cancel Preset Lock, press and hold the OPEN/STOP button for 5 seconds with the centrifuge lid open and while in Settings mode. Two beeps will confirm that the selection has been cancelled. Saved cycles can again be edited or programmed.

Programming Memory Locations

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

1. To access memory locations, press the MENU button.
2. Select a memory location using the up and down SET buttons.
3. Once the desired memory location has been selected move the cursor to the desired parameter using the left scroll (START) and right scroll (OPEN/STOP) buttons.
4. Changing the parameter is accomplished by scrolling up and down with the SET buttons.
5. Memory locations can be renamed by scrolling to the name (Default names= MEM 1-10), moving the cursor to the desired location and selecting a scrolling through the characters with the SET buttons.
6. Exit the program menu by pressing the MENU button.
7. Any changes are automatically saved upon exiting the program menu.

Display Cycle Count

1. Press the MENU button to enter Settings mode.
2. Press the left arrow once to access the cycle counter.
3. Press the MENU button to exit Settings mode.

Record Custom Cycles

Cycle	Tube Type	RPM	G-Force (RCF)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Operation:

NOTE: Follow the initial setup procedure on page 3 before initial operation.

1. Push the 'OPEN/STOP' button and then open the lid.
2. Insert cushions (if needed) into the tube holders for the tube size you are using.
3. Place the test tube samples into the tube holders. Be sure to follow the rules for balanced loads.
4. Close the lid and turn the lid knob clockwise to its complete stop position. The 'LATCHED' indicator light should turn on to indicate that the latch is closed properly. If the lid knob is not completely latched, the 'LATCHED' indicator light will not turn on and the centrifuge will not operate!
5. Select a memory location using the up and down SET buttons.
6. Turn on the machine by pushing the 'START' button on the control panel.
7. The centrifuge should begin to spin. The 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 !

8. The running indicator light will begin to flash when one minute remains.
9. After time has elapsed, the RUN indicator light will extinguish and the rotor will slow to a complete stop.
10. The 'UNLOCKED' indicator light will illuminate and the locking mechanism will disengage allowing entry into the rotor chamber. If it does not, refer to page 7 on troubleshooting.
11. Turn the lid knob counterclockwise and open the lid.
12. Remove the samples.
13. If the machine re-locks before the samples are removed, press the OPEN/STOP button to unlock the lid for an additional fifteen (15) seconds.

Balanced Loads:

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

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

Rotor Removal and Installation:

To remove the rotor:

1. Unlock the centrifuge by pushing the OPEN/STOP button and unlatch and open the lid. **CAUTION:** Unplug the centrifuge from the electrical outlet 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 1/2 in. nut driver may be required).
4. The rotor is sitting on a cone-shaped adapter. Pull the rotor up and off of this adapter.

Care and Preventative Maintenance:

With proper care and maintenance your Cardinal Health™ HORIZON 6 Flex centrifuge will provide years of laboratory service. For proper care, the following steps should be taken:

1. **Provide Adequate Ventilation:** For cooling purposes, the Cardinal Health™ HORIZON 6 Flex 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 HORIZON 6 Flex has a unique counter balanced motor mounting design which, along with its rubber suction feet, produces excellent vibration dampening. However, out-of-balance loads may break glass test tubes and may produce unsatisfactory separation results. Proper load balancing will improve sample separation and extend the life of the centrifuge. Refer to page 5 for additional information on balancing the load.
3. **Keep the Tube Holders Clean: NOTE:** Always follow the safety guidelines of your laboratory to properly clean up and/or dispose of materials in the event that a substance known to be potentially toxic, radioactive or contaminated with a pathogenic microorganism is spilt in or on the centrifuge. Small glass fragments left in the tube holder after a tube breakage may adhere to the next test tube inserted in that holder. When this tube is handled, these fragments may puncture protective gloves and lacerate the operator's fingers or hand. Remaining fragments may provide stress points on subsequent tubes and result in additional breakage. If a tube breakage occurs, carefully remove the tube holder. Properly dispose of the sample and tube fragments and thoroughly clean both the inside and outside of the tube holder. Insert a new tube cushion (if necessary) and replace the tube holder in the rotor.
4. **Motor and Electrical Maintenance:** The Cardinal Health™ HORIZON 6 Flex uses a brushless DC 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. **Tube Holder Replacement:** It is recommended that the tube holders be replaced after 24 months of use. Inspect tube holders regularly for cracks. If cracks are discovered, replace immediately.
6. **Remove Accessories Before Moving:** All tube holders, samples, and caps must be removed from the rotor chamber before transporting or storing the centrifuge to prevent damage and injury.

Cleaning and Disinfection:

To prolong the life of the centrifuge cleaning and disinfection is recommended every six months, or whenever there is a spillage or tube breakage. Contaminants must be removed immediately, or corrosion and premature degradation of components can occur. Before using any cleaning or decontamination methods except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment.

1. Unplug the centrifuge before cleaning.
2. Use appropriate personal protective equipment (PPE).
3. 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.
4. ONLY isopropyl alcohol, soap and water, or a 10% (5500 PPM) bleach solution should be used for cleaning and disinfection of the centrifuge and accessories.
5. All surfaces must be dried immediately after cleaning and disinfecting.
6. TBQ Germicidal products shall not be used, as they will cause damage to the centrifuge and void the warranty.
7. The use of fully/partially halogenated hydrocarbons, ketones, esters, ethers, benzyls, ethyl benzenes, and all other chemicals not prescribed by the manufacturer shall not be used as they may cause damage to the rotor chamber, rotor, tube holders, accessories and centrifuge exterior and void the warranty.
8. It may be necessary to remove the rotor core and clean inside the air shroud. Follow the instructions on page 7 to remove and reinstall the rotor.

Troubleshooting:

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

1. Problem: The rotor does not spin freely.
Solutions: <ul style="list-style-type: none">– Make sure nothing has fallen into the rotor chamber.– If there is nothing obstructing the rotor, the rotor may be damaged. Contact Cardinal Health for further assistance.
2. Problem: Excessive noise when the machine is running.
Solutions: <ul style="list-style-type: none">– Check to see that the load is balanced.– Make sure that nothing has fallen into the rotor chamber.– Make sure that the nut in the center of the rotor is tight.– Have a technician test the motor and replace it if necessary.
3. Problem: The centrifuge does not run.
Solutions: <ul style="list-style-type: none">– Check the electrical outlet.– Make sure the lid latch is turned completely clockwise to its stop position. When the lid is closed properly, the latch light on the control panel will illuminate.– Check the circuit breaker switch at the bottom left of the machine. If the switch is white, the breaker has tripped. Contact Cardinal Health 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: <ul style="list-style-type: none">– Make sure that the unit has power.– Make sure the lid latch is turned completely clockwise to its stop position. The latch makes contact with a switch underneath the front top of the cabinet. If this switch is not activated, the light will not turn on and the machine will not run.
5. Problem: The machine does not unlock after a run has completed.
Solutions: <ul style="list-style-type: none">– The lid should remain locked until the rotor has nearly come to a complete stop and then unlock for 60 seconds. If additional unlock time is needed, press the 'OPEN / STOP' button with the machine plugged in and the rotor stopped. If the lid remains locked after this and will not unlock, the electronics may have been damaged. Contact Cardinal Health for assistance.
6. Problem: The run time is not set to the desired length.
Solutions: <ul style="list-style-type: none">– Check the run preset by following the instructions on page 4. If the preset is not the desired length follow the procedure on the same page to change the run preset time.
7. Problem: All LED indicators are blinking with 2 short audible beeps repeating continuously.
Solutions: <ul style="list-style-type: none">- The imbalance detection threshold has been reached during the cycle indicating a full cycle was not completed.- Check the balance of the load. Refer to BALANCED LOADS on page 5.- If it is determined that the detection is too sensitive this can be adjusted by increasing the imbalance detection threshold. Refer to page 4 for programming settings.
8. Problem: The yellow and red LED indicators are blinking with 3 short audible beeps repeating continuously.
Solutions: <ul style="list-style-type: none">- The electrical current to the motor has exceeded the allowable limit, indicating that the full cycle was not completed.- Make sure that nothing has fallen into the rotor chamber preventing the rotor from spinning freely.- If there is nothing obstructing the rotor, the motor may be damaged. Contact Cardinal Health for further assistance.
9. Problem: The yellow and green LED indicators are blinking with 4 short audible beeps repeating continuously.
Solutions: <ul style="list-style-type: none">- The internal tachometer has either not sensed a speed or the sensed speed is out of range.- Remove the rotor following the instructions on page 5. Check to see that there is a small silver reflective sticker on the exterior vertical wall of the rotor.- If the reflective sticker is present contact Cardinal Health for further assistance.

For servicing information or additional technical support, contact Cardinal Health customer service.

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 Interlock System: In addition to the Lid Safety Switch, the centrifuge 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.

4A Resettable Circuit Breaker: The centrifuge is protected with two in-line 4A resettable circuit breakers on the underside of the device. Any electrical overcurrent will trip the breakers, cutting power to the machine and protecting the internal electronics. **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 Cardinal Health.

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 Cardinal Health for further information or testing availability.

Transportation: It is recommended that the top speed, ground continuity and line leakage be tested every two years for continued safe operation. Contact Cardinal Health for further information or testing availability.

Repaired Units: For verification of the safe state of the centrifuge following factory service or repair, refer to the date on the Factory Calibration located on the back of the centrifuge. This is the date that the repaired centrifuge was last factory tested and calibrated. For additional servicing information and technical support, contact Cardinal Health.

Replacement Parts:

Part No.	Description
7713079	Blue Tube Holder, for 75-100 mm tubes
7786067	Rotor, six place horizontal
7735049	Motor, 1/30 H.P., 115 VAC Permanent Split Capacitor
7714101	Pawl, latch, lid
7714103	Knob, latch, lid
7712316	Lid
7724071	Hinge, friction
7732018	Seal, lid gasket
7760006	Power Line Cord (North America)
7760005	Power Line Cord (Europe)
7724037	Foot, rubber
7729009	Capacitor, 5uF, 250V A.C.
7751043	4A, Circuit Breaker
02-006-0-0010	Control Circuit Board for VES
02-002-1-0016	Lid locking assembly

Available Accessories:



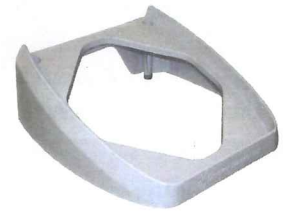
1 in. Tube cushion
p/n 1525



0.25 in. Tube cushion
p/n 9150



Shield caps
p/n 7713011



Centrifuge Platform
p/n 00-079-009-001

Warranty:

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

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