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# User's Manual

## CentriVap<sup>®</sup> DNA Systems

### Models

7970010  
7970011  
7970030  
7970035  
7970037

To receive important product updates,  
complete your product registration card  
online at [register.labconco.com](http://register.labconco.com)

Please read the User's Manual before operating the equipment.

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Labconco Corporation provides a warranty to the original buyer for the repair or replacement of parts and reasonable labor as a result of normal and proper use of the equipment with compatible chemicals. Broken glassware and maintenance items, such as filters, gaskets, light bulbs, finishes and lubrication are not warranted. Excluded from warranty are products with improper installation, erratic electrical or utility supply, unauthorized repair and products used with incompatible chemicals.

The warranty for CentriVap® DNA Systems will expire one year from date of installation or two years from date of shipment from Labconco, whichever is sooner. Warranty is non-transferable and only applies to the owner (organization) of record.

Buyer is exclusively responsible for the set-up, installation, verification, decontamination or calibration of equipment. This limited warranty covers parts and labor, but not transportation and insurance charges. If the failure is determined to be covered under this warranty, the dealer or Labconco Corporation will authorize repair or replacement of all defective parts to restore the unit to operation. Repairs may be completed by 3<sup>rd</sup> party service agents approved by Labconco Corporation. Labconco Corporation reserves the rights to limit this warranty based on a service agent's travel, working hours, the site's entry restrictions and unobstructed access to serviceable components of the product.

Under no circumstances shall Labconco Corporation be liable for indirect, consequential, or special damages of any kind. This warranty is exclusive and in lieu of all other warranties whether oral, or implied.

## **Returned or Damaged Goods**

Do not return goods without the prior authorization from Labconco. Unauthorized returns will not be accepted. If your shipment was damaged in transit, you must file a claim directly with the freight carrier. Labconco Corporation and its dealers are not responsible for shipping damages.

The United States Interstate Commerce Commission rules require that claims be filed with the delivery carrier within fifteen (15) days of delivery.

## **Limitation of Liability**

The disposal and/or emission of substances used in connection with this equipment may be governed by various federal, state, or local regulations. All users of this equipment are required to become familiar with any regulations that apply in the user's area concerning the dumping of waste materials in or upon water, land, or air and to comply with such regulations. Labconco Corporation is held harmless with respect to user's compliance with such regulations.

## **Contacting Labconco Corporation**

If you have questions that are not addressed in this manual, or if you need technical assistance, contact Labconco's Customer Service Department or Labconco's Product Service Department at 1-800-821-5525 or 1-816-333-8811, between the hours of 7:30 a.m. and 5:30 p.m., Central Standard Time.

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# Chapter 1:

## Introduction

Congratulations on your purchase of a Labconco CentriVap DNA Centrifugal Concentrator . Models are available for operation on 115V or 230V.

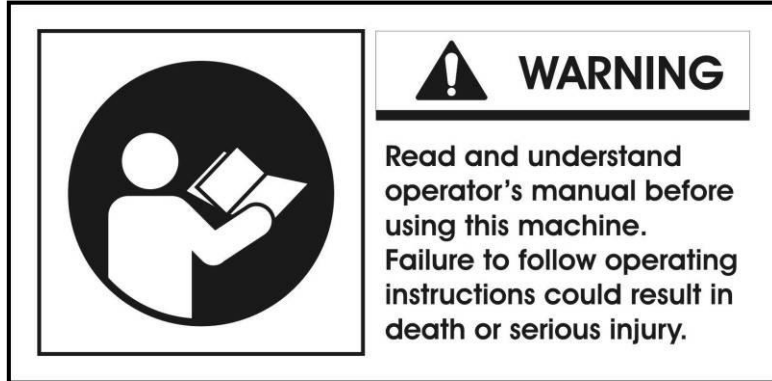
The CentriVap Concentrator uses centrifugal force with heat and vacuum to rapidly dry precipitates of DNA and RNA samples. Centrifugation eliminates bumping and foaming as vacuum is applied and also concentrates the solute in the bottom of the vial. This allows recovery of solutes from sample volumes as small as a few microliters. The concentrator is equipped with a 300 watt heater to speed evaporation by warming the chamber during processing. A timed outlet for the vacuum pump connection delays the start of the pump until the rotor reaches operating speed. A safety switch prevents the concentrator from starting when the lid is in the open position and a latch prevents the lid from being opened while the rotor is turning. The compact, low profile design allows the concentrator to be placed on a bench top or other laboratory work surface.

All wetted parts within the pump are PTFE, or other chemical resistant fluoropolymers. A glass trap is provided to remove liquid from the system before it enters the pump and a second glass trap is provided on the outlet side of the pump to trap liquid expelled from the pump.

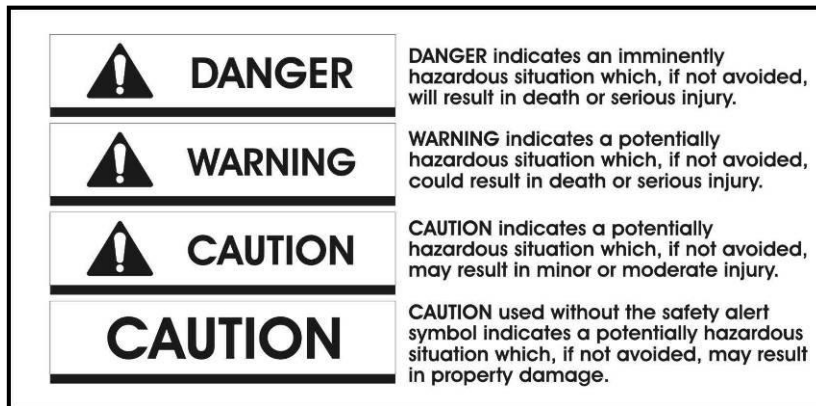
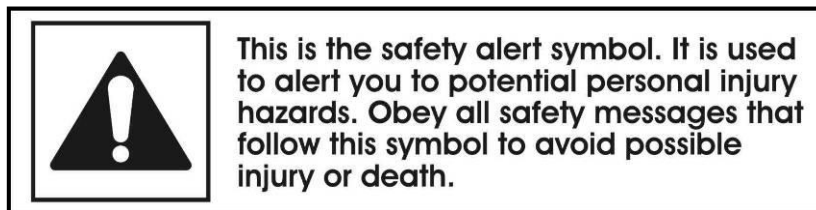
The microprocessor, which controls the operation of the heater and the motor, provides excellent regulation and reproducibility of protocols. A manually preset timer can signal the end of the run. Nine different protocols can be stored in memory so exact test parameters can be easily repeated.

## Safety Symbols

Your CentriVap Concentrator was designed with safety in mind, however conditions may exist that could be hazardous.



Throughout this manual potentially hazardous conditions are identified using the following words and symbols.



It is important that you understand the warnings listed throughout this manual before you operate the CentriVap Concentrator

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## Chapter 2: Prerequisites

Before you install your CentriVap, you need to prepare your site for installation. Carefully examine the location where you intend to install your CentriVap. You must be certain that the area is level and of solid construction. In addition, an exhaust means must be provided. An electrical source must be located near the installation site.

Carefully read this chapter to learn:

- The electrical supply requirements.
- The exhaust requirements.

Refer to *Appendix C: CentriVap Specifications* for complete CentriVap electrical and environmental conditions, specifications and requirements.

## Electrical Requirements

The CentriVap Concentrator requires a dedicated grounded electrical outlet. This outlet requires a 15 Amp circuit breaker or fuse for models rated at 115V (60 Hz). An 8 Amp circuit breaker or fuse is required for models rated at 230V (50/60 Hz). Various models are available for use in different locations throughout the world. Each has a unique plug suitable for the specific location. See CentriVap Components in Chapter 3 for detail plug specifications. If the plug supplied with the CentriVap Does not match with the available receptacle, remove this plug and replace it with an approved plug of the suitable style.

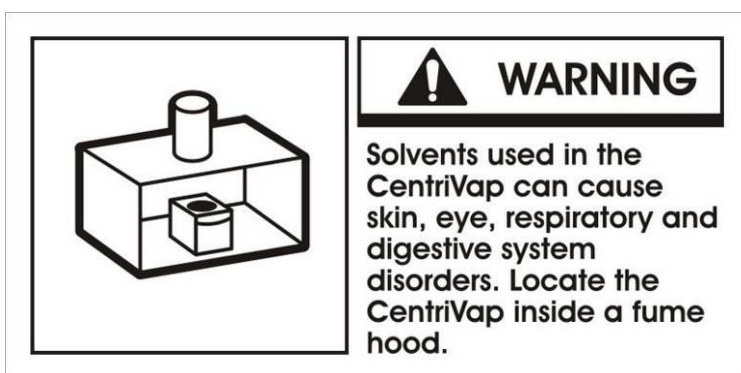
It is recommended that an emergency switch for disconnecting the mains in the case of a malfunction be located remote from the CentriVap, preferably outside the room in which the CentriVap is housed, or adjacent to the exit from that room.

## Location and Exhaust Requirements

The CentriVap Concentrator should be located on a surface that is stable, flat and level.

**WARNING: The CentriVap System should be located within a fume hood if hazardous or flammable solvents are used. Heating of materials could lead to the liberation of hazardous gases. In all cases, regardless of the solvent used, it is strongly recommended that the vacuum pump is vented in a fume hood. An accessory secondary trap is available to minimize the exhausting of solvents into the atmosphere. This does not, however, negate the need to exhaust the vacuum pump into a fume hood. Failure to properly vent the CentriVap will expose personnel to potentially harmful chemicals.**

The CentriVap has not been evaluated by an approval agency for the use of biological, radio toxins or flammable liquids or materials.



## Space Requirements

Refer to *Appendix B: CentriVap Dimensions* for dimensional drawings of the CentriVap DNA System.

No person or any hazardous material should be within 12 inches of the CentriVap Concentrator while it is operating.

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## Chapter 3: Getting Started

Now that the site for your CentriVap is properly prepared, you are ready to unpack, inspect, install, and test your CentriVap. Read this chapter to learn how to:

- Unpack and move your CentriVap.
- Set up your CentriVap.
- Connect the electrical supply source to your CentriVap.
- Properly exhaust your CentriVap.
- Safely use solvents with your CentriVap.

**CAUTION: The CentriVap Concentrator weighs over 80 lbs. (36 Kg). The carton allows for lifting with a mechanical lift truck or hand truck. If you must lift the CentriVap manually, use at least two (2) persons and follow safe lifting guidelines.**



## Unpacking Your CentriVap

Carefully unpack your CentriVap and inspect it for damage that may have occurred in transit. If your CentriVap is damaged, notify the delivery carrier immediately and retain the entire shipment intact for inspection by the carrier.

The United States Interstate Commerce Commission rules require that claims be filed with the delivery carrier within fifteen (15) days of delivery.

**NOTE: Do not return goods without the prior authorization of Labconco. Unauthorized returns will not be accepted. If your CentriVap was damaged in transit, you must file a claim directly with the freight carrier. Labconco Corporation and its dealers are not responsible for shipping damage.**

Do not discard the carton or packing material for your CentriVap until you have checked all of the components and installed and tested the CentriVap.

## CentriVap Components

As previously mentioned, the CentriVap DNA System is available in 115V or 230V. Locate the model of CentriVap you received in the following table. Verify that the components listed are present and undamaged.

<b>Catalog #</b>	<b>Product Description</b>
7970010	CentriVap DNA Concentrator – 115V – USA
1334500	Power Cord with NEMA 5-15P Plug
7462900	Rotor
7397609	User's Manual
7970011	CentriVap DNA Concentrator – 230V – USA
1338000	Power Cord with NEMA 6-15P Plug
7462900	Rotor
7397609	User's Manual
7970030	CentriVap DNA Concentrator – 230V – EU
1336100	Power Cord with CEE 7/7 Plug
7462900	Rotor
7397609	User's Manual
7970035	CentriVap DNA Concentrator – 230V – UK
1332600	Power Cord with BS 1363 Plug
7462900	Rotor
7397609	User's Manual
7970037	CentriVap DNA Concentrator – 230V – China
1332700	Power Cord with CHI-10P Plug
7462900	Rotor
7397609	User's Manual

If you do not receive one or more of the components listed for your CentriVap, or if any of the components are damaged, contact Labconco Corporation immediately for further instructions.

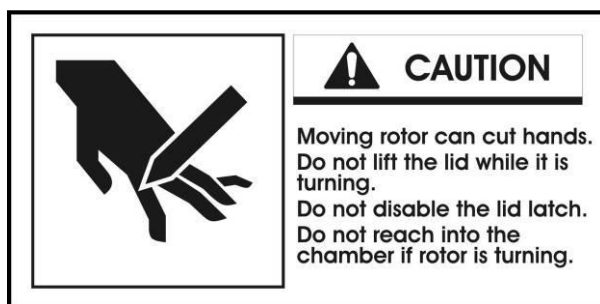
## Setting Up Your CentriVap

After you verify receipt of the proper components, move your CentriVap to the level and sturdy location where you want to install it. There is no need to secure the CentriVap DNA Concentrator to the work surface. Then, follow the steps listed below.

## Emergency Access Into the Chamber

The CentriVap is designed to prevent access to the chamber in the event of a power disruption. If it is necessary to open the lid when there is no electrical power connected to the CentriVap, insert a small screwdriver or similar instrument into the small round hole on the left side of the case near the top behind the control panel. This will unlock the lid latch mechanism. While holding the screwdriver in place, raise the lid with the other hand.

**CAUTION: Never attempt to defeat the latch or open the lid while the CentriVap is running. Personnel injury can result from moving parts and chemicals.**



## Exhaust Port

If the CentriVap is not located in a fume hood, attach one end of a .50 inch ID hose to the exhaust port on the left side on the vacuum pump glass trap exhaust port. Clamp securely. Route the other end to a fume hood or other laboratory ventilation device.

## Electrical Connection

Plug the power cord into the receptacle on the back of the CentriVap Concentrator and plug the other end into a suitable power receptacle

## Rotor Installation

Place the rotor onto the shaft of the Concentrator. Rotate the rotor slightly to engage the drive pin in the shaft with the slots in the rotor hub. The top of the shaft should be in line with the top of the rotor hub.

**IMPORTANT: Do not use a rotor if it shows any signs of damage.**

# Chemical Resistance of CentriVap Components

Your CentriVap DNA Centrifugal Concentrator is designed to be chemical resistant to most compounds that are commonly used in the concentration processes that are performed in it. However, by necessity, the CentriVap is comprised of a number of different materials, some of which may be attacked and degraded by certain chemicals. The degree of degradation is obviously dependent on the concentration and duration of exposure. Some major components of the CentriVap that are susceptible to degradation are as follows:

COMPONENT	MATERIAL	Acids							Bases		Solvents													
		Acetic Acid 20%	Boric Acid	Formic Acid	Hydrobromic Acid 20%	Hydrochloric Acid 20%	Nitric Acid 20%	Sulfuric Acid 10%	Trifluoroacetic Acid (TFA)	Ammonium Hydroxide	Acetone	Acetonitrile	Chloroform	Dimethyl Formamide	Dimethyl Sulfoxide (DMSO)	Ethanol	Ethyl Acetate	Hexanes	Isopropanol	Methanol	Methylene Chloride	Methyl t-Butyl Ether (MTBE)	Toluene	Water
<b>Standard CentriVap</b>																								
Chamber	Epoxy coated Aluminum			C				D					C	D										
Lid	Acrylic							C	D	C			D	D	C	D			D	C	D		D	
Bearings	High Carbon Steel	D	D	D	D	D	D	D		D			D	D					D	C	D		D	D
Lid Gasket	EPDM						D	D				D		D			D			C	C	D		
Rotor Shaft	Stainless Steel				D	D		D																
Valve	Stainless Steel				D	D		D																
O Rings	Viton (Fluorocarbon)							C					C	C		D						C		
Fittings	Polypropylene	D														C								
Rotor	Anodized Aluminum				D	D																		
Rotor Hub	Acetal (Delrin)	C			C	C	D	D	D	C				D										C
Tubing	PVC	D		C			D	D					D	D	D	D	D	C	D	D		D		D
<b>Acid Resistant CentriVap</b>																								
Chamber	Teflon coated Aluminum																							
Lid	Glass																							
Bearings	Stainless Steel				D	D		D											D		C	C	D	
Lid Gasket	EPDM						D	D				D	D			D				C	C	D		
Rotor Shaft	Hastelloy																							
Valve	Teflon																							
O Rings	Viton (Fluorocarbon)							C					C	C		D						C		
Fittings	Polypropylene	D																						
Rotor	Teflon coated Aluminum																							
Rotor Hub	Polypropylene	D																						
Tubing	PVC	D		C			D	D					D	D	D	D	D	C	D	D		D		D
<b>Cold Trap -50°C</b>																								
Chamber	Stainless Steel				D	D		D																
Lid	Acrylic							C	D	C			D	D	D	C	D		D	C	D		D	
Cold Trap Gasket	Neoprene		D		D	C	D	D					C	D	D	D		D			D	C	D	
<b>Cold Trap -84°C &amp; -105°C</b>																								
Chamber	Stainless Steel				D	D		D																
Lid	Stainless Steel				D	D		D																
Cold Trap Gasket	Neoprene		D		D	C	D	D					C	D	D	D		D			D	C	D	
C- Moderate Degradation- Questionable use																								
D- Severe Degradation- Infrequent use recommended- immediate thorough cleaning required																								

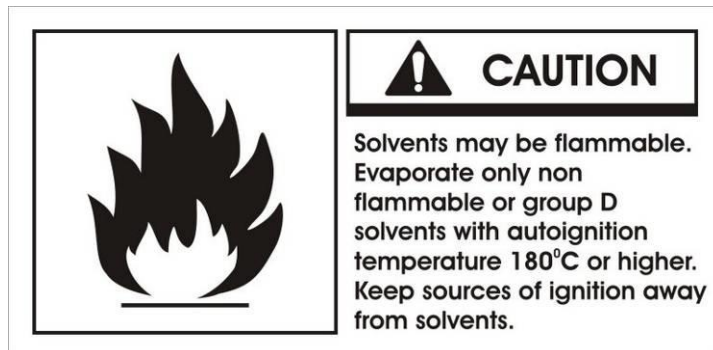
- Diaphragm vacuum pumps sold by Labconco have wetted parts either made from PTFE or protected by PTFE coatings and are suitable for nearly all procedures.

When using compounds in the CentriVap that are hostile to the materials of construction, it is imperative that the equipment is appropriately maintained.

- After each run, clean up all residues, spills and materials that might have splashed in the chamber using agents suitable for the substance involved.
- If the compounds used attack acrylic, consider using the optional glass chamber lid. Contact Labconco for ordering information.
- If optional secondary traps are used, monitor their condition often and replace them when they are saturated. A new acid trap is off-white and changes color to purple when used up. A new moisture trap is blue and changes color to pink when it is used up. The solvent trap molecular sieve does not change color when saturated so extra care must be taken to determine when a replacement cartridge should be installed.

## Solvent Safety Precautions

**CAUTION:** The CentriVap is not classified as “explosion proof.” It has been designed with safety as a primary consideration and should be used in a prudent manner using “good laboratory practices.” It has been designed for use with compounds as described in the United States National Electrical Code Class I, Group D. The heater may be programmed to run as hot as 100°C, however, the heater element may normally run at 110°C. A thermal fuse limits the heater to a maximum temperature of 141°C. In an over-temperature or “run away” heater situation occurs, the thermal fuse will stop all power to the heating element. You will see the temperature on the display reduce. The thermal fuse will automatically reset and restore power to the heating element once the temperature drops below 120°C. It is important that the solvents used are compatible with these temperatures. Do not evaporate solvents that have an autoignition temperature below 180°C. Do not evaporate solvents that are classified as Group A, B, or C by the National Electrical Code. Evaporate only non-flammable or Group D solvents with autoignition temperatures 180°C or above. Use of other compounds could cause an explosion.



**CAUTION:** Solvents used in the CentriVap may be flammable or hazardous. Use extreme caution and keep sources of ignition away from the solvents. When using flammable or hazardous solvents, both the CentriVap and the vacuum pump should be operated inside a fume hood.

If a sample is spilled in the chamber it must immediately be cleaned up. Hazardous materials such as strong acids or bases, radioactive substances and volatile organics, must be handled carefully and promptly cleaned up if spilled.

Do not store flammable or hazardous solvents within 12 inches (300 mm) of the CentriVap.

**IMPORTANT:** The disposal of substances used in connection with this equipment may be governed by various Federal, State or local regulations. All users of this equipment are urged to become familiar with any regulations that apply in the user's area concerning the dumping of waste materials in or upon water, land or air and to comply with such regulations.

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## Chapter 4:

# Using Your CentriVap

After your CentriVap has been installed as detailed in *Chapter 3: Getting Started*, you are ready to begin using your CentriVap. Read this chapter to learn how to:

- Set operating parameters.
- Operate the controls.
- Properly select and position glassware inside your CentriVap.
- Understand the display.
- Interrupt a cycle after it has begun.

**NOTE:** See *Appendix C: CentriVap Specifications*, for electrical requirements.

**NOTE:** Do not store or stack supplies or equipment on top of the CentriVap.

## Planning

Thoroughly understand procedures and the equipment operation prior to beginning work. The unique performance of the CentriVap is dependent upon the proper balance of heat, vacuum and centrifugal force. If the proper balance is not established, it is possible to damage or lose a portion of the sample. Therefore, if you are unfamiliar with the CentriVap or are attempting a new protocol, it may be helpful to make a trial run that is void of the sample you are attempting to concentrate.

## Glassware Selection

Normally, sample tubes should be filled no more than approximately half full. Select the size of the sample tube so it is compatible with the rotor and the desired sample size. Tubes should not be loose in the rotor. Rotors are available with holes for various size tubes. Refer to *Chapter 6: Accessories for your CentriVap DNA Concentrator* for available rotor sizes.

## Loading Glassware into the CentriVap

Smooth operation of the CentriVap is dependent upon proper balance of the machine. Therefore, if less than a full load of samples is run, it is important to load samples into the CentriVap in a fairly symmetrical manner distributing the weight of the samples evenly in the sample rotor.

## Temperature Setting Guidelines

The evaporation rate achieved by the CentriVap is dependent upon a variety of factors. These include the nature of the solvent, the temperature and the pressure in the vacuum system.

As a general guideline, to speed the evaporation process, the CentriVap temperature should be set as high as possible as long as the temperature will not damage the sample or cause the sample to bump.

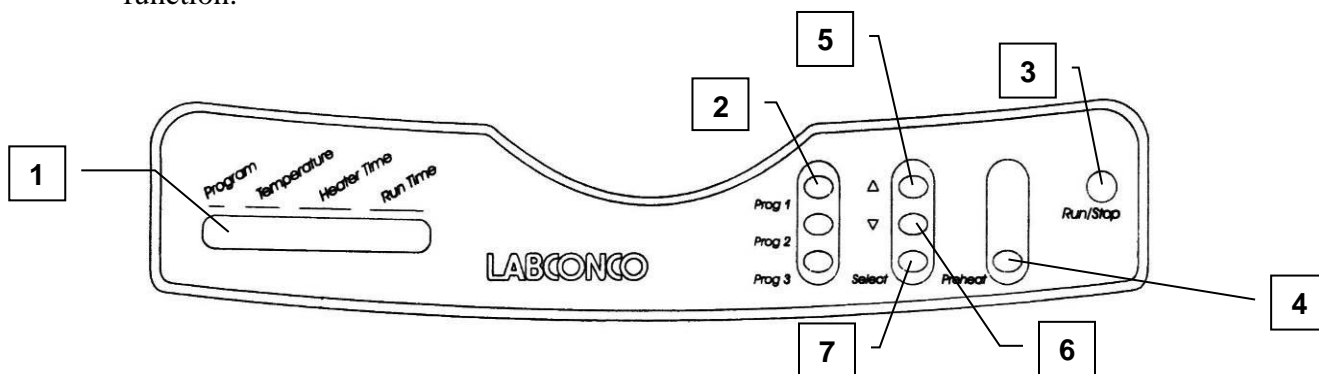
## Time Setting Guidelines

The CentriVap Concentrator has two timers. The “RUN TIME” turns the entire concentrator off after the user set period of time. This stops the rotation, turns off the heater and vacuum pump and bleeds vacuum from the system. The heater may be turned off prior to the concentrator turning off so heat-sensitive samples may be protected from exposure to excessive heat after the solvent has evaporated. To turn the heater off prior to stopping the entire system, enter a set time into the memory at the “HEATER TIME.” When the programmed time expires, the heater will turn off but the rotation and vacuum will continue until the run time expires.

The tables in *Appendix C: CentriVap Specifications* indicate approximate times required to evaporate various common solvents. Actual times must be determined by the user. The CentriVap can be set to alarm after a preset period of operation. When the time expires, the CentriVap will give an audible alarm and turn itself off.

## CentriVap Controls

The control panel for the CentriVap is shown below with a description about its function.



1. Display – The liquid crystal display (LCD) shows set point parameters and actual measured conditions.
2. Program Buttons – Used to initiate the start of a run with the use of just one button.
3. Run/Stop Button – Used to start or stop a run.
4. Preheat Button – Used to turn on the heater to preheat the chamber prior to loading samples.
5. Increase Button – When pressed, the last selected set point will increase.
6. Decrease Button – When pressed, the last selected set point will decrease.
7. Set Point Select Button – To select a parameter to change, press the select button. Arrows on the display will point to the parameter that may be altered.

## Operating the CentriVap Controls

### Preheat:

To preheat the chamber, press the “PREHEAT” button. The display will show:

SP: XXX ACT: XXX

Press the increase or decrease button until the desired set point (SP) is displayed. The actual chamber temperature, (ACT) is displayed to the right. When power is being supplied to the heaters, a bar under the actual temperature will illuminate. The chamber will continue to preheat until either the “PREHEAT” button is pressed again or the “RUN” button is pressed.

### Select existing program:

Operating parameters can be stored in memory so protocols can be repeated. Nine programs can be stored. To select a program, press the set point “SELECT” button until arrows point to the program number indicating that this set point can be run or altered. To change the program number, press the increase or decrease button until the desired program number is displayed. When the program number is changed, all its set points change also to indicate the last entered parameters for that program.

Store frequently run protocols in program 1, 2, or 3. Then, by pressing “PROG 1,” “PROG 2” or “PROG 3,” the stored program will be initiated without having to press any other button. Pressing just the one button starts the rotor, the heater, the timers and the vacuum pump.

### Change “Temperature” Set Point:

To change the “Temperature” set point, press the set point “SELECT” button until arrows point to the “Temperature” set point, which can be changed from - (OFF) up to 99° by pressing the increase or decrease buttons. The set point is 100°C if the display shows “HI.” The last entered set point is stored in memory.

### Change “Run Time” or “Heater Time” Set Point:

To change the time set point, press the set point “SELECT” button until arrows point to the “Heater Time” or “Run Time” set point which can be changed from 1 to 999 minutes by pressing the increase or decrease buttons. If it is desired to have the CentriVap run continuously without alarming at the end of a time period, press the increase button until the “Run Time” display says “ON.” The last entered set point is stored in memory.

If during a run the “STOP” button is pressed, the timers remember the time at which stop occurred. If “RUN” is then pressed, the timers continue to count down from the time at which they were stopped. If you are running program 1, program 2 or program 3, pressing “PROG 1,” “PROG 2” or “PROG 3” resets the timers to the original set point time and the CentriVap starts a new run.

To reset the timers to the original set point time when running programs other than program 1, program 2 or program 3, press the start button and hold it for five seconds. The display will indicate that the timer is reset.

## Operating the CentriVap

**CAUTION: To avoid personnel injury; Do not operate the CentriVap if the lid is scratched or nicked, or shows signs of damage. A damaged lid could fail under vacuum.**



While the CentriVap Concentrator is operating, do not lean on the lid, do not stand near it longer than necessary and do not place hazardous materials within 12 inches.

1. Turn "ON" the CentriVap power switch.
2. Select a program or set the set point parameters.
3. Preheat the chamber if desired.
4. Place samples in vials. Normally the vials should be no more than half full. Place vials in a rotor.
5. Load the rotor with samples into the chamber.
6. Close the lid.
7. Press "RUN." If the display was showing set point parameters, it will change to show actual parameters. Press "RUN" again. The "S" (STOP) in the display changes to "R" (RUN). The program on the display alternately displays "R" or the number of the program that is running. If you intend to run program 1, 2 or 3, simply press "PROG 1," "PROG 2" or "PROG 3" to quick start the CentriVap. The rotor will start, the vacuum break valve will close and the vacuum pump will start after the rotor reaches operating speed.
8. Set point parameters can be altered at any time during a run by first selecting the parameter using the set point "SELECT" button and then pressing the "INCREASE" or "DECREASE" switch.
9. If the run time set point is used, at the end of the set time an alarm sounds. All functions cease.

10. Press “STOP” to terminate operation if the CentriVap has not already stopped itself.
11. When the evaporation is complete, allow the rotor to stop moving, lift the lid and remove the samples.

### Operational Notes

When the CentriVap is turned on, the CentriVap returns to the same mode (“RUN” or “STOP”) that it was in when the power was turned off. If the CentriVap was in the “RUN” mode when the power was turned off, when the power is turned on, the CentriVap attempts to return to the programmed set points and continue the run.

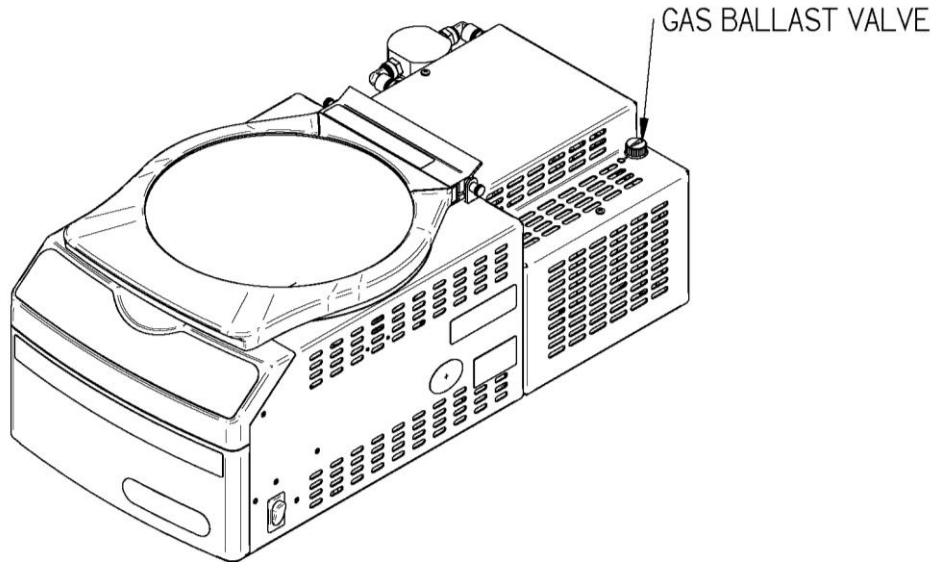
To reset the timers to the original set point when running other than program 1, program 2 or program 3, press the start button and hold it for five seconds. The display will indicate that the timer is reset.

### Interrupting a Cycle After it Has Begun

At any time during a run, the cycle may be stopped by pressing the “STOP” button. This shuts off all operating functions. After the rotor stops, the lid may be opened. If it is necessary to re-start the CentriVap, close the lid and press “RUN.” The CentriVap resumes operation at the same set point parameters and the timer continues to count down from the time at which the CentriVap was stopped.

### Gas Ballast

The vacuum pump incorporated in the CentriVap DNA Concentrator is capable of achieving an ultimate pressure of <7 MBAR. Some solvents may freeze when exposed to low pressure. If the sample being processed freezes, evaporation ceases and the sublimation process occurs, which in turn greatly reduces the concentration rate. Freezing of the sample may be prevented by opening the gas ballast valve which increases the ultimate pressure in the system. Pressure may be monitored using a vacuum gauge as described in Chapter 6: Installing a Vacuum Gauge.



## Safety Precautions

Special precautions must be observed if the materials used in the CentriVap Concentrator are known to be hazardous, toxic, radioactive, or contaminated with pathogenic micro organisms. These actions should include but are not limited to the following:

- Refer to the World Health Organization Laboratory Biosafety Manual, paying special attention to information about centrifuges and the handling of hazardous materials.
- Operate or vent the CentriVap Concentrator inside a suitable fume hood or ventilation device. Load rotors in a ventilation device.
- Periodically inspect all parts of the CentriVap Concentrator including the lid, gasket, chamber, plumbing components and rotors.

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## Chapter 5:

# Maintaining Your CentriVap

Under normal operation, the CentriVap requires little maintenance. The following maintenance schedule is recommended. Before servicing the CentriVap, disconnect electrical power. Special precautions must be observed if materials used in the CentriVap Concentrator are known to be hazardous, toxic, radioactive or contaminated with pathogenic micro organisms. Before servicing, the CentriVap Concentrator must be suitably decontaminated. Wear appropriate eyewear, gloves and other safety apparel.

### As needed:

Before using any cleaning or decontamination method except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage equipment.

1. Clean up all spills; remove liquids from the chamber. Clean or decontaminate all surfaces using agents suitable for the substance spilled.
2. Clean lid and gasket using soft cloth, sponge or chamois and a mild, non-abrasive soap or detergent.
3. At the end of the run, liquid collected in the glass traps should be removed. To empty a trap, unscrew the glass bowl from the head. Dispose of the liquid in accordance with all codes. Reinstall the glass bowl by screwing it back on to the head.
4. If the media in the optional clear canister has changed color, discard and replace the insert with a new insert. For the radiochemical trap insert, no indicator exists; therefore, it should be discarded after each use. In radioactive applications, the system should be monitored with a Geiger counter.
5. Check rotors for loose or missing parts. Tighten or replace as required. Do not use defective rotors.
6. Inspect the chamber to insure that there are no cracks or structural damage. Call Labconco if defects exist.
7. Check the continuity of the protective earth between the ground terminal on the power inlet and a bare metal housing panel. Contact Labconco if there is no continuity.
8. Repair any defects to the surface where the CentriVap is installed.

### **Daily:**

1. To prolong the life of the DNA vacuum pump and to optimize its performance, it is important to purge all liquid from within it. When the DNA concentration process is completed, open the CentriVap lid and push the rotor switch ON. In ten seconds, the pump will operate and will draw air through the system. The rotor will not turn with the lid open. The length of the liquid purge time is dependent on the volatility of the solvents used. Use of water may require an overnight purge time.

### **Monthly:**

1. The rubber components on the CentriVap may eventually deteriorate and require replacement. The effective life of rubber parts depends upon both their usage and the surrounding environment. Check all rubber hoses and gaskets and replace any that show signs of hardening, permanent set or deterioration.
2. Using a soft cloth, sponge or chamois and a mild, non-abrasive soap or detergent, clean the glass lid.
3. Using a soft cloth, sponge, or chamois and a mild, non-abrasive soap or detergent, clean the exterior surfaces of the unit. Liquid spray cleaners and polishes may be used on the exterior surfaces. Do not use solvents to remove stains from the exterior surfaces as they may damage the finish.

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## Chapter 6:

# Accessories for Your CentriVap

The configuration of your CentriVap can be changed to accommodate your needs. If the solvents used in the CentriVap degrade the acrylic lid, it may be replaced with an optional glass lid to gain added chemical resistance. You may wish to add a secondary trap to trap vapors exhausted from the vacuum pump. To observe the samples while they are processing, an optional CentriZap Strobe light may be installed. Read this chapter to learn how to:

- Install a glass lid.
- Install a chemical trap.
- Install an accessory vacuum gauge.
- Install a CentriZap™ strobe.

The following accessories are available for the CentriVap DNA Concentrator.

<b>PART #</b>	<b>DESCRIPTION</b>
7462900 7462901*	Rotor (DNA) Holds (72) 0.5 ml microcentrifuge tubes and (60) 1.5 ml microcentrifuge tubes or (60) 2.0 ml microcentrifuge tubes
7450700 7450701*	Rotor (1.5 ml) Holds (132) 1.5 ml microcentrifuge tubes or (132) 2.0 ml microcentrifuge tubes
7455000 7455001*	Rotor (15 ml) Holds (44) 12 x 55 mm tubes or (36) 12 x 75 mm tubes or (36) 12 x 95 mm tubes or (36) 13 x 75 mm tubes or (36) 13 x 100 mm tubes and (24) 16 x 100 mm tubes or (18) 16 x 120 mm conical tubes or (18) 17 x 95 mm tubes or (18) 17 x 100 mm centrifuge tubes or (18) 17 x 120 mm tubes
7455100 7455101*	Rotor (12-13 mm) Holds (40) 1.5 ml microcentrifuge tubes or (40) 2.0 ml microcentrifuge tubes and (16) 12 x 55 mm tubes or (100) 12 x 75 mm tubes or (64) 12 x 95 mm tubes or (100) 13 x 75 mm tubes or (64) 13 x 100 mm tubes
7455200 7455201*	Rotor (50 ml) Holds (32) 1.5 ml microcentrifuge tubes or (32) 2.0 ml microcentrifuge tubes and (12) 28 x 115 mm conical tubes or (12) 28 x 135 mm conical tubes or (12) 28 x 140 mm conical tubes
7461900 7461901*	Rotor (96 well plate) Holds (4) Standard 96 well plates or (2) Deep well 96 well plates
7460900	Clear Canister - Accommodates inserts listed below
7814800	Acid Trap Insert
7814900	Moisture Trap Insert
7815000	Radiochemical Trap Insert
7815200	Solvent Trap Insert
7456600	Glass Lid for Concentrator – Direct replacement for standard equipment acrylic lid. For use with chemicals that could craze acrylic.
7464300	CentriZap™ Strobe Light – For observing samples while the rotor is spinning.
7995600	Ammonia Trap Insert

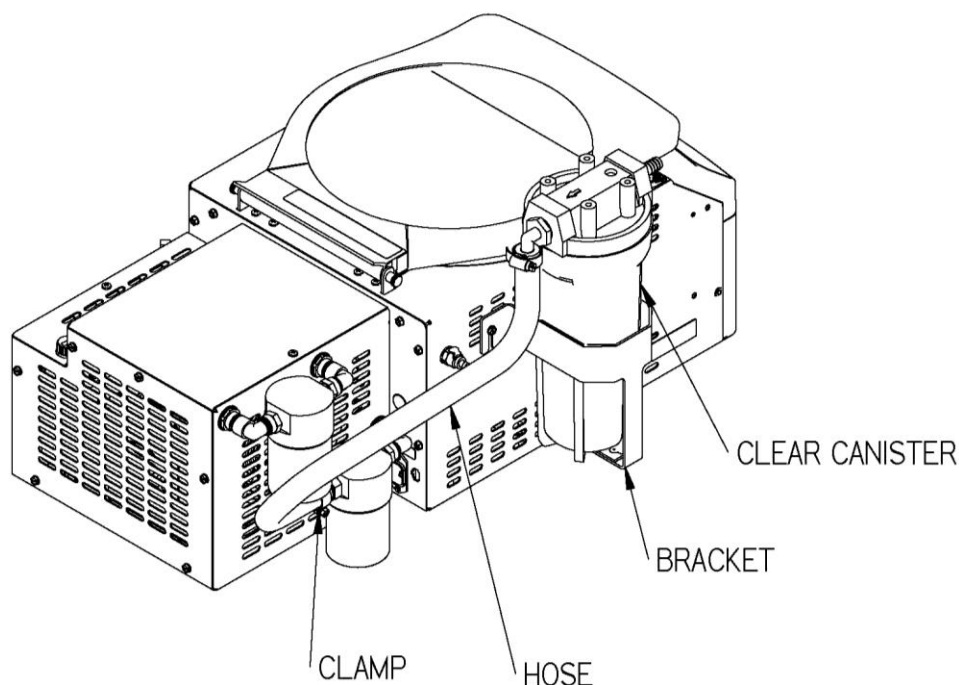
\*PTFE Coated

## Installing a Glass Lid

Turn off the CentriVap. Unplug the power cord from the wall receptacle. Pull outward on the hinge pin knob. Lift and remove the old lid. To install the new lid, reverse the process.

## Installing a Secondary Chemical Trap

An accessory secondary chemical trap is available to minimize the exhausting of solvents into the atmosphere. Attach the bracket to the left hand side of the housing using the screws provided. Attach the hose from the outlet on the vacuum pump to the “out” connector of the canister housing. Unscrew the clear bowl of the canister housing from the head. Remove both the upper and lower caps from the filter cartridge and insert the small end of the cartridge into the hole in the center of the head. Reinstall the clear bowl.



Be sure to use the proper cartridge for your application. The moisture cartridge is used to trap water vapor. The acid cartridge is used to trap acid vapors. The solvent cartridge is used to trap solvent vapors and the radiochemical cartridge is used to trap radioactive waste.

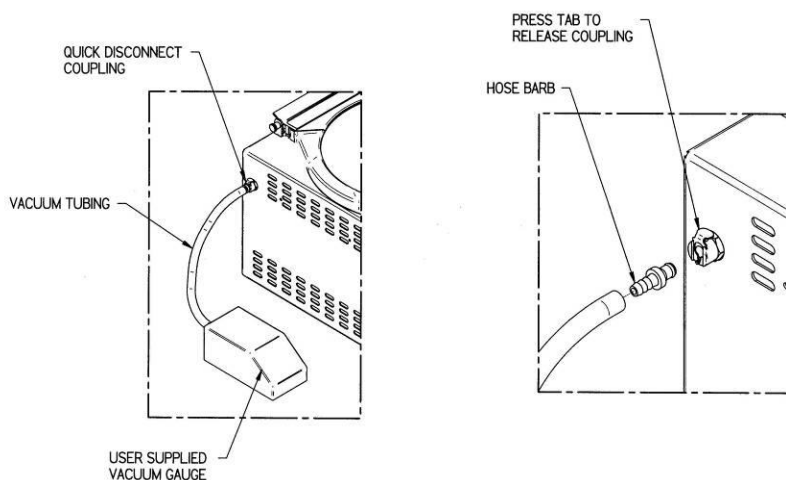
When the media in the insert has changed color, discard the insert and replace it with a new insert. For the radiochemical trap insert, no color indicator exists therefore it should be discarded after each use. Use a Geiger counter to monitor the pump exhaust.

**Warning: This radiochemical cartridge does not meet NRC filter design recommendations.**

**After operating, properly dispose of all hazardous materials in compliance with all applicable codes. Labconco is not responsible for improper disposal of any materials.**

## Installing a Vacuum Gauge

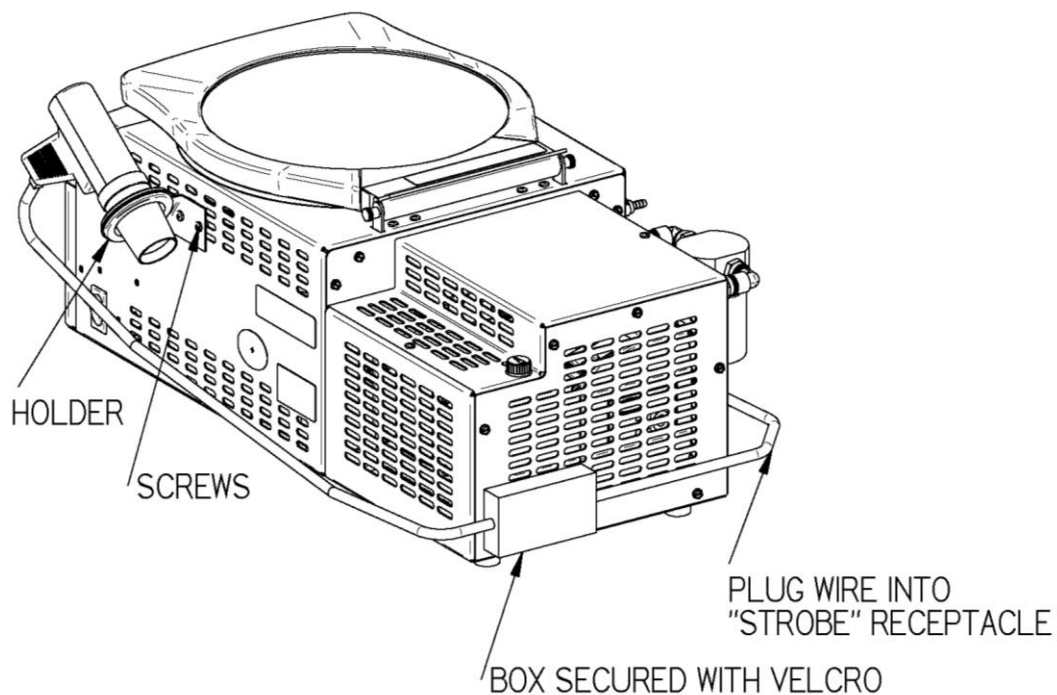
A user-supplied vacuum gauge may be attached to the CentriVap to monitor the vacuum level. Attach the vacuum gauge to the barb end of the Quick Disconnect Coupling fitting that was supplied with the CentriVap using a length of suitable rubber hose. The Quick Disconnect Coupling fitting can then be pushed into the mating connector on the left side of the CentriVap located towards the rear. The Quick Disconnect Coupling fitting can be removed from the mating connector by pressing on the tab on the connector and then pulling out the Quick Disconnect Coupling fitting. Always remove the Quick Disconnect Coupling from the CentriVap when a vacuum gauge is not attached to it.



## Installing a CentriZap™ Strobe Light

An accessory strobe light is available to enable you to see the samples as they are rotating in the rotor. Attach the holder to the right hand side of the CentriVap Concentrator using the screws provided. Plug the connector on the strobe light harness into the receptacle on the back of the CentriVap marked “STROBE OUTLET.” Peel the protective backing off the enclosed Velcro® and attach it to the back of the vacuum pump housing. Secure the power supply box on the harness to the Velcro. Place the light in the holder.

To use the strobe light while the CentriVap is operating, remove the light from its holder, press the trigger and shine the light on the samples in the rotor.

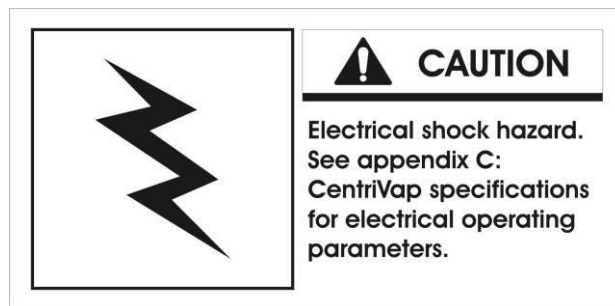


# Chapter 7:

## Troubleshooting

Refer to the following if your CentriVap fails to operate properly. If the suggested corrective actions do not solve your problem, contact Labconco for additional assistance. The following failure codes may appear on the display when problems are sensed by the internal self check routine.

**CAUTION: Disconnect power before corrective action is taken.**



DISPLAY ERROR CODE	CAUSE	CORRECTIVE ACTION
Heat Sensor	Sensor failure	Replace sensor assembly.
	Connection failure	Repair connection.
Close Lid	Lid open	Close lid.
Latch Fail	Solenoid failure	Check component.
	Switch or sensor failure	Check connections.
Mem Fail P1	Memory failure	Push program button #1.
	New memory IC chip	Push program button #1.
	Bad memory IC chip	Call Labconco – Replace IC chip or control PCB.

Other corrective actions for potential problems are as follows:

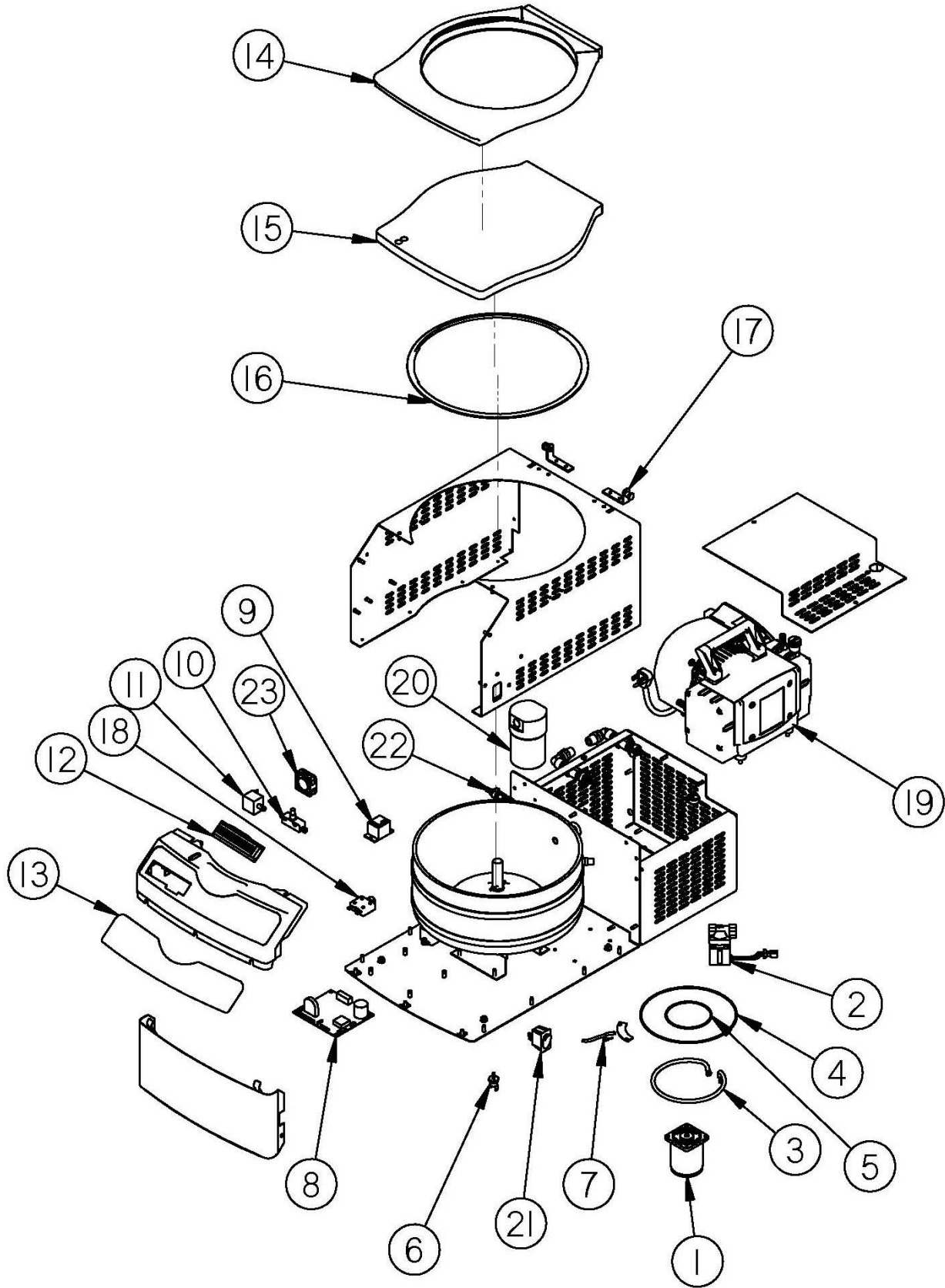
<b>PROBLEM</b>	<b>CAUSE</b>	<b>CORRECTIVE ACTION</b>
MOTOR ERROR	<b>Defective motor</b>	<b>Replace motor.</b>
	<b>Hall effect sensor failure</b>	<b>Replace sensor.</b>
	<b>Wire failure</b>	<b>Replace wire.</b>
	<b>Unit will not operate</b>	<b>Unit not connected to electrical power</b>
Unit will not operate	<b>Circuit breaker blown</b>	<b>Correct electrical problem and reset circuit breaker by pressing button.</b>
	<b>Lid open</b>	<b>Close lid.</b>
	<b>Excessive vibration</b>	<b>Sample tubes not located symmetrically in rotor</b>
Sample odor in lab	<b>Vent hose exhausting into lab area</b>	<b>Redirect hose to fume hood.</b>
Evaporation rate is reduced	<b>Heater inoperable</b>	<b>Contact Labconco.</b>
	<b>Vacuum pump failure</b>	<b>Check pump.</b>
	<b>Obstruction in hose</b>	<b>Remove obstruction or replace hose.</b>
	<b>Lack of adequate vacuum</b>	<b>See below.</b>
No vacuum/poor vacuum	<b>Pump not on</b>	<b>Turn on pump.</b>
	<b>Liquid in glass trap</b>	<b>Empty trap</b>
	<b>Control valve open</b>	<b>Check control valve.</b>
	<b>Leaks in lines or connectors or gasket</b>	<b>Locate and repair.</b>
	<b>Foreign material on lid gasket</b>	<b>Clean gasket and lid.</b>
Unit starts and shuts off	<b>Latch optical sensor improperly calibrated</b>	<b>Unplug power cord. Wait 10 seconds. Plug in power cord</b>

# Appendix A:

## CentriVap Components

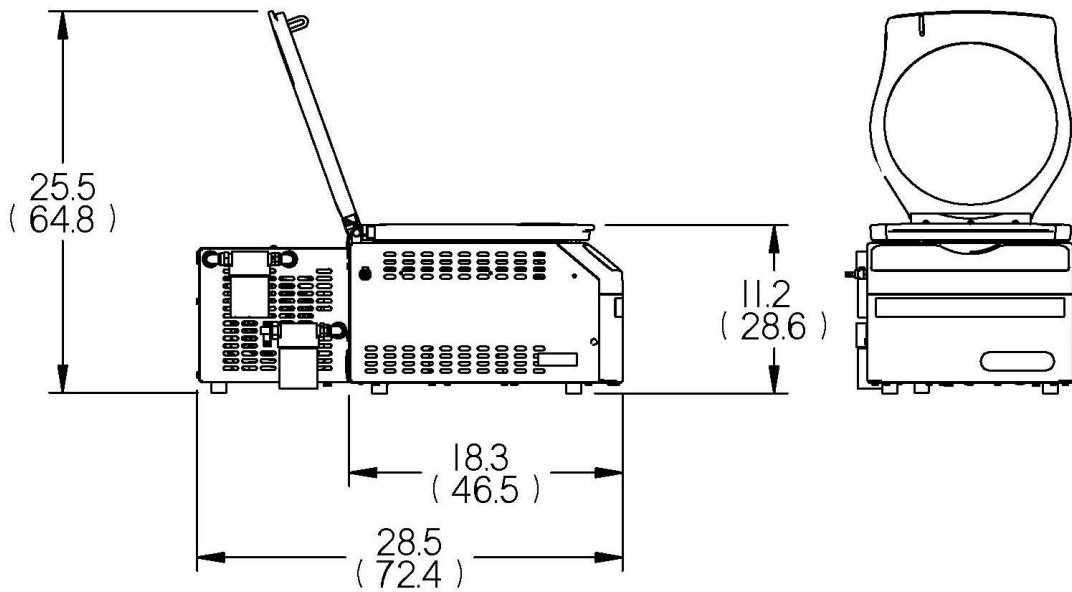
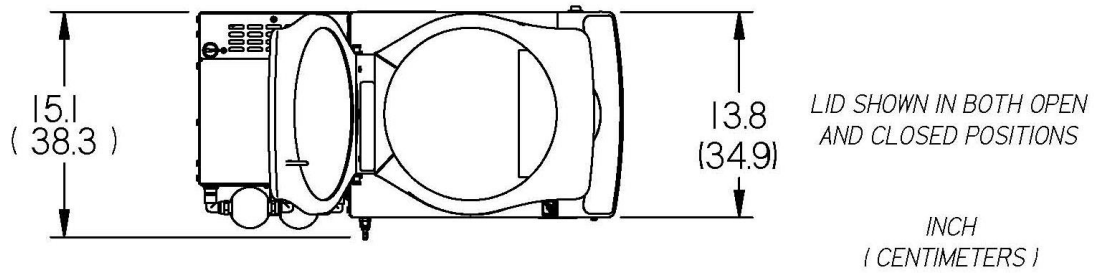
The following pages list components that are available for your CentriVap. The parts shown are the most common replacement parts. If other parts are required, contact Product Service.

Item	Quantity	Part No.	Description
1	1	7459000	Motor w/Capacitor
2	1	7546700	Valve, Vacuum Break (115V)
2A	1	7546701	Valve, Vacuum Break (230V)
3	1	7453500	Heater (115V)
3A	1	7453501	Heater (230V)
4	1	1647106	O-Ring, Outer
5	1	1647105	O-Ring, Inner
6	1	7325101	T'stat High Temp Limiter
7	1	7456000	Harness, Temp & Speed Sensor
8	1	7479400	PCB
9	1	1289200	Relay Vacuum Pump (115V)
9A	1	1289100	Relay Vacuum Pump (230V)
10	1	7826000	Switch, Latch
11	1	7478700	Solenoid, Latch
12	1	4503702	Display
13	1	7118400	Label/Switch Pad
14	1	7452600	Gasket, Lid
15	1	7452500	Lid, Acrylic
16	42.2 inch	7451700	Extrusion
17	2	7452200	Hinge, Bracket Assembly
18	1	1289312	Circuit Breaker (115V)
18A	2	1289306	Circuit Breaker (230V)
19	1	7312400	Vacuum Pump (115V/230V)
20	2	7450200	Jar, Trap
20A	2	7450300	Gasket, Jar, Trap
Not Shown	1	1334500	Power Cord – USA (115V)
Not Shown	1	1338000	Power Cord – USA (230V)
Not Shown	1	1336100	Power Cord – EU (230V)
Not Shown	1	1332600	Power Cord – UK (230V)
Not Shown	1	1332700	Power Cord – China (230V)
21	1	1302300	Switch
22	1	7397601	Coupling Insert
23	1	7441500	Fan



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## Appendix B: CentriVap Dimensions



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# Appendix C:

## CentriVap Specifications

This Appendix contains technical information about the CentriVap including specifications, environmental operating conditions, wiring diagrams and evaporation rates.

### Electrical Specifications

- Nominal amperage for 115V CentriVap (model 7970010) (including vacuum pump): 5A
- Nominal amperage for 230V CentriVap (model 7970011) (including vacuum pump): 3A
- Frequency (all models): 50/60 Hz.
- Phase: Single
- Heater power: 300 watts
- Rotor Speed: Up to 1,725 RPM

### Environmental Conditions

- Indoor use only.
- Maximum altitude: 6562 feet (2000 meters).
- Ambient temperature range: 41° to 104°F (5° to 40°C).
- Maximum relative humidity: 80% for temperatures up to 88°F (31°C), decreasing linearly to 50% relative humidity at 104°F (40°C).
- Main supply voltage fluctuations not to exceed  $\pm 10\%$  of the nominal voltage.
- Transient overvoltages according to Installation Categories II (Overvoltage Categories per IEC 1010). Temporary voltage spikes on the AC input line that may be as high as 1500V for 115V models and 2500V for 230V models are allowed.
- Used in an environment of Pollution degrees 2 (i.e., where normally only non-conductive atmospheres are present). Occasionally, however, a temporary conductivity caused by condensation must be expected, in accordance with IEC 664.

## Evaporation Rates

Solvent	Tube Size (ml)	Number of Samples	Sample Size (ml)	Temp (C)	Time to Dry (min.)	Ballast	Rate Overall (ml/min)
<b>Acetonitrile</b>	1.5	132	1	45	56	Open	2.36
	1.5	132	1	60	41	Open	3.22
	1.5	132	1	75	34	Open	3.88
	1.5	132	1	24	30	Open	5.50
<b>Methanol</b>	1.5	132	1	35	82	Open	1.61
	1.5	132	1	45	65	Open	2.03
	1.5	132	1	60	50	Open	2.64
	1.5	132	1	75	37	Open	3.57
	1.5	132	1	100	28	Open	4.71
<b>Water</b>	1.5	132	1	45	403	Open	0.33
	1.5	132	1	60	260	Open	0.51
	1.5	132	1	75	188	Open	0.70
	1.5	132	1	100	123	Open	1.07
<b>Methylene Chloride</b>	1.5	132	1	45	23	Open	5.74
	1.5	132	1	60	18	Open	7.33
	1.5	132	1	75	14	Open	9.42
	1.5	132	1	100	12	Open	11
<b>Ethanol</b>	1.5	132	1	45	70	Open	1.89
	1.5	132	1	60	48	Open	2.75
	1.5	132	1	75	36	Open	3.67
	1.5	132	1	100	25	Open	5.28