

User's Manual

CentriVap® Mobile Systems

Models

78120-00

78120-01

78120-02

78120-03

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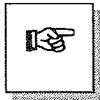
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CHAPTER 1

INTRODUCTION

Congratulations on your purchase of a Labconco CentriVap Mobile Console. Models are available for operation on 115V or 230V.

The CentriVap Mobile Console combines a Concentrator and a Cold Trap in one compact cabinet. The Concentrator uses centrifugal force with heat and vacuum to rapidly evaporate solvents from biological and analytical 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 microprocessor which controls the operation of the heater and the motor provides excellent regulation and reproducibility of protocols. The end of the run can be signaled by a manually preset timer. Nine different protocols can be stored in memory so exact test parameters can be easily repeated.

As an integral part of the Mobile Console, the Cold Trap protects the vacuum pump by trapping moisture, vapors and corrosive fumes as they evaporate from the samples. The CFC free refrigeration system reduces the temperature of the Cold Trap to -55°C . The stainless steel trap is used for aqueous and organic applications. For corrosive applications, the optional Glass Trap insert should be used. The 230V models comply with CE regulations.

About This Manual

This manual is designed to help you learn how to install, use, and maintain your CentriVap Mobile Console. Instructions for performing routine maintenance and making minor modifications to your CentriVap Mobile Console are also included.

Chapter 1: Introduction provides a brief overview of the CentriVap Mobile Console, explains the organization of the manual, and defines the typographical conventions used in the manual.

Chapter 2: Prerequisites explains what you need to do to prepare your site before you install your CentriVap Mobile Console. Electrical and exhaust requirements are discussed.

Chapter 3: Getting Started contains the information you need to properly unpack, inspect and install your CentriVap Mobile Console.

Chapter 4: Using Your CentriVap Mobile Console discusses the basic operation of your CentriVap Mobile Console. Information on how to arrange the samples inside your CentriVap Mobile Console and select an operating cycle is included.

Chapter 5: Maintaining Your CentriVap Mobile Console explains how to perform routine maintenance on your CentriVap Mobile Console.

Chapter 6: Modifying Your CentriVap Mobile Console describes how to install the optional glass lid.

Chapter 7: Troubleshooting contains a table of problems you may encounter while using your CentriVap Mobile Console, including the probable causes of the problems, and suggested corrective actions.

Appendix A: CentriVap Mobile Console Components contains labeled diagrams of the components of the CentriVap Mobile Console.

Appendix B: CentriVap Mobile Console Dimensions contains comprehensive diagrams showing the dimensions for the CentriVap Mobile Console.

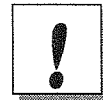
Appendix C: CentriVap Mobile Console Specifications contains product specifications. Wiring diagrams for both the 115V and 230V CentriVap Mobile Console are also included.

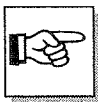
Appendix D: CentriVap Mobile Console Accessories lists the part numbers and descriptions of all of the accessories available for your CentriVap Mobile Console.

Typographical Conventions

Recognizing the following typographical conventions will help you understand and use this manual:

- Book, chapter, and section titles are shown in italic type (e.g., *Chapter 3: Getting Started*).
- Steps required to perform a task are presented in a numbered format.
- Comments located in the margins provide suggestions, reminders, and references.
- Critical information is presented in boldface type in paragraphs that are preceded by the exclamation icon. Failure to comply with the information following an exclamation icon may result in injury to the user or permanent damage to your CentriVap Mobile Console.





- Important information is presented in capitalized type in paragraphs that are preceded by the pointer icon. It is imperative that the information contained in these paragraphs be thoroughly read and understood by the user.

Your Next Step

If your CentriVap Mobile Console needs to be installed, proceed to *Chapter 2: Prerequisites* to ensure your installation site meets all of the requirements. Then, go to *Chapter 3: Getting Started* for instructions on how to install your CentriVap Mobile Console and make all of the necessary connections.

For information on the operational characteristics of your CentriVap Mobile Console, go to *Chapter 4: Using Your CentriVap Mobile Console*.

If your CentriVap Mobile Console is installed and you need to perform routine maintenance on the CentriVap Mobile Console, proceed to *Chapter 5: Maintaining Your CentriVap Mobile Console*.

For information on making modifications to the configuration of your CentriVap Mobile Console go to *Chapter 6: Modifying Your CentriVap Mobile Console*.

Refer to *Chapter 7: Troubleshooting* if you are experiencing problems with your CentriVap Mobile Console.

CHAPTER 2

PREREQUISITES

Before you install your CentriVap Mobile Console, you need to prepare your site for installation. Carefully examine the location where you intend to install your CentriVap Mobile Console. 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.
- the vacuum pump requirements.

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



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

Electrical Requirements

The CentriVap Mobile Console requires a dedicated grounded electrical outlet. This outlet requires a 20 Amp circuit breaker or fuse for models rated at 115V (60 Hz). A 10 Amp circuit breaker or fuse is required for models rated at 230V (50/60 Hz). 115V models are equipped with a 20 Amp NEMA 5/20 plug. 230V models are equipped with a CE (7) VII continental European plug. It may be necessary to install a plug to match the available receptacle.

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 Mobile Console should be located on a solid, level floor close to a fume hood. In all cases, regardless of the solvent used, it is strongly recommended that the vacuum pump is vented into the fume hood. An accessory secondary trap is included 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.

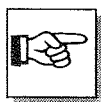
The CentriVap Mobile Console should be located in an area that provides an unobstructed flow of air around the cabinet. This air cools the refrigeration system. Air is drawn in through the sides and exhausts out the back. A minimum of 3" should be allowed between the CentriVap Mobile Console sides and rear, and the adjacent wall surfaces.

Vacuum Pump Requirements

A vacuum pump must be provided by the user. A vacuum pump with a free air flow rate of 113 liters per minute and 0.2×10^{-3} mbar blank off pressure is adequate for aqueous samples. More volatile samples

can be satisfactorily processed using a diaphragm pump with a free airflow of 42 liters per minute and 200 mbar vacuum. The inlet fitting on the vacuum pump must be suitable for 0.50 I.D. hose.

Vacuum pumps used with 115V systems should be equipped with a 115V, 15 Amp NEMA 5-15P plug. Vacuum pumps used with 230V systems should be equipped with a "reverse" IEC 320 plug.



TO INSURE THAT AGGRESSIVE SAMPLES USED IN THE CENTRIVAP DO NOT DAMAGE THE VACUUM PUMP, IT IS RECOMMENDED THAT ALL INTERNAL WETTED PARTS ARE TEFLON®* OR TEFLON COATED.



CAUTION: When selecting the vacuum pump it is very important to consider the flammability of the solvent that will be used. If the solvents are flammable, an explosion proof vacuum pump or one suitable for the solvents to be processed is recommended.

Vacuum Line Traps

When evaporating acids, it is advisable to use the optional Glass Trap Insert in the Cold Trap and to include a soda lime acid secondary trap in the vacuum

*Teflon® is a registered trademark of DuPont

line. This adds additional protection for the pump and the stainless steel Cold Trap.



Several components within the CentriVap Mobile Console are made from stainless steel or aluminum and can be degraded if exposed to acids. Before evaporating acids, be sure to contact Labconco.

A moisture trap, solvent trap and radioisotope trap are also available. Refer to *Appendix D: CentriVap Mobile Console Accessories* for ordering information.

Space Requirements

Refer to *Appendix C: CentriVap Mobile Console Specifications* for dimensional drawings of the CentriVap.

Your Next Step

After you have determined that the location for your CentriVap Mobile Console accommodates the installation and operational requirements, you are ready to unpack and install your CentriVap Mobile Console. Proceed to *Chapter 3: Getting Started*.

CHAPTER 3

GETTING STARTED

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

- unpack and move your CentriVap Mobile Console.
- set up your CentriVap Mobile Console.
- connect the electrical supply source to your CentriVap Mobile Console.
- properly exhaust your CentriVap Mobile Console.
- safely use solvents with your CentriVap Mobile Console.

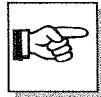


The CentriVap Mobile Console weighs over 153 lbs. (69 Kg). The carton allows for lifting with a mechanical lift truck or hand truck. If you must lift the CentriVap manually, use at least two (2) persons and follow safe lifting guidelines.

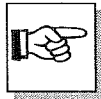
Unpacking Your CentriVap

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

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



DO NOT RETURN GOODS WITHOUT THE PRIOR AUTHORIZATION OF LABCONCO. UNAUTHORIZED RETURNS WILL NOT BE ACCEPTED.



IF YOUR CENTRIVAP MOBILE CONSOLE 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 Mobile Console until you have checked all of the components and installed and tested the CentriVap Mobile Console.

CentriVap Mobile Console Components

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

Catalog #	Product Description
78120-00	CentriVap Mobile Console– 115V
78120-01	CentriVap Mobile Console – 230V
78120-02	CentriVap Mobile Console with Heat Boost – 115V
78120-03	CentriVap Mobile Console with Heat Boost – 230V

Plus the Following:

Part #	Component Description
74692-00	User's Manual
13364-00	Power Cord – 115V or
13365-00	Power Cord – 230V
14888-00	Clamp
74507-00	Rotor
78152-00	Cartridge, Solvent Trap

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

Setting Up Your CentriVap Mobile Console

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

Emergency Access to Into the Chamber

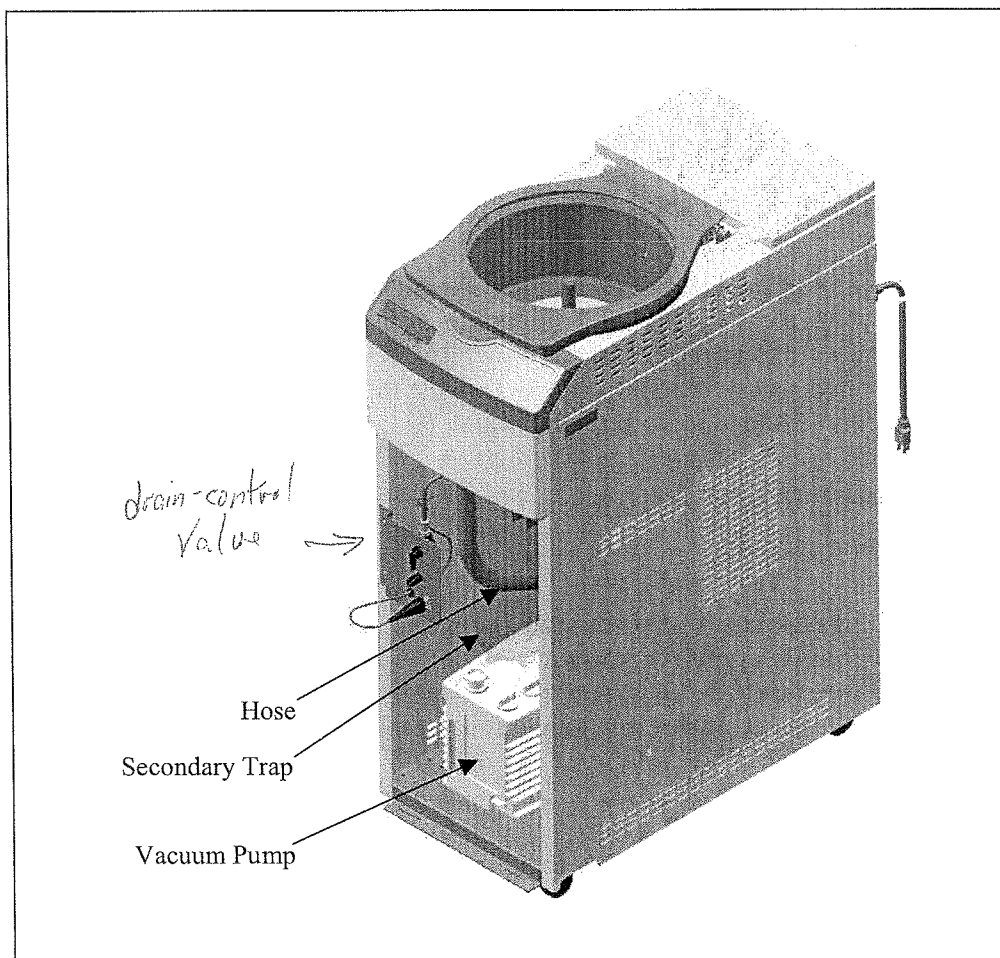
The CentriVap is designed to prevent access to the chamber in the event of a power disruption. If it is necessary to open the lid when there is no electrical power connected to the CentriVap, insert a small screwdriver or similar instrument into the small round hole on the left side of the case near 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.



Never attempt to defeat the latch or open the lid while the CentriVap is running.

Vacuum Pump Installation

The user supplied vacuum pump can be installed inside the cabinet of the CentriVap Mobile Console. To gain access to the pump area, grasp the front lower panel near the top and pull it outward. The vacuum pump should be positioned on the lower shelf of the cabinet. Attach the hose that is hanging from the clear canister to the inlet fitting of the vacuum pump. Clamp the hose securely with the clamp supplied.



Exhaust Port

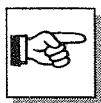
Attach one end of a user supplied hose to the exhaust port on the vacuum pump. Clamp securely. Route the other end to a fume hood or other laboratory ventilation device.

Installing a Secondary Chemical Trap Insert

A secondary chemical trap is included to minimize the exhausting of solvents into the atmosphere. 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. A solvent cartridge is included with the CentriVap Mobile Console. The moisture cartridge is used to trap water vapor. The acid cartridge is used to trap acid 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.



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.

Electrical Connection

Plug the supplied power cord into the receptacle on the back of the CentriVap Mobile Console and plug the other end into a suitable power receptacle. Plug the power cord from the vacuum pump into the receptacle on the back of the CentriVap Mobile Console. If the vacuum pump has an off/on switch, turn the switch on. The vacuum pump will be controlled by the CentriVap Mobile Console.

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.



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

Ground Wire



When draining the CentriVap Cold Trap always attach the grounding clip to the solvent catch pot to eliminate the risk of electrostatic spark ignition.

Solvent Safety Precautions



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. 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.

Solvents used in the CentriVap Mobile Console 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 Mobile Console 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.

Several components of the CentriVap Mobile Console which are located inside the chamber are made of stainless steel which can be attacked by acids. Use of acids such as trifluoroacetic acid can result in

degradation of the product and the vacuum pump. Use care when using aggressive liquids which can damage the CentriVap Mobile Console and thoroughly clean the CentriVap Mobile Console after each use. Contact Labconco before evaporating acids.

WARNING: 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.

Your Next Step

The installation and setup of your CentriVap Mobile Console is now complete. To learn how to load and operate your CentriVap Mobile Console, proceed to *Chapter 4: Using Your CentriVap Mobile Console*. To make a modification to the configuration of your CentriVap Mobile Console, proceed to *Chapter 6: Modifying your CentriVap Mobile Console*. To perform additional diagnostics on your CentriVap Mobile Console, proceed to *Chapter 7: Troubleshooting*. To learn about the maintenance requirements for your CentriVap Mobile Console, proceed to *Chapter 5: Maintaining Your CentriVap Mobile Console*.

CHAPTER 4

USING YOUR

CENTRIVAP MOBILE

CONSOLE

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

- set operating parameters.
- operate the controls.
- properly select and position glassware inside your CentriVap Mobile Console.
- understand the display.
- interrupt a cycle after it has begun.



Do not use the CentriVap Mobile Console in a manner not specified by the manufacturer (refer to *Appendix C: CentriVap Mobile Console Specifications*). The electrical protection properties of the CentriVap Mobile Console may be impaired if the CentriVap Mobile Console is used inappropriately.



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 Mobile Console 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 Mobile Console 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 *Appendix D: CentriVap Mobile Console Accessories* for available rotor sizes.

Loading Glassware Into the CentriVap Mobile Console

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

Heat Setting Guidelines

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

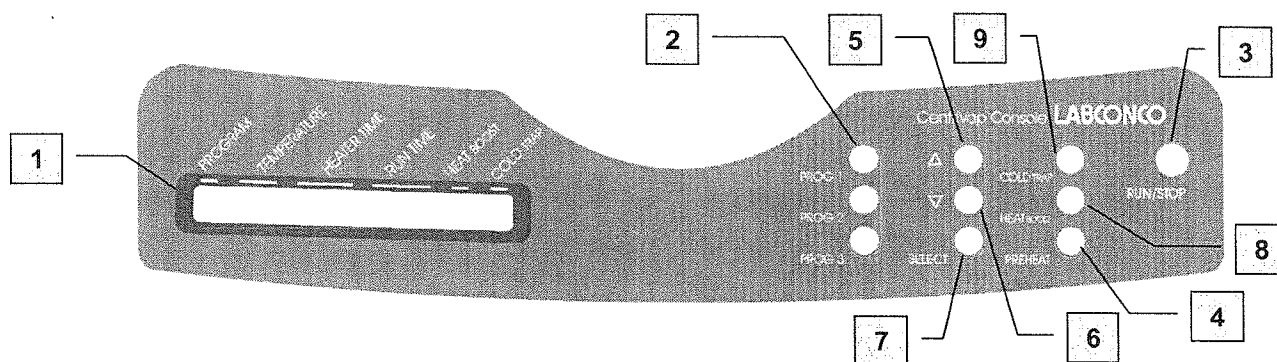
Heat Boost Operation

Some CentriVap Mobile Console models are equipped with a secondary “Heat Boost” heater which is

positioned on the side wall of the chamber near the top. It provides additional heat to the samples to speed evaporation. The “Heat Boost” heater is controlled by the microprocessor to maintain the set point temperature at the bottom of the chamber to prevent excessive overheating of the samples.

CentriVap Mobile Console Controls

The control panel for the CentriVap Mobile Console 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.

8. Heat Boost Button – If the model is so equipped, pressing the button will activate or deactivate the auxiliary Heat Boost heater.
9. Cold Trap Button – Used to start or stop the refrigeration system for the Cold Trap.

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 heat set point:

To change the heat 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 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 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



Never lift the lid if the rotor is moving.

Never attempt to reach into the chamber if the rotor is moving.

Never attempt to defeat the lid latch mechanism.

Do not operate the CentriVap if the lid is scratched or nicked or shows signs of damage.

Never lean on the CentriVap when it is operating.

1. Press the Cold Trap "ON" switch. The "Y" in the display under Cold Trap will flash. When the trap reaches operating temperature, the "Y" will illuminate steady.
2. Select a program or set the set point parameters.
3. Preheat the chamber if desired.
4. Turn on Heat Boost if the CentriVap Mobile Console is so equipped and additional heat is desired.
5. Place samples in vials. Normally the vials should be no more than half full. Place vials in a rotor.
6. Load the rotor with samples into the chamber.
7. Close the lid.
8. 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.
9. 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.
10. If the run time set point is used, at the end of the set time an alarm sounds. All functions cease.
11. Press "STOP" to terminate operation if the CentriVap Mobile Console has not already stopped itself. The Cold Trap will remain on until the Cold Trap button is pushed.
12. When the evaporation is complete, allow the rotor to stop moving, lift the lid and remove the samples.

Operational Notes

As solvent is evaporated in the Concentrator and then condensed in the Cold Trap, it is normal for the Cold Trap temperature to rise as its load increases. Depending on which solvent is used, the volume of the sample and the system operating parameters, the Cold Trap may warm up sufficiently to cause the “READY” indicator to turn off. As the sample reaches completion, the load on the Cold Trap will decrease and its temperature will decrease. The “READY” indicator will once again illuminate.

The LCD display conveys various pieces of information. 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.

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.

CHAPTER 5

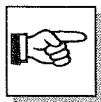
MAINTAINING YOUR CENTRIVAP MOBILE CONSOLE

Under normal operation, the CentriVap Mobile Console requires little maintenance. The following maintenance schedule is recommended:

As needed:

1. Clean up all spills; remove liquids from the chamber. Clean or decontaminate all surfaces using agent 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. Check oil level of the vacuum pump, if applicable. It should be between MIN and MAX. If the oil level is less than an inch (25.4 mm) above MIN, add oil to proper level.
4. If oil shows cloudiness, particles or discoloration, drain the pump and replace with fresh oil.
5. Utilization of acids requires immediate cleaning and neutralization after a run or physical damage to the collection chamber will result.
6. Check the Cold Trap for condensed or frozen solvents and dispose of appropriately. Completely empty the trap before the next run. If solvents are

frozen in the glass trap, run it under cold water immediately after operating.



IF THE ICE HAS MELTED, THE GLASS TRAP INSERT MUST BE EMPTIED BEFORE THE COLD TRAP IS STARTED AGAIN.

7. If the Glass Trap is used, check to see that the ethanol in the stainless steel trap is free of ice or water. Drain the ethanol and replace it with fresh ethanol.
8. 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.

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.

Annually:

1. Every 12 months, or more often, if the Cold Trap is operated in a dusty environment, the refrigeration system condenser of the Cold Trap should be cleaned. Using a vacuum cleaner with brush attachment, clean the condenser to ensure proper airflow for peak performance.

CHAPTER 6

MODIFYING YOUR

CENTRIVAP MOBILE

CONSOLE

The configuration of your CentriVap Mobile Console can be changed to accommodate your needs. If the solvents used in the CentriVap Mobile Console degrade the acrylic lid it may be replaced with an optional glass lid to gain added chemical resistance. To observe the samples while they are processing, an optional strobe light may be installed. Read this chapter to learn how to:

- install a glass lid
- install a CentriZap™ strobe.
- install a glass trap in the Cold Trap chamber.

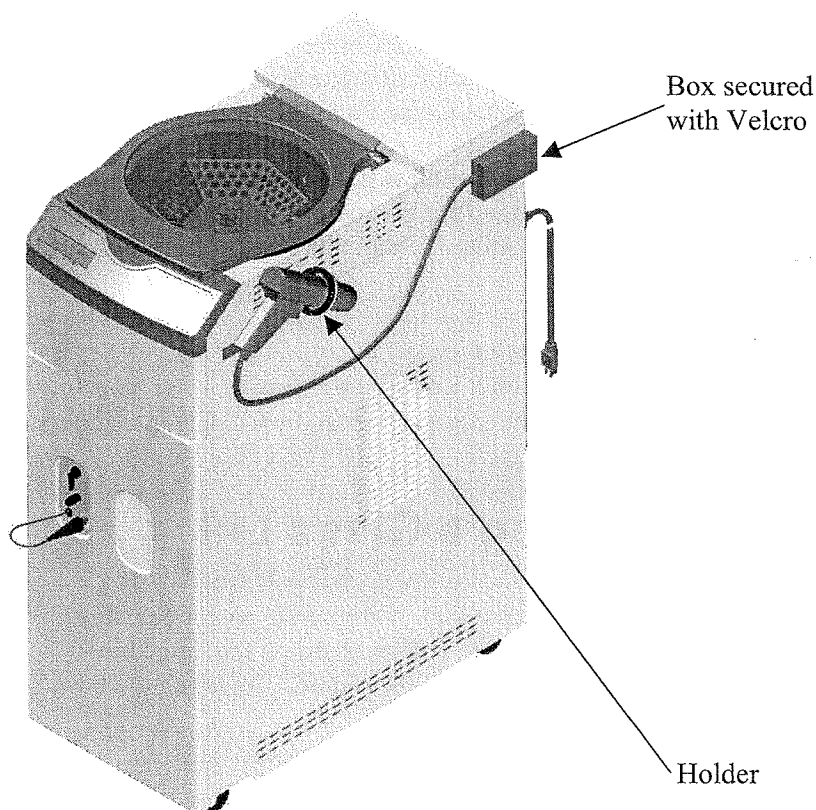
Installing a Glass Lid

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 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. Peel the protective backing off the enclosed Velcro® and attach it to the side of the Concentrator. 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.

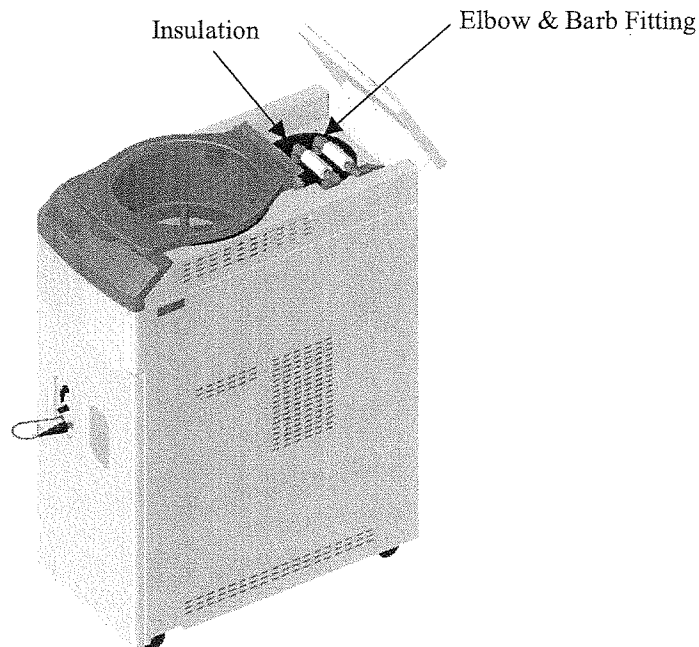


Installing a Glass Trap in the Cold Trap

An accessory Glass Trap is available for use in the Cold Trap for use when corrosive chemicals are used that could attack the stainless steel chamber of the Cold Trap. Remove the Cold Trap cover assembly by pulling the barb fittings out of the hose. Insert the new hose barb fittings with elbows into the hoses. Be certain that the drain valve is close by. Place the Glass Trap inside the stainless steel trap. Add ethyl alcohol to the stainless steel trap until the Glass Trap is at least two-thirds immersed. Fit the Glass Trap insulation tightly around the top opening of the stainless steel trap to hold the Glass Trap securely in place. Push the elbow fittings onto the stems of the glass trap.



AFTER A RUN, IF THE ICE IN THE GLASS TRAP HAS MELTED, THE TRAP MUST BE EMPTIED BEFORE THE COLD TRAP IS STARTED AGAIN.



CHAPTER 7

TROUBLESHOOTING

Refer to the following if your CentriVap Mobile Console 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.

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.
MOTOR ERROR	Defective motor	Replace motor.
	Hall effect sensor failure	Replace sensor.
	Wire failure	Replace wire.

Other corrective actions for potential problems are as follows:

PROBLEM	CAUSE	CORRECTIVE ACTION
Unit will not operate	Unit not connected to electrical power	Connect unit to proper electrical receptacle.
	Circuit breaker blown	Correct electrical problem and reset circuit breaker by pressing button.
	Lid open	Close lid.
Excessive vibration	Sample tubes not located symmetrically in rotor	Reposition sample tubes.
Sample odor in lab	Vent hose exhausting into lab area	Redirect hose to fume hood.
Evaporation rate is reduced	Heater inoperable	Contact Labconco.
	Vacuum pump failure	Check pump.
	Obstruction in hose	Remove obstruction or replace hose.
	Lack of adequate vacuum	See below.
No vacuum poor vacuum	Pump not on	Turn on pump.
	Control valve open	Check control valve.
	Leaks in lines or connectors or gasket	Locate and repair.
	Foreign material on lid gasket	Clean gasket and lid.
	Pump is not functioning properly	Check pump by locating vacuum gauge closer to pump and close off rest of system. Check pump oil for cloudiness or particles and change. If pump is faulty, seek authorized service or replace pump.
	Cold Trap or Concentrator gasket is not sealing properly	Check gasket for cleanliness. Adjust gasket as needed.

PROBLEM	CAUSE	CORRECTIVE ACTION
No vacuum poor vacuum (cont.)	Secondary Trap Cannister not fitted properly	Tighten all connections to and from the Secondary Trap Cannister.
	Secondary Trap Insert is spent	Replace with new insert.
	New Secondary Trap has moisture in it	Run vacuum pump for 24 hours to remove moisture.
Recovery of condensate in Cold Trap is less than normally expected	Cold Trap is not ON	Check to make sure switch is ON and condensing unit fan is moving air out of the rear of the cabinet.
	Cold Trap does not cool down	Turn vacuum pump OFF and allow Cold Trap to cool for at least 30 min. to reach temperature. -55°C temperature can be checked with a solvent thermometer or digital thermometer.
Frequent oil change needed in pump	Secondary Trap insert is spent	Change insert often.
	Cold Trap is not emptied after each run and dried	Empty the traps (glass or stainless steel) after each run and replace.
	Vacuum too strong for chemical	Use a Secondary Trap insert and diaphragm pump.

Chapter 7: Troubleshooting

APPENDIX A

CENTRIVAP MOBILE

CONSOLE

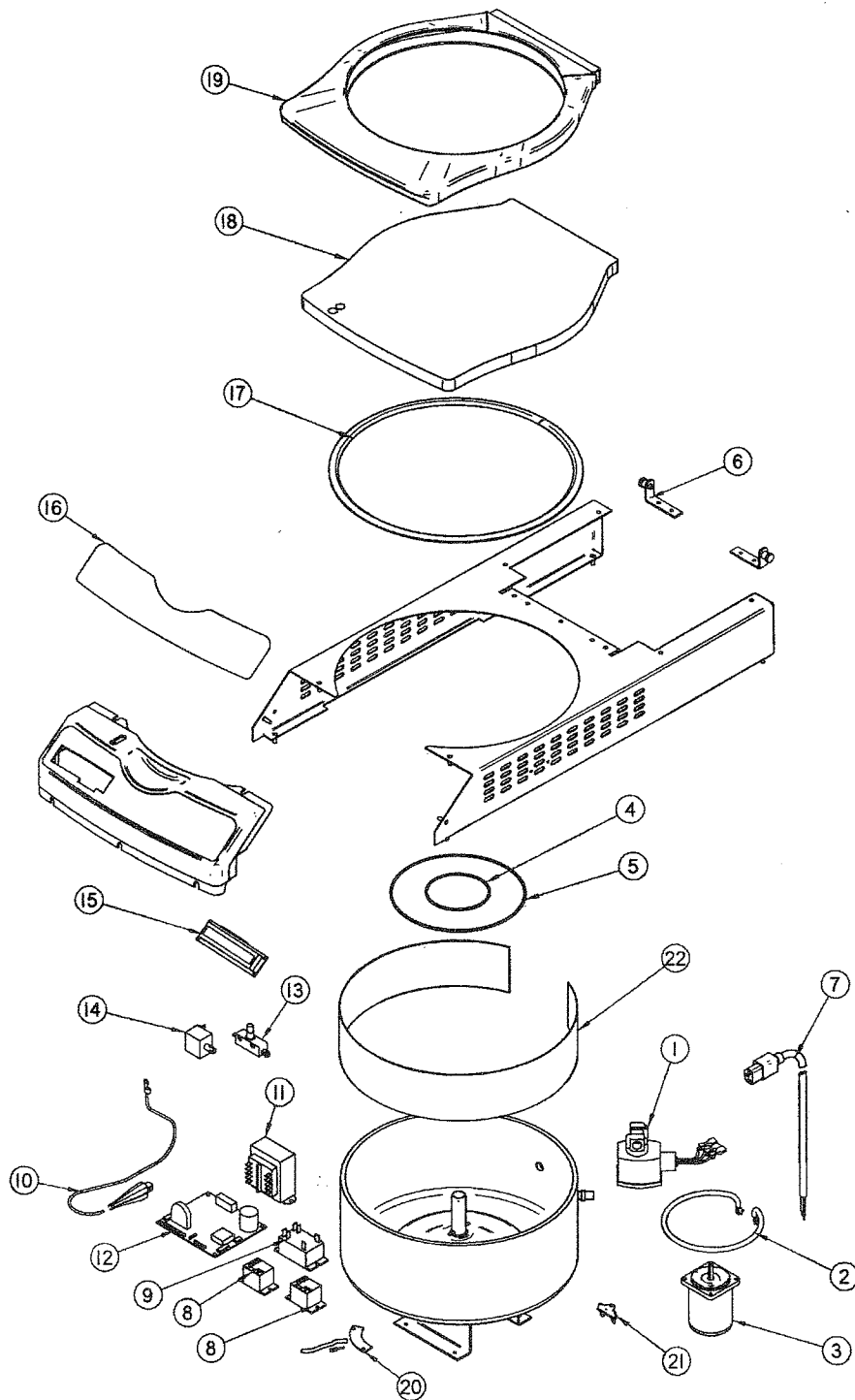
COMPONENTS

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

CentriVap Concentrator Components

Item	Quantity	Part No. (115V)	Part No. (230V)	Description
1	1	7481700	7481701	Valve, Vacuum Break
2	1	7453500	7453501	Heater
3	1	7459000	7459000	Motor w/ Capacitor
4	1	1647105	1647105	O-Ring, Inner
5	1	1647106	1647106	O-Ring, Outer
6	2	7452200	7452200	Hinge Bracket Assembly
7	1	1336400	1336500	Power Cord
8	AR	1289200	1289200	Relay
9	1	--	1289100	Relay – 30 Amp
10	1	7880900	7880900	Wire Assembly Ground
11	1	7456900	7456900	Transformer
12	1	7479400	7479400	PCB
13	1	7826000	7826000	Switch, Latch
14	1	7478700	7478700	Solenoid, Latch
15	1	7403701	7403701	Display
16	1	7455500	7455500	Label/Switch Pad
16A	1	7455600	7455600	Label/Switch Pad with Heat Boost
17	42.4 inch	7451700	7451700	Extrusion
18	1	7452500	7452500	Lid, Acrylic
19	1	7452600	7452600	Gasket, Lid
20	1	7456000	7456000	Harness – Temp & Speed Sensor
21	1	7975902	7975902	Fuse – High Temp Limiter
22	1	7460600	7460601	Heater Boost

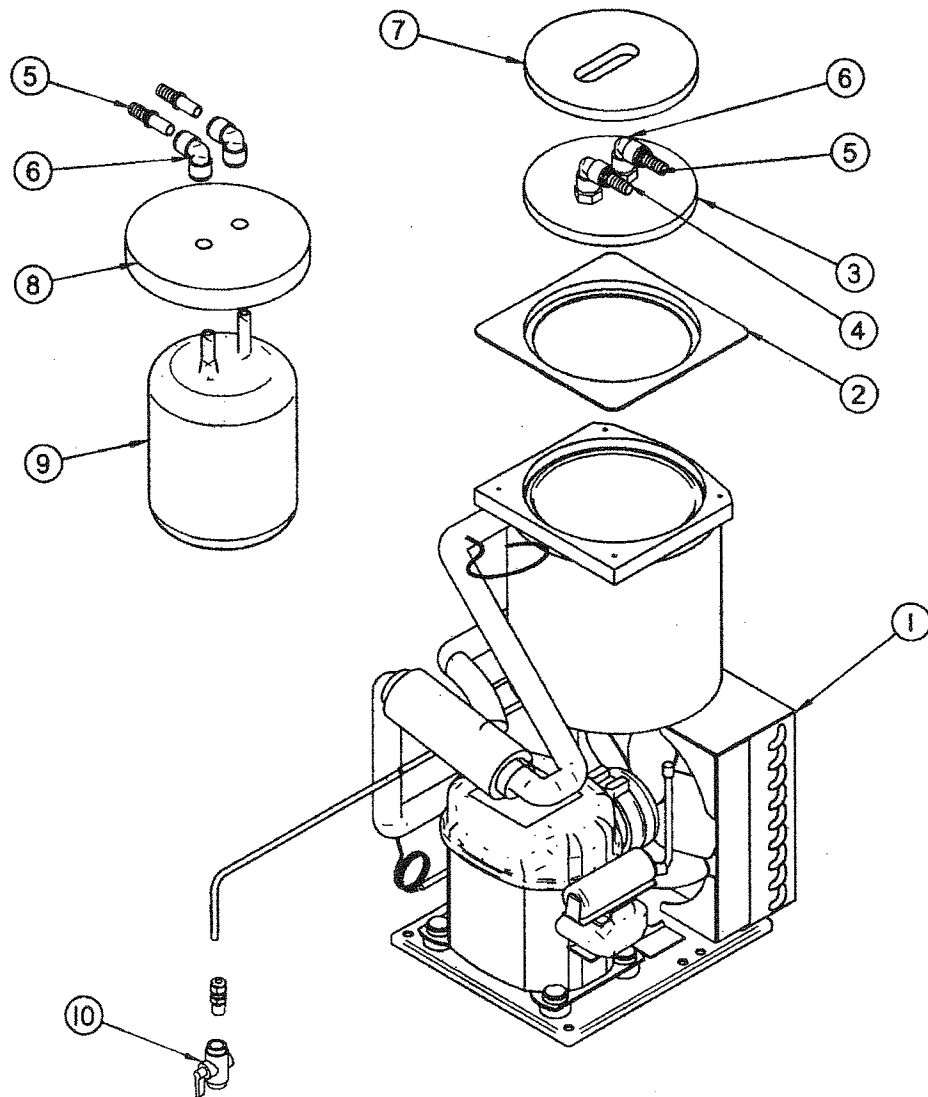
Appendix A: CentriVap Mobile Console Components



CentriVap Cold Trap Components

Item	Quantity	Part No.	Description
1	1	7469000	Module Assembly (115V)
1A	1	7469001	Module Assembly (230V)
2	1	7871000	Gasket – Cover
3	1	7873500	Cover Assembly
4	2	1584603	Stem Adapter
5	2	1584101	Stem
6	2	1544501	Elbow
7	1	7981400	Insulation – Lid Assembly
8	1	7873200	Insulation – Glass Trap
9	1	7871500	Glass Trap
10	1	1360500	Valve

Appendix A: CentriVap Mobile Console Components



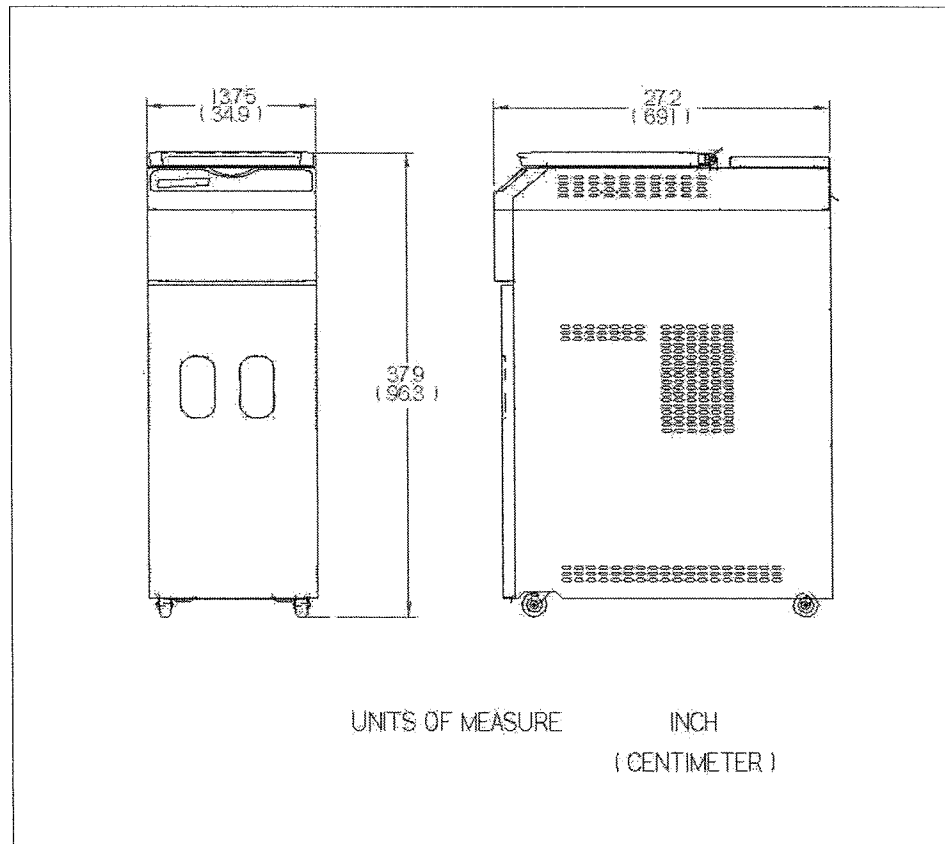
Appendix A: CentriVap Mobile Console Components

APPENDIX B

CENTRI VAP MOBILE

CONSOLE

DIMENSIONS



Appendix B: CentriVap Mobile Console Dimensions

APPENDIX C

CENTRIVAP MOBILE

CONSOLE

SPECIFICATIONS

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

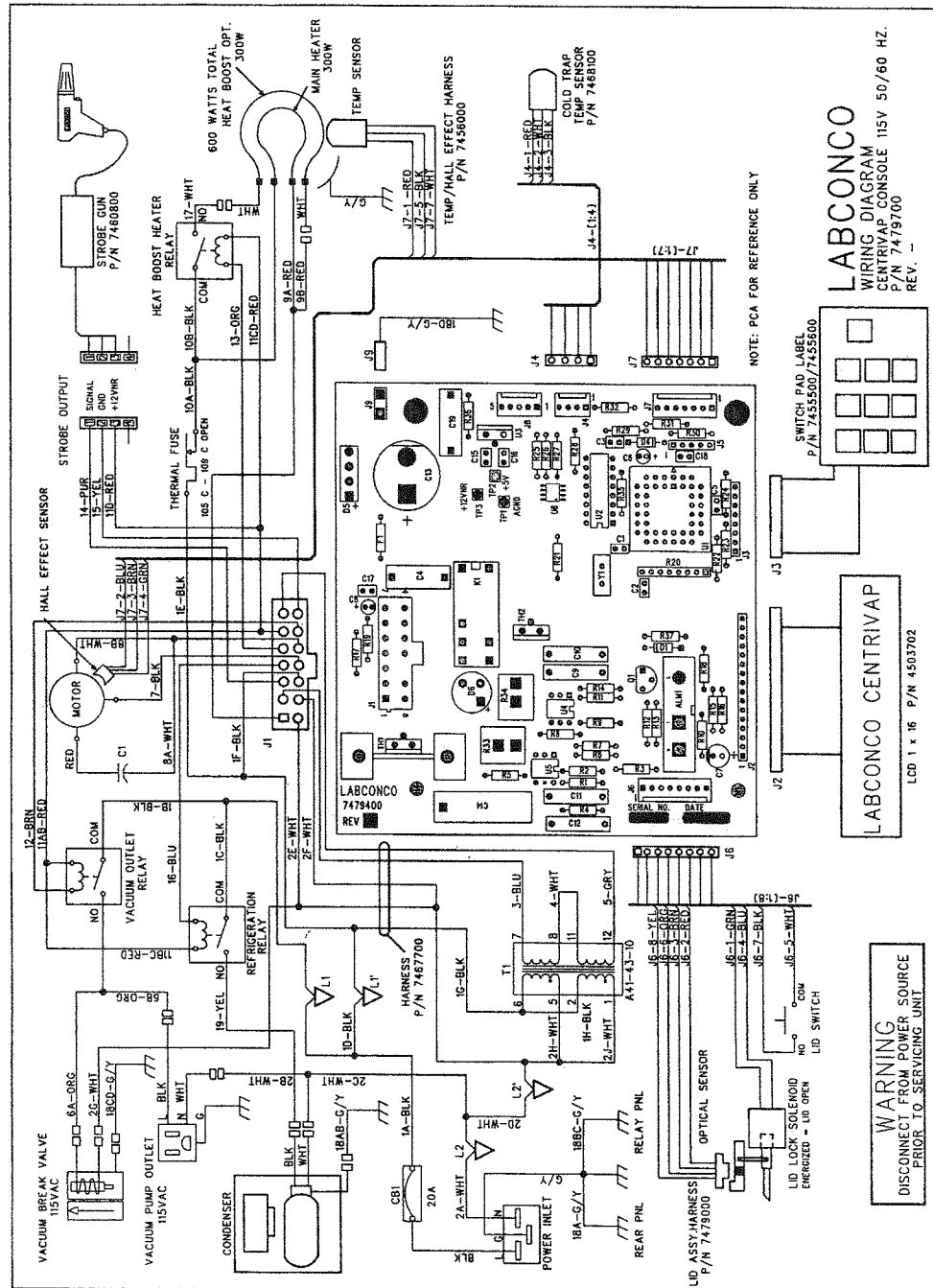
Electrical Specifications

- Nominal amperage for 115V CentriVap (model 78120-00) (excluding vacuum pump): 5.6A
- Nominal amperage for 230V CentriVap (model 78120-01) (excluding vacuum pump): 2.8A
- Nominal amperage for 115V CentriVap (model 78120-02) (excluding vacuum pump): 8.2A
- Nominal amperage for 230V CentriVap (model 78120-03) (excluding vacuum pump): 4.1A
- Frequency (all models): 50/60 Hz
- Phase: Single
- Heater power: 300 watts – Main heater
- Heater power: 300 watts – Heat boost

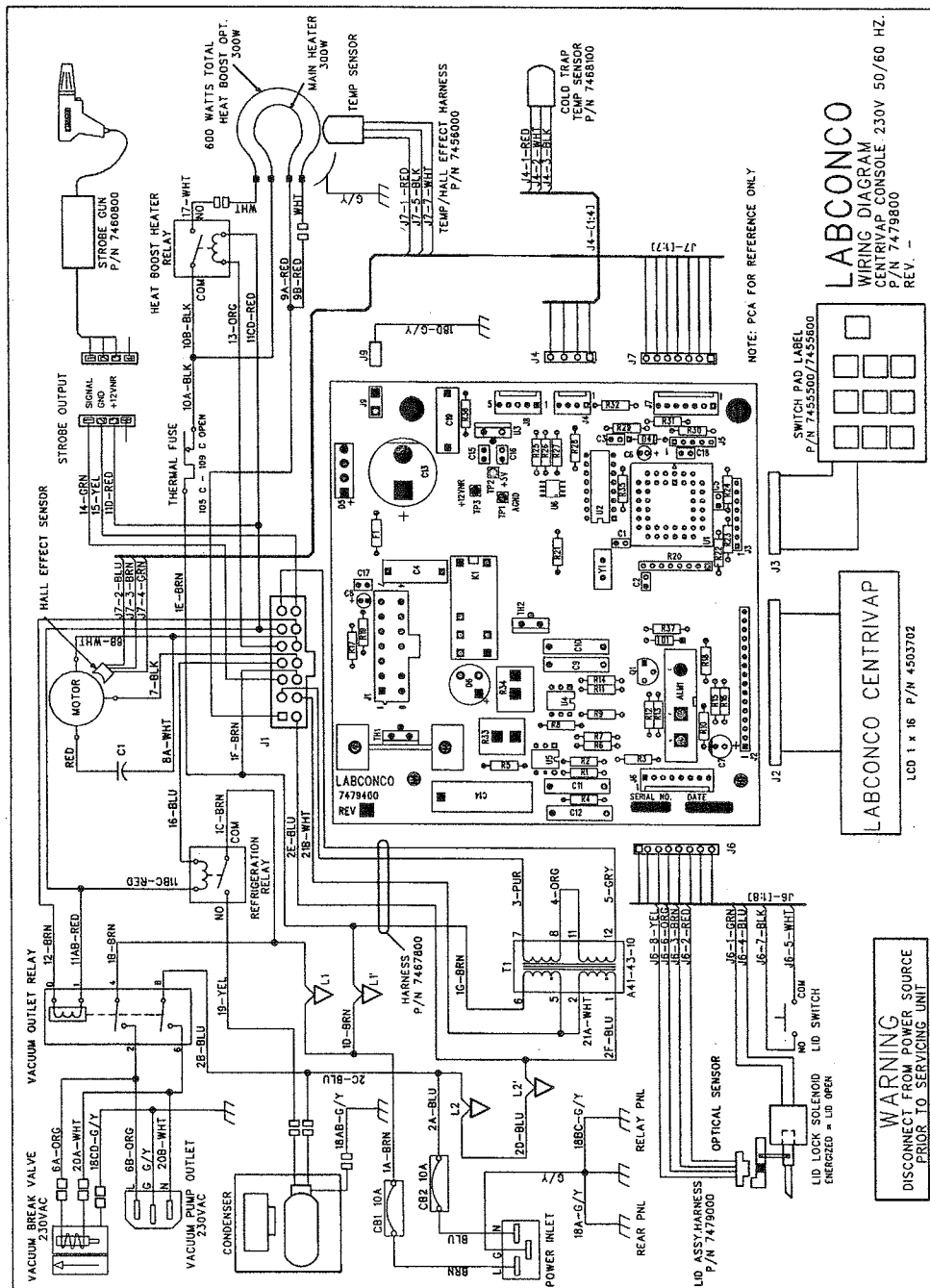
Environmental Conditions

- 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.

Wiring Diagram (115V Model)



Wiring Diagram (230V Model)



Evaporation Rates

Methylene Chloride bp 40

<i>Tube Size (ml)</i>	<i>Number of Samples</i>	<i>Sample Size (ml)</i>	<i>Heater Temp (C)</i>	<i>Heat Boost</i>	<i>Vacuum Pump</i>	<i>Time to Dry (min)</i>	<i>Cold Trap</i>	<i>Rate Overall (ml/min)</i>
50	12	25	45	off	Diaphragm	80	no	3.75
50	12	25	45	on	Diaphragm	78	no	3.85
15	18	10	45	off	Diaphragm	45	no	4.00
15	18	10	45	on	Diaphragm	45	no	4.00

Toluene bp 111

50	12	25	45	off	Diaphragm	204	no	1.47
50	12	25	45	on	Diaphragm	187	no	1.60
50	12	25	100	off	Diaphragm	96	no	3.13
50	12	25	100	on	Diaphragm	66	no	4.55
15	18	10	45	off	Diaphragm	119	no	1.51
15	18	10	45	on	Diaphragm	99	no	1.82
15	18	10	100	off	Diaphragm	42	no	4.29
15	18	10	400	on	Diaphragm	34	no	5.29

Acetonitrile bp 82

50	12	25	45	off	Diaphragm	184	no	1.63
50	12	25	45	on	Diaphragm	181	no	1.66
50	12	25	100	off	Diaphragm	81	no	3.70
50	12	25	100	on	Diaphragm	77	no	3.90
15	18	10	45	off	Diaphragm	106	no	1.70
15	18	10	100	off	Diaphragm	52	no	3.46
15	18	10	100	on	Diaphragm	45	no	4.00
1.5	132	1	45	off	Diaphragm	55	no	2.40
1.5	90	1	45	off	Diaphragm	47	no	1.92
1.5	132	1	60	off	Diaphragm	37	no	3.57
1.5	132	1	75	off	Diaphragm	33	no	5.74
1.5	132	1	100	off	Diaphragm	21	no	6.29
1.5	132	1	100	on	Diaphragm	17	no	7.76

Methanol bp 65

50	12	25	45	off	Diaphragm	233	no	1.29
15	18	10	45	off	Diaphragm	141	no	1.28
1.5	132	1	35	off	Diaphragm	88	no	1.50
1.5	132	1	45	off	Diaphragm	64	no	2.06
1.5	132	1	60	off	Diaphragm	50	no	2.64
1.5	90	1	75	off	Diaphragm	38	no	2.37
1.5	132	1	75	off	Diaphragm	39	no	3.38
1.5	132	1	100	off	Diaphragm	25	no	5.28
1.5	132	1	100	on	Diaphragm	22	no	6.00

Appendix C: CentriVap Mobile Console Specifications

Water bp 100

<i>Tube Size (ml)</i>	<i>Number of Samples</i>	<i>Sample Size (ml)</i>	<i>Heater Temp (C)</i>	<i>Heat Boost</i>	<i>Vacuum Pump</i>	<i>Time to Dry (min)</i>	<i>Cold Trap</i>	<i>Rate Overall (ml/min)</i>
50	12	25	45	off	Diaphragm	1397	no	0.21
50	12	25	100	off	Diaphragm	445	no	0.67
50	12	25	100	on	Diaphragm	430	no	0.70
15	18	10	45	off	Diaphragm	841	no	0.19
1.5	132	1	45	off	Diaphragm	427	no	0.30
1.5	132	1	60	off	Diaphragm	303	no	0.44
1.5	132	1	75	off	Diaphragm	196	no	0.67
1.5	132	1	100	off	Diaphragm	117	no	1.13
1.5	132	1	100	on	Diaphragm	108	no	1.22
50	12	25	45	off	rotary vane	1002	yes	0.30
50	12	25	100	off	rotary vane	424	yes	0.70
50	12	25	100	on	rotary vane	373	yes	0.80
15	18	10	45	off	rotary vane	565	yes	0.32
15	18	10	60	off	rotary vane	456	yes	0.39
1.5	132	1	45	off	rotary vane	299	yes	0.44
1.5	132	1	75	off	rotary vane	207	yes	0.64
1.5	132	1	100	off	rotary vane	131	yes	1.01
1.5	132	1	100	on	rotary vane	122	yes	1.08

Vacuum Pumps:

Diaphragm – Rated at 12 mbar ultimate vacuum and 34 L/min displacement

Rotary vane – Rated at 2.0×10^{-3} mbar ultimate vacuum and 195 L/min displacement

Chamber preheated prior to each run to run temp.

APPENDIX D

CENTRIVAP MOBILE

CONSOLE

ACCESSORIES

The following accessories are available for the CentriVap Mobile Console.

PART #	DESCRIPTION
74629-00	Rotor (DNA) Holds (72) 0.5 ml microcentrifuge tubes or (60) 1.5 ml microcentrifuge tubes or (60) 2.0 ml microcentrifuge tubes
74507-00	Rotor (1.5 ml) Holds (132) 1.5 ml microcentrifuge tubes or (132) 2.0 ml microcentrifuge tubes
74550-00	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 100 mm tubes or (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

Appendix D: CentriVap Mobile Console Accessories

PART #	DESCRIPTION
74551-00	Rotor (12 mm) Holds (40) 1.5 ml microcentrifuge tubes or (40) 2.0 ml microcentrifuge tubes or (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
74552-00	Rotor (50 ml) Holds (32) 1.5 ml microcentrifuge tubes or (32) 2.0 ml microcentrifuge tubes or (12) 28 x 115 mm conical tubes or (12) 28 x 135 mm conical tubes or (12) 28 x 140 mm conical tubes
74619-00	Rotor (96 well plate) Holds (4) Standard 96 well plates or (2) Deep well 96 well plates
78148-00	Acid Trap Insert
78149-00	Moisture Trap Insert
78150-00	Radiochemical Trap Insert
78152-00	Solvent Trap Insert
74566-01	Glass Lid for Concentrator – Direct replacement for standard equipment acrylic lid. For use with chemicals that could craze acrylic.

Appendix D: CentriVap Mobile Console Accessories

PART #	DESCRIPTION
74643-00	Strobe Light – For observing samples while the rotor is spinning.
14721-00	Direct Drive Vacuum Pump – 117 liters/minute pumping capacity with gas ballast. Ultimate pressure 1.3×10^{-4} mBar. 115 VAC, 60 Hz, single phase, 4.6 amp
14677-00	Direct Drive Vacuum Pump – 195 liters/minute capacity with gas ballast. Ultimate pressure 1.3×10^{-4} mBar. 115 VAC, 60 Hz, single phase, 7.8 amp
77394-02	Direct Drive Vacuum Pump – 117 liters/minute. Same as 14721-00 except 220/208-230 VAC, 50/60 Hz, single phase, 2.4 amp operation
77394-03	Direct Drive Vacuum Pump – 195 liters/minute. Same as 14677-00 except 220/208-230 VAC, 50/60 Hz, single phase, 4.0 amp operation
79141-00	Diaphragm Vacuum Pump – Corrosion resistant, 115V, 60 Hz, 3.3 amps, single phase, 42 liters/minute, 23.8 in. Hg vacuum (For use with nonflammable solvents only)
79141-01	Diaphragm Vacuum Pump – Corrosion resistant, 220V, 50 Hz, 1.5 amps, single phase, 35 liters/minute, 23.8 in. Hg vacuum (For use with nonflammable solvents only)
79171-00	Diaphragm Vacuum Pump – Corrosion resistant, 115V, 60 Hz, 10.8 amps, single phase, 88 liters/minute, 29 in. Hg vacuum (For use with nonflammable solvents only)
79171-01	Diaphragm Vacuum Pump – Corrosion resistant, 230V, 50 Hz, 4.5 amps, single phase, 74 liters/minute, 29 in. Hg vacuum (For use with nonflammable solvents only)

Appendix D: CentriVap Mobile Console Accessories

PART #	DESCRIPTION
79248-00	Diaphragm Vacuum Pump – Corrosion resistant, explosion proof motor, 23.8 in. Hg Vacuum, 115V, 60 Hz, 5.8 amps, single phase, 42 liters/minute
79248-01	Diaphragm Vacuum Pump – Corrosion resistant, explosion proof motor, 23.8 in. Hg Vacuum, 220V, 50 Hz, 3.1 amps, single phase, 36 liters/minute
79249-00	Diaphragm Vacuum Pump – Corrosion resistant, explosion proof motor, 29 in. Hg Vacuum, 115V, 60 Hz, 5.8 amps, single phase, 88 liters/minute
79249-01	Diaphragm Vacuum Pump – Corrosion resistant, explosion proof motor, 29 in. Hg Vacuum, 220V, 50 Hz, 3.1 amps, single phase, 74 liters/minute
14723-00	Vacuum Pump Exhaust Filter – Installs on pumps PN 14721-00, 14677-00, 77394-02 and 77394-03 to eliminate oil mist from the exhaust
75221-00	Two Place Freeze Dry Manifold – Manifold has 1/2" neoprene valves and is used for freeze drying small volume samples
79782-00	Auxiliary Port – Attaches to Cold Trap allowing connection of other laboratory equipment
78734-00	Glass Trap Insert – Provides protection to the Cold Trap when evaporating acids.

DECLARATION OF CONFORMITY

Application Council Directive(s): 73/23/EEC, 89/336/EEC

Standard(s) to which conformity is declared: EN60950, EN55014, EN55104

Manufacturer's Name: Labconco Corporation

Manufacturer's Address: 8811 Prospect Avenue
Kansas City, MO 64132 USA

Importer's Name: See Shipping/Customs Documents*

Importer's Address: See Shipping/Customs Documents for your equipment

Type of Equipment: Laboratory Equipment

Model No.: Centrivap DNA System 79700-01
Centrivap Benchtop Concentrator 78100-01, 78100-03
Centrivap Cold Trap 78110-01, 74600-01
Centrivap Mobile Console 78120-01, 78120-03

Serial No.: Various – See Individual Declaration

Year of Manufacture: 2000 and Subsequent

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

See individual Declaration of Conformity which
will be signed by the importer for your country.

Place:

(Signature)

Date:

(Full Name)

(Position)

*An individual version of this declaration is included with your shipping/customs documentation.

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