Instructions For Use

Allegra V-15R Centrifuge

PN C63130AF
June 2022

Beckman Coulter, Inc.
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Brea, CA 92821 U.S.A.

BECKMAN COULTER

Allegra V-15R
Instructions for Use
PN C63130AF (June 2022)

Contact Us
If you have any questions, contact our Customer Support Center.

- Worldwide, find us via our website at www.beckman.com/support/technical
- In the USA and Canada, call us at 1-800-369-0333.
- In Austria, call us at 0810 300484
- In Germany, call us at 02151 333999
- In Sweden, call us at +46 (0)8 564 859 14
- In the Netherlands, call us at +31 348 799 815
- In France, call us at 0825838306 6
- In the UK, call us at +44 845 600 1345
- In Ireland, call us at +353 (01) 4073082
- In Italy, call us at +39 0295392 456
- In other locales, contact your local Beckman Coulter Representative.

May be covered by one or more pat. - see www.beckman.com/patents.

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Glossary of Symbols is available at beckman.com/techdocs (PN C24689).

Original Instructions

Revision History

This document applies to the latest software listed and higher versions. When a subsequent software version changes the information in this document, a new issue will be released to the Beckman Coulter website. For updates, go to beckman.com/techdocs and download the most recent manual or system help for your instrument.

Initial Issue C63130AA, 08/2021
Software Version 043

Issue AB, 10/2021
Changes or additions were made to the following: UKCA symbol and address added to Copyright page (inside cover page); Revision History, Software Version; Safety Notice, Safety and Regulatory Symbols, Safety Symbols Used for Allegra V-15R Centrifuge; CHAPTER 1, System Description, Table 1.2 Specifications.

Issue AC, 01/2022
Changes or additions were made to the following: CHAPTER 1, System Description, Table 1.2, Specifications; CHAPTER 2, Operation, Enabling and Disabling ECO Mode; CHAPTER 2, Operation, Deceleration; CHAPTER 3, Troubleshooting Procedures, Table 3.1, Diagnostic Error Codes and Messages Chart; APPENDIX A, Unpacking and Installation, Space and Location Requirements.

Issue AD, 02/2022
Changes or additions were made to the following: Safety Notice, Mechanical Safety; CHAPTER 2, Operation, Installing the Rotor; CHAPTER 4, Centrifuge Maintenance, Instrument Care, Cleaning.

Issue AE, 04/2022
Changes or additions were made to the following:

Safety Notice, Mechanical Safety.

Introduction, Intended Use; Conventions, Typographic Conventions.

CHAPTER 1: System Description, Centrifuge Principle, Function and Safety Features, Centrifuge Function; Centrifuge Chassis, Drive; Controls and Indicators, Control Panel; Specifications, Table 1.2, Specifications; Available Rotors, Table 1.3, Available Rotors for Allegra V-15R.

CHAPTER 4: Centrifuge Maintenance, Supply List, Replacement Parts.

Issue AF, 06/2022
Changes or additions were made to the following:

Safety Notice, Electrical Safety, High Voltage; Safety Notice, Mechanical Safety.

CHAPTER 1: System Description, Specifications, Table 1.2, Specifications.

CHAPTER 2: Operation, Installing the Rotor; Manual Run; Manual Run, Speed, Hold Run, Run Time Clock, Temperature, Precooling, Program “Rapid Temp”, Pulse Run, Door, AutoOpen, Buzzer; Programmed Run, Loading and Running a Saved Program.

CHAPTER 3: Troubleshooting Procedures, Table 3.1, Diagnostic Error Codes and Messages Chart, Table 3.2, Troubleshooting Chart

CHAPTER 4: Centrifuge Maintenance, Instrument Care, Centrifuge Maintenance, Plastic Accessories.

APPENDIX A: Unpacking and Installation, Space and Location Requirements; Unpacking, Removing Transport Safety Device; Electrical Requirements.

APPENDIX B: Storage and Transport, Transport Safety Device, Installation.

APPENDIX C: Acceleration and Deceleration Profiles, Table C.1, Allegra V-15R Acceleration and Deceleration Profiles.

Note: Changes that are part of the most recent revision are indicated in text by a bar in the left margin of the amended page.

Safety Notice

Read all product manuals before attempting to operate instrument. Do not attempt to perform any procedure before carefully reading all instructions. Always follow product labeling and manufacturer's recommendations. If in doubt as to how to proceed in any situation, contact us.

Beckman Coulter, Inc. urges its customers and employees to comply with all national health and safety standards such as the use of barrier protection. This may include, but is not limited to, protective eyewear, gloves, and suitable laboratory attire when operating or maintaining this or any other automated laboratory instrumentation. Wear Personal Protective Equipment (PPE) such as gloves, eye shields, and lab coats when performing any procedure. To avoid injury, observe and follow all the warnings and cautions throughout this manual.

⚠ WARNING

If the equipment is used in a manner not specified by Beckman Coulter, Inc., the protection provided by the equipment may be impaired.

Alerts for Danger, Warning, Caution, and Note

All Dangers, Warnings, and Cautions in this document include an exclamation point, framed within a triangle.

The exclamation point symbol is an international symbol which serves as a reminder that all safety instructions should be read and understood before installation, use, maintenance, and servicing are attempted.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury and/or mechanical damage.

NOTE NOTE is used to call attention to notable information that should be followed during installation, use, or servicing of this equipment.

Safety During Installation and/or Maintenance

⚠ WARNING

Risk of personal injury or equipment damage. The Allegra V-15R centrifuge weighs 110 kg (243 lb). Do not attempt to lift or move it without assistance. Follow your safety officer's instructions regarding lifting heavy objects.

⚠ WARNING

Risk of injury or equipment damage. Vapors from flammable reagents or combustible fluids could enter the centrifuge air system and be ignited by the motor. Do not use the centrifuge near areas of flammable liquids or vapors, and do not run such materials in the instrument.

Perform only the maintenance described in this manual for the Allegra V-15R centrifuge. Maintenance other than that specified in this manual should be performed only by a Beckman Coulter Representative.

IMPORTANT It is your responsibility to decontaminate components of the instrument before requesting service by a Beckman Coulter Representative or returning parts to Beckman Coulter for repair. Beckman Coulter will NOT accept any items which have not been decontaminated where it is appropriate to do so. If any parts are returned, they must be enclosed in a sealed plastic bag stating that the contents are safe to handle and are not contaminated.

Any servicing of this equipment that requires removal of any covers can expose parts that involve the risk of electric shock or personal injury. Make sure that the power switch is off and the centrifuge is disconnected from the main power source by removing the power plug from the outlet receptacle, and refer such servicing to qualified personnel.

Do not replace any centrifuge components with parts not specified for use on this instrument.

Instrument Safety Precautions

⚠ WARNING

Risk of operator injury if:

- **All doors, covers and panels are not closed and/or secured in place prior to and during instrument operation.**
- **The integrity of safety interlocks and sensors is compromised.**
- **Instrument alarms and error messages are not acknowledged and acted upon.**
- **You contact moving parts.**
- **You mishandle broken parts.**
- **Doors, covers and panels are not opened, closed, removed and/or replaced with care.**

- **Improper tools are used for troubleshooting.**
- **Castors (wheels) on the cart (if used) are not locked in place.**

To avoid injury:

- **Keep doors, covers and panels closed and/or secured in place while the instrument is in use.**
- **Take full advantage of the safety features of the instrument. Do not defeat safety interlocks and sensors.**
- **Acknowledge and act upon instrument alarms and error messages.**
- **Keep away from moving parts.**
- **Report any broken parts to your Beckman Coulter Representative.**
- **Open/remove and close/replace doors, covers and panels with care.**
- **Use the proper tools when troubleshooting.**
- **Castors on the cart, if used, must be locked prior to use.**

⚠ CAUTION

System integrity could be compromised and operational failures could occur if this equipment is used in a manner other than specified. Operate the instrument as instructed in the Product Manuals.

⚠ CAUTION

If you purchased this product from anyone other than Beckman Coulter or an authorized Beckman Coulter distributor, and if it is not presently under a Beckman Coulter Service Maintenance Agreement, Beckman Coulter cannot guarantee that the product is fitted with the most current mandatory engineering revisions or that you will receive the most current information bulletins concerning the product. If you purchased this product from a third party and would like further information concerning this topic, contact us.

Cleaning

⚠ WARNING

Risk of personal injury or contamination. Prior to cleaning equipment that has been exposed to hazardous material, contact the appropriate chemical and biological safety personnel. Always use the appropriate Personal Protective Equipment (PPE) when cleaning the centrifuge.

Observe the cleaning procedures outlined for the Allegra V-15R centrifuge in this manual. Prior to cleaning equipment that has been exposed to hazardous material, we recommend that you:

- Contact the appropriate Chemical and Biological Safety personnel.
- Review the Chemical and Biological Safety information in the user's manual.

Electrical Safety

High Voltage

To prevent electrically related injuries and property damage, properly inspect all electrical equipment prior to use and immediately report any electrical deficiencies. Contact a Beckman Coulter Representative for any servicing of equipment requiring the removal of covers or panels.

DANGER

To reduce the risk of electrical shock, the instrument uses a three-wire electrical cord and plug to connect it to earth-ground. Make sure that the matching wall outlet receptacle is properly wired and earth-grounded.

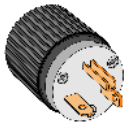
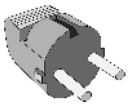
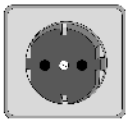
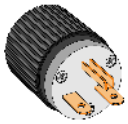
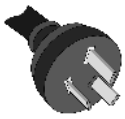
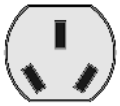
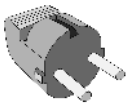
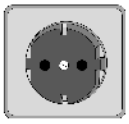
- **Check that the line voltage agrees with the voltage listed on the name-rating plate affixed to the centrifuge.**
- **Never use a three-to-two wire plug adapter.**
- **Never use a two-wire extension cord or a two-wire non-grounding type of multiple-outlet receptacle strip.**
- **Do not place containers holding liquid on or near the chamber door. If spilled, liquid may get into the centrifuge and damage electrical components.**
- **The power line cord, for the Allegra V-15R, is the disconnecting device used to remove electrical power. Make sure there is adequate clearance around the centrifuge in order to reach the line cord.**
- **To ensure safety, the centrifuge should be wired to a remote emergency switch (preferably outside the room where the centrifuge is housed, or adjacent to the exit from that room) in order to disconnect the centrifuge from the main power source in case of a malfunction.**

To reduce the risk of electrical shock, this centrifuge comes with a 2.5-m (8-ft) three-wire electrical cord and plug to connect the centrifuge to earth-ground.

IMPORTANT Whenever possible, use the power cord supplied with the instrument.

In cases where the appropriate power cord is not included, a power cord that meets local electrical and safety requirements must be obtained.

Electrical Plugs and Outlets Suitable for Allegra V-15R

Part Number	Instrument Rating	Suitable Cord Plug	Suitable Cord Outlet
C63124, C63125	120 VAC, 60 Hz, 16A		
C63126, C63127	220-240, 50 Hz, 9.5A		
C63128, C63129	200 VAC, 50/60 Hz, 10.8A 208 VAC, 60 Hz, 10.3A		
C63161, C63190	220-240 VAC, 50 Hz, 9.5A		
C63186, C63187	220 VAC, 60 Hz, 10.3A		

Additional electrical specifications can be found in *Specifications*.

IMPORTANT If there is any question about voltage, have a qualified facility person measure it under load while the drive is operating.

IMPORTANT Mean power supply fluctuations are not to exceed +/-10% of the nominal supply voltage.

Safety Against Risk of Fire

⚠ WARNING

Risk of personal injury or equipment damage. This centrifuge is not designed for use with materials capable of developing flammable or explosive vapors or hazardous chemical reactions. Do not centrifuge such materials (such as chloroform or ethyl alcohol) in this centrifuge nor handle or store them within the 30-cm (1-ft) area surrounding the centrifuge.

Mechanical Safety

This device is intended for indoor use only. Safety protection may be impaired if used in a manner not specified by the manufacturer.

⚠ WARNING

Risk of personal injury. The gas dampers provide support for the centrifuge door. Regularly check that the centrifuge door remains in its fully opened position until it is manually closed. Worn gas dampers will cause the door to fall. Gas dampers must be replaced immediately when they no longer are able to hold the door in its fully opened position. To prevent injury, gas dampers should be replaced every 3 years.

⚠ WARNING

Risk of personal injury or equipment damage. For safe operation of the equipment, observe the following:

- **Use only the rotors and accessories designed for use in this centrifuge.**
- **Before starting the centrifuge, make sure that the rotor tie-down screw is securely fastened.**
- **Do not exceed the maximum rated speed of the rotor in use.**
- **NEVER attempt to slow or stop the rotor by hand.**
- **Do not lift or move the centrifuge while the rotor is spinning.**
- **NEVER attempt to override door interlock system while the rotor is spinning.**
- **Maintain a 30-cm (1-ft.) clearance envelope around the centrifuge while it is running. During operation you should come within the envelope only to adjust instrument controls, if necessary.**
- **Never bring any flammable substances within the 30-cm (1-ft) area surrounding the centrifuge.**
- **Never lean on the centrifuge or place items on it while it is operating.**
- **If using the optional Allegra V-15R Mobile Cart, the castors must be locked prior to use.**

Chemical and Biological Safety

⚠ WARNING

Risk of chemical injury from bleach. To avoid contact with the bleach, use barrier protection, including protective eyewear, gloves, and suitable laboratory attire. Refer to the Safety Data Sheet for details about chemical exposure before using the chemical.

If a hazardous substance such as blood is spilled on or in the instrument, rotors, or accessories, clean up the spill by using a high-quality, fragrance-free, gel-free bleach (5 to 6% solution of sodium hypochlorite - available chlorine) or ethanol solution, or use your laboratory decontamination solution. Then follow your laboratory procedure for disposal of hazardous materials. If the instrument, rotors, or accessories need to be decontaminated, contact us.

Normal operation may involve the use of solutions and test samples that are pathogenic, toxic, or radioactive. Such materials should not be used in this centrifuge unless *all necessary safety precautions are taken.*

- Observe all cautionary information printed on the original solution containers prior to their use.
- Handle body fluids with care because they can transmit disease. No known test offers complete assurance that they are free of micro-organisms. Some of the most virulent — Hepatitis (B and C) and HIV (I–V) viruses, atypical mycobacteria, and certain systemic fungi — further emphasize the need for aerosol protection. Handle other infectious samples according to good laboratory procedures and methods to prevent spread of disease. Because spills may generate aerosols, observe proper safety precautions for aerosol containment.
- Use universal precautions when working with pathogenic materials. Means must be available to decontaminate the instrument and to dispose of biohazardous waste.
- Do not run toxic, pathogenic, or radioactive materials in this centrifuge without taking appropriate safety precautions. Biosafe containment should be used when Risk Group II materials (as identified in the World Health Organization *Laboratory Biosafety Manual*) are handled; materials of a higher group require more than one level of protection.
- Dispose of all waste solutions according to environmental health and safety guidelines.

It is your responsibility to decontaminate the centrifuge and accessories before requesting service by Beckman Coulter.

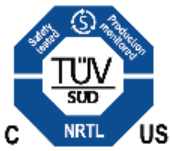
Safety and Regulatory Symbols

Safety symbols alert you to potentially dangerous conditions. The symbols apply to specific procedures and appear as needed.

Safety Symbols Used for Allegra V-15R Centrifuge

Symbol/ Regulatory Mark	Title of Symbol/ Regulatory Mark	Standard Reference	Meaning of Symbol from Standard
	**Recycling Symbol** WEEE Wheeled Bin Symbol	N/A	The symbol of a crossed-out wheeled bin on the product is required in accordance with the Waste Electrical and Electronic Equipment (WEEE) Directive of the European Union. The presence of this marking on the product indicates **1.** the device was put on the European market after August 13, 2005 and **2.** that the device is not to be disposed via the municipal waste collection system of any member state of the European Union. For products under the requirement of WEEE directive, please contact your dealer or local Beckman Coulter office for the proper decontamination information and take-back program which will facilitate the proper collection, treatment, recovery, recycling, and safe disposal of device. **For the Japan market:** This system is considered an industrial waste, subject to special controls for infectious waste. Before disposal of the system, refer to the Waste Disposal and Public Cleaning Law for compliance procedures.
	**Caution**	ISO 7000[a]; 0434A	To indicate that caution is necessary when operating the device or control close to where the symbol is placed, or to indicate that the current situation needs operator awareness or operator action in order to avoid undesirable consequences.

Safety Symbols Used for Allegra V-15R Centrifuge *(Continued)*

Symbol/ Regulatory Mark	Title of Symbol/ Regulatory Mark	Standard Reference	Meaning of Symbol from Standard
	**Biological Hazard**	ISO 7010[b]; W009	This symbol is used to warn of the potentiality of a virus or toxin biological hazard.
	**RoHS Caution Symbol**	People's Republic of China Electronic Industry Standard SJ/T11364-2006	This label indicates that the electronic information product contains certain toxic or hazardous substances. The center number is the Environmentally Friendly Use Period (EFUP) date, and indicates the number of calendar years the product can be in operation. Upon the expiration of the EFUP, the product must be immediately recycled. The circling arrows indicate the product is recyclable. The date code on the label or product indicates the date of manufacture.
	**CE Mark**	N/A	A "CE" mark indicates that a product has been assessed before being placed on the market, and has been found to meet European Union safety, health, and/or environmental protection requirements
	**TUV Certification Mark**	N/A	This mark indicates North American product certification by TUV SUD which is a Nationally Recognized Testing Laboratory (NRTL). The product has been evaluated to ensure that it has met the relevant product safety requirements.
	**RCM Mark**	N/A	The "RCM" (Regulatory Compliance Mark) is depicted as a triangle with a partial circle and check. The mark is applied to products that comply with the EMC requirements of the Australian Communications Media Authority (ACMA) for use in Australia and New Zealand.
	**UKCA Mark**	N/A	A "UKCA" mark indicates that a product has been assessed before being placed in UK market, and has been found to meet UK safety, health, and/or environmental protection requirements.

Safety Symbols Used for Allegra V-15R Centrifuge *(Continued)*

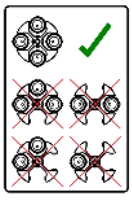
Symbol/ Regulatory Mark	Title of Symbol/ Regulatory Mark	Standard Reference	Meaning of Symbol from Standard
	On (Power)	IEC 60417-5007 (2009-02)	This symbol is used to indicate where power is turned on for the instrument.
	**Off (Power)**	IEC 60417-5008 (2009-02)	This symbol is used to indicate where power is turned off for the instrument.
	**Heavy Object 2 People Needed**	N/A	This symbol warns that an object is too heavy for one person to lift.
	**Packaging Recycle**	N/A	This symbol indicates the cardboard packaging is recyclable.

a. ISO 7000, Graphical symbols for use on equipment – Registered symbols
b. ISO 7010, Graphical symbols – Registered safety sign

Additional Instrument Labels and Symbols

The following labels and symbols can also be found on the Allegra V-15R centrifuge.

Allegra V-15R Centrifuge Labels[a]

Name	Label	Meaning
Rotation Symbol		Indicates the direction of the spin of the rotor. For the Allegra V-15R centrifuge, the rotor rotation is counterclockwise.
Beckman Coulter		The company name.
Consult Operating Manual		There is an instrument manual that should be read.
Rotor Loading		Safety indication for rotor loading.

a. Other instrument labels can be found in the *Glossary of Symbols*, available at www.beckman.com/techdocs (PN C24689)

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Introduction

Certification

Beckman Coulter Allegra V-15R Centrifuges are manufactured in a facility that maintains certifications to both ISO 9001 and ISO 13485. Each centrifuge has been designed and tested to be compliant (when used with Beckman Coulter rotors) with the laboratory equipment requirements of applicable regulatory agencies. Declarations of conformity and certificates of compliance are available at www.beckman.com.

Scope of Manual

This manual is designed to familiarize you with the Beckman Coulter Allegra V-15R refrigerated centrifuge, its functions, specifications, operation, and routine operator care and maintenance. Beckman Coulter recommends that you read this entire manual, especially the *Safety Notice* and all safety-related information, before operating this centrifuge or performing maintenance.

NOTE If the centrifuge is used in a manner other than specified in this manual, the safety and performance of this equipment could be impaired. Further, the use of any equipment other than that recommended by Beckman Coulter has not been evaluated for safety. Use of any equipment not specifically recommended in this manual and/or the applicable rotor manual is the sole responsibility of the user.

- CHAPTER 1, *System Description* contains system specifications and a brief physical and functional description of the centrifuge, including the operating controls and indicators.
- CHAPTER 2, *Operation* contains centrifuge operating procedures.
- CHAPTER 3, *Troubleshooting Procedures* lists diagnostic messages and other possible malfunctions, together with probable causes and suggested corrective actions.
- CHAPTER 4, *Centrifuge Maintenance* contains procedures for routine operator care and maintenance, as well as a brief list of supplies and replacement parts.
- APPENDIX A, *Unpacking and Installation* provides information on unpacking the centrifuge, and the centrifuge installation requirements in order to prepare laboratory facilities for installation of the centrifuge.
- APPENDIX B, *Storage and Transport* provides storage requirements for the Allegra V-15R centrifuge, and information on preparing the centrifuge for shipping.
- APPENDIX C, *Acceleration and Deceleration Profiles* provides information about the acceleration and deceleration profiles used by the Allegra V-15R centrifuge.

Conventions

Certain symbols are used in this manual to call out safety-related and other important information. These international symbols may also be displayed on the centrifuge and are reproduced in *Glossary of Symbols* (PN C24689).

Typographic Conventions

Certain typographic conventions are used throughout this manual to distinguish names of user interface components, such as keys and displays.

- Button Icon names (such as **START** or **DOOR**) appear as boldface capital letters.
- Function and option selections seen within the display (such as **Speed** or **Time**) are in boldface.
- The directional path to a specific function or option within a function appears with three periods (...) between succeeding functions and options within functions. An example to set the rotor speed to 3900 would be:  ... (Set) **Speed** ...  ...  (3900) ...  .
- Links to information in another part of the document are in blue. To access the linked information, click to navigate the blue (hyperlink) text.

CFC-Free Centrifugation

To ensure minimal environmental impact, no CFCs are used in the manufacture or operation of Allegra V-15R refrigerated centrifuges.

Electromagnetic Compatibility (EMC) Compliance

This device complies with the emissions and immunity requirements as specified in the EN/IEC 61326 series of Product Family Standards for a “basic electromagnetic environment.” Such equipment is supplied directly at low voltage from public mains network. This equipment is not intended for residential use.

This device generates, uses, and can radiate unintentional radio-frequency (RF) energy. If this device is not installed and operated correctly, this RF energy can cause interference with other equipment. It is the responsibility of the end user to be sure that a compatible electromagnetic environment for the device can be maintained so that the device operates as intended.

In addition, other equipment can radiate RF energy to which this device is sensitive. If one suspects interference between this device and other equipment, Beckman Coulter recommends the following actions to correct the interference:

- Evaluate the electromagnetic environment before installation and operation of this device.
- Do not operate this device close to sources of strong electromagnetic radiation (for example: unshielded intentional RF sources), as these can interfere with proper operation. Examples of

unshielded intentional radiators are handheld radio transmitters, cordless phones, and cellular phones.

- Do not place this device near medical electrical equipment that can be susceptible to malfunctions caused by close-proximity to electromagnetic fields.
- This device has been designed and tested to CISPR 11, Class A emission limits. In a domestic environment, this device can cause radio interference, in which case, you need to take measures to mitigate the interference.

CHAPTER 1

System Description

Introduction

This chapter provides a brief physical and functional description of Beckman Coulter Allegra V-15R refrigerated centrifuges. The operating controls and indicators are also described. Instructions for using the controls and indicators are in CHAPTER 2, *Operation*. *Chemical compatibilities of materials listed in this manual can be found in the publication "Chemical Resistances" (publication IN-175).*

Refer to the Allegra V-15R Rotors Instructions For Use (PN C63132) for rotor descriptions.

Sections in this chapter include:

Centrifuge Principle, Function and Safety Features

Centrifugation Principle

Centrifugation is a process for the separation of heterogeneous mixtures of substances (suspensions, emulsions, or gas mixtures) into their components. The mixture of substances, which rotates on a circular path, is subject to centrifugal acceleration that is several times greater than the gravitational acceleration.

Centrifuges use the mass inertia inside the rotor chamber for separating the substances. Due to their higher inertia, particles or media with a higher density travel outwards. In doing so, they displace the components with a lower density, which in turn travel towards the center.

The centrifugal acceleration of an object inside a centrifuge, along with the effect of centrifugal force, depends on the following: the distance between the object and the axis of rotation, and the angular velocity. It increases linearly as a function of the distance with regard to the axis of rotation, and quadratically as a function of the angular velocity. The bigger the radius in the rotor chamber along with increases in the speed, produces higher the centrifugal acceleration. This however, also increases the forces acting on the rotor.

Centrifuge Function

The Beckman Coulter Allegra V-15R refrigerated centrifuge (Figure 1.1) is a benchtop centrifuge that can be used for the separation of components through the use of relative centrifugal force.

Figure 1.1 Allegra V-15R Centrifuge

When used with the Allegra V-15R rotors designed for use in this centrifuge, applications this centrifuge can perform include:

- Routine processing such as sample preparations, pelleting, extractions, purifications, concentrations, phase separations, receptor binding, and column centrifugations.
- Cell isolation.
- Binding studies and separation of whole blood.
- Processing large numbers of small-volume samples in multiwell plates for concentrating tissue-culture cells, cloning and replicate studies, cytotoxicity studies, receptor binding, genetic engineering experimentation, high-throughput processing, and serial dilutions of small liquid volumes.
- Rapid sedimentation of protein precipitates, large particles, and cell debris.

The Allegra V-15R refrigerated centrifuges are microprocessor-controlled, providing interactive operation. The instrument design features an asynchronous three-phase direct-drive motor that is brushless for quiet operation, automatic rotor identification system, program memory that enables repeated run conditions, and a choice of acceleration and deceleration profiles. The Allegra V-15R features a temperature control system as well. Audible and visual indicators alert the operator to conditions that may need attention.

Safety Features

The Allegra V-15R refrigerated centrifuge has been designed and tested to operate safely indoors at altitudes up to 2000 m (6562 ft). Safety features include the following.

- An electromechanical door lock system prevents operator contact with spinning rotors and prevents run initiation unless the door is properly shut and locked. The door is locked when a run is in progress, and can be opened only after the rotor has stopped by pressing the **DOOR** 

button. If there is a power failure, the door can be manually unlocked for sample recovery (see CHAPTER 3, *Troubleshooting Procedures*).
- A steel barrier surrounds the rotor chamber to provide full operator protection.

- A rotor model identification system prevents the installed rotor from running above its maximum rated speed. During acceleration the microprocessor checks that the identified rotor is supported. Speed is limited to the maximum safe speed of the identified rotor. If the system determines that the set speed exceeds the maximum rated speed of the rotor, the system displays an error message and reduces the speed to the maximum allowable speed of the rotor.

IMPORTANT The automatic rotor identification system will also activate if it detects a different rotor than the rotor that is set. Refer to CHAPTER 2, *Automatic Rotor Identification System*.

- An imbalance detector monitors the rotor during the run, causing automatic shutdown if rotor loads are severely out of balance. At low speeds, an incorrectly loaded rotor can cause imbalance. Rotor instability can also occur if the centrifuge is moved while running, or if it is not resting on a level and secure surface.

  During acceleration, Imbalance may be displayed temporarily as the rotor accelerates through its critical speed range. When an out of balance event occurs, an error code will be displayed and the run will be stopped (see CHAPTER 3, *Troubleshooting Procedures*).
- The centrifuge feet, made of rubber, have been designed to minimize possible rotation in the event of a rotor mishap.

Centrifuge Chassis

Housing

The centrifuge housing is made of sheet steel, finished with urethane paint. The control panel is covered by a protective overlay made of structured polyester. The control panel provides the user control interface and displays system information and alerts.

Door

The door is made of a solid sheet of steel, and is secured to the housing by solid hinges. A window in the center allows strobe viewing. When the door is closed, the locking system engages.

An electromechanical door lock system prevents operator contact with spinning rotors, and prevents run initiation unless the door is shut and latched. The door is locked when a run is in progress and can be opened only when the rotor is stopped. When the rotor has stopped, the **DOOR**  button will be illuminated indicating that it can be pressed to open the door. If there is a power failure, the door lock can be manually released for sample recovery (see CHAPTER 3, *Troubleshooting Procedures*).

Rotor Chamber

The rotor chamber is made of stainless steel and is sealed by a foam gasket.

Temperature Sensing and Control

With the power on, the temperature control system is activated when the door is closed and locked. A sensor in the rotor chamber continuously monitors chamber temperature. The micro controller adjusts the chamber temperature to the temperature entered by the user. The temperature can be set between –10 and +40°C.

NOTE To avoid chamber icing, refrigeration is off when the door is open. The centrifuge door must be closed and gently pressed down until it locks before the refrigeration system will begin to operate.

ECO Mode

ECO mode will disable the temperature control system after a time selected by the user, reducing energy consumption. ECO mode can be set in 30-minute increments up to 8 hours maximum. See CHAPTER 2, *ECO Mode* for information on using ECO Mode.

Drive

The asynchronous direct-drive motor is brushless for a clean, quiet operation. A tie-down screw is used to attach the rotor to the drive shaft. The resilient suspension ensures that loads will not be disturbed by vibration, and prevents damage to the drive shaft if an imbalance occurs during centrifugation. Maximum acceleration and deceleration may be selected to allow fast processing of samples. Alternately, delicate gradients may be preserved using slower acceleration and deceleration.

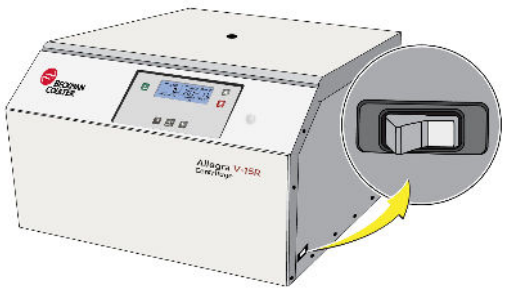
Controls and Indicators

Power Switch

The power switch, located on the right side of centrifuge (see Figure 1.2), controls electrical power to the centrifuge. It is also a circuit breaker that will trip to cut off power in the event of a power overload. The power switch must be turned on before the chamber door can be opened or closed.

IMPORTANT If there is a need to retrieve a sample from the centrifuge during a power failure, see CHAPTER 3, *Retrieving Your Sample in Case of a Power Failure*.

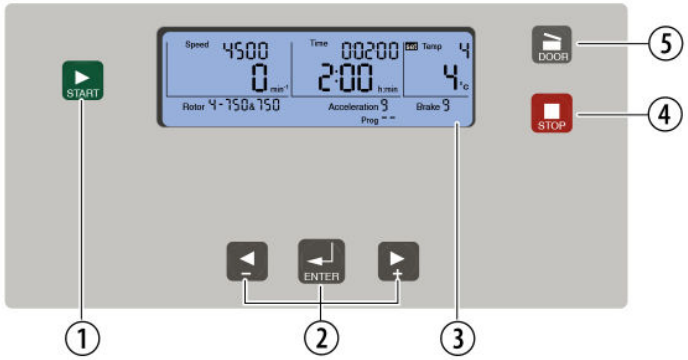
Figure 1.2 Power Switch Location



Control Panel

The control panel (Figure 1.3) is mounted at an angle on the centrifuge front for easy visibility and access. It is used to enter run parameters via the display screen, and to display run parameters, program information, and user messages. The centrifuge is operated by **Start**, **Stop**, and **Door** buttons that have integrated light-emitting diodes, two directional buttons, and an enter/select button. The various functions of the system can be accessed by using the two directional buttons and pressing the enter/select button.

Figure 1.3 Control Panel



1. Start button
2. Directional and Enter/Select Controls
3. Display
4. Stop button
5. Door button

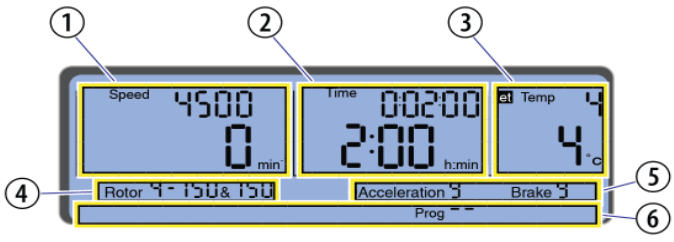
Display Screen

The instrument settings and status are presented on the instrument display (Figure 1.4). The screen is segmented into separate areas that display different aspects of a run, such as speed, time, and temperature settings. Each option within the display screen interface is explained in CHAPTER 2, *Operation*.

Display Fields, Functions Displayed, and Control Panel Buttons

Fields within the display show the current status of the instrument. Control Panel buttons are used to help operate the instrument.

Figure 1.4 Display Fields



1. Speed/RCF field
2. Time field
3. Temperature field
4. Rotor/Bucket field
5. Accel/Decel field
6. Options fields

Table 1.1 Status Fields and Buttons

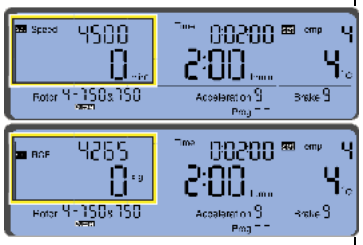
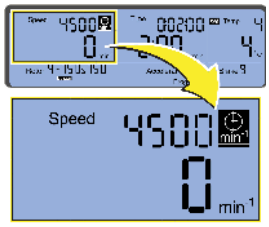
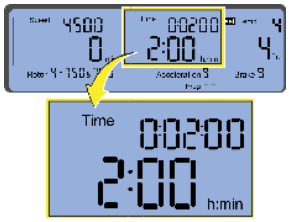
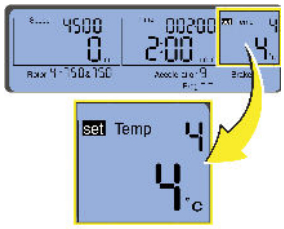
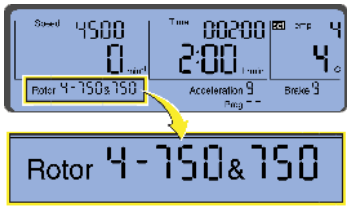
SPEED		The set speed of the centrifuge is displayed in the upper area of the Speed/RCF field. Either "Speed" (which is rpm) or "RCF" will be displayed. The actual speed value is displayed directly below. • If **Speed** is displayed, the rotor speed is shown in revolutions per minute (rpm), designated on the display by min^{-1}. **NOTE** The letters **RPM** are not displayed; instead, **min^{-1}** will be displayed for RPM (min^{-1} = rpm). • If **RCF** is displayed, the rotor speed is shown in relative centrifugal force (designated as x g). See Speed in CHAPTER 2, Operation for additional details.
RUN TIME CLOCK		When the clock icon (located in the upper-right corner of the Speed field) is enabled, run time starts when the rotor reaches set speed. Otherwise, it starts at the beginning of the run. If the clock icon is shown, it is enabled. See Run Time Clock in CHAPTER 2, Operation for additional details.
TIME		The set time is displayed in the upper section of this field, with the remaining or elapsed time (depending on the mode selected) shown below. Refer to Time in Table 1.2, Specifications for additional details on hours/minutes/seconds.
TEMPERATURE		The set temperature value is displayed in the upper area of the field and the actual sample temperature is displayed in the lower area. Temperatures between -10 °C and +40 °C can be preselected. See Temperature in CHAPTER 2, Operation for additional details.
ROTOR		This field is used to select the rotor before the run and display the rotor that was detected by the instrument. For rotors with several compatible buckets, the supported buckets will be sequentially displayed. Refer to Rotor Selection in CHAPTER 2, Operation for additional information about selecting rotors and buckets. **NOTE** The rotor selection can only be changed when the centrifuge is at a stop.

Table 1.1 Status Fields and Buttons *(Continued)*

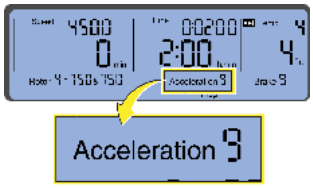
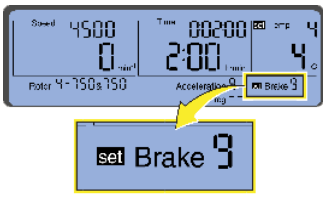
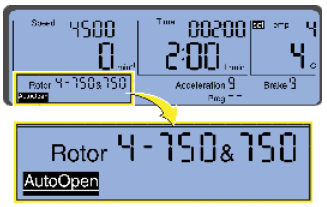
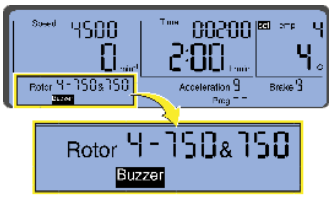
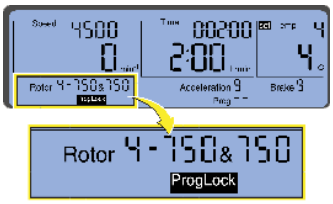
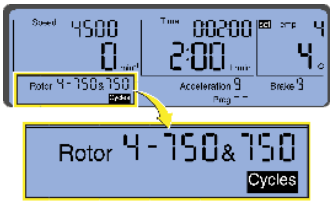
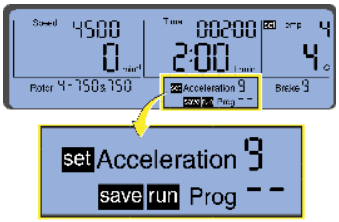
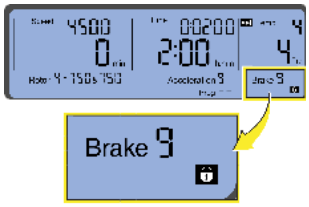
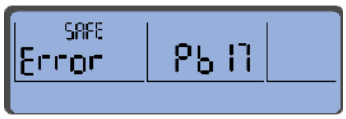
ACCELERATION		This field is used to select and display the acceleration profile being used. The system offers 10 acceleration profiles (profiles 0-9). Additional detail about acceleration rates and profiles can be found in Acceleration and Deceleration Profiles in CHAPTER 2, Operation.
DECELERATION		This field is used to select and display the profile that decelerates the rotor to a stop. The system offers 10 deceleration profiles (profiles 0-9), including no brake (0). Additional detail about deceleration rates and profiles can be found in Acceleration and Deceleration Profiles in CHAPTER 2, Operation.
AUTO OPEN		**AutoOpen** is displayed when the automatic door opening function has been activated so that the door opens automatically at the end of the run. See AutoOpen in CHAPTER 2, Operation for additional details.
BUZZER		This field is used to select and display **Buzzer** which indicates an acoustic warning signal will sound at the end of the centrifugation run, or in the event of an error message. See Buzzer in CHAPTER 2, Operation for additional details.
PROGLOCK		This field is used to select and display the Program Lock setting. When **ProgLock** is displayed, it is impossible to save any new programs or change any existing programs. See Program Lock in CHAPTER 2, Operation for additional details.
CYCLES		This field is used to enable display of the number of cycles a rotor has accumulated. The cycle counts will be presented in the Speed and Time fields. For swinging bucket rotors with multiple bucket options, the cycle counts for both the yoke and the selected bucket will be displayed. See Rotor Cycles Display in CHAPTER 2, Operation for additional details.
PROGRAM		This field is used to save the settings used for a centrifuge run as a program, or to select a program to be used for a centrifuge run. A maximum of 50 programs can be stored under the numbers 1 - 50. **- -** means that the current run parameters that are currently set are not a saved program. See Programmed Run in CHAPTER 2, Operation for additional details.

Table 1.1 Status Fields and Buttons *(Continued)*

SETTINGS LOCK		This field is used to indicate when inputs for changing the parameters set for the centrifuge cannot be changed. When a settings lock has been activated, a padlock symbol will be displayed in the field. See Settings Lock in CHAPTER 2, Operation for additional details.
ERROR		An error message is displayed as **Error** followed by a diagnostic code number. See CHAPTER 3, *Diagnostic Error Codes Chart*.
START BUTTON		When the **START** button is illuminated, pressing it will start a centrifugation run. See Start in CHAPTER 2, Operation for additional details.
STOP BUTTON		Press the **STOP** button in order to interrupt a centrifugation run. The centrifugation run will be stopped. If the **STOP** button is pressed for more than two seconds, a quick stop will be initiated which causes the centrifuge to decelerate with the maximum deceleration profile. See Stop in CHAPTER 2, Operation for additional details.
DOOR BUTTON		The door can be opened on the centrifuge if the **DOOR** button is illuminated. **IMPORTANT** Opening the centrifuge door is only possible if the rotor has stopped moving. See Door in CHAPTER 2, Operation for additional details.
LEFT BUTTON		This button is used to navigate within the display, and also to adjust settings within the display. When used, movement will be to the left within the menus shown on the display. The left movement is dependent on display or field mode. The button can be either consecutively pressed and released for movement or selection of a setting, or held-down pressed for more rapid movement or scrolling of settings for selection.
RIGHT BUTTON		This button is used to navigate within the display, and also to adjust settings within the display. When used, movement will be to the right within the menus shown on the display. The right movement is dependent on display or field mode. The button can be either consecutively pressed and released for movement or selection of a setting, or held-down pressed for more rapid movement or scrolling of settings for selection.
ENTER/SELECT BUTTON		This button is used to either select or enter functions shown on the display.

Specifications

Only values with tolerances or limits are guaranteed data. Values without tolerances are informative data, without guarantee.

Table 1.2 Specifications

Specification		Allegra V-15R Refrigerated
Speed	Set Speed	100 to 13,500 in 100 rpm increments
	Set RCF	10 to 20,412 *x g* in 10 *x g* increments
	Speed Display	Actual rotor speed in 1 rpm increments or actual RCF in 10 *x g* increments
	Speed Accuracy	±30 rpm of Set Speed from 100 to 13,500 rpm
Time	Set Time	10 seconds to 99 hours 59 minutes and 59 seconds or continuous (hold)
	HH:MM for time >= 1 hour MM:SS for time < 1 hour	Timed Run: indicates run time remaining Hold Run: indicates elapsed time Pulse Run: indicates elapsed time
Temperature	Set Temperature	–10 to +40°C in 1°C increments
	Temperature Display	Estimated sample temperature in 1°C increments
	Temperature Accuracy[a]	±2°C of set temperature (after equilibration); applies to 4 to 25°C temperature range
	Over Temperature Shutdown[b]	>50°C
Acceleration	Acceleration Profiles	10 acceleration rates (0-9), including maximum torque
Deceleration	Deceleration Profiles	10 deceleration rates 0-9), including maximum torque and no braking
Dimensions	Height	39.0 cm (15.4 in)
	Height with open chamber door	88.3 cm (34.8 in)
	Width	60.5 cm (23.8 in)
	Depth	63.5 cm (25.0 in)
Weight	Weight, not including rotor	110 kg (243 lbs)
Ventilation Clearances	Sides	30 cm (1 ft)
	Rear	30 cm (1 ft)
Electrical	Electrical Requirements	120 VAC, 16A, 60 Hz 200 VAC, 10.8A, 50 Hz and 60 Hz 208 VAC, 10.3A, 60 Hz 220 VAC, 10.3A, 60 Hz 220-240 VAC, 9.5A, 50 Hz
	Electrical Supply	Class 1
	Installation (overvoltage) category	II

Table 1.2 Specifications *(Continued)*

Specification		Allegra V-15R Refrigerated
Environmental	Maximum Noise Output (1 m in front of instrument, 1.5 meters above the floor at Instrument Rated Speed)	56 dBA
	Ambient Temperature Range	5°C to 31°C
	Humidity	Max. allowable relative humidity of air 75% from 5°C up to 31°C
	Refrigerant	R452A
	Maximum heat dissipation under steady-state conditions	120V, 60Hz: 5527 Btu/h (1.62 kW) 200V, 50/60Hz: 6483 Btu/h (1.90 kW) 208V, 60Hz: 6176 Btu/h (1.81 kW) 220V, 60Hz: 6210 Btu/h (1.82 kW) 220-240V, 50Hz: 6858 Btu/h (2.01 kW)
	Pollution degree	2[c]
	Maximum Altitude	2,000 meters above sea level
Finishes	Top Surface	Painted sheet steel
	Front Surface	Painted sheet steel
	Door	Painted sheet steel

a. To reach temperatures above ambient, the centrifuge is dependent on the frictional heat generated inside the chamber during operation. At low run speeds or low ambient temperatures, the centrifuge may not be able to achieve some higher temperatures. At high run speeds or high ambient temperatures, the centrifuge may not be able to achieve some lower temperatures.

b. If the system reaches this temperature, it will issue a diagnostic and shut down using maximum deceleration.

c. Normally only nonconductive pollution occurs; occasionally however, a temporary conductivity caused by condensation must be expected.

Available Rotors

The following Beckman Coulter rotors can be used in the Allegra V-15R centrifuge. More detailed specifications for each rotor listed in Table 1.3 can be found in the Allegra V-15R Rotors Instructions For Use (PN C63132).

Table 1.3 Available Rotors for Allegra V-15R

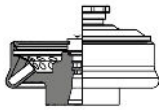
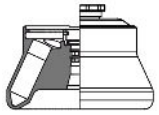
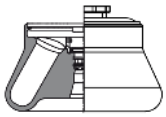
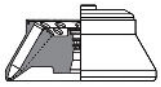
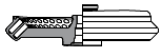
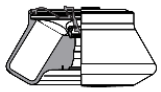
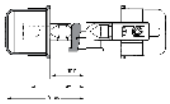
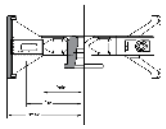
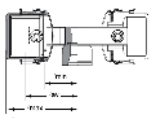
Rotor Profile	Description	RPM[a]	Max RCF[b] (× *g*) at r_{max}	Number of Tubes × Nominal Capacity[c]	Part Number
	VF 48.2 Fixed Angle r_{max} = 100 mm for outer row and inner row	13,500 - Max 13,000 - 4°C operation	20,412 x *g* 18,928 x g - 4°C operation	48 x 2 mL	C63136
	VFC 8.50 Fixed Angle r_{max} = 104 mm	11,360 - Max, 4°C operation	15,032 x *g*	8 x 50 mL	C63139
	VF 6.94 Fixed Angle r_{max} = 106 mm	10,000 - Max, 4°C operation	11,872 x *g*	6 x 94 mL	C63140
	VFC 24.15 Fixed Angle r_{max} = 126 mm for outer row and inner row	9,000 - Max, 4°C operation	11,431 x *g*	24 x 15 mL	C63138
	VF 100.2 Fixed Angle r_{max} = 163 mm for outer row r_{max} = 151 mm for inner row	6,500 - Max, 4°C operation	7,713 x *g* (outer row) 7,145 x *g* (inner row)	100 x 2 mL	C63137

Table 1.3 Available Rotors for Allegra V-15R *(Continued)*

Rotor Profile	Description	RPM[a]	Max RCF[b] ($\times g$) at r_{max}	Number of Tubes $\times$ Nominal Capacity[c]	Part Number
	VF 6.250 Fixed Angle r_{max} = 145 mm	5,450 - Max, 4°C operation	4,824 x *g*	6 x 250 mL	C63141
	VS 4.750 Swinging Bucket r_{max} = 188 mm	4,700 (200-240 VAC) 4,500 (120 VAC) 4,700 - 4°C operation	4,651 x *g* (200-240 VAC) 4,264 x *g* (120 VAC) 4,651 - x g - 4°C operation	4 x 1,000 grams 4 x 750 mL	C63142
	VS 4.750-Hex Swinging Bucket r_{max} = 181 mm	4,700 (200-240 VAC) 4,300 (120 VAC) 4,700 - 4°C operation	4,478 x *g* (200-240 VAC) 3,748 x *g* (120 VAC) 4,478 - x g - 4°C operation	4 x 900 grams 4 x 25 x 10 mL	C63143
	VS 4.750-96 Swinging Bucket r_{max} = 157 mm	4,700 (200-240 VAC) 4,500 (120 VAC) 4,700 - 4°C operation	3,884 x *g* (200-240 VAC) 3,561 x *g* (120 VAC) 3,884 - x g - 4°C operation	4 x 500 grams 4 x 4 x 96 mL	C63144
	VS 2.5-96 Swinging Bucket r_{max} = 151 mm	5,700 (200-240 VAC) 5,400 (120 VAC) 5,600 - 4°C operation	5,495 x *g* (200-240 VAC) 4,932 x *g* (120 VAC) 5,304 - x g - 4°C operation	2 x 520 grams 2 x 5 x 96 mL	C63145

a. Maximum speeds are based on a solution density of 1.2 g/mL. At upper temperature and humidity ambient conditions, swinging bucket rotor speed may require reduction.

b. Relative Centrifugal Field (RCF) is the ratio of the centrifugal acceleration at a specified radius and speed ($r\omega^2$) to the standard acceleration of gravity (*g*) according to the following formula: RCF = $r\omega^2/g$—where *r* is the radius in millimeters, ω is the angular velocity in radians per second (2π rpm/60), and *g* is the standard acceleration of gravity (9807 mm/s^2). After substitution: RCF = 1.12 *r* (rpm/1000)^2

c. For swinging bucket rotors, the maximum load in grams is listed in addition to the nominal capacity in milliliters. The maximum load in grams includes the sample, bottle adapters, and multi-well plate carriages but excludes the bucket and bucket lid.

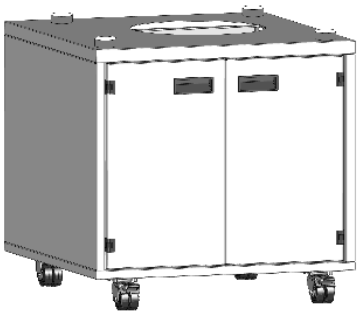
Allegra V-15R Mobile Centrifuge Cart

A mobile cart is available for the Allegra V-15R centrifuge that can be used as a table for the centrifuge. Wheels on the cart can be locked into place to prevent the cart from moving after the cart has been positioned at a desired location. Detailed information about the cart can be found in the *Allegra V-15R Centrifuge Cart Manual* (PN C63225).

⚠ WARNING

The wheels on the cart must be locked prior to use.

Figure 1.5 Allegra V-15R Mobile Cart



CHAPTER 2

Operation

Introduction

This section contains centrifuge operating procedures. A summary is provided at the start of this section. If you are an experienced user of this centrifuge, you can turn to the summary for a quick review of operating steps. Refer to the Allegra V-15R Rotors IFU (PN C63132) for instructions on preparing the rotor for centrifugation.

Sections in this chapter include:

⚠ WARNING

Risk of injury or equipment damage. Vapors from flammable reagents or combustible fluids could enter the centrifuge air system and be ignited by the motor. Do not use the centrifuge in the vicinity of flammable liquids or vapors, and do not run such materials in the instrument.

⚠ WARNING

Risk of contamination. No known test offers complete assurance that they are free of micro-organisms. Some of the most virulent — Hepatitis (B and C) and HIV (I–V) viruses, atypical mycobacteria, and certain systemic fungi — further emphasize the need for aerosol protection. Handle other infectious samples according to good laboratory procedures and methods to prevent spread of disease. Because spills may generate aerosols, observe proper safety precautions for aerosol containment. Handle body fluids with care because they can transmit disease.

Do not run toxic, pathogenic, or radioactive materials in this centrifuge without taking appropriate safety precautions. Biosafe containment should be used when Risk Group II materials (as identified in the World Health Organization *Laboratory Biosafety Manual)* are handled; materials of a higher group require more than one level of protection.

Installing the Rotor

Prepare the rotor for centrifugation as described in the *Allegra V-15R Rotors Instructions For Use* (PN C63132).

NOTE For runs at temperatures cooler than ambient room temperature, refrigerate the rotor beforehand for fast equilibration.

NOTE The power must be turned on before the chamber door can be unlocked and opened.

NOTE To end a run for any reason, do not turn the power switch off; press the **STOP** 

button instead.

To install a rotor:

1 Turn the power switch on.

The display will illuminate. The centrifuge is now ready for operation.

2 If necessary, open the door by pressing the **DOOR** 

button.

NOTE This command will only be available when the rotor is at a complete stop.

⚠ CAUTION

Risk of equipment damage. When using rotors for microtiter plates, ensure that the carriages are inserted together with the plates into the buckets.

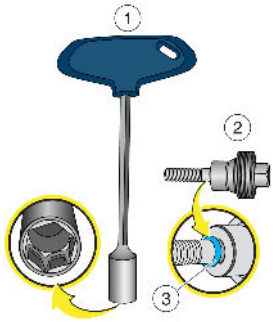
⚠ WARNING

Risk of personal injury. Before starting the centrifuge, make sure that the rotor tie-down screw is securely fastened.

3 Install the rotor onto the drive shaft. Then, insert the tie-down screw (see Figure 2.1) into the hole at the top of the rotor. Hold the rotor with one hand, and then tighten the tie-down screw by turning clockwise with the T-handle rotor wrench (until you can no longer tighten by turning) to secure the rotor to the drive shaft.

NOTE Before installing the rotor, ensure the drive shaft is sufficiently lubricated. See CHAPTER 4, *Centrifuge Maintenance* for instructions.

Figure 2.1 Tie-down Screw and T-handle rotor wrench



1. Rotor wrench, socket size 13mm
2. Rotor tie-down screw
3. O-ring on tie-down screw

NOTE Inspect the tie-down screw before each run, and always confirm that the O-ring is present as shown in Figure 2.1. Also, clean and lubricate the tie-down screw as needed.

- Ensure that the rotor is correctly seated onto the drive shaft.
- Ensure that the rotor is secured to the shaft with the tie-down screw.

⚠ CAUTION

Risk of personal injury. Do not place your fingers between the door and the housing when closing the door.

4 Close the chamber door, and with both hands on the door press down gently until the automatic door locking mechanism takes over and completes the locking of the door.

When the door is properly latched, the **START** button will illuminate.

⚠ CAUTION

Risk of equipment damage. After 20 cycles, the rotor must be removed and reinstalled (i.e., reseated) onto the shaft again. This ensures a proper connection between the rotor and the motor shaft.

Detailed information on rotor installation can be found in "Chapter 2: Rotor Preparation and Operation" within the *Allegra V-15R Rotors Instructions For Use* (PN C63132).

Manual Run

To Perform a Manual Run:

1 Turn the power switch on (Figure 1.2).

The display and **START** 

button will illuminate. The centrifuge is now ready for operation.

2 Press the **DOOR** 

button to unlock the door of the centrifuge. The door will automatically lift open.

3 Install the rotor. Refer to the *Installing the Rotor* section within this Chapter.

NOTE Before installing the rotor, ensure the drive shaft is sufficiently lubricated. See CHAPTER 4, *Centrifuge Maintenance* for instructions.

⚠ CAUTION

Risk of personal injury. Do not place your fingers between the door and the housing when closing the door.

4 Close the door, and with both hands on the door press down gently until the automatic door locking mechanism takes over and completes the locking of the door.

5 Set the run parameters. (See *Rotor Selection*, *Speed*, *Time*, *Temperature*, *Acceleration and Deceleration Profiles*)

- Use the navigation buttons and **ENTER** 

button to set the parameters for the run.

6 Check that all parameters are correct. Ensure the door is properly latched, and press the **START** button.

7 Wait for the time to count down to zero, or end the run by pressing the **STOP** 

button.

NOTE To end a run for any reason, do not turn the power switch off; press the **STOP** 

button instead.

8 When the rotor stops, a tone sounds if the buzzer (see *Buzzer*) has been enabled. Select the **DOOR** button to unlock the door. The door will automatically lift open.

Rotor Selection

This field is used to select a rotor, and also shows the rotor that is currently being used.

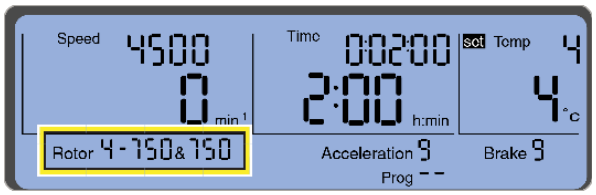
NOTE The rotor selection can only be changed when the centrifuge has stopped.

IMPORTANT For swinging bucket rotors that support more than one bucket, a bucket selection is required.

1 Navigate to the **Rotor** field. To navigate use the **Left** and **Right** control panel buttons to make the selection first, and when the desired selection is displayed press the **ENTER** button to apply or save the rotor selection setting. The word "**set**" will begin flashing after the selection.

2 If the rotor selected has several compatible buckets, the supported buckets will be sequentially displayed. Select the correct bucket and press the **ENTER** button again to use the selection.

Figure 2.2 Preselection of a rotor



3 The selected rotor or rotor/bucket combination will be applied.

Automatic Rotor Identification System

The Allegra V-15R centrifuge is equipped with an automatic rotor identification system. If the system detects a different rotor with more than one compatible bucket, the bucket with the lowest maximum speed will be pre-selected by the system and the user will have the option of changing the bucket type.

Speed

The centrifugation speed is shown in the upper-left section of the display (see Figure 2.3). Either enter a run speed up to the maximum speed of the rotor in use, or enter a Relative Centrifugal Force (RCF) value up to the maximum achievable RCF of the rotor.

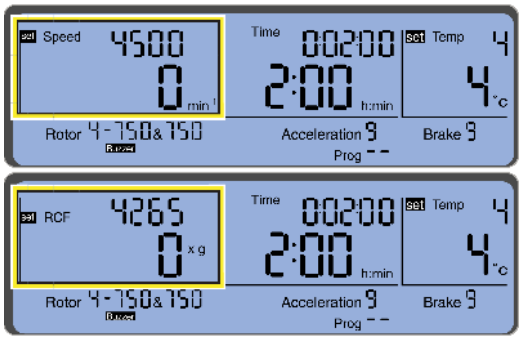
NOTE The maximum speed (and RCF) of some rotors vary by instrument model.

Speed / Relative Centrifugal Force (RCF)

The set speed of the centrifuge is displayed in the upper area of the Speed/RCF field (Figure 2.3). The actual value is displayed right below. The speed is stated as the number of revolutions per minute (min^{-1} = rpm), and the RCF values as a multiple of the gravitational acceleration (x g). The values are interdependent. The maximum speed/RCF value depends on the rotor that is used.

IMPORTANT The letters **RPM** are not displayed; instead, **min^{-1}** will be displayed for **RPM** (min^{-1} = rpm).

Figure 2.3 Setting the speed value or the RCF value



The parameters speed and RCF can be changed during the centrifugation run.

Time

The set time is displayed in the upper section of this field, with the remaining or elapsed time shown below. For the start of a timed run, time is counted down from the set value (starting with the start of the centrifuge and ending with the start of the deceleration phase). The maximum time is: 99 h:59 min:59 sec. Once 59 min:59 sec is reached, the unit switches from “h:min” to “min:s”.

Figure 2.4 Setting the time (shown here in the time unit “h:min”)

The time parameter can be changed during the centrifugation.

IMPORTANT If the time is changed during an active centrifugation run, the time that has already elapsed will not be taken into consideration. The centrifuge will perform a complete run with the new time.

Hold Run

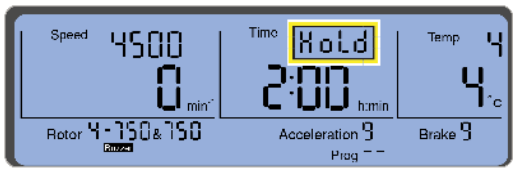
During a Hold Run, the centrifuge run will continue until manually stopped. To set the centrifuge for a Hold Run, perform the following steps:

1 Select the **Time** field and press the **ENTER** button. The indication **"set"** will appear next to **Time**. The "set" indication will be flashing. Pressing the **ENTER** button with set displayed will enable the set function, and pressing **ENTER** when set is not displayed with disable the set function.

2 Press and hold the **Right** control panel button to increase the set time to 99:59:59, release the button, and then press it again to enable the Hold mode. The indication **"HoLd"** will be displayed in the **Time** field as shown in Figure 2.5. During the centrifugation run, the elapsed time will be displayed.

Alternatively, press and hold the **Left** control panel button to decrease the set time to 0:00:10, release the button, and then press it again to enable Hold mode.

Figure 2.5 Indication "HoLd" during a Hold Run



3 Deactivate the **HoLd** run by pressing the **STOP** button.

NOTE When a run is in progress, the run can be changed from a Hold run to a Timed run, or from a Timed run to a Hold run.

Run Time Clock

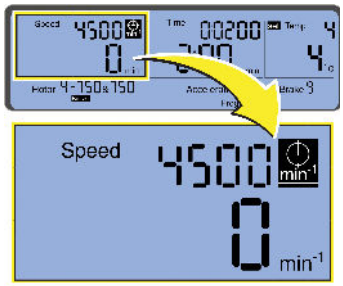
The centrifuge software allows configuring the run time to include the acceleration phase. If the run time is to be counted when the acceleration set speed is reached, the clock symbol that will appear in the upper right of the Speed field (see Figure 2.6). To start counting when the set speed is reached do the following:

1 Navigate within the **Speed/RCF** field until the **Run Time Clock** symbol appears. It will appear for both the **Speed** and the **RCF** setting. The symbol and the bar under the symbol will be flashing.

Pressing the **ENTER** 

button with the symbol displayed will enable the function, and pressing **ENTER** when the symbol is not displayed with disable the function.

Figure 2.6 The function “Run Time Clock” is activated



Temperature

The set value is displayed in the upper area of the field and the estimated sample temperature is displayed in the lower area. The temperature can be set before or during a run. Temperatures between -10 °C and +40 °C can be selected.

NOTE The centrifuge door must be closed before the refrigeration system will begin to operate.

Figure 2.7 Setting the temperature

NOTE To reach temperatures above ambient, the centrifuge is dependent on the frictional heat generated inside the chamber during operation. At low run speeds or low ambient temperatures, the centrifuge may not be able to achieve some higher temperatures.

NOTE At high run speeds, the centrifuge may not be able to achieve some low temperatures. Refer to the *Allegra V-15R Rotors Instructions For Use* (PN C63132) for details on this for each rotor.

Precooling

Depending on the substances to be centrifuged, it may be necessary to precool the centrifuge rotor and sample to ensure the sample temperature is maintained during the run.

To precool the rotor chamber, run a 30-minute cycle at the required temperature using an empty rotor, and the speed set at 2000 rpm.

The Allegra V-15R centrifuge also has a setting for rapid precooling. Refer to Program “Rapid Temp” in this section.

NOTE For runs with temperatures cooler than ambient room temperature, refrigerate the rotor and pre-cool the chamber beforehand for fast equilibration.

NOTE If samples that have not been pre-cooled are placed into the rotor after a pre-cool run, the displayed temperature will not represent the sample temperature until after equilibration.

⚠ CAUTION

Risk of equipment damage. At temperatures below 0°C, stagnant air in the chamber may cause refrigeration components to freeze. Remove your sample promptly after each run. If pre-cooling the chamber while the rotor is not spinning, set temperature to 8-10°C. This will allow for rapid cooling to 4-6°C when pre-cooling a spinning rotor.

Program "Rapid Temp"

The centrifuge has a special "Rapid Temp" program that precools the centrifuge rapidly under defined conditions. The Rapid Temp program can only be activated when the set temperature is lower than the actual temperature.

IMPORTANT The Rapid Temp option is not available if the actual temperature is already lower than the set temperature.

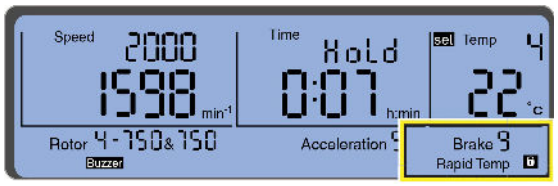
1 Navigate to the **Temperature** field and enter the set temperature. Refer to Temperature.

2 Navigate to the **Rotor** field and select the rotor. Refer to Rotor Selection.

3 Navigate to the menu item **run Prog**, and select it with the **ENTER** button.

4 Press the **Left** navigation button (it may need to be pressed several times) until **Rapid Temp** flashes, and then press the **Enter** button to enable the function. The speed will change to 2000 rpm, and the time will change to **HoLd**. Refer to Figure 2.8.

Figure 2.8 "Rapid Temp" Program



5 Close the centrifuge door, and then press the **START** button.

Rapid Temp will continuously flash until the set temperature is reached.

When the set temperature is reached the run will stop, and **Rapid Temp** will no longer be displayed. The system will hold the set temperature indefinitely, or until ECO Mode (see ECO Mode) is activated.

The **Rapid Temp** program will stop under the following conditions:

- The set value is reached. The run will stop, and there will be an audible signal if the Buzzer function has been activated.
- The **STOP** button is pressed. The run will be stopped immediately.
- A parameter is changed (except for the temperature).

If the **Rapid Temp** run stops due to one of the conditions listed above, then either the previous run settings will be reloaded or the changed parameters will be adopted as the new settings.

NOTE The automatic door opening function **AutoOpen** is suppressed after a **Rapid Temp** run in order to prevent the system from reheating.

ECO Mode

The centrifuge provides a mode that will cause the refrigeration system to be automatically powered off based on the ECO Mode timer. The mode can be used to conserve energy, and is called "ECO Mode." ECO Mode is the period of time after a run that the refrigeration system is powered off and the chamber door is automatically opened. ECO Mode is enabled after a pre-selected time duration. ECO Mode settings range from 0 (disabled) up to 8 hours in 30-minute increments. When ECO Mode is disabled and the chamber door remains closed, the refrigeration system will continue to operate as needed to keep the chamber temperature at the set temperature.

Enabling and Disabling ECO Mode

1 Press the **DOOR** 

button to open the centrifuge door.

2 Use either the **Left** or **Right** navigation button to navigate to the **Time** field.

IMPORTANT The cursor must be on the **Time** field in order to enable ECO Mode.

3 Press the **START** 

button 3 times. The 3rd press must be a long press (approximately 2 seconds).

4 While in the **Time** field, select the period of time that the refrigeration system remains active after the run completes with the **Right** and **Left** control panel buttons. A setting of 0 means that ECO Mode is deactivated, and that the temperature control system will continue to operate indefinitely as long as the door is closed.

Figure 2.9 Example of ECO Mode Set for 30 Minutes

5 Press the **ENTER** button to save the setting.

6 Setup and perform the run operation. The run operation can be either a Manual Run run or a Programmed Run.

- The ECO Mode timer will start after the run has completed.

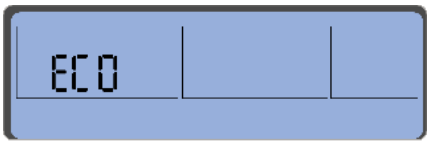
IMPORTANT If the centrifuge door is opened before the ECO Mode timer reaches 0, then the ECO Mode timer will stop. If the ECO Mode timer stops before reaching 0, it can be restarted again by closing the door or by pressing a control panel button.

- Twenty-nine minutes before ECO Mode will be activated, the decreasing time value is shown on the display with the word "ECO." An example of this is show in Figure 2.10.

Figure 2.10 Example of decreasing time value before ECO activation

- When the ECO Mode timer reaches 0, the door of the centrifuge will open and the word "ECO" will show on the display as shown in Figure 2.11.

Figure 2.11 ECO Mode timer expired



Acceleration and Deceleration Profiles

The Allegra V-15R centrifuge uses acceleration and deceleration profiles to protect the gradient and sample-to-gradient interface. Profiles should be selected depending on the type of run you are performing. For pelleting runs, where sample mixing is not a concern, maximum acceleration and deceleration can be used. If running delicate gradients, a lower setting may be needed. If no profile is selected, the centrifuge automatically uses the acceleration and deceleration rates from the previous run.

Acceleration

Navigate to the **Acceleration/Deceleration** field to select an acceleration profile. The Allegra V-15R offers 10 acceleration profiles (profiles 0-9). Additional information about the acceleration profiles provided by the Allegra V-15R can be found in APPENDIX C, *Acceleration and Deceleration Profiles*.

NOTE Select profile 9 for the maximum acceleration rate.

Figure 2.12 Example preselection of an acceleration profile

Deceleration

Navigate to the **Acceleration/Deceleration** field to select a profile that decelerates the centrifuge to a stop. The Allegra V-15R offers 10 deceleration (i.e., braking) profiles (profiles 0-9). Deceleration profile 0 provides deceleration without braking. Additional information about the deceleration profiles provided by the Allegra V-15R can be found in APPENDIX C, *Acceleration and Deceleration Profiles*.

NOTE Select profile 9 for the maximum deceleration rate. Select profile 0 for deceleration without braking.

Start

When the **START** 

button is illuminated, pressing it will start a centrifugation run.

The **START** button can also be pressed during deceleration to restart the centrifuge.

Stop

Press the **STOP** 

button to interrupt a centrifugation run. The centrifugation run will be terminated.

Quick Stop:

1. Press the **STOP** button for more than two seconds for a "Quick Stop."
   - The centrifuge will decelerate with the maximum deceleration profile.
   - "Fast" will be displayed in the lower right-hand corner of the display.

   NOTE A quick stop can also be triggered while decelerating in order to speed up the deceleration.

2. Open and then close the centrifuge door after a "Quick Stop" in order to start a new centrifugation run.

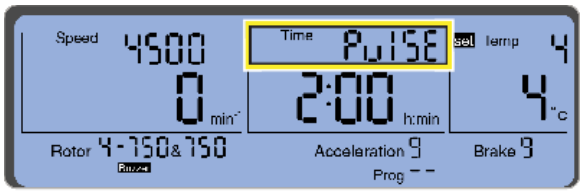
Pulse Run

A Pulse Run is a run that will last as long as the **START** button is pressed. It is essentially a short run.

1 Press and hold the **START** button to initiate a Pulse run.

During the pulse run, the centrifuge accelerates with the maximum acceleration until the maximum speed of the rotor is reached. "PuLSE" will be displayed in the **Time** field along with the elapsed time during a Pulse run.

Figure 2.13 Indication "PuLSE" during a Pulse Run



2 When the **START** button is released, the centrifuge decelerates to a stop based on the maximum deceleration profile.

When the pulse run is completed, the original parameters (profiles, time, and speed) are restored and displayed.

Door

The centrifuge door can be opened if the **DOOR** button is illuminated. Press the button in order to open the door.

IMPORTANT Opening the centrifuge door is only possible if the rotor has stopped moving.

- The centrifuge cannot be started if the door is open.
- To close the door, press with both hands gently down on the door until the automatic door locking mechanism takes over and completes the locking of the door.

⚠ CAUTION

Risk of personal injury. Do not place your fingers between the door and the housing when closing the door.

Settings Lock

In order to prevent accidental or inadvertent change of the settings on the centrifuge, settings can be locked with the Settings Lock function. Navigate to the Padlock symbol in the lower-right corner of the display to access the Temporary Lock setting.

Activating a Temporary Lock:

1 Position the cursor over the “Padlock” symbol in the lower right-hand corner of the display (Figure 2.14).

Figure 2.14 “Padlock” symbol indicating an activated settings lock

As long as the padlock symbol is displayed, the centrifuge settings cannot be changed.

Activating a Permanent Lock:

IMPORTANT The cursor must not be in the **Time** field when activating a Permanent Lock.

1 Press the **START** button three times and hold for approximately 2 seconds when pressing it for the third time.

When the padlock symbol flashes, the permanent lock is activated.

2 Proceed in the same manner to deactivate the permanent lock.

AutoOpen

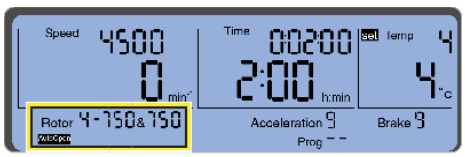
The automatic door opening function can be activated so that the door opens automatically at the end of a centrifugation run.

In order to activate the automatic door opening function:

1 Use the navigation buttons to move the cursor to the **AutoOpen** symbol, then select **AutoOpen** with the **ENTER** button. The symbol and the bar under the symbol start to flash Figure 2.15.

2 Activate the function by pressing the **ENTER** button. The symbol remains displayed and the bar continues to flash.

Figure 2.15 The automatic door opening function “Auto Open” is activated



3 Navigate to **AutoOpen** again (if necessary) and press the **ENTER** button to deactivate the "Auto Open" function. In this case, the AutoOpen symbol disappears but the bar that was underneath the symbol will continue to flash.

Buzzer

This function is used to enable an acoustic warning signal that sounds at the end of the centrifugation run, and also in the event of an error message.

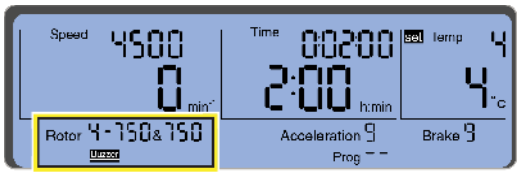
In order to activate the sound signal:

1 Select the **Buzzer** symbol with the cursor and confirm the selection. The **Buzzer** symbol and the bar under the symbol start to flash. Refer to Figure 2.16.

2 Activate the function by pressing the **ENTER** 

button. The **Buzzer** symbol remains displayed and the bar continues to flash.

Figure 2.16 The sound signal Buzzer is activated



3 Navigate to **Buzzer** again (if necessary) and press the **ENTER** button to deactivate the Buzzer function. In this case, the Buzzer symbol disappears but the bar that was underneath the symbol will continue to flash.

Programmed Run

The instrument's internal memory can store programs, which can be recalled by selecting the program number. Saved programs are retained in memory even if the centrifuge's power is turned off. Programs can be protected against modification or deletion when the Program Lock feature is enabled.

A maximum of 50 programs can be stored under the numbers 1 - 50.

"**--**" means that the values that are currently displayed are not associated with a stored program.

NOTE The rapid cooling program Program "Rapid Temp" does not occupy any storage location, and cannot be deleted.

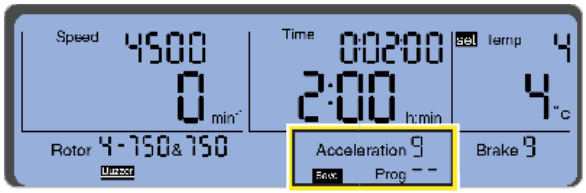
Saving a Program

A program can only be saved when the centrifuge is stopped.

1 Enter the parameters (i.e., Rotor Selection, Speed, Time, Temperature, Acceleration and Deceleration Profiles) that are saved as part of the program.

2 Select the menu item **Save Prog** and confirm the selection. The indication **"Save"** flashes when **Save Prog** is selected. See Figure 2.17.

Figure 2.17 Saving a program



3 Use the navigation buttons to select an available storage location from the program selection list. Empty storage locations are indicated by a flashing display. If an occupied storage location is selected, its settings will be overwritten during the saving process.

Loading and Running a Saved Program

1 If necessary, turn the power switch on (Figure 1.2).

The display and **START** 

button will illuminate. The centrifuge is now ready for operation.

2 Press the **DOOR** 

button to open the chamber door. The door will automatically lift open.

3 Install the rotor using the instructions found in the *Installing the Rotor* section within this Chapter. Close the chamber door, and with both hands on the door press down gently until the automatic door locking mechanism takes over and completes the locking of the door.

NOTE Before installing the rotor, ensure the drive shaft is sufficiently lubricated. See CHAPTER 4, *Centrifuge Maintenance* for instructions.

⚠ CAUTION

Risk of personal injury. Do not place your fingers between the door and the housing when closing the door.

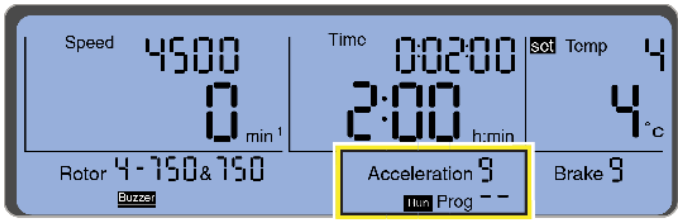
4 Use the **Left** and **Right** control panel buttons to navigate to the menu item **run Prog**, and select it with the **ENTER** 

button. The indication **"run"** flashes once **run Prog** is selected.

5 Select the desired program and confirm the selection by pressing the **ENTER** 

button.

Figure 2.18 Running a program



The program is now loaded.

6 Press the **START** 

button.

Program Lock

When the Program Lock feature is enabled, the “Save Program” function is disabled.

In order to activate the program lock:

1. Select the “**ProgLock**” symbol with the cursor and confirm the selection. The symbol and the bar under the symbol start to flash.

2. Activate the function by pressing the **ENTER** button. The symbol remains displayed and the bar continues to flash.

Figure 2.19 The program lock “ProgLock” is activated

3. Using the navigation buttons at this point will deactivate the function. In this case, the symbol disappears but the bar continues to flash.

4. Press the **ENTER** button in order to activate the desired setting. The bar remains visible as long as the cursor is placed over the symbol.

Rotor Cycles

Rotor Cycles Display

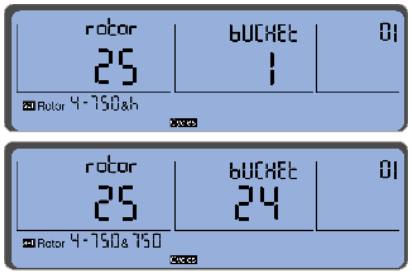
In order to activate the rotor cycle display:

1. Select the “Cycles” symbol with the cursor and confirm the selection. The symbol is displayed and “set” flashes in front of the rotor display. Refer to Figure 2.20.

2. All of the rotors and buckets can be selected by using the navigation buttons and **ENTER** button. The cycles of the selected rotor and, if applicable, also of the selected bucket are displayed.

IMPORTANT For a rotor with multiple bucket types, the "rotor" will be incremented each time any bucket is selected. The rotor count should equal the sum of all bucket counts. See Figure 2.20.

Figure 2.20 Examples of cycles displayed



3 Press the **ENTER** button to exit the cycle display.

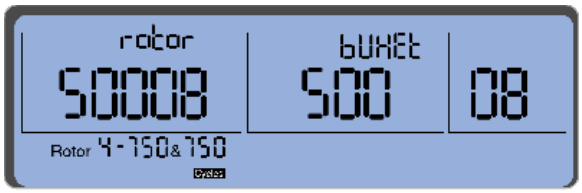
Maximum Number of Cycles

If the maximum number of cycles for the rotor or bucket being used has already been reached, the **START** button, **DOOR** button, and entire display will flash every time a centrifuge run is started.

NOTE The maximum number of cycles for each rotor and bucket used by the Allegra V-15R centrifuge can be found in the Allegra V-15R Rotors Instructions For Use (PN C63132).

When the **START** button is pressed, "**Cycles**" will be displayed (Figure 2.21). The centrifuge run will not start until the **START** button is pressed again.

Figure 2.21 Flashing display when maximum number of cycles is reached



⚠ WARNING

Risk of personal injury or equipment damage. When the maximum number of cycles for the rotor or bucket is reached, the rotor must be replaced.

The cycle display can be reset after the rotor and buckets have been replaced.

IMPORTANT Beckman Coulter provides a special code to reset the cycle count. Please contact us.

CHAPTER 3

Troubleshooting Procedures

Introduction

This section lists possible error codes with recommended corrective actions, and gives solutions to some other possible problems. Maintenance procedures are given in CHAPTER 4, *Centrifuge Maintenance*. *For any problems not covered in this chapter, contact us.*

NOTE It is your responsibility to decontaminate the instrument, as well as any rotors and/or accessories, before requesting service by Beckman Coulter Field Service.

Sections in this chapter include:

- *Diagnostic Error Codes Chart*
- *Other Possible Problems and Solutions*
- *Retrieving Your Sample in Case of a Power Failure*

Diagnostic Error Codes Chart

Error messages are displayed as "Error" followed by a code number. If the **Buzzer** is enabled, it sounds when the error message is displayed. Refer to Table 3.1 to determine the nature of the condition and any recommended actions.

If a problem persists after you have performed the recommended action, contact us. To help the field service representative diagnose and correct the problem, gather as much information about the situation as you can, including the following:

- The diagnostic number and message displayed.
- The operating situation when the diagnostic condition occurred (such as rotor in use, speed, or load type).
- Any unusual environmental and/or operating conditions (such as ambient temperature or voltage fluctuations).

IMPORTANT Error codes and messages can be acknowledged in order to continue centrifuge operation by pressing the **DOOR**  button.

Table 3.1 Diagnostic Error Codes and Messages Chart

Error Number	Error Type	Definition/Response	Recommended Action
1 - 9	System Error	System Error. Rotor coasts to a stop.	**1.** Allow rotor to stop. **2.** To acknowledge error, turn power off and then back on. **3.** If the problem persists, contact us.
10 - 17	Speed Error	Speed Error. Rotor coasts to a stop.	**1.** Allow rotor to stop. **2.** To acknowledge error, turn power off and then back on. **3.** If the problem persists, contact us.
22	Motor Error	Motor Error. Rotor coasts to a stop.	**1.** Allow rotor to stop. **2.** To acknowledge error, turn power off and then back on. **3.** Confirm adequate clearance around instrument **4.** Confirm ambient temperature and humidity are within limits. **5.** Allow centrifuge chamber to cool down. **6.** If the problem persists, contact us.
26	Power Error	Power Error. Rotor coasts to a stop.	**1.** Allow rotor to stop. **2.** To acknowledge error, turn power off and then back on. **3.** If the problem persists, contact us.
27	Power Error	Power Error. Rotor stops per profile.	**1.** Allow rotor to stop. **2.** To acknowledge error, press the **Door** button. **3.** If the problem persists, contact us.
33 - 34	EEPROM Error	EEPROM Error. Rotor stops with maximum braking.	**1.** Allow rotor to stop. **2.** To acknowledge error, press the **Door** button. **3.** If the problem persists, contact us.
37 - 38	EEPROM Error	EEPROM Error. Rotor stops per profile.	**1.** Allow rotor to stop. **2.** To acknowledge error, press the **Door** button. **3.** If the problem persists, contact us.

Table 3.1 Diagnostic Error Codes and Messages Chart *(Continued)*

Error Number	Error Type	Definition/Response	Recommended Action
40 - 43	Temperature Error	Temperature Error. Rotor stops with maximum braking.	**1.** Allow rotor to stop. **2.** Turn centrifuge power Off. **3.** Confirm adequate clearance around instrument. **4.** Confirm ambient temperature and humidity are within limits **5.** Allow centrifuge chamber to cool down. **6.** Pre-cool rotor chamber and rotor before running at low temperatures. **7.** If the problem persists, contact us.
46	Imbalance Error	Rotor Imbalance Error. Rotor stops with maximum braking.	**1.** Allow rotor to stop. **2.** To acknowledge error, press the **Door** button. **3.** Make sure the rotor is installed properly. **4.** Ensure rotor load is balanced. **5.** Ensure the pivot pins are clean and lubricate. **6.** Ensure the bucket pin pockets are clean. **7.** If the problem persists, contact us.
50	Door Error	Door Latch Error. **Start** button will not light up. Door will unexpectedly open.	**1.** To acknowledge error, turn power off and then back on. **2.** Close centrifuge door. **3.** If the problem persists, contact us.
51 - 53	Door Error	Door Latch Error. Rotor stops with maximum braking.	**1.** Allow rotor to stop. **2.** To acknowledge error, press the **Door** button. **3.** Remove anything that may prevent the door from latching. **4.** Close centrifuge door. **5.** If the problem persists, contact us.
57	Door Error	Door Latch Error.	**1.** To acknowledge error, press the **Door** button. **2.** If the problem persists, contact us.
61	Power Error	Power Error. Rotor stops with maximum braking.	**1.** Allow rotor to stop. **2.** To acknowledge error, press the **Door** button. **3.** Confirm that AC power cord is connected securely. **4.** Confirm that AC line voltage and frequency are within normal operating range. **5.** Check AC outlet. **6.** Refer to building maintenance for frequent AC line interruptions. **7.** If the problem persists, contact us.

Table 3.1 Diagnostic Error Codes and Messages Chart *(Continued)*

Error Number	Error Type	Definition/Response	Recommended Action
70 - 72	Communication Error	Communication Error. Rotor coasts to a stop.	**1.** Allow rotor to stop. **2.** To acknowledge error, turn power off and then back on. **3.** If the problem persists, contact us.
80	Rotor Error	Rotor Error. Incorrect rotor selected. Run continues with reduction in Set Speed if required.	**1.** Confirm Set Speed (or Set RCF) is correct. **2.** If the problem persists, contact us.
81 - 82	Rotor Error	Rotor Error. Rotor stops with maximum braking.	**1.** Allow rotor to stop. **2.** To acknowledge error, press the **Door** button. **3.** Ensure that the rotor is tied down. **4.** If the problem persists, contact us.
84	Rotor Error	Rotor Error. Maximum cycle count reached.	Replace the rotor, contact us

Other Possible Problems and Solutions

Operating problems that may not be indicated by diagnostic messages are described in Table 3.2, along with probable causes, listed in the probable order of occurrence, and corrective actions. Perform the recommended corrective action in sequence, as listed. If you are unable to correct the problem, contact us.

Table 3.2 Troubleshooting Chart

Problem	Problem/Result	Recommended Action
No indication on the display	Instrument power is switched off.	Switch instrument power switch on.
	Power cord is not plugged in.	Make sure power cord is securely connected.
	Fuse has blown.	Reset the instrument by turning the power switch back to the on (I) position. Refer to Circuit Breaker and Fuses.
	Power not on.	Check fuse in the circuit breaker that provides power to outlet being used. — If the problem persists, contact us.

Table 3.2 Troubleshooting Chart *(Continued)*

Problem	Problem/Result	Recommended Action
Centrifugation run cannot be started (Start button LED is not illuminated)	Several possible causes: **1.** An error may have occurred that resulted in the rotor decelerating without brake. **2.** Power no longer being supplied to centrifuge. **3.** Electronic board failure.	Power off/on. — If the problem persists, contact us.
Centrifugation run cannot be started (DOOR button LED flashes)	The door is not locked.	Open the door. Then close the door, and with both hands on the door press down gently until the automatic door locking mechanism takes over and completes the locking of the door. — If the problem persists, contact us.
Centrifuge decelerates during operation	Brief power failure.	**1.** Wait for the rotor to come to a complete stop, and the **Door** button to flash. **2.** Press the **Door** button. **3.** Close the door. **4.** Restart the centrifuge run. **5.** If the problem persists, contact us.
	System error.	Power off/on. — If the problem persists, contact us.
Imbalance Error	Samples are not loaded symmetrically. Centrifuge is not level. Drive problem. Centrifuge was moved during run.	Balance samples and restart the run. — If the problem persists, contact us.
	Pivot pins on the rotor yoke are not sufficiently lubricated.	Clean and lubricate pivot pins.
Set temperature cannot be reached	Set Temperature out of range for selected rotor and set speed. Refer to the Allegra V-15R Rotors IFU. Condenser (intake vent) is dirty. Ambient temperature is out of range.	• Reduce set speed. • Clean the condenser. • Pre-cool or pre-warm rotors before running at low or high temperatures. • Pre-cool rotor chamber by running a 30-minute cycle at the required temperature with the speed set at 2000 rpm. Alternatively, initiate the Rapid Temp program before the run. • Clean condenser. • Make sure the air intake vent is clear. • Ensure adequate clearance around instrument. • If the problem persists, contact us.

Table 3.2 Troubleshooting Chart *(Continued)*

Problem	Problem/Result	Recommended Action
	Excess humidity in chamber. Condensation build-up between runs.	• Enable ECO Mode or reduce the ECO Mode activation timer duration. • Wipe out moisture from the chamber and the chamber gasket before each run. • Leave door open between runs. • Set temperature to a setting higher than ambient temperature. • Turn centrifuge power off. • If the problem persists, contact us.
Door cannot be opened	Door lock has not released.	Unlock the door manually and contact us.
	Door seal sticks.	Clean the door seal. If the problem persists, contact us.

Retrieving Your Sample in Case of a Power Failure

⚠ WARNING

Risk of personal injury. Never attempt to override the door interlock system while the rotor is spinning. Wait for the rotor to come to a complete stop before attempting to open the door.

If facility power fails, the run will have to be restarted when the power is restored. In the event of an extended power failure, it may be necessary to override the door-locking mechanism manually to remove the rotor and retrieve your sample.

To retrieve a sample during a power failure:

1 Turn the power off and disconnect the power cord from the instrument.

2 Remove the plug (Figure 3.1) from the opening on the right side of the control panel with a small flat-head screwdriver.

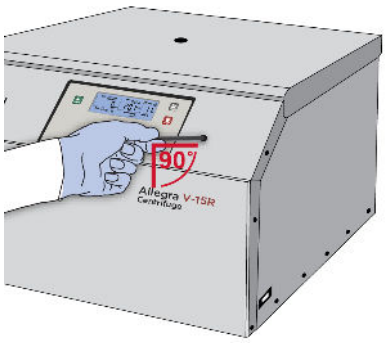
Figure 3.1 Location of plug for access to door release opening

1. Emergency door release opening

3 Insert the supplied 5mm T-handle Allen wrench (Figure 3.2) horizontally into the emergency door release opening as far as it will go. See Figure 3.3. The wrench is guided through a funnel-shaped tube to the door lock mechanism.

Figure 3.2 Supplied T-handle Allen wrench (size 5)

Figure 3.3 Inserting the emergency door release key



⚠ WARNING

Risk of personal injury. Do not unlock or open the door unless the rotor has stopped moving.

4 Unlock the motorized door lock by turning it clockwise.

5 Remove the Allen wrench and replace the plug.

CHAPTER 4

Centrifuge Maintenance

Introduction

This section contains care and maintenance procedures that should be performed regularly. For maintenance not covered in this manual, contact us for assistance. Error codes and user messages and recommended actions are discussed in CHAPTER 3, Troubleshooting Procedures.

NOTE It is your responsibility to decontaminate the centrifuge, as well as any rotors and/or accessories, before requesting service by Beckman Coulter Field Service.

Sections in this chapter include:

- *Instrument Care*
- *Circuit Breaker and Fuses*
- *Supply List*

Instrument Care

The centrifuge, rotor, and accessories are subject to high mechanical stress. Thorough maintenance performed by the user extends the service life and prevents premature failure.

DANGER

Risk of personal injury. Any maintenance procedure requiring removal of a panel exposes the operator to the possibility of electrical shock and/or mechanical injury. Turn the power off and disconnect the instrument from the main power source and refer such maintenance to service personnel.

For the Allegra V-15R, always adhere to the following in regards to instrument care:

- Use a mild detergent or other water-soluble, mild cleaning agents with a pH value between 6 and 8 for cleaning the centrifuge and accessories.
- Do not use solvents.
- Do not use agents with abrasive particles.
- Do not expose the centrifuge and rotors to intensive UV radiation or thermal stress (e.g., heat generators)

IMPORTANT If corrosion or other damage occurs due to improper care, the manufacturer cannot be held liable, or be subject to any warranty claims.

Centrifuge Maintenance

⚠ WARNING

Risk of personal injury. The gas dampers provide support for the centrifuge door. Regularly check that the centrifuge door remains in its fully opened position until it is manually closed. Worn gas dampers will cause the door to fall. Gas dampers must be replaced immediately when they are no longer are able to hold the door in its fully opened position. To prevent injury, gas dampers should be replaced every 3 years.

Perform the following procedures regularly to ensure continued performance and long service life of the centrifuge.

- Lubricate the drive shaft with Spinkote (see *Supplies*) at least once a month, and after each cleaning.

⚠ WARNING

Risk of instrument damage. The centrifuge is subject to high mechanical stresses which will result in aging of the motor mounts with extensive use. To prevent instrument damage, motor mounts should be replaced every 3 years.

- Inspect the centrifuge chamber for accumulations of sample, dust, or glass particles from broken sample tubes. Clean as required (see *Cleaning*).
- Check the air intake and exhaust for obstructions. Keep vents clear and clean.
- Wipe condensation out of the rotor chamber between runs with a sponge or clean cloth to prevent chamber icing.
- Open the centrifuge when it is not in use so moisture can evaporate.
- If chamber icing occurs, defrost the system and wipe moisture out of the chamber before use.

  To defrost the system, set the temperature to 30°C for 20 minutes, and run the centrifuge with a rotor installed. (These are suggested settings which may be adjusted as appropriate for your laboratory conditions.)
- Carefully remove all liquids, including water and particularly all the solvents, acids, and alkaline solutions from the rotor chamber using a cloth in order to avoid damage to the motor bearings.

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

⚠ WARNING

Risk of personal injury or contamination. Consult with your Lab Safety Officer or laboratory guidelines if there is a risk of toxic, radioactive, or pathogenic contamination. Always wear suitable PPE.

- If the centrifuge has been contaminated with toxic, radioactive, or pathogenic substances, clean the rotor chamber immediately with a suitable decontamination agent.
- When lightly lubricating the drive shaft, distribute a small amount of Spinkote with a cloth so that it forms a thin layer. Refer to Figure 4.1.

Figure 4.1 Lubricate the drive shaft

1. Drive Shaft

Condenser

In order to cool the refrigerant that is compressed by the refrigeration unit, centrifuges with an air-cooled refrigeration system use a lamellar condenser. It is cooled by air. Dust and dirt obstruct the cooling flow of air. The dust on condenser pipes and lamellas reduces the heat exchange and thus the performance of the refrigeration unit.

IMPORTANT Keep the centrifuge installation area as clean as possible.

- Check the condenser at least once a month for dirt and if necessary clean it.
- If you have any additional questions, contact us.

Plastic Accessories

The chemical resistance of plastic decreases with rising temperatures.

- If solvents, acids, or alkaline solutions have been used, thoroughly clean the plastic accessories.

Cleaning

⚠ WARNING

Risk of personal injury or contamination. Prior to cleaning equipment that has been exposed to hazardous material, contact the appropriate chemical and biological safety personnel. Always use the appropriate Personal Protective Equipment (PPE) when cleaning the centrifuge.

⚠ WARNING

Risk of personal injury. If a glass tubes breaks, glass fragments may escape the bucket or rotor. Be careful when examining or cleaning the chamber and chamber gasket, as sharp glass fragments may be embedded in their surfaces. Always use the appropriate Personal Protective Equipment (PPE) when cleaning the centrifuge.

Clean the centrifuge frequently. Always clean up spills when they occur to prevent corrosives or contaminants from drying on component surfaces.

1 Unplug the power cord from the centrifuge before cleaning.

2 To prevent accumulations of sample, dust, and/or glass particles from broken sample tubes, keep the chamber clean and dry by frequent wiping with a cloth or paper towel.

- **a.** For thorough cleaning, wash the chamber using a mild detergent such as Solution 555 (see *Supplies*).
- **b.** Dilute the detergent with water (10 parts water to 1 part detergent).
- **c.** Rinse thoroughly and dry completely.
- **d.** If a cleaning solution other than Solution 555 is used, consult *Chemical Resistances* (publication IN-175) or contact the cleaning-solution vendor to verify that the solution will not damage the centrifuge.

⚠ CAUTION

Risk of equipment damage. Plastic parts can be damaged if solvents, acids, or alkaline solutions are used on the plastic surfaces of the Allegra V-15R centrifuge.

3 Remove the rotor from the centrifuge and clean the drive shaft, shaft cavity, threads, and the tie-down screw regularly using a mild detergent such as Solution 555 and a soft brush.

- **a.** Dilute the detergent with water (10 parts water to 1 part detergent).
- **b.** Rinse thoroughly and dry completely.
- **c.** Lubricate the drive shaft and tie-down screw with Spinkote after cleaning.

4 Clean the centrifuge exterior surfaces by wiping with a cloth dampened with Solution 555.

Dilute the detergent with water (10 parts water to 1 part detergent).

IMPORTANT Do not use acetone.

Glass Tube Breakage

⚠ WARNING

Risk of personal injury. If a glass tube breaks, glass fragments may escape the bucket or rotor. Be careful when examining or cleaning the chamber and chamber gasket, as sharp glass fragments may be embedded in their surfaces. Always use appropriate personal protective equipment (PPE) when cleaning the centrifuge.

1 If a glass tube breaks, and all the glass is not contained in the bucket or rotor, be sure to thoroughly clean the chamber.

2 Examine the chamber gasket to make sure that no glass particles are retained in it.

Carefully remove any glass particles that may remain.

3 Carefully remove any glass particles that remain in the chamber.

Glass particles can cause the following problems:

- Glass particles will damage the anodized coating of the rotor and buckets, which will then lead to corrosion.
- Glass particles on the pivot pins prevent the buckets and carriers from swinging evenly, which will cause an imbalance.
- Glass particles in the rotor chamber will cause metal abrasion due to the strong air circulation. This metal dust will not only pollute the rotor chamber, rotor, and materials to be centrifuged but also damage the surfaces of the accessories, rotors, and rotor chamber.

Perform the following steps to completely remove glass particles (and metal dust due to abrasion) from the rotor chamber:

1 Lubricate the upper third of the rotor chamber with an approved grease (e.g., Vaseline).

2 Turn on the centrifuge and rotate the rotor for a few minutes at a moderate speed (approximately 2000 rpm).

The glass and metal particles will accumulate on the greased part of the chamber.

3 Use a cloth to carefully remove all of the grease.

4 Repeat this procedure (steps 1-3) until all of the glass and metal particles have been removed.

Decontamination

⚠ WARNING

Risk of personal injury. If dangerous materials (e.g., infectious and pathogenic substances) are used, the centrifuge and accessories must be disinfected.

If the centrifuge and/or accessories are contaminated with radioactive or pathogenic solutions, perform appropriate decontamination procedures. Refer to *Chemical Resistances* (publication IN-175) to be sure the decontamination method will not damage any part of the instrument.

Sterilization and Disinfection of the Rotor Chamber and Accessories

⚠ WARNING

Risk of personal injury and equipment damage. Ethanol is a flammability hazard. Vapors from flammable reagents or combustible fluids could enter the centrifuge air system and be ignited by the motor. Do not use Ethanol or other combustible materials near operating centrifuges.

The centrifuge is finished with urethane paint. Ethanol (70%) may be used on this surface. Consult *Chemical Resistances* (publication IN-175) for more information regarding chemical resistance of centrifuge and accessory materials.

While Beckman Coulter has tested these methods and found that they do not damage the centrifuge, no guarantee of sterility or disinfection is expressed or implied. When sterilization or disinfection is a concern, consult your laboratory safety officer regarding proper methods to use.

Consider the following:

- The centrifuge and the accessories consist of various materials. Before using cleaning or decontamination agents that were not recommended by Beckman Coulter, contact the manufacturer of the cleaning or decontamination agent to ensure that such a procedure will not damage the centrifuge.
- If autoclaving is to be done, consider the continuous heat resistance of the individual materials.

Please contact us if you have any questions about sterilization and disinfection.

Circuit Breaker and Fuses

There are no user-replaceable fuses in the Allegra V-15R centrifuge.

If the centrifuge circuit breaker trips for any reason, the power switch will move to the off (**O**) position. Reset the circuit breaker by turning the power switch back to the on (**I**) position. If it immediately trips again, *do not reset it*. Contact us.

⚠ CAUTION

Risk of equipment damage. Repeated attempts to reset the centrifuge circuit breaker can cause substantial damage to electrical and electronic components. Do not repeatedly attempt to reset the centrifuge circuit breaker.

Supply List

Contact us for information about ordering parts and supplies. For your convenience, a partial list is given below.

Replacement Parts

Description	Part Number
Rotor Tie-Down Screw	C16205
T-handle Allen Wrench, size 5 (For emergency chamber door release)	B31161
T-handle Allen Wrench, size 13	368246
Mobile Centrifuge Cart	C63177
Transport Safety Device	C63367

Supplies

NOTE For SDS information, go to the Beckman Coulter website at www.beckman.com.

Description	Part Number
Solution 555 (1 qt)	339555
Spinkote	306812

APPENDIX A

Unpacking and Installation

Introduction

This Appendix provides information on unpacking the centrifuge, and the centrifuge installation requirements in order to prepare laboratory facilities for the installation.

Sections in this chapter include:

⚠ WARNING

Risk of personal injury or equipment damage. The Allegra V-15R centrifuge weighs 110 kg (243 lb). Do not attempt to lift or move it without assistance. Follow your safety officer's instructions regarding lifting heavy objects.

Space and Location Requirements

⚠ WARNING

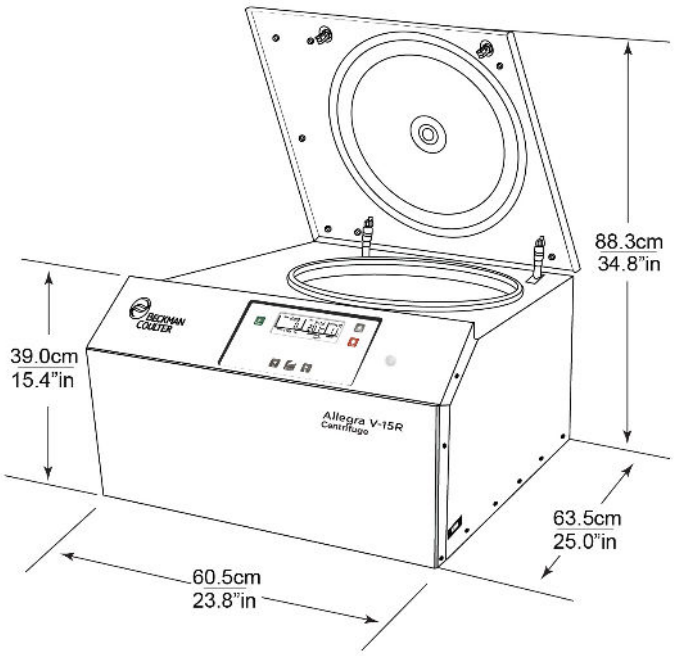
Risk of personal injury or equipment damage. Vapors from flammable reagents or combustible fluids could enter the centrifuge air system and be ignited by the motor. Do not use the centrifuge near areas of flammable liquids or vapors, and do not run such materials in the instrument.

Pertinent space and location requirements for the Allegra V-15R centrifuge are as follows:

- Locate the centrifuge away from heat-producing laboratory equipment.
- Locate the centrifuge in an area with sufficient ventilation to allow for sufficient heat dissipation.
- Position the centrifuge on a level surface, such as the Allegra V-15R Mobile Centrifuge Cart (see *Supply List*), a sturdy table, or a laboratory bench that is able to support the weight of the centrifuge and resist vibration (see CHAPTER 1, *Specifications* for weight).
- Make sure that all centrifuge feet are fully supported on the table.
- Check that there are adequate clearances at the sides and back of the centrifuge to ensure sufficient air circulation.

- Ambient temperatures during operation should not be lower than 5°C (41°F), or higher than 31°C (87.8°F) for the Allegra V-15R.
- Altitude should not exceed 2000 meters (6561.68 feet).
- Dimensions for the Allegra V-15R are shown in Figure A.1.
- Relative humidity should not exceed 75% (non-condensing).

Figure A.1 Allegra V-15R Centrifuge Dimensions (cm/in)



Unpacking

The centrifuge ships in a cardboard box on a wooden pallet. For easy access, remove the top of the box, the foam insert on top of the centrifuge, and then the upper part (sides) of the box and set them aside. When removing the centrifuge from the pallet, with assistance, consider the following:

⚠ WARNING

Risk of personal injury or equipment damage. The V-15R centrifuge weighs 110 kg (243 lb). Do not attempt to lift or move it without assistance. Follow your safety officer's instructions regarding lifting heavy objects.

- Always consider the weight of the centrifuge before lifting it.
- Always lift the centrifuge with the assistance of additional persons.
- When lifting the centrifuge, always reach under the centrifuge from the side.
- Position the centrifuge on a level surface, such as the Allegra V-15R Mobile Centrifuge Cart (see *Supply List* and also the Allegra V-15R Mobile Centrifuge Cart Instructions for Use (PN C63225)),

a sturdy table, or a laboratory bench that is able to support the weight of the centrifuge and resist vibration (see CHAPTER 1, *Specifications* for weight).

IMPORTANT Make sure that all feet are fully supported on the table.

- Remove the transport safety device. See *Removing Transport Safety Device*.
- Retain the packaging for any possible future transport of the centrifuge.

Removing Transport Safety Device

IMPORTANT The Transport Safety Device must be removed before operating the Allegra V-15R Centrifuge.

The Transport Safety Device consists of two Allen screws that secure the centrifuge's motor in place for shipping purposes. These two screws must be removed before the centrifuge can be used.

Removal

1 Lift the centrifuge at the front of unit, and tilt it backward to expose the bottom of the unit.

2 Stabilize the centrifuge by placing a suitable object, such as a wooden block, under the centrifuge. The two screws are on the bottom panel of the centrifuge. Refer to Figure A.2 and Figure A.3.

Figure A.2 Transport Safety Device

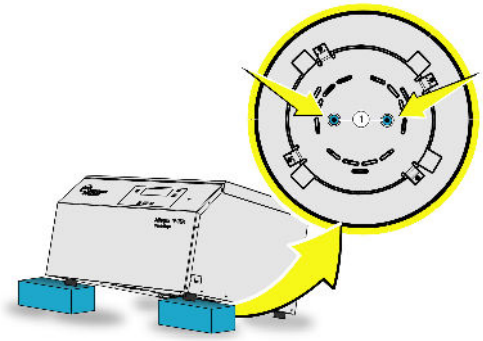
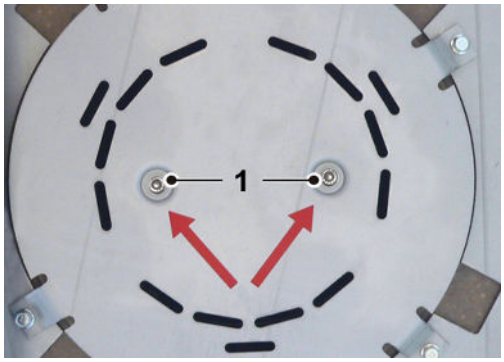


Figure A.3 Location of locking screws



1. Locking screws that must be removed

3 Using a #4 Allen wrench, turn the two Allen screws counterclockwise to remove the screws.

4 Save the transport safety device screws in case the centrifuge will have to be moved or shipped to a different location.

Electrical Requirements

DANGER

To reduce the risk of electrical shock, the instrument uses a three-wire electrical cord and plug to connect it to earth-ground. Make sure that the matching wall outlet receptacle is properly wired and earth-grounded.

- **Check that the line voltage agrees with the voltage listed on the name-rating plate affixed to the centrifuge.**
- **Never use a three-to-two wire plug adapter.**
- **Never use a two-wire extension cord or a two-wire non-grounding type of multiple-outlet receptacle strip.**
- **Do not place containers holding liquid on or near the chamber door. If spilled, liquid may get into the centrifuge and damage electrical components.**
- **The power line cord, for the Allegra V-15R, is the disconnecting device used to remove electrical power. Make sure there is adequate clearance around the centrifuge in order to reach the line cord.**
- **To ensure safety, the centrifuge should be wired to a remote emergency switch (preferably outside the room where the centrifuge is housed, or adjacent to the exit from that room) in order to disconnect the centrifuge from the main power source in case of a malfunction.**

To reduce the risk of electrical shock, this centrifuge comes with a 2.5-m (8-ft) three-wire electrical cord and plug to connect the centrifuge to earth-ground.

IMPORTANT Whenever possible, use the power cord supplied with the instrument.

In cases where the appropriate power cord is not included, a power cord that meets local electrical and safety requirements must be obtained.

Table A.1 Electrical Plugs and Outlets Suitable for Allegra V-15R

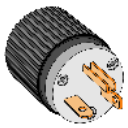
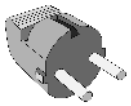
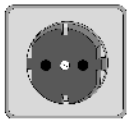
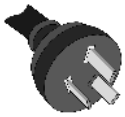
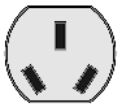
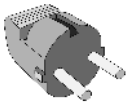
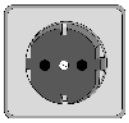
Part Number	Instrument Rating	Suitable Cord Plug	Suitable Cord Outlet
C63124, C63125	120 VAC, 60 Hz, 16A		
C63126, C63127	220-240, 50 Hz, 9.5A		
C63128, C63129	200 VAC, 50/60 Hz, 10.8A 208 VAC, 60 Hz, 10.3A		

Table A.1 Electrical Plugs and Outlets Suitable for Allegra V-15R *(Continued)*

Part Number	Instrument Rating	Suitable Cord Plug	Suitable Cord Outlet
C63161, C63190	220-240 VAC, 50 Hz, 9.5A		
C63186, C63187	220 VAC, 60 Hz, 10.3A		

Additional electrical specifications can be found in *Specifications*.

IMPORTANT If there is any question about voltage, have a qualified facility person measure it under load while the drive is operating.

IMPORTANT Mean power supply fluctuations are not to exceed +/-10% of the nominal supply voltage.

Test Run

NOTE The centrifuge must be plugged in and the power switch turned to the on position before the door can be opened.

We recommend that you make a test run to ensure that the centrifuge is in proper operating condition following shipment. See CHAPTER 2, *Operation* for instructions on operating the centrifuge.

APPENDIX B

Storage and Transport

Introduction

This Appendix provides storage requirements for the Allegra V-15R centrifuge, and information on preparing the centrifuge for shipping.

Sections in this chapter include:

⚠ WARNING

Risk of personal injury or equipment damage. The Allegra V-15R centrifuge weighs 110 kg (243 lb). Do not attempt to lift or move it without assistance. Follow your safety officer's instructions regarding lifting heavy objects.

Dimensions and Weight

Specification	Allegra V-15R
Height:	368.3 mm (14.5 in)
Height with open door:	844.5 mm (33.25 in)
Width:	604.5 mm (23.8 in)
Depth:	635 mm (25.0 in)
Weight:	110 kg (242.5 lbs)

Storage Conditions

Temperature and humidity conditions for storage should meet the environmental requirements described under *Specifications* in CHAPTER 1. The centrifuge can be stored in its original packaging for up to a year.

- Store the centrifuge only in dry rooms.
- The permissible storage temperature is between -20°C and +60°C.
- If you would like to store it for more than one year, or if you intend to ship it overseas, please contact us.

Notes On Transport

To ensure that the centrifuge does not get damaged, contact us for specific instructions and/or assistance in preparing the equipment for transport or long-term storage.

⚠ WARNING

Risk of personal injury or equipment damage. The Allegra V-15R centrifuge weighs 110 kg (243 lb). Do not attempt to lift or move it without assistance. Follow your safety officer's instructions regarding lifting heavy objects.

Adhere to the following recommendations in order to transport the centrifuge:

- Install the transport safety device. See Transport Safety Device section.
- Always consider the weight of the centrifuge before lifting it.
- Always lift the centrifuge with the assistance of additional persons.
- When lifting the centrifuge, always reach under the centrifuge from the side.
- For transport use suitable packaging and, if at all possible, the original packaging. See APPENDIX A, *Unpacking* for details about the original packaging.

Transport Safety Device

⚠ CAUTION

Risk of injury or equipment damage. The transport safety device screws must be inserted prior to transporting the centrifuge.

The Transport Safety Device consists of two Allen screws that are used on the bottom of the instrument (see Figure B.1 and Figure B.2). The two screws secure the centrifuge's motor in place for shipping purposes.

Installation

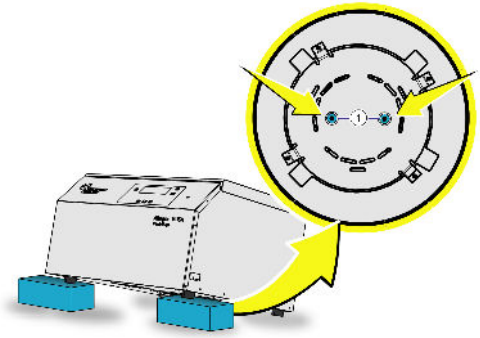
1. Lift the centrifuge from the front of unit and tilt it backward to expose the bottom of the unit.

2. Stabilize the centrifuge by placing a suitable object, such as a wooden block, under the centrifuge. Refer to Figure B.1.

3. Insert the two Allen Screws that were removed during the initial instrument installation into the holes in the bottom of the centrifuge. Align the holes in the motor to allow the screws to engage the motor.

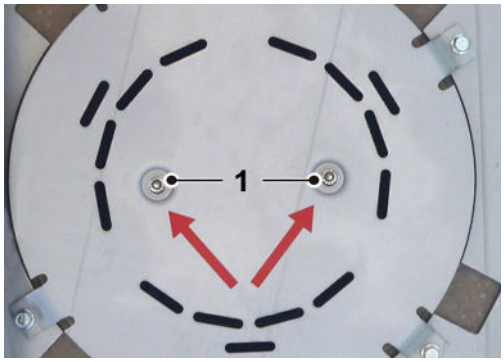
4. Using a #4 Allen wrench, tighten the two Allen screws (see Figure B.2) in a clockwise direction to secure the motor.

Figure B.1 Transport Safety Device



1. Transport Safety Device screws properly installed

Figure B.2 Location of locking screws



APPENDIX C

Acceleration and Deceleration Profiles

Introduction

This Appendix provides additional information about the acceleration and deceleration profiles used by the Allegra V-15R centrifuge.

Description of Allegra V-15R Profiles

The acceleration profiles produced by the Allegra V-15R are numbered 0 - 9 to reflect increasing acceleration rate with 9 being the maximum. The deceleration profiles are also numbered 0 - 9 to reflect increasing deceleration rate. Profile 0 decelerates without braking. See Table C.1.

Acceleration profile 9 provides the maximum rate of acceleration from 0 rpm to Set Speed. This profile is dependent on the moment of inertia of the rotor. For the other profiles, rotor inertia is only one factor that contributes acceleration time. Acceleration profiles 0 to 8 provide non-linear acceleration from 0 rpm to 1000 rpm. These profiles are intended to protect the sample while providing efficient acceleration. A linear slope is applied for speeds above 1000 rpm.

Deceleration profile 9 provides the maximum rate of deceleration from Set Speed to 0 rpm. This profile is dependent on the moment of inertia of the rotor. Deceleration profiles 8 to 1 provide non-linear deceleration from 1000 rpm to 0 rpm. These profiles are also intended to protect the sample while providing efficient deceleration. When decelerating from set speed to 1000 rpm, a linear slope is applied.

A table representation of the Allegra V-15R acceleration and deceleration profiles are shown in Table C.1.

Table C.1 Allegra V-15R Acceleration and Deceleration Profiles

Profile	Acceleration		Deceleration	
	Time to 1000 RPM (seconds)	Slope above 1000 RPM (rpm / sec)	Time to 1000 RPM (seconds)	Slope above 1000 RPM (rpm / sec)
9	Max		Max	
8	10	200	10	200
7	15	150	15	150
6	20	100	20	100
5	40	50	40	50
4	60	33	60	33

Table C.1 Allegra V-15R Acceleration and Deceleration Profiles *(Continued)*

Profile	Acceleration		Deceleration	
	Time to 1000 RPM (seconds)	**Slope above 1000 RPM (rpm / sec)**	**Time to 1000 RPM (seconds)**	**Slope above 1000 RPM (rpm / sec)**
3	80	25	80	25
2	100	20	100	20
1	118	17	118	17
0	200	10	Coast (no brake)	

Abbreviations

A — Ampere

Btu — British thermal unit

bps — Bits per second

°C — Degrees Celsius or Degrees Centigrade

CE — Conformite European Marking signifying compliance with applicable European directives

cm — Centimeter

dBA — Decibel

°F — Degrees Fahrenheit

ft — Foot or feet

g — Grams

h — Hour

Hz — Hertz

ID — Identification

IEC — International Electrical Commission

in. — Inches

ISO — International Organization for Standardization

kg — Kilograms

kW — Kilowatt

L — Liter

lb — Pound

LCD — Liquid crystal diode

m — Meter

mL — Milliliter

mm — Millimeter

n — Number

NRTL — Nationally Recognized Testing Laboratory

PN — Part number

RCF — Relative Centrifugal Force

Rmax — Maximum radius

RPM — Rotations per minute

SDS — Safety data sheets

V — Volt

Vac — Volts of alternating current

W — Watt

WEEE — Waste Electrical and Electronic Equipment

Index

T

V

W

Beckman Coulter, Inc.
Allegra V-15R Centrifuge Warranty

Subject to the exceptions and upon the conditions specified below and the warranty clause of the Beckman Coulter, Inc. terms and conditions in effect at the time of sale, Beckman Coulter agrees to correct either by repair or, at its election, by replacement, any defects of material or workmanship which develop within two (2) years after delivery of an Allegra V-15R Refrigerated Centrifuge (the product), to the original buyer by Beckman Coulter or by an authorized representative, provided that investigation and factory inspection by Beckman Coulter discloses that such defect developed under normal and proper use.

Some components and accessories by their nature are not intended to and will not function for as long as two (2) years. A complete list of such components or accessories is maintained at the factory and at each Beckman Coulter District Sales Office. The lists applicable to the products sold hereunder shall be deemed to be part of this warranty. If any such component or accessory fails to give reasonable service for a reasonable period of time, Beckman Coulter will repair or, at its election, replace such component or accessory. What constitutes either reasonable service and a reasonable period of time shall be determined solely by Beckman Coulter.

Replacement

Any product claimed to be defective must, if requested by Beckman Coulter, be returned to the factory, transportation charges prepaid, and will be returned to Buyer with the transportation charges collect unless the product is found to be defective, in which case Beckman Coulter will pay all transportation charges.

Conditions

Beckman Coulter makes no warranty concerning products or accessories not manufactured by it. In the event of failure of any such product or accessory, Beckman Coulter will give reasonable assistance to the Buyer in obtaining from the respective manufacturer whatever adjustment is reasonable in light of the manufacturer's own warranty.

Beckman Coulter shall be released from all obligations under all warranties, either expressed or implied, if the product(s) covered hereby are repaired or modified by persons other than its own authorized service personnel, unless such repair in the sole opinion of Beckman Coulter is minor, or unless such modification is merely the installation of a new Beckman Coulter plug-in component for such product(s).

Disclaimer

IT IS EXPRESSLY AGREED THAT THE ABOVE WARRANTY SHALL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND OF THE WARRANTY OF MERCHANTABILITY AND THAT BECKMAN COULTER, INC., SHALL HAVE NO LIABILITY FOR SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY KIND WHATSOEVER ARISING OUT OF THE MANUFACTURE, USE, SALE, HANDLING, REPAIR, MAINTENANCE, OR REPLACEMENT OF THE PRODUCT.

Related Documents

Allegra V-15R Rotors
Instructions For Use
PN C63132

Allegra V-15R Mobile Centrifuge Cart
Instructions For Use
PN C63225

Allegra V-15R Mobile Centrifuge Cart
Mobile Cart Safety Notice
PN C63374

Allegra V-15R Centrifuge
Pre-installation Guide
PN C63194

Allegra V-15R Centrifuge
Transport Safety Notice
PN C63370

Chemical Resistances for Beckman Coulter
Centrifugation Products
PN IN-175

Available in hard copy or electronic PDF by request.

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