Instructions For Use

Allegra X-5

Centrifuge

Rx Only in the U.S.A.

CE IVD

PN B29071AE
April 2017

Beckman Coulter, Inc.
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BECKMAN COULTER

Allegra X-5 Centrifuge
Instructions for Use
PN B29071AE (April 2017)

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

- Worldwide, find us via our website at www.beckmancoulter.com/customersupport/support
- In the USA and Canada, call us at 1-800-369-0333.
- Outside of the USA and Canada, contact your local Beckman Coulter Representative.

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Printed in the U.S.A.

Revision Status

This document applies to the latest software listed and higher versions. When a subsequent software version affects the information in this document, a new issue will be released to the Beckman Coulter website. For labeling updates, go to www.beckmancoulter.com and download the latest version of the manual or system help for your instrument.

Initial Issue 29071AA, 7/2013

Issue AB, 12/2015

Changes were made to: *CE Mark*

Issue AC, 03/2016

Changes were made to: Australian EMC Compliance Label, Preparation and Loading.

Issue AD, 04/2016

Changes were made to: Symbols and Labels.

Issue AE, 04/2017

Changes were made to: APPENDIX B, *Table of Hazardous Substance's Name and Concentration*.

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

Safety Notice

Read all product manuals and consult with Beckman Coulter-trained personnel before attempting to operate the 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.

Alerts for Danger, Warning, Caution, Important, and Note

⚠ 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. It may also be used to alert against unsafe practices.

IMPORTANT IMPORTANT is used for comments that add value to the step or procedure being performed. Following the advice in the Important adds benefit to the performance of a piece of equipment or to a process.

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 centrifuge weighs 77 kg/169 lb. DO NOT attempt to lift or move it without assistance from a lifting device and/or another person.

⚠ WARNING

Risk of personal injury. Any servicing of this equipment that requires removal of any covers can expose parts which involve the risk of electric shock or personal injury. Make sure that the power switch is turned off and the instrument is disconnected from the main power source by removing the Main (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.

Electrical Safety

To reduce the risk of electrical shock, this equipment uses a three-wire electrical cord and plug to connect this equipment to earth-ground. To preserve this safety feature:

- 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 instrument.
- 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 they spill, liquid may get into the instrument and damage electrical or mechanical components.
- Work on the power supply system must be performed by certified electricians.
- Inspect the electrical equipment of the unit regularly. Defects such as loose or burnt cables must be eliminated immediately.

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. Do not centrifuge such materials (such as chloroform or ethyl alcohol) or materials which could react chemically with sufficient vigor to cause a HAZARD, nor handle or store them within the 30 cm (1ft) clearance envelope surrounding the centrifuge. Do not use the centrifuge in hazardous locations.

Mechanical Safety

For safe operation of the equipment, observe the following:

- Use only the rotor 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.
- If a glass tube breaks inside the chamber bowl, be careful when examining or cleaning the gasket or chamber, as sharp glass fragments may be embedded in their surfaces.
- NEVER attempt to override the door interlock system while the rotor is spinning.
- Maintain a 30 cm (12 in.) 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 (12 in.) area surrounding the centrifuge. Never lean on the centrifuge or place items on the centrifuge while it is operating.
- Never operate the instrument without a rotor installed.

Chemical and Biological Safety

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 instrument 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. 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 appropriate environmental health and safety guidelines.
- Do not centrifuge materials that could result in a hazardous chemical reaction.

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

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Introduction

Intended Use

For *In Vitro* Diagnostic Use.

This Allegra X-5 centrifuge is intended for the separation of components through the use of relative centrifugal force.

It is designed to separate human samples, including blood and other body fluids, for processing, analysis, and *in vitro* diagnostic testing, as well as non-human body samples and chemicals, including industrial and environmental samples.

This centrifuge should be operated by qualified personnel only.

Certification

The Beckman Coulter Allegra X-5 Centrifuge is manufactured in a facility that maintains certifications to ISO 9001:2008 or ISO 13485:2003. It 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.beckmancoulter.com.

Scope of Manual

This manual is designed to familiarize you with the Beckman Coulter Allegra X-5 Centrifuge, its functions, specifications, operation, and routine operator care and maintenance. Beckman Coulter recommends that you read this entire manual, especially the *Safety Notice* section and all safety related information, before operating the centrifuge or performing instrument maintenance.

The following introductory pages contain the instrument specifications, as well as space, electrical, and temperature conditions required for optimal centrifuge performance. A list of available rotors is also included.

- CHAPTER 1, *Description* provides a brief physical and functional description of the centrifuge and the operating controls and indicators.
- CHAPTER 2, *Operation* contains centrifuge operating procedures.
- CHAPTER 3, *Troubleshooting* lists diagnostic messages and other possible malfunctions, together with probable causes and suggested corrective actions.
- CHAPTER 4, *Care and Maintenance* contains procedures for routine operator care and maintenance, as well as a brief list of supplies and replacement parts.

- APPENDIX A, *Installation* contains instructions for installing and connecting the centrifuge.

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.

Conventions

Certain symbols are used in the product labeling to call out safety-related and other important information. These international symbols may also be displayed on the centrifuge and are reproduced on the inside of the back cover of this manual.

Typographic Conventions

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

- Key names (for example, **START** or **ENTER**) and *display names* (for example, **TIME** or **SPEED**) appear in bold type.
- *Cursor keys*, used to increment values up or down when setting parameters, are shown as up and down arrows (▲ or ▼).

CFC-Free Centrifugation

To ensure minimal environmental impact, no CFCs are used in the manufacture or operation of Allegra X-5 centrifuges.

Symbols and Labels

This section provides information for some labels and symbols appearing on the Allegra X-5 instrument housing. These labels and symbols may be associated with user-serviceable procedures. Individual hazards associated with a specific procedure in this manual may use these labels and symbols, and are included in Warnings or Cautions within the procedures for that task.

Biohazard

This caution symbol indicates biohazardous risk from possible patient specimen contamination.

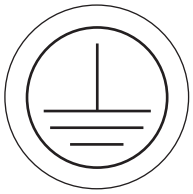
Caution Symbol

This symbol indicates a caution message and appears adjacent to an explanation or other symbols that define the caution.

High Voltage Danger

This symbol indicates high voltage is present or that there is a risk of electric shock when working in this area. Operation, replacement or servicing of any components where contact with bare, live hazardous parts could occur, possibly resulting in electric shock, should only be performed by your Beckman Coulter representative.

Protective Ground



This symbol is used to indicate a protective ground. This instrument must be properly grounded. Do not under any circumstances operate the instrument unless it is properly grounded.

Recycling Label

This symbol 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:

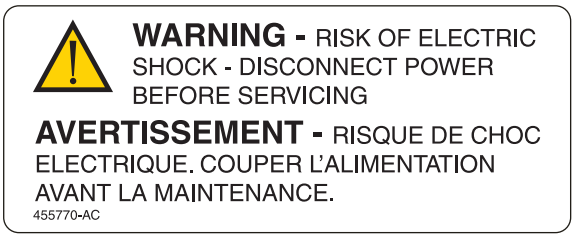
- the device was put on the European Market after August 13, 2005 and
- the device is not to be disposed of via the municipal waste collection system of any member state of the European Union.

It is very important that customers understand and follow all laws regarding the proper decontamination and safe disposal of electrical equipment. For Beckman Coulter products bearing this label, please contact your dealer or local Beckman Coulter office for details on the take-back program that will facilitate the proper collection, treatment, recovery, recycling and safe disposal of the device.

Risk of Fire Warning

Before replacing fuses, shut off power and disconnect the power cord. Failure to do so can cause electric shock and/or equipment damage. Replace fuses only with approved type and rating replacement fuse.

Electric Shock Warning



Operation, replacement or servicing of any components where contact with electronic components could occur can result in electric shock, and should only be performed by your Beckman Coulter representative.

Rotor Rotation

This label indicates the direction of the rotor rotation.

China RoHS Caution Label

This label and materials declaration table (APPENDIX B, *Table of Hazardous Substance's Name and Concentration*) are to meet People's Republic of China Electronic Industry Standard SJ/T11364-2006 "Marking for Control of Pollution Caused by Electronic Information Products" requirements.

This label indicates that this electronic information product contains certain toxic or hazardous elements, and can be used safely during its environmental protection use period. The number in the middle of the logo is the environmental protection use period for the product.The outer circle indicates that the product can be recycled. The logo also signifies that the product should be recycled immediately after its environmental protection use period has expired. The date on the label indicates the date of manufacture.

Australian EMC Compliance Label

The C-Tick mark is intended for use on products that comply with Australian Communication Authority (ACA) EMC Requirements.

CE Mark

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.

Consult IFU Label

This label indicates that the Instructions for Use should be referred to for more information.

IVD Label

This label indicates an In Vitro diagnostic medical device.

TUV-NRTL Label

This label indicates recognition by a Nationally Recognized Test Laboratory (NRTL) that the instrument has met the relevant product safety standards.

CHAPTER 1

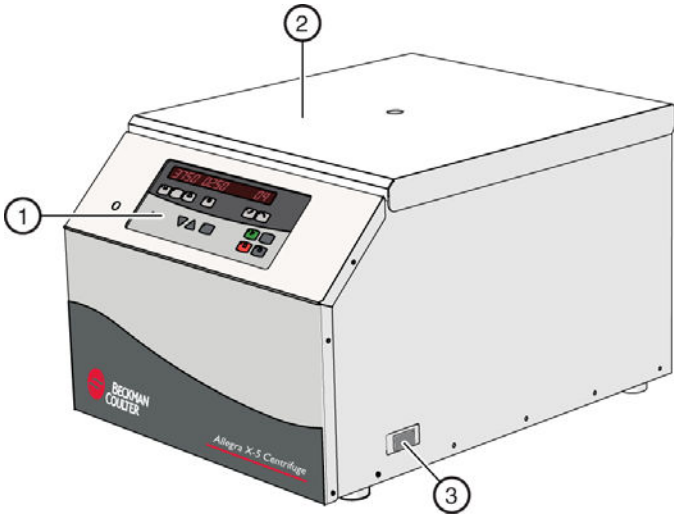
Description

Introduction

This chapter provides a brief physical and functional description of the Beckman Coulter Allegra X-5 Centrifuge. The operating controls and indicators are also described; instructions for their use are in CHAPTER 2, Operation. Chemical compatibilities of materials listed in this manual can be found in Chemical Resistances (*publication IN-175). Refer to the applicable rotor manuals for rotor descriptions.*

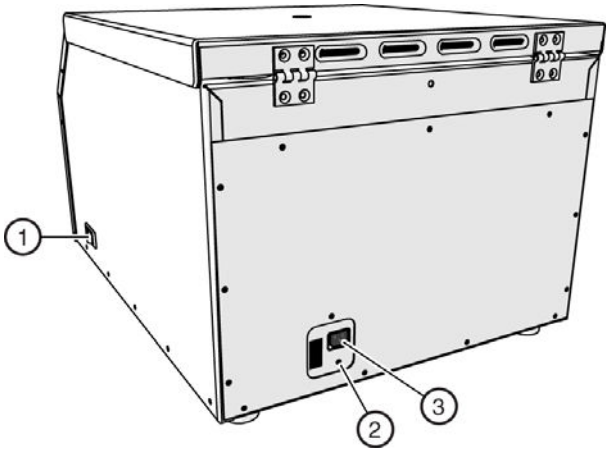
Centrifuge Function and Safety Features

Figure 1.1 Front View



1. User Interface
2. Door
3. Main Power Switch

Figure 1.2 Back View



1. Main Power Switch
2. Ground Screw
3. Mains Power Input

Centrifuge Function

The Beckman Coulter Allegra X-5 bench top centrifuge generates centrifugal forces required for a variety of applications. Together with the Beckman Coulter rotor designed specifically for use in this centrifuge, the applications include:

- Routine clinical sample processing of serum, plasma, whole blood and other body fluids.
- Rapid sedimentation of protein precipitates, particulates and cells from clinical samples.
- Processing of samples for in-vitro cytotoxicity studies, receptor binding studies and other specialized tests.

The centrifuges are microprocessor-controlled, providing interactive operation. The instrument design features a brushless three-phase drive system, automatic rotor overspeed identification system, and a choice of acceleration/deceleration rates. User messages and a series of audible tones alert the operator to conditions that may need attention. (Instructions for disabling the audible tones are in CHAPTER 2, *Operation*.)

Safety Features

The Allegra X-5 Centrifuge has been designed and tested to operate safely indoors at altitudes up to 2000 m (6562 ft).

Instrument safety features include:

- An electromechanical door-locking mechanism prevents operator contact with spinning rotors. When the door is closed it locks automatically. It can be unlocked only by pressing the OPEN DOOR key, and opened only when the power is on and the rotor is at rest.
- A steel barrier surrounds the rotor chamber to provide full operator protection.

- An overspeed system continuously monitors the rotor during centrifugation. The system includes a magnetic sensor on the drive motor. Throughout the run, checks are made to ensure that the rotor does not exceed set speed.
- An imbalance detector monitors the rotor during the run, causing automatic shutdown if rotor loads are severely out of balance. If the Audible Tones are enabled, a sound signal (beep) is also emitted (see CHAPTER 2, *Enabling or Disabling the Audible Tones*). 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 surface.
- The centrifuge feet, made of rubber, have been designed to minimize possible rotation in the event of a rotor mishap.

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 coated polycarbonate (Figure 1.1 and Figure 1.2).

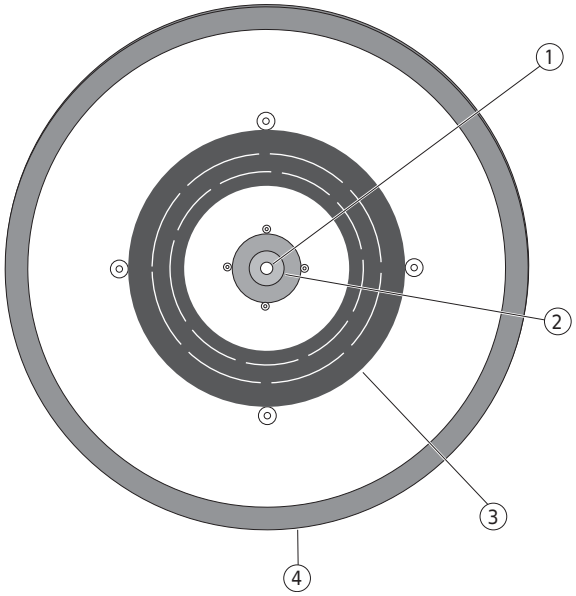
Door

The door is made of a solid sheet of steel, encased in foam molding. In the center of the door is a window for strobe viewing. The door is secured to the housing by two hinges. 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. (A light-emitting diode [LED] on the **OPEN DOOR** key lights up when the door can be opened.) In the event of a power failure, the door lock can be manually released for sample recovery (see CHAPTER 3, *Troubleshooting*).

Rotor Chamber

The rotor chamber is shown in Figure 1.3. The drive shaft, mounting plate, and a rubber boot surrounding the drive shaft are visible in the chamber bottom. A gasket system around the chamber opening ensures sealing. (Instrument gaskets have not been designed as bioseals for aerosol containment.)

Figure 1.3 Interior View of the Rotor Chamber



1. Drive Shaft
2. Tapered Sleeve
3. Boot
4. Gasket

Drive

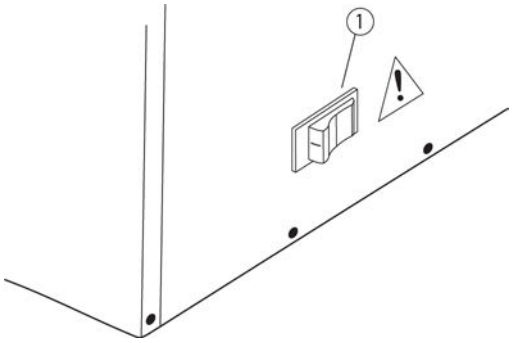
The asynchronous three-phase direct-drive motor is brushless for clean, quiet operation. A tie-down screw is used to attach the rotor to the drive shaft. The resilient suspension ensures that loads are not disturbed by vibration, and prevents damage to the drive shaft if an imbalance occurs during centrifugation.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

Controls and Indicators

Power Switch

The power switch is located on the centrifuge right side panel (see Figure 1.4). This two-position rocker switch (**I**, on; **O**, off) controls electrical power to the centrifuge.

Figure 1.4 The Power Switch



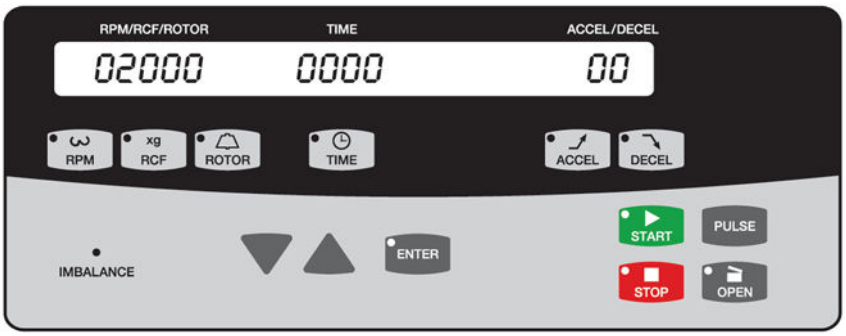
1. Power Switch

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

Control Panel

The control panel is mounted at an angle on the front of the centrifuge and includes system keys, programming keys, and digital displays (see Figure 1.5). The panel also contains an **IMBALANCE** light that flashes if rotor loads are severely out of balance.

Figure 1.5 The Control Panel



System Keys

The centrifuge operation is controlled through the system keys. Each key (except the **PULSE** key) has an LED in the upper left corner that lights to indicate that the key can be activated.

START 	Pressing the **START** key causes the centrifuge run to begin. This key can also be used to abort a deceleration process and restart the centrifuge.
STOP 	The **STOP** key can be pressed to end a run. It operates in two modes, depending on how you press it: • **Normal stop** (press and release): The centrifuge decelerates to a complete stop according to the preselected deceleration rate. Deceleration can be terminated and the centrifuge restarted by pressing **START** again. The centrifuge emits a series of audible tones when the rotor reaches 0 RPM. (Instructions for disabling the tones are in CHAPTER 2, *Operation*.) • **Fast stop** (press and hold for at least two seconds): The centrifuge decelerates to a complete stop at the maximum rate. The deceleration cannot be interrupted; the centrifuge can only be restarted after the rotor stops and the door is opened and closed.
OPEN DOOR 	Pressing the **OPEN DOOR** key unlatches the centrifuge door locks and allows the door to be opened. The centrifuge accepts this command only when the rotor is completely stopped and the **OPEN DOOR** key LED is lit.
PULSE 	Pressing the **PULSE** key causes the installed rotor to accelerate at the maximum rate up to the set speed for short-duration runs (as long as the key is pressed). Deceleration, at the maximum rate, begins when the key is released.

Program Keys

The program keys are used to set run parameters (a program consists of all of the parameters for a run). Except for the cursor and **ENTER** keys, program keys are located beneath the applicable digital displays, which show the parameters as they are input. Each key (except for the cursor keys) has an LED in the upper left corner that lights to indicate operational readiness. The LEDs also blink if an incorrect parameter is entered.

Cursor Keys 	The cursor keys are up and down arrow keys, which can be pressed to increment values up or down when setting parameters.
ENTER 	Parameter (speed, time, temperature, and acceleration or deceleration profile) changes made while a run is in progress must be verified by pressing the **ENTER** key.
RPM 	When the **RPM** key is pressed the last digit in the **RPM**/**RCF**/**ROTOR** display (**0**) flashes, indicating that the speed can be entered in increments of 100 revolutions per minute (RPM). After the run starts, the actual RPM of the rotor is displayed.
RCF 	The **RCF** key can be used to select the speed setting by required relative centrifugal field (RCF). The corresponding RPM is automatically calculated and displayed during the run. If the **RCF** key is pressed during the run, the RCF value is shown in the **RPM**/**RCF**/**ROTOR** display.
ROTOR 	Pressing the **Rotor** key displays the rotor number.

TIME 	The **TIME** key is used to select the run duration. When the **TIME** key is pressed, the last digit on the **TIME** display flashes, indicating that the time can be entered with the cursor keys. • Timed run — Run time up to 9 hours and 59 minutes can be set. If the minutes parameter exceeds 59, it is automatically converted into hours. • Continuous run — If a run time of less than 1 minute or more than 9 hours and 59 minutes is selected, continuous operation is activated, and an infinity symbol (∞) is displayed. Time is not counted down, and the run continues until the **STOP** key is pressed.
ACCEL 	The **ACCEL** key is used to select acceleration rates that protect delicate gradients. When the **ACCEL** key is pressed, the **ACCEL/DECEL** display flashes, indicating that one of ten preset rates can be entered with the cursor keys (9 is the fastest rate and 0 is the slowest rate). Acceleration rates are described in CHAPTER 2, *Acceleration/Deceleration Times (in minutes:seconds)*.
DECEL 	The **DECEL** key is used to select deceleration rates that maintain optimum separation while protecting delicate gradients. When the **DECEL** key is pressed, the **ACCEL/DECEL** display flashes, indicating that one of ten preset rates can be entered with the cursor keys (9 is the fastest rate and 0 is a no-brake coast to stop). Deceleration rate selections are described in CHAPTER 2, *Acceleration/Deceleration Times (in minutes:seconds)*.

Digital Displays

Digital displays indicate rotor speed, run time, and numbers that represent selected acceleration and deceleration profiles (see Figure 1.6). When the power is turned on, they show the most recently entered parameters, before the power was turned off. The displays serve a dual purpose:

- When the run parameters are being set (the input mode), the displays show the set values (those selected by the operator). When a run parameter key (for example, **TIME** or **RPM**) is pressed, the appropriate display flashes to indicate that data can be entered.
- The *actual* (real-time) operating conditions of the centrifuge are displayed during the run, after **START** is pressed.

NOTE Error messages (see Table 3.1, Error Message Chart) also appear on the displays, when applicable. The centrifuge emits a series of audible tones to alert the user to an error condition.

Figure 1.6 Digital Displays

RPM/RCF/ROTOR	• *In input mode* the RPM/RCF/ROTOR display shows the value of the parameter being set, depending on the programming key pressed (**RPM**, **RCF**, or **ROTOR**). For example, if the **ROTOR** programming key is pressed, the rotor number appears on the **RPM/RCF/ROTOR** display. • *During centrifugation*, the **RPM/RCF/ROTOR** display shows the speed of the rotor in RPM. If the **RCF** key is pressed while the centrifuge is running, the RCF value is displayed.
TIME	• During a *timed run* (between 1 minute and 9 hours, 59 minutes), the **TIME** display begins counting down when the rotor starts to spin and continues the countdown until deceleration begins. The **TIME** display indicates the remaining run time in hours and minutes. • During a *continuous run* (less than 1 minute or more than 9 hours, 59 minutes selected), countdown time is not displayed. Instead, the infinity (∞) symbol, indicating continuous operation, lights up and the **TIME** display shows time elapsed since the run start. After 9 hours and 59 minutes the timer resets to 0 and continues counting elapsed time.
ACCEL/DECEL	The **ACCEL/DECEL** display shows the acceleration profile that was selected for the run. The deceleration profile number can be displayed by pressing the **DECEL** key.

Name Rating Plate

The name rating plate is affixed to the right side of the centrifuge. Check that the line voltage agrees with the voltage listed on this name rating plate before connecting the centrifuge. Always mention the serial number and the model number shown when corresponding with Beckman Coulter regarding your centrifuge.

Specifications

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

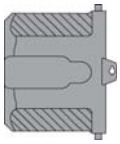
Speed Set speed Speed control Speed display	 100 to 4700 RPM (in 100-RPM increments) actual rotor speed, ±50 RPM of set speed actual rotor speed in 100-RPM increments *or* in RCF (when selected)
Time Set time Time display	 1 min. to 9 hr 59 min, (in 1 min. increments), time remaining in run (timed run ±1 minute) *or* ∞ and elapsed time (continuous run)
Acceleration	10 acceleration rates
Deceleration	10 deceleration rates
Ambient temperature range	5 to 40°C
Humidity restrictions	<80% (noncondensing)

Maximum altitude	2000 m (6562 ft).
Dimensions Width Depth Height, door closed Height, door open	 49.6 cm (19.5 in.) 63.4 cm (25.0 in.) 39.0 cm (15.3 in.) 88.0 cm (34.6 in.)
Weight	77 kg (169 lb)
Clearances (sides)	30 cm (11.8 in.)
Electrical requirements 120-V instrument 200 V instrument 220–240-V instrument	 120 VAC, 12A, 60 Hz 200 VAC, 10A, 50/60 Hz 220–240 VAC, 9A, 50/60 Hz
Electrical supply	Class I
Maximum heat dissipation into room under steady-state conditions	3750 BTU/h (1.1 kW)
Noise level at max. speed (approx.)	≤67 dBa
Installation (overvoltage) category	II
Pollution degree[a]	2

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

Rotor

See the *SX4700 User Manual* for information on rotor use, care and maintenance, and rotor accessories.

Rotor Profile	Description	Max RPM	Max RCF (x g)	Max Capacity (mL)	Rotor Part Number/ Rotor Manual Number
	SX4700 Swinging Bucket r_{max} = 181 mm	4700	4470	100 x 10 mL 140 x 5/7 mL	B30593/B30343

CHAPTER 2

Operation

Introduction

This section contains operating procedures for the centrifuge, using the Beckman Coulter rotor designed for use in this centrifuge. Refer to the rotor manual for instructions on preparing the rotor for centrifugation.

NOTE If the centrifuge is used in a manner other than that specified in this manual, the safety and performance of this equipment could be impaired.

⚠ WARNING

Risk of personal injury or contamination. Normal operation may involve the use of solutions and test samples that are pathogenic, toxic, or radioactive. Operator error or tube failure may generate aerosols. Do not run potentially hazardous materials in this centrifuge unless all appropriate safety precautions are taken. Always use the appropriate rotors and adapters.

Handle all infectious samples according to good laboratory practices and methods to prevent the spread of disease. Ask your laboratory safety officer to advise you about the level of containment required for your application and about the proper decontamination or sterilization procedures to follow if fluids escape from containers. 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. Because spills may generate aerosols, observe proper safety precautions for aerosol containment.

⚠ WARNING

Risk of personal injury or property damage. The centrifuge must not be used in the vicinity of flammable liquids or vapors, and such materials should not be run in the centrifuge. During operation you should come within the 30 cm (12 in.) clearance envelope only to adjust the instrument controls, if necessary. Never bring any flammable substances within the 30 cm (12 in.) area surrounding the centrifuge. Do not lean on the centrifuge or place items on the centrifuge while it is operating.

Run Procedure

The following detailed operating procedures are summarized at the end 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.

Preparation and Loading

NOTE Before installing the rotor, lubricate it following the instructions in the rotor manual.

1 Check the name rating plate for the correct voltage, then plug the power cord into the wall receptacle.

2 Press the power switch to on (**I**).

3 Press the **OPEN DOOR** key and lift the door up; it remains in the open position.

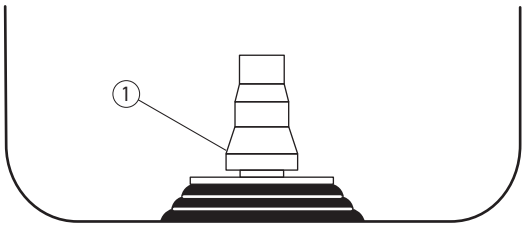
4 Use the T-handle wrench to turn the rotor tie-down screw to the left (counterclockwise).

a. Remove the tie-down screw.

5 Make sure that the tapered sleeve is in place at the base of the centrifuge drive shaft before installing the rotor (see Figure 2.1) and wipe the sleeve to be sure that it is clean and dry.

- The rotor rests on the sleeve while spinning, and does not operate properly if the sleeve is missing.

Figure 2.1 Tapered Sleeve Position



1. Tapered Sleeve

NOTE If the tapered sleeve comes off, it must be replaced by a Beckman Coulter Field Service representative. Contact us.

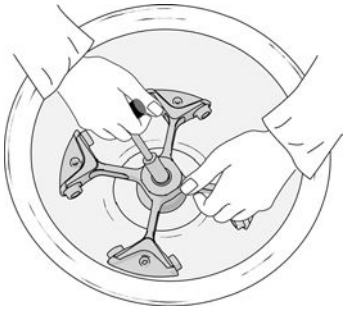
⚠ CAUTION

Risk of equipment damage. Do not drop the rotor onto the drive shaft. The shaft can be damaged if the rotor is forced sideways or dropped onto it. Install the rotor by centering it over the shaft and carefully lowering it straight down.

6 Install the rotor according to the instructions in the rotor manual.

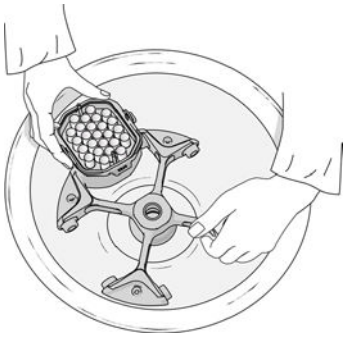
a. Lower the rotor straight down onto the drive shaft.

b. Tighten the tie-down screw clockwise onto the drive shaft.



c. Seat the filled buckets onto the yoke pins.

- Be sure to fill all positions on the yoke with buckets.



⚠ CAUTION

Risk of equipment damage. An improperly loaded rotor can cause severe vibration. Always run the rotor with a balanced load.

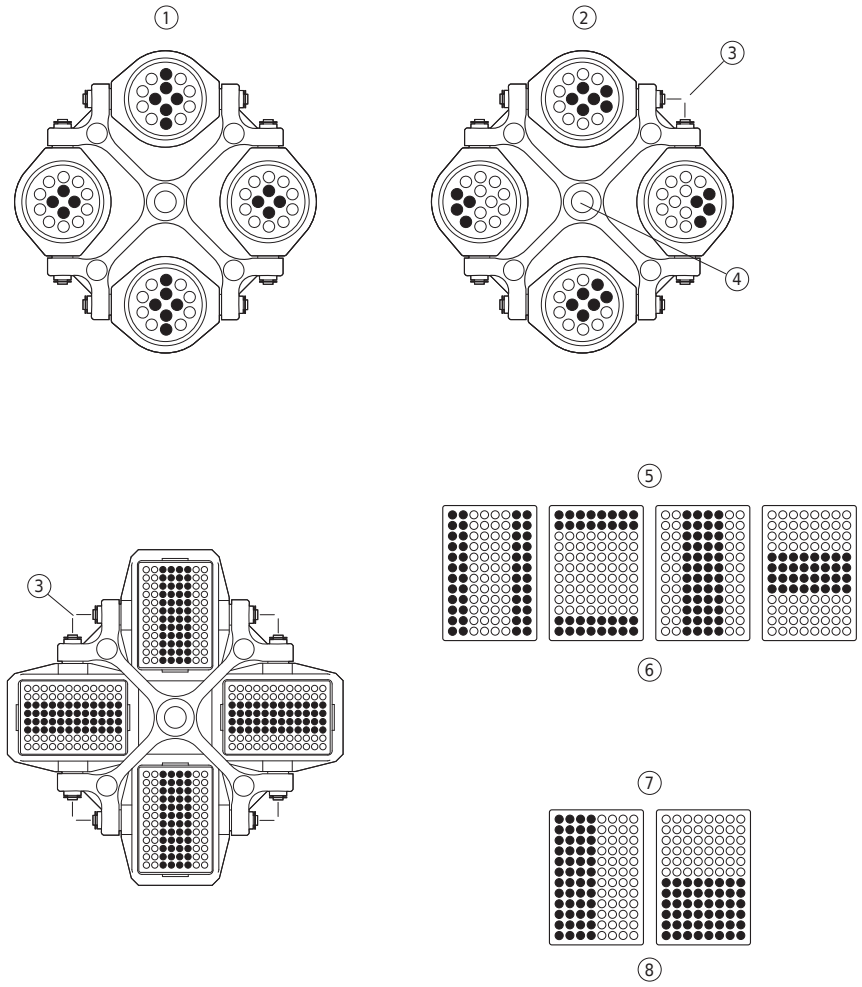
7 Close the centrifuge door and push firmly down on both sides of the door front until you hear a clicking (latching) sound.

8 Remove the rotor from the centrifuge if a long period between runs is anticipated.

⚠ CAUTION

If the rotor is left in the centrifuge between runs, make sure the rotor is seated on the drive shaft and the tie-down screw is tight before each run.

Figure 2.2 Examples of Correctly and Incorrectly Loaded Buckets and Carriers



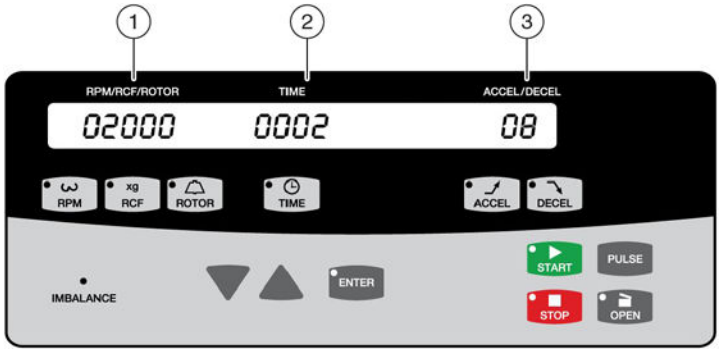
1. Balanced Load
2. Unbalanced Load
3. Pivotal Axis of Bucket
4. Center of Rotation
5. CORRECT
6. Examples of Symmetrically Loaded Multiwell Plates (load opposite plates the same way)
7. INCORRECT
8. Examples of Nonsymmetrically Loaded Multiwell Plates

NOTE Contents of opposing buckets must be the same and each bucket must be balanced on its pivotal axis.

Entering Run Parameters

When the power is applied for the first time (no previous runs), default values are displayed (see Figure 2.3). After the initial use, the parameters of the most recent run are displayed when power is applied.

Figure 2.3 Default Parameters



1. Accelerate rotor to 2000 RPM.
2. Continue run for two minutes.
3. Use acceleration profile 8.

Setting Run Speed

Centrifuge speed can be set for up to the maximum rated speed of the rotor. Either revolutions per minute (RPM) or relative centrifugal field (RCF) can be used to select speed. During centrifugation, the **RPM/RCF/ROTOR** display indicates the actual run speed (RPM) of the rotor.

Setting RPM

1 Press the **RPM** key.

- The last digit on the **RPM/RCF/ROTOR** display (**0**) flashes, indicating that the RPM can be entered (in 100-RPM increments) with the cursor keys.

2 Press the ▲ or ▼ cursor key until the required RPM is displayed.

- The corresponding RCF is automatically calculated by the centrifuge, but the RPM value is displayed during the run.
- You can check the RCF during the run by pressing the **RCF** key while the centrifuge is running.

Setting RCF

1 Press the **RCF** key.

- The last digit on the **RPM/RCF/ROTOR** display (**0**) flashes, indicating that you can enter the RCF.

2 Press the ▲ or ▼ cursor key until the required RCF is displayed.

- The corresponding RPM is automatically calculated and the centrifuge runs at the calculated speed.

Setting Run Time

Run time can be set for either a timed run or continuous operation.

Timed Run
Time can be set for up to 9 hours and 59 minutes (if the minutes parameter entered exceeds 59, it is automatically converted into hours). During centrifugation, the **TIME** display begins counting down when the rotor starts to spin, and continues the count-down until deceleration begins. The **TIME** display shows the time remaining in the run in hours and minutes. When the time display reaches zero, the run ends.

Continuous Run
If a run time of less than 1 minute or more than 9 hours and 59 minutes is selected, continuous operation is activated. Time is not counted down during continuous operation; instead, the infinity (∞) symbol, indicating continuous operation, lights up and time elapsed from the start of the run is displayed. The run continues until the **STOP** key is pressed.

1 Press the **TIME** key.

The last digit on the **TIME** display flashes, indicating that the time can be entered with the cursor keys.

2 Press the ▲ or ▼ cursor key until the required run duration is displayed.

Setting Acceleration Rate

The **ACCEL** key is used to select acceleration rates that protect delicate gradients. When the **ACCEL** key is pressed, the **ACC/DEC** display flashes, indicating that one of the 10 preset acceleration rates can be entered with the cursor keys. The selected rate depends on the type of run you are performing. For pelleting runs, where sample mixing is not a concern, maximum acceleration (setting 9) can be used. However, if delicate gradients are being run, a lower setting may be needed. Acceleration rates are listed in Table 2.1.

1 Press the **ACCEL** key.

- The **ACC/DEC** display flashes, indicating that the selected rate number can be entered with the cursor keys.

2 Press the ▲ or ▼ cursor key until the required number is displayed.

Table 2.1 Acceleration/Deceleration Times (in minutes:seconds[a])

Profile	4700 RPM	
	Accel	**Decel**
9	0:38	0:24
8	0:37	0:32
7	0:45	0:52
6	1:23	1:28
5	2:08	2:11
4	2:47	2:50
3	4:22	4:24
2	8:43	8:44
1	11:37	11:38
0	17:27	coast

a. Times are approximate; actual times vary depending on the rotor load, run speed, and voltage fluctuations.

Setting Deceleration Rate

The **DECEL** key is used to select deceleration rates that maintain optimum separation. When the **DECEL** key is pressed, the **ACC/DEC** display flashes, indicating that one of the ten preset deceleration rates can be entered with the cursor keys. The selected rate depends on the type of run you are performing. For pelleting runs, where sample mixing is not a concern, maximum brake (setting 9) can be used. However, if delicate gradients are being run, a lower brake setting may be needed. Deceleration rates are listed in Table 2.1.

1 Press the **DECEL** key.

The **ACC**/**DEC** display flashes, indicating that the selected number can be entered with the cursor keys.

2 Press the ▲ or ▼ cursor key until the required number is displayed.

Starting a Run

The run can be started using the parameters in memory from a previous run, or using new or changed parameters that you enter using the procedure described above.

1 Check that all parameters are correct and the door is shut and latched.

2 Press the **ENTER** key, then the **START** key.

- The instrument displays the rotor speed as it accelerates, until it reaches and displays the speed entered.
- If the actual speed exceeds the rotor's maximum permitted speed of 4700 RPM, an error is displayed and the centrifuge shuts down.
  - See CHAPTER 3, *Troubleshooting* for information on error codes.
  - The error must be cleared and an appropriate speed entered before the centrifuge can be started.
  - Throughout the run, checks are made to ensure that the rotor does not exceed set speed.
- The **RPM**/**RCF**/**ROTOR** display indicates the rotor speed in RPM.
  - (The RCF can be checked by pressing the **RCF** key.)
- A blinking LED at the bottom of the **TIME** display indicates that the run is in progress.
  - This display also shows the time remaining in the run (or ∞ and elapsed time for continuous operation).

⚠ WARNING

Risk of personal injury. Do not attempt to override the door interlock system while the rotor is spinning or if there is any sound or vibration coming from the drive. Always wait for the rotor to come to a complete stop before attempting to open the centrifuge door.

⚠ CAUTION

Risk of personal injury or equipment damage. Do not lift or move the centrifuge while the rotor is spinning. Do not place items on the centrifuge during operation.

Pulse Function

The pulse function, accessed by pressing the **PULSE** key, is used for short-duration runs.

- When the **PULSE** key is pressed, the rotor accelerates at maximum rate to the set speed and continues to spin as long as the **PULSE** key is pressed. (The current run time, acceleration, and deceleration settings are overridden by the pulse function.) When the **PULSE** key is released, the rotor begins decelerating to 0 RPM using maximum deceleration. Using the pulse function eliminates the need to press the **START** and **STOP** keys.
- When the **PULSE** key is pressed, the **TIME** display begins displaying the elapsed seconds. When the **PULSE** key is released, the seconds stop accumulating. The **ACCEL/DECEL** display continues to show the user-entered settings during a pulse run even though the maximum rates are used.
- If the **PULSE** key is pressed while the rotor is running at set speed, the rotor continues running at speed until the **PULSE** key is released. When the **PULSE** key is released, the rotor begins decelerating to 0 RPM using maximum deceleration.
- The centrifuge memory retains the parameters of the last run performed before the **PULSE** key was pressed. At the end of a pulse run, after the centrifuge door is opened and closed the previous run parameters are displayed.

Changing Parameters During a Run

While a run is in progress, run parameters (speed, time, and acceleration or deceleration rate) can be altered without stopping the run. Run duration can also be changed from continuous to a specified time period, or from a specified time period to continuous.

NOTE The deceleration rate cannot be changed after deceleration starts.

Use the program keys as described under *Entering Run Parameters* (above) to change parameters. Parameter changes made during a run must be verified by pressing the **ENTER** key. For example, to change run speed during centrifugation:

1 Press the **RPM** key.

- The last digit on the **RPM/RCF/ROTOR** display flashes, indicating that the RPM can be raised or lowered with the cursor keys.

2 Press the ▲ or ▼ cursor key until the required RPM is displayed.

3 Press the **ENTER** key.

- The current RPM value is displayed, changing to the new value as the rotor accelerates or decelerates to the new speed selected.
  - The corresponding RCF is automatically calculated by the centrifuge.

Stopping a Run

A timed run ends automatically when the **TIME** display counts down to zero. The centrifuge emits a series of audible tones when the rotor reaches 0 RPM. (Instructions for disabling the audible tones are on page 2-11, *Enabling or Disabling the Audible Tones*.) To end a run in progress for any reason:

1 Press the **STOP** key for normal deceleration as selected by the deceleration profile.

(*or*)

Press and hold the **STOP** key for deceleration at the maximum rate (see Table 2.1).

NOTE If you hold the **STOP** key for at least two seconds, the deceleration process cannot be interrupted; the centrifuge cannot be restarted until the rotor comes to a complete stop and the door is opened and closed.

2 *After the rotor stops spinning* and the **OPEN DOOR** light comes on, press the **OPEN DOOR** key to release the door latches, then open the door.

Unloading

NOTE When you remove the rotor, make sure that the tapered sleeve from the centrifuge drive shaft does not come out with the rotor. If the tapered sleeve is inside the rotor drive hole, call Beckman Coulter Field Service (1-800-742-2345 in the United States; outside the U.S. contact your local Beckman Coulter office or visit us at www.beckmancoulter.com).

After completing a run, unload the rotor following the instructions in the rotor manual.

⚠ CAUTION

Risk of personal injury or contamination. If disassembly reveals evidence of leakage, you should assume that some fluid escaped the rotor. Apply appropriate decontamination procedures to the centrifuge and accessories according to the procedures outlined by your laboratory safety officer.

Enabling or Disabling the Audible Tones

The audible tones (beeps) that sound at the end of each run and if an error occurs can be turned on and off by following the steps below (rotor must be at 0 RPM).

1 Press the **STOP** key and hold for 3 seconds until the word "**Beep**" appears in the display.

2 Press either the ▲ or ▼ cursor key to turn the beeps on or off.

- (The word "**on**" or "**off**" is displayed to indicate the current setting.
  - The arrow keys toggle between on and off settings.)

3 Press **ENTER** to save the selection.

Summary of Run Procedures

1 Press the POWER switch to on (**I**).

a. Open the centrifuge door (press the **OPEN DOOR** key and lift the door up).

2 Make sure that the tapered sleeve is in place at the base of the centrifuge drive shaft before installing the rotor.

- The rotor does not operate properly if the sleeve is missing.

3 Install the rotor according to the instructions in the rotor manual.

- *Always run the rotor with a balanced load.*

4 Close the centrifuge door and push firmly down on it until you hear the latch engage.

5 Enter run parameters:

a. Set run speed — **RPM**, ▲ or ▼; *or* **RCF**, ▲ or ▼

b. Set run duration — **TIME**, ▲ or ▼

c. Select acceleration rate (0 through 9) — **ACCEL**, ▲ or ▼

d. Select deceleration rate (0 through 9) — **DECEL**, ▲ or ▼

6 Check that all parameters are correct and the door is shut and latched, then press **ENTER**, then **START**.

⚠ WARNING

Risk of personal injury. Do not attempt to override the door interlock system while the rotor is spinning or if there is any sound or vibration coming from the drive. Always wait for the rotor to come to a complete stop before attempting to open the centrifuge door.

⚠ CAUTION

Risk of personal injury or equipment damage. Do not lift or move the centrifuge while the rotor is spinning. Do not place items on the centrifuge during operation.

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

8 *After the rotor stops spinning* and the **OPEN DOOR** light comes on, press the **OPEN DOOR** key to release the door latch; open the door.

9 Unload the rotor according to instructions in the rotor manual.

⚠ CAUTION

Risk of personal injury or contamination. If disassembly reveals evidence of leakage, you should assume that some fluid escaped the rotor. Apply appropriate decontamination procedures to the centrifuge and accessories according to the procedures outlined by your laboratory safety officer.

CHAPTER 3

Troubleshooting

Introduction

This section lists possible malfunctions, together with probable causes and corrective actions required. Maintenance procedures are contained in CHAPTER 4, *Care and Maintenance*. *For any problems not covered here, contact us.*

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

User Messages

⚠ CAUTION

If the message SEr appears on the display, do not press any keys while the message is displayed. Turn the centrifuge power off (O) and back on (I) to clear the message. This message indicates that you have inadvertently accessed the service mode. Pressing any keys while in this mode could erase the centrifuge memory and critically interfere with future operation.

If a problem occurs during operation, the rotor decelerates to a stop, an error code appears on the **RPM/RCF/ROTOR** display, and the centrifuge emits a series of audible tones to alert the operator to the error condition. Such problems may result from incorrect input or from an equipment malfunction. Refer to Table 3.1 to determine the nature of the problem and recommended actions. If you are unable to correct the problem, contact us. To help diagnose and correct the problem, gather as much information about the situation as you can:

- Write down the error number that appears on the display.
- Note the operating situation when the error occurred (speed, load type, etc.).
- Note any unusual environmental and/or operating conditions (ambient temperature, voltage fluctuations, etc.).
- Add any other information that may be helpful.

NOTE Instructions for disabling the audible tones are in CHAPTER 2, *Operation*.

Table 3.1 Error Message Chart[a]

Error Number	Error Type	Recommended Action	Note
1-9	System Error	• Allow to slow down • Power off/on	All these errors stop the centrifuge or cause it to decelerate brakeless
10-19	Speedometer error	• Allow to slow down • Power off/on	
20-29	Motor error	• Power off • Ensure ventilation	
30-39	EEPROM error	• Allow to slow down • Power off/on	With error 34, 35, and 36, the centrifuge will stop; with error 37 and 38 only an error message will be given
46-49	Imbalance error	• Allow to slow down • Power off • Eliminate the imbalance	
50-59	Door error	• Press door key • Close door • Remove foreign matter from the opening of the door lock device	With error 50 and 51, the centrifuge will stop
60-69	Process error	• Allow to slow down • Power off/on	With error 60 message “power failure during run”, with error 61, the message “stop after power on”
70-79	Communication error	• Allow to slow down • Power off/on	
80-89	Parameter error	• Power off • Allow to cool down • Provide for better ventilation	With error 83, error message only
90-99	Other errors	• Check connections	

a. If the recommended action does not correct the problem, contact us.

Other Possible Problems

Possible malfunctions that may not be indicated by diagnostic messages are described in Table 3.2, along with probable causes and corrective actions required. Possible causes for each problem are listed in the probable order of occurrence. 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
Imbalance LED lights and rotor decelerates to stop	**1.** Rotor is out of balance	**1.** Check to be sure the rotor is in good condition and is loaded symmetrically around the center of rotation, with containers of equal weight and density opposite each other.
	2. Centrifuge is misaligned (tilted)	**2.** Align the centrifuge on the bench or table.
	3. Centrifuge was moved during operation	**3.** After the rotor comes to a complete stop, open and close the centrifuge door, then restart.
	4. Drive error (mechanical damage)	**4.** Contact us.
Rotor cannot achieve set speed	**1.** Line voltage below rating	**1.** Have a qualified service person measure line voltage while the instrument is operating.
	2. Electrical failure	**2.** Make sure both ends of the power cord are securely connected; contact us.
	3. Motor failure	**3.** Contact us.
Door does not open	**1.** Rotor spinning	**1.** Wait until the rotor stops.
	2. Power not on	**2.** Plug in the power cord; turn power on (**I**).
	3. Source power failure	**3.** See *Emergency Door Release* below.
	4. Latch stuck	**4.** See *Emergency Door Release* below.
Displays are blank	**1.** Power not on	**1.** Plug in the power cord; turn power on (**I**).
	2. Electrical failure	**2.** Make sure both ends of the power cord are securely connected; contact us.
	3. Fuse blown	**3.** System fuses cannot be replaced by the user. Contact us.

Emergency Door Release

If the facility power fails only momentarily, the centrifuge resumes operation when power is restored and the rotor returns to set speed. However, if the rotor comes to a complete stop you have to restart the run when the power is restored. In the event of an extended power failure, you may have to trip the door-locking mechanism manually to remove the rotor and retrieve your sample.

⚠ WARNING

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 by removing the Mains (power) plug from the outlet receptacle, and refer such maintenance to qualified service personnel.

1 Turn the Main power switch to off (**O**) and disconnect the power cord from the main power source by removing its power plug from the receptacle.

⚠ WARNING

Risk of personal injury. Do not attempt to override the door interlock system while the rotor is spinning or if there is any sound or vibration coming from the drive. Always wait for the rotor to come to a complete stop before attempting to open the centrifuge door.

2 Make sure that the rotor is not spinning.

3 Using a flat blade screwdriver, remove the plug from the opening on the left side of the control panel (Figure 3.1).

Figure 3.1 Location of the emergency door release. opening.

1. Emergency Release access opening

4 Insert the supplied 5mm T-handle Allen wrench (P/N B31161) wrench horizontally into the hole (Figure 3.2). The wrench will be guided through a funnel-shaped tube to the shaft of the door lock motor.

Figure 3.2 Insertion of Allen wrench.

5 Turn the Allen wrench counter-clockwise to unlock the door.

⚠ WARNING

Risk of personal injury. Do not unlock or open the door unless the rotor is at a complete stop.

⚠ DANGER

Risk of personal injury. Never try to slow or stop the rotor by hand. Always allow the rotor to come to a complete stop before performing any action inside the rotor chamber.

6 Remove the Allen wrench and replace the plug.

CHAPTER 4

Care and Maintenance

Introduction

For maintenance not covered in this manual, contact us. User messages are discussed in CHAPTER 3, Troubleshooting. Refer to the rotor manual and to Chemical Resistances (publication IN-175) for instructions on the care of rotors and their accessories.

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

⚠ WARNING

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

⚠ CAUTION

Risk of personal injury. Flammability hazard. Do not use Ethanol or other flammable liquids in or near operating centrifuges.

Maintenance

Preventive Maintenance

The following procedures should be performed regularly to ensure continued performance and long service life of the centrifuge.

1 Regularly inspect the interior of the rotor chamber for accumulations of sample, dust, or glass particles from broken sample tubes.

   a. Clean as required (see *Cleaning*, below), as these accumulations can result in rotor vibrations.

2 Regularly check the air intake and exhaust vents for obstructions.

   a. Keep vents clear and clean.

3 To prevent the rotor from sticking, lubricate the drive shaft with Spinkote at least once a month, and after each cleaning.

Cleaning

Frequent cleaning is recommended to prolong the life of the centrifuge. Always clean up spills when they occur to prevent corrosives or contaminants from drying on component surfaces.

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

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

2 Clean the drive shaft, shaft cavity, threads, and the tie-down screw at least once a week 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 with Spinkote after cleaning.

3 Wash the bowl using a mild detergent such as diluted Solution 555.

- **a.** Rinse thoroughly and dry completely.
- **b.** 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.

4 Clean the centrifuge case and door by wiping with a cloth dampened with diluted Solution 555.

Do not use acetone or other solvents.

Tube Breakage

If a glass tube breaks, and all the glass is not contained in the bucket or rotor, you must thoroughly clean the interior of the chamber bowl.

⚠ WARNING

Risk of personal injury. In the event of tube breakage, sharp glass fragments may be embedded in the surfaces of the sealing gasket or chamber. Be careful when examining or cleaning the sealing gasket or chamber.

1 Examine the door gasket to make sure that no glass particles are retained in it.

   a. Carefully remove any glass particles that may remain.

2 Carefully wipe away any glass particles that remain in the bowl.

Decontamination

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

Sterilization and Disinfection

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

⚠ CAUTION

Risk of personal injury. Flammability hazard. Do not use Ethanol or other flammable liquids in or near operating centrifuges.

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.

Storage and Transport

Storage

Before storing a centrifuge for an extended period, return it to its original shipping container to protect it from dust and dirt. Reinsert the shipping foam (removed at time of centrifuge installation) into the chamber, making sure the drive shaft is stabilized in the hole in the foam.

Temperature and humidity conditions for storage should meet the environmental requirements described in the specifications given in CHAPTER 1, *Description*.

Notes on Transport

- Install the Transport Safety Device (see *Transport Safety Device*)
- Always lift the centrifuge with a lifting device

Transport Safety Device

The Transport Safety Device consists of two Allen screws, located on the bottom of the instrument.

Installation

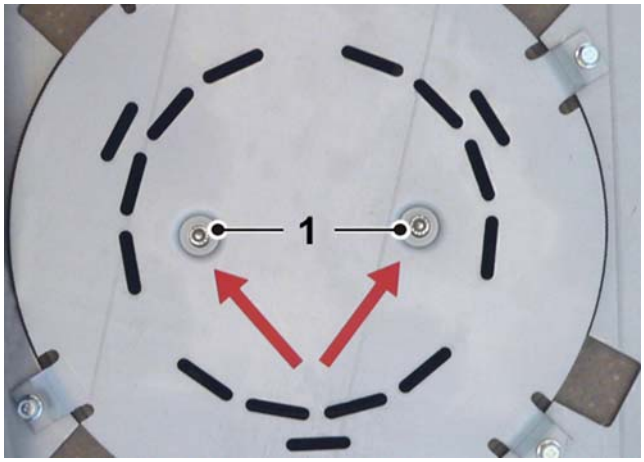
1. Lift the centrifuge from the front of unit and tilt it backward to expose the bottom of the unit.

2. Stabilize the centrifuge by placing a suitable object, such as a wooden block under the centrifuge.

3. Insert the two Allen Screws that were removed during the initial instrument installation (see APPENDIX A, *Transportation Safety Devices*) 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 in a clockwise direction to secure the motor.

Figure 4.1 Locking Screws (Transport Safety Device)



1. Locking Screws

Returning a Centrifuge

Before returning a centrifuge or accessory for any reason, prior permission must be obtained from Beckman Coulter, Inc. Contact us to obtain the authorization form and for packaging and shipping instructions.

To protect our personnel, it is the customer's responsibility to ensure that all parts are free from pathogens and/or radioactivity. Sterilization and decontamination must be done before returning the parts.

All parts must be accompanied by a signed note, plainly visible on the outside of the box, stating that they are safe to handle and that they are not contaminated with pathogens or radioactivity. ***Failure to attach this notification will result in return or disposal of the items without review of the reported problem.***

Install the Transport Safety Device (see *Transport Safety Device*), and if possible, return in the original packaging.

Supply List

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

Refer to the applicable rotor manual for materials and supplies needed for rotors.

Replacement Parts

NOTE For MSDS information, go to the Beckman Coulter website at www.beckmancoulter.com.

Description	Part Number
Rotor tie-down screw	368245
T handle rotor wrench, size 13	368246
Allen T wrench, size 5 emergency door release	B31161
Spinkote	306812

APPENDIX A

Installation

Introduction

This chapter contains instructions for installing and connecting the centrifuge. Check that required clearances and electrical power are available.

⚠ WARNING

Risk of personal injury or equipment damage. This centrifuge weigh 77kg/169 lbs. DO NOT attempt to lift or move it without assistance from a lifting device and/or another person.

Installing the Instrument

⚠ WARNING

Risk of personal injury or equipment damage. Do not place the centrifuge in or near areas containing flammable reagents or combustible fluids. Vapors from these materials could enter the centrifuge air system and be ignited by the motor.

⚠ WARNING

Risk of personal injury. Maintain a 30 cm (12 in.) clearance envelope around the centrifuge while it is running. During operation you should come within the 30 cm (12 in.) clearance envelope only to adjust the instrument controls, if necessary. Do not handle or store hazardous materials within the 30 cm (12 in.) area surrounding the centrifuge.

1 The centrifuge ships in a wooden 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.

   a. Then, *with the help of another person* and/or a lifting device, move the centrifuge from the pallet to its final position.

   - (Note the warning above regarding centrifuge weight.)

2 Position the centrifuge on a level surface, such as a sturdy table or laboratory bench that is able to support the weight of the centrifuge and resist vibration.

- Refer to CHAPTER 1, *Specifications* for weight.

a. Make sure that the centrifuge front feet are fully supported on the table.

b. Locate the centrifuge in an area with sufficient ventilation to allow for heat dissipation.

c. Check that there are 7.6-cm (3-in.) clearances at the sides of the centrifuge to ensure sufficient air circulation.

Dimensions are shown in Figure A.2. Additional clearance is required on the right side to allow access to the power switch.

The centrifuge must have adequate air ventilation to ensure compliance to local requirements for vapors produced during operation.

Ambient temperatures during operation should not be lower than 5°C (41°F) or higher than 40°C (104°F). Relative humidity should not exceed 80% (non condensing).

NOTE During transport between areas with varying temperatures, condensation may occur inside the centrifuge. Allow sufficient drying time before running the centrifuge.

Transportation Safety Devices

A sheet of foam rubber is installed in the rotor chamber at the factory. A hole in the center of the foam stabilizes the drive shaft during transport. On receipt of the centrifuge, remove the foam and store it in case future relocation of the centrifuge is necessary.

Transport Safety Device

The Transport Safety Device consists of two Allen screws, located on the bottom of the instrument. These screws lock the rotor in place and must be removed prior to operating the centrifuge.

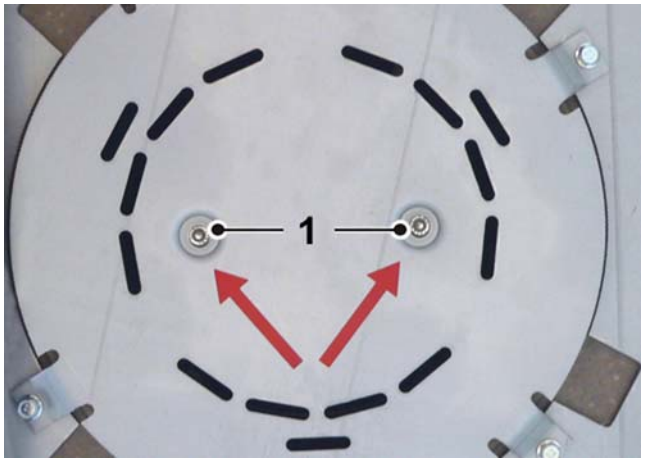
Removal

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.

3 Using a #4 Allen wrench, turn the two Allen screws counter-clockwise to remove them.

Figure A.1 Locking Screws (Transport Safety Device)



1. Locking Screws

4 Save the Transport Safety Device Screws for future transport of the centrifuge.

Electrical Requirements

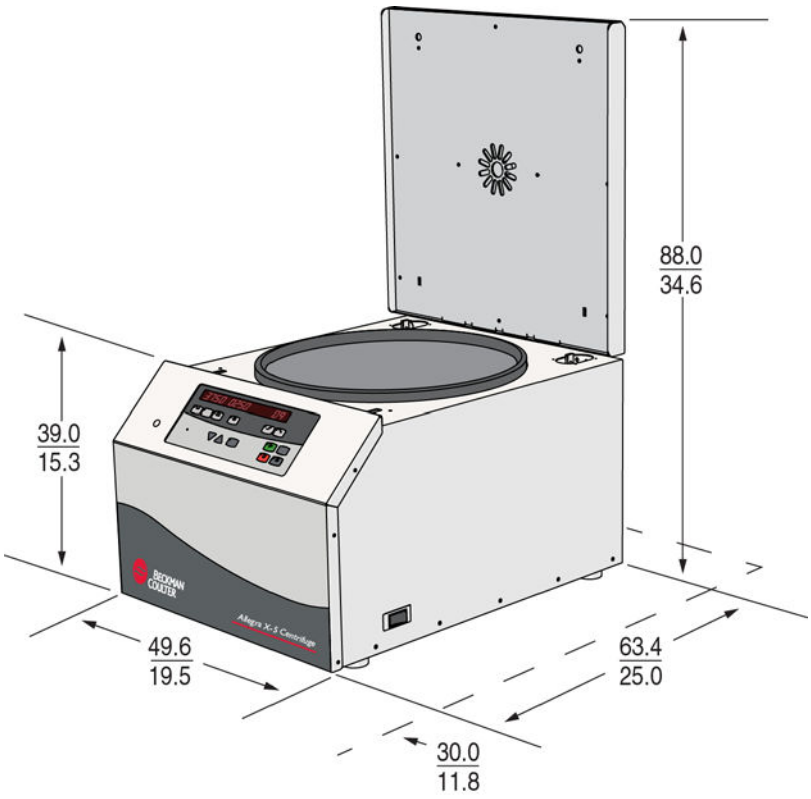
See the CHAPTER 1, *Specifications* for centrifuge electrical requirements.

Make sure the voltage and frequency imprinted on the name rating plate affixed to the right side of the centrifuge agree with the line voltage and frequency of the outlet used. Plug in both ends of the centrifuge power cord. If there is any question about voltage, have a qualified service person measure it under load while the drive is operating.

A 1.8-m (6-ft) power cord with grounded plug is supplied with the centrifuge. Make sure that the matching wall outlet is located near the centrifuge and is easily accessible.

NOTE The power plug serves as the Disconnecting Device and must remain easily accessible.

Figure A.2 Dimensions of the Centrifuge



NOTE Additional clearance is required on the right side to allow to allow access to the power switch.

⚠ WARNING

Risk of personal injury. Improper electrical connection could produce an electric shock. To reduce the risk of electrical shock, this equipment uses a three-wire electrical cord and plug to connect the centrifuge to earth-ground. To preserve this safety feature:

- **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.**

Test Run

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

Beckman Coulter recommends 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.

After completing the test run, log on to www.beckmancoulter.com to register your centrifuge. This validates the centrifuge warranty and ensures your receipt of further information regarding new accessories and/or modifications as they become available.

APPENDIX B

Table of Hazardous Substance's Name and Concentration

This materials declaration table (the Table of Hazardous Susbtance's Name and Concentration) and the *China RoHS Caution Label* are to meet People's Republic of China Electronic Industry Standard SJ/T11364-2006"Marking for Control of Pollution Caused by Electronic Information Products" requirements.

有毒有害物质名称及吉量的标识格式

Table of Hazardous Substance's Name and Concentration

电子电气产品号码 **EEP Part Number:** B30585, B30588	**产品名称 Product Name:** Benchtop Centrifuge **产品型号Product Model Number:** Allegra X-5

部件名称 Component Name	**有毒有害物质或元素 Hazardous Substances Name**					
	铅 Pb	**汞 Hg**	**镉 Cd**	**六价铬 Cr6+**	**多溴联苯 PBB**	**多溴二苯醚 PBDE**
印刷电路板组件 Printed Circuit Board Sub Assemblies	X	O	O	O	O	O
电缆组件 Cable Sub Assemblies	O	O	O	O	O	O
塑料部件 Plastic Parts	O	O	O	O	O	O
钣金部件 Sheet Metal	O	O	O	O	O	O
连接部件 （螺钉，螺栓等） Hardware (screws, bolts, etc.)	O	O	O	O	O	O
电源组件 Power Supply Sub Assembly	X	O	O	O	O	O

This table is prepared in accordance with the provisions of SJ/T 11364

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 GB/T 26572 标准规定的限量要求以下

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 标准规定的限量要求

（企业可在此处，根据实际情况对上表中打"X"的技术原因进行进一步说明）

O: Indicates that the toxic or hazardous substances contained in all of the homogenous materials for this part is below the limit requirements in GB/T 26572.

X: Indicates that this toxic or hazardous substance contained in at least one of the homogenous materials for this part is above the limit requirement in GB/T 26572.

Beckman Coulter, Inc.
Allegra X-5 Centrifuge Warranty

Subject to the exceptions and upon the conditions specified below, Beckman Coulter agrees to correct, either by repair, or, at its election, by replacement, any defects of material or workmanship which develop within one (1) year after delivery of the Allegra X-5 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 one (1) year. 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 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 NEITHER BECKMAN COULTER, INC. NOR ITS SUPPLIERS SHALL HAVE ANY 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.

English / Deutsch / Español / Français / Italiano / Português / Русский / 中文 / 日本語 / 한국어		
Symbol **Simbole** **Symbol** **символ** **Simbolo** 符号 **Symbole** 記号 **Simbolo** 상징	**Title / Titel / Titulo / Titre / Titolo / Titulo / Название** / 标题 / タイトル / 제목	
	Dangerous voltage Gefährliche electrische Spannung Voltaje peligroso Courant haute tension Pericolo: alta tensione	Tensão perigosa Опасное напряжение тока 危险电压 危険な電圧 위험한 전압
	Caution, consult accompanying documents Vorsicht, konsultieren Begleitdokumente Atención, consulta documentos adjuntos Attention, consultent des documents d'accompagnement Attenzione, consulta i documenti di accompagnamento	Cuidado, ulta documentos adjuntos Внимание, советует с сопроводительными документами 注意, 咨询附属单证 注意, 伴う文書に相談しなさい 주의, 동반 문서를 상담하십시오
	Biohazard Potentiell infektiösem Material Riesgo biológico Risque biologiqu Pericolo biologico	Material infeccioso potencial биологической опасности 可能的传染性物 潜在的な感染性物質 전염하는 물자
	On (power) Ein (Netzverbindung) Encendido Marche (mise sous tension) Acceso (sotto tensione)	Fora (o poder) На (мощности) 开（电源） ン（電源） 에 (힘)
	Off (power) Aus (Netzverbindung) Apagado Arrêt (mise sous tension) Spento (fuori tensione)	Fora de (poder) С (сила) （电源） ン（電源） 떨어져 (힘)
	Protective earth (ground) Schutzleiteranschluß Puesta a tierra de protección Liaison à la terre Collegamento di protezione a terra	Terra de proteção (terra) Защитное заземление (земля) 保护接地 保護アース（接地） 방어적인 지구 (지상)
	Earth (ground) Erde (Masse) La tierra (suelo) Terre (sol) Scarica a terra	Terra Земли 接地 アース（接地） 지구 (지상)
	In vitro diagnostic medical device In-vitro-diagnosemedizinisches Gerät Aparato médico de diagnóstico in vitro Appareil médical diagnostique in vitro Apparecchio medico diagnostico in vitro	In vitro dispositivo médico diagnóstico В медицинской службе диагностики vitro 体外诊断医疗设备 生体外の診断医療機器 생체외 진단 의료 기기
	Manufacturer Hersteller Fabricante Fabricant Fabbricante	Fabricante производитель 制造商 メーカー 제조자

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Symbol **Simbole** **Symbol** **символ** **Simbolo** 符号 **Symbole** 記号 **Simbolo** 상징	**Title / Titel / Titulo / Titre / Titolo / Titulo / Название** / 标题 / タイトル / 제목	
EC REP	Authorized representative in the European Community Autorisierter Repräsentant in der Europäischen Gemeinschaft Representante autorizado en la Comunidad Europea Représentant autorisé dans le Communauté européen Rappresentante autorizzato nella Comunità Europea	Representante autorizado na Comunidade Européia Утвержденный представитель в сообществ 在欧共体的授权代表 欧州共同体の承認された代表 유럽 공동체에 있는 허가한 대표자
	Consult Instructions for Use Konsultieren Sie Anwendungsvorschriften Consulte las instrucciones para el uso Consultez les instructions pour l'usage Consulti le istruzioni per uso	Consulte instruções para o uso Советуйте с инструкциями для пользы 咨询使用说明书 使用説明に相談しなさい 사용 설명을 상담하십시오

Related Documents

SX4700 Swinging-Bucket Rotor Instructions for Use
PN B30343

Chemical Resistances for Beckman Coulter Centrifugation Products
PN IN-175

Use and Care of Tubes and Bottles
PN IN-192

Available in hard copy or electronic pdf by request.

Available at www.beckmancoulter.com

www.beckmancoulter.com

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