Instructions for Use

StatSpin Cytofuge 2 System Model Number M801-22

This manual is intended for

CF02 - Cytofuge 2 for 100 to 240 VAC, 50/60 Hz

55-003074-001FE
December 2021

Beckman Coulter, Inc.
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BECKMAN COULTER

Instructions for Use
StatSpin Cytofuge 2 System Model Number M801-22
PN 55-003074-001FE (December 2021)

Trademarks

Find us on the World Wide Web at:
www.beckmancoulter.com

Original Instructions

Revision History 55-003074-001

FE (December, 2021)

- Added: Product Description
- Added Updated the following:

  Copyright page
  Symbols and Definitions
  Safety Notices Warning and Cautions throughout
  Intended Use
  Limited Warranty and Disclaimer
  Audible Indicators
  Dilution
  Cell and Filter Concentrators
  Installing the System
  Preconcentration
  Quick Start Instructions
  Specifications
  Spin the Sample

FD (September, 2018)

- Moved: Symbol/Regulatory Mark and a link to the website in the California Proposition 65 statement

FC (March, 2018)

- Added: Symbols and Definitions table
- Updated: Manufacturer address, Limited Warranty statement, Warning and Cautions, Quick Start Instructions, and Spin the Sample
- Deleted: CE, and EC Rep

FB (September, 2016)

- Converted the Cytofuge 2 Cytocentrifuge System Operator's Manual to a Beckman Coulter Instructions for Use (IFU)
- Made general clarifications to the IFU
- Update the Logo
- Deleted "In Vitro Diagnostics", and IVD symbol
- Added warning and caution statements, and updated existing warning and caution statements
- Added the Recycling Label information

- Updated specifications, symbol tables, error codes, troubleshooting and maintenance sections
- Updated Limited Warranty statement

Safety Notice

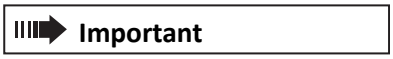
Read all product manuals and consult with Beckman Coulter-trained personnel before you operate the system. Do not perform any procedure before you carefully read all instructions. Always follow the product labels and the manufacturer's recommendations. If you have any questions:

- Visit http://www.beckmancoulter.com.
- US customers: Contact Beckman Coulter Customer Support at 1-800-854-3633.
- International customers: Contact your local distributor.

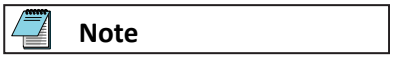
Alerts for Warning, Caution, Important, Note, and Tip

Warning indicates a potentially hazardous situation which can cause death or serious injury. Warning can indicate the possibility of erroneous data that could cause an incorrect diagnosis.

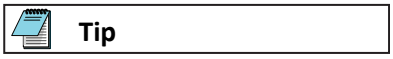
Caution indicates a potentially hazardous situation which can cause minor or moderate injury. Caution can also alert against unsafe practices, or indicate the possibility of erroneous data that could cause an incorrect diagnosis.



Important indicates important information to follow.



Note indicates notable information to follow.



Tip indicates information to consider.

Warnings and Cautions

Pay close attention to the instructions that accompany the notes and symbols and the standard laboratory procedures outlined by your facility and local regulatory agencies.

Warning

Always operate the system with the cover closed and secured to avoid injury.

Perform system operations with caution.

Wear Personal Protective Equipment (PPE) such as gloves, eye shields, and lab coats.

Wash hands thoroughly after contact with sample media and all maintenance activities.

Observe all laboratory policies and procedures related to the handling of biohazardous materials.

Refer to the applicable sources (such as Safety Data Sheets) for specific hazard information.

Warning

Do not expose the rotor to strong or concentrated acids, bases, esters, aromatic or halogenated hydrocarbons, ketones, strong oxidizing agents, or environmental influences, including natural ultra-violet radiation. Doing so will subject the rotor to corrosion or weakening of the construction.

Warning

Do not operate the centrifuge below the minimum operating temperature. Do not store the rotor below the minimum storage temperature. Doing so will subject the rotor materials to damage. See Specifications.

Warning

Handle and dispose of sharp fragments according to the World Health Organization's Laboratory Biosafety Manual and relevant local and national regulations.

Warning

Safety protection may be impaired if the equipment is used in a manner not specified by the manufacturer.

Warning

Inspect the instrument for cracks or any physical damage to housing, cover, and rotor upon the receipt of the unit. Damage can cause unsafe operation; if damage or cracks are found, discontinue use until repairs have been performed.

Warning

Only reset the cycle counter after conducting the recommended inspections and service. Resetting the cycle counter without performing the recommended inspections and service reduces the reliability and safety of the instrument.

Warning

Only use the external power supply (Beckman Coulter Part Number X01-003553-001) included with the unit. Use of any other external power supply can cause damage to the unit and will void the warranty.

Warning

Outside of North America: do not use the power cord supplied. Use power cord for at least 1.0 Amp with an IEC320/CEE22 female connector and male connector suitable for the power outlet to be used.

Warning

Picking up or moving the centrifuge during operation can cause injury to the operator and/or damage to the centrifuge.

Warning

Electromagnetic Compatibility

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.

This equipment is designed for use in a PROFESSIONAL HEALTHCARE FACILITY ENVIRONMENT. It is likely to perform incorrectly if used in a HOME HEALTHCARE

ENVIRONMENT. If it is suspected that performance is affected by electromagnetic interference, correct operation may be restored by increasing the distance between the equipment and the source of the interference.

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.**

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Caution

Disconnect the power cord of the external power supply from the electrical outlet before performing maintenance or inspection.

Caution

Do not spray cleaning solutions directly onto the centrifuge bowl or housing. Overspray can reach the motor bearings or internal circuitry, causing harm to the electronics and could also cause corrosion or weakening of the construction of the protective casing.

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. Cleaning and decontamination may be necessary as a safeguard before laboratory centrifuges, rotors, and any accessories are maintained, repaired, or transferred.

Caution

During operation maintain a 30 cm (12 inch) clearance around the centrifuge. The clearance must be free from obstruction and away from the edge of the surface that the centrifuge is on. The appliance coupler on the external power supply is considered the power source disconnect device, ensure that is is accessible after installation.

Caution

Follow Universal Precautions with all biological specimens, regardless of whether the specimen is known to contain an infectious agent. (See References)

Caution

Inspect rotor on a routine basis. Rotor lifespan depends on usage. Inspect the rotor for cracks and replace the rotor immediately when any crack or visible wear occurs.

Caution

Never operate the Cytofuge 2 without the rotor cover in position.

Caution

Never operate the centrifuge without the rotor properly mounted. Failure to install and secure the rotor correctly can damage the centrifuge.

Caution

Running the centrifuge repeatedly with an unbalanced load condition can cause excessive vibrations and premature equipment failure.

Caution

The cover interlock bypass is for emergency use only. Disconnect the power cord of the external power supply from the electrical outlet and ensure the rotor has come to a complete stop before using the interlock bypass. If the equipment is not used correctly, safety can be impaired.

Caution

The instructions prohibit use of the specified materials within the centrifuge

- **flammable or explosive materials.**
- **materials which could react chemically with sufficient vigor to cause a hazard.**

Caution

The Cytofuge 2 is designed to use only the model CFRT-2 rotor. The use of any other rotor may result in a hazard.

Caution

Addition of excess amounts of liquid (overfilling) to Cell or Filter Concentrator causes the fluid to spin out during centrifugation.

Caution

Be careful when replacing the rotor. Confirm that the two locator pins are in the corresponding holes in the rotor. Do not over tighten the Rotor Hold-Down Nut (3-lobed). Make certain it is replaced with the flat surface facing up.

Caution

Never use any tool to tighten either the rotor hold-down nut (3-lobed) or the cover nut.

Please use the instrument as intended. Improper use may cause damage to the instrument, inaccurate results, or potentially nullify warranties.

Symbols and Definitions

Table 1 Cytofuge 2 Symbols Glossary

Symbol	Description
	**Warning; Biological hazard** This symbol indicates a warning of a biological hazard. *ISO 7010. Graphical Symbols - Safety colors and safety signs. #W009* **Supplemental Product-Specific Manufacturer Information** This symbol indicates a caution to operate only with all covers in position to decrease risk of personal injury or biohazard. This symbol indicates the use of biohazardous materials in the area. Use caution when working with possible infectious samples. Wear Personal Protective Equipment (PPE) such as gloves, eye shields, and lab coats. Handle and dispose of biohazardous materials according to your laboratory procedures.
	**Consult instructions for use** This symbol indicates the need for the user to consult the instructions for use. *ISO 15223-1. Medical devices - Symbols to be used with medical device labels, labelling and information to be supplied - Part 1: General Requirements. #5.4.3*

Table 1 Cytofuge 2 Symbols Glossary (Continued)

Symbol	Description
	**Caution** This symbol indicates the need for the user to consult the instructions for use for important cautionary information such as warnings and precautions that cannot, for a variety of reasons, be presented on the medical device itself. *ISO 15223-1. Medical devices - Symbols to be used with medical device labels, labelling and information to be supplied - Part 1: General Requirements. #5.4.4*
	**Warning; Crushing of hands** This symbol indicates a warning of a closing motion of mechanical parts of equipment. *ISO 7010. Graphical Symbols for electrical equipment in medical practices. #W024* **Supplemental Product-Specific Manufacturer Information** Use caution to avoid injury to hands when close to equipment with moving mechanical parts.
	**Moving Parts Symbol** This symbol indicates that there are moving parts in the area. Only operate the system when all covers are in position and use caution to reduce the risk of personal injury. While the system is operating, do not touch the moving parts of the system. Do not insert fingers or hands into any system opening.
	**cNRTLus Certification Mark** This symbol indicates recognition by a Nationally Recognized Testing Laboratory (NRTL) that the system has met the relevant product safety standards for the United States and Canada. *OSHA, CEC*
	**RCM Symbol** This symbol indicates compliance with the Australian Communications Media Authority (ACMA) requirements (safety and EMC) for Australia and New Zealand.

Table 1 Cytofuge 2 Symbols Glossary (Continued)

Symbol	Description
	**Recycling Symbol** This symbol is required by the Waste Electrical and Electronic Equipment (WEEE) Directive of the European Union. This symbol indicates that: 1. The device was put on the European Market after August 13, 2005. 2. The device is not to be disposed of via the municipal waste collection system of any member state of the European Union. Customers must understand and follow all laws regarding the correct decontamination and safe disposal of electrical equipment. For Beckman Coulter products bearing this label, contact your dealer or your local Beckman Coulter Representative for more information on the take-back program that facilitates the correct collection, treatment, recovery, recycling, and safe disposal of these products. *EU Directive 2002-96-EC: waste electrical and electronic equipment (WEEE)* 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.
	**RoHS Caution Symbol** This symbol 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 indicates the environmental protection use period (in years) 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. These labels and materials declaration table (the Table of Hazardous Substance's Name and Concentration) meet People's Republic of China Electronic Industry Standard SJ/T11364-2006 *Marking for Control of Pollution Caused by Electronic Information Products* requirements.
	**"OFF" (power)** This symbol indicates disconnection from the mains, at least for mains switches or their positions, and all those cases where safety is involved. *IEC 60417: Graphical symbols for use on equipment - Overview and application, #5008* **Supplemental Product-Specific Manufacturer Information** This symbol indicates the off position.

Table 1 Cytofuge 2 Symbols Glossary (Continued)

Symbol	Description
	**"ON" (power)** This symbol indicates connection to the mains, at least for mains switches or their positions, and all those cases where safety is involved. *IEC 60417: Graphical symbols for use on equipment - Overview and application, #5007* **Supplemental Product-Specific Manufacturer Information** This symbol indicates the on position.
	**Alternating current** This symbol indicates on the rating plate that the equipment is suitable for alternating current only; to identify relevant terminals. *IEC 60417: Graphical symbols for use on equipment - Overview and application, #5032*
	**Direct current** This symbol indicates on the rating plate that the equipment is suitable for direct current only; to identify relevant terminals. *IEC 60417: Graphical symbols for use on equipment - Overview and application, #5031*
	**Date of Manufacture** This symbol indicates the date when the medical device was manufactured. *ISO 15223-1. Medical devices - Symbols to be used with medical device labels, labelling and information to be supplied - Part 1: General Requirements. #5.1.3*
	**Manufacturer** This symbol indicates the medical device manufacturer. *ISO 15223-1. Medical devices - Symbols to be used with medical device labels, labelling and information to be supplied - Part 1: General Requirements. #5.1.1* **Supplemental Product-Specific Manufacturer Information** This symbol indicates who the legal manufacturer of the product is.

Table 1 Cytofuge 2 Symbols Glossary (Continued)

Symbol	Description
REF	**Catalogue Number** This symbol indicates the manufacturer's catalogue number so that the medical device can be identified. *ISO 15223-1. Medical devices - Symbols to be used with medical device labels, labelling and information to be supplied - Part 1: General Requirements. #5.1.6*
SN	**Serial number** This symbol indicates the manufacturer's serial number so that a specific medical device can be identified. *ISO 15223-1. Medical devices - Symbols to be used with medical device labels, labelling and information to be supplied - Part 1: General Requirements. #5.1.7*
Made in *Country of Origin*	**Country of Origin Symbol** This symbol indicates the country that the product was manufactured in.
Info for USA only: California Proposition 65 WARNING Cancer & Reproductive Harm www.P65Warnings.ca.gov	**California Proposition 65** This symbol indicates that this product can expose you to chemicals known to the State of California to cause Cancer and Reproductive Harm. For more information go to https://www.P65Warnings.ca.gov.
CONTENTS	**Contents** Indicates product contents.
	Temperature limitation Indicates storage requirements limit.
NON STERILE	**Non-sterile** Indicates non-sterile product.
	Do not reuse Indicates product is single use only.
LOT	**Batch Code** Indicates product lot number.
	Use by Indicates product expiration date.

Table 1 Cytofuge 2 Symbols Glossary (Continued)

Symbol	Description
	**Error or Service Indicator** The red LED, identified as Error or Service, is illuminated continuously or flashing when service is required.
	**Start button** The **Start** button initiates the pre-timed cycle at a fixed speed.
	**Stop or Open button** The **Stop** or **Open** button interrupts the cycle and stops the centrifugation. This button can also be used to release the cover.
	**Power indicator** The Green LED, identified as power, is illuminated when the Cytofuge 2 is connected to a power source.
	**Release cover** Located below the **Stop** or **Open** button on the instrument front panel.
	**Time selector** Available time settings: 2, 4, 6, 8, 10, and 30 minutes.
	**Speed Selector** Available speed settings: 600, 700, 850, 1,000, 1,300, 1,600, 2,200, and 4,400 rpm.
	**Polarity of d.c. power connector** This symbol indicates the positive and negative connections (the polarity) of a direct current power supply, or the positive and negative connections on a piece of equipment to which a direct current power supply may be connected. *IEC 60417: Graphical symbols for use on equipment - Overview and application, #5926*

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CHAPTER 1

Installation

Inspecting the Packaging

The Cytofuge 2 and its accessories are delivered in one carton. If the centrifuge or accessories have suffered any damage in transport, inform your carrier immediately.

Note

Save shipping carton and components to simplify return if service is required.

Confirming the Contents

The package contains:

- One Cytofuge 2 cytocentrifuge (Model No. M801-22)
- One External Power Supply (Beckman Coulter Part No. X01-003553-001)
- One grounded line cord (for North American use only)
- One Instructions for Use
- One Accessory Carton
- One Warranty Card – Complete the warranty registration as directed

The accessory carton includes:

Table 2 Accessory Carton

Item	Product Number
3-well Cell Concentrators and 3-well gaskets, package of 4 each	CC03
1-well Cell Concentrators and 1-well gaskets, package of 4 each	CC01
Stainless Steel Clips for Cell Concentrators, package of 8 each	CLIP
Backing Plates for Cell Concentrators, package of 4 each	BP01
Filter Concentrators, 2 bags of 4 each	FF01
Stainless Steel Clips for Filter Concentrators, package of 4 each	FFCL

Installing the System

To install the system:

1 Place the Cytofuge 2 on a level surface suitable for laboratory instrumentation.

Caution

During operation maintain a 30 cm (12 inch) clearance around the centrifuge. The clearance must be free from obstruction and away from the edge of the surface that the centrifuge is on. The appliance coupler on the external power supply is considered the power source disconnect device, ensure that is is accessible after installation.

2 Position the Cytofuge 2 away from direct sunlight and sources of heat or cold.

For the acceptable range of operating temperature and humidity, refer to Specifications.

Connecting the Power

Plug the power supply of the external power cord into a grounded outlet supplying the voltage and frequency indicated on the power supply. When power is connected, two beeps sound, and the cover lock releases. To turn the system off completely, disconnect the power located at the rear of the analyzer.

Warning

Only use the external power supply (Beckman Coulter Part Number X01-003553-001) included with the unit. Use of any other external power supply can cause damage to the unit and will void the warranty.

Warning

Outside of North America: do not use the power cord supplied. Use power cord for at least 1.0 Amp with an IEC320/CEE22 female connector and male connector suitable for the power outlet to be used.

CHAPTER 2

System Overview

Intended Use

The Cytofuge 2 is a microprocessor controlled cell preparation system that uses centrifugal force to deposit cells onto microscope slides. Samples are centrifuged in reusable or disposable gasket-sealed chambers (Cell Concentrators), or in disposable chambers (Filter Concentrators) that include a filter material to absorb and capture suspension fluid during cytocentrifugation.

Product Description

A four-position rotor with transparent cover is supplied as standard equipment. The system is designed to be operated on a laboratory bench or, if potentially biohazardous material is processed, in a biological safety cabinet. A cover interlock system prevents operation until the centrifuge cover is securely latched, and prevents access to spinning parts until the rotor has come to a complete stop. Speeds from 600 rpm to 4400 rpm and cycle times from 2 minutes to 30 minutes can be selected. Automatic acceleration rate control and dynamic braking are included to protect delicate samples.

Operating Controls

Table 3 Cytofuge 2 Operating Controls

Symbol	Description
	**Start button** The **Start** button initiates the pre-timed cycle at a fixed speed.
	**Stop or Open button** The **Stop** or **Open** button interrupts the cycle and stops the centrifugation. This button can also be used to release the cover.
●	**Power indicator** The Green LED, identified as power, is illuminated when the Cytofuge 2 is connected to a power source.
	**Release cover** Located below the **Stop** or **Open** button on the instrument front panel.

Table 3 Cytofuge 2 Operating Controls (Continued)

Symbol	Description
	**Time selector** Available time settings: 2, 4, 6, 8, 10, and 30 minutes.
	**Speed Selector** Available speed settings: 600, 700, 850, 1,000, 1,300, 1,600, 2,200, and 4,400 rpm.

Note

Buttons should be depressed with finger tips only. Never press buttons with a sharp object such as a pen, screwdriver, centrifuge insert, fingernail, etc. The buttons are membrane switches designed to be activated by finger actuation. Use with any hard, sharp object can cause damage to the tactile layer of the button, rendering the button unstable and prone to premature failure.

Audible Indicators

Table 4 Normal Function Codes

Sound	Meaning
2 medium beeps	Sounds on power up; instrument ready.
3 short beeps	Cycle completed per specified operating parameters.
Chirp	Start or stop command recognized by the microprocessor.

Table 5 Malfunction Codes

Error Indicator	Error
1 long beep followed by: 2 short beeps	Cover opened during operation.
1 long beep followed by: 1 short beep	Rotor failed to reach selected rpm within allotted time
1 long beep followed by: 4 short beeps	Insufficient power to maintain rpm

The system beeps continuously if one of the following conditions are present:

- Centrifuge is over operating temperature
- Short circuit of the motor drives, fan, or solenoid
- Reduction in the availability of electrical power
- Short-term power failures

To stop the beeps, press the stop button.

Cell and Filter Concentrators

Various concentration options are available for use with the Cytofuge 2. For more information, refer to the package inserts for the Filter Concentrators and the Cell Concentrators.

CHAPTER 3

Sample Requirements and Preparation

Overview

The approximate cell concentration of the specimen should be established before slide preparation on the Cytofuge 2. Samples containing higher than optimal cell concentration produces slides with cells too closely packed or overlapping. Samples containing too low a cell concentration yields slides where cells are difficult to find, count, or examine. The following is a general guideline for sample concentration based on an average cell diameter of 10 µm:

Table 6 Sample Concentration

Sample Concentration	Recommendation
500 - 1500 cells/µL[1]	Use optimum sample volume
Less than 500 cells/µL	Pre-concentrate sample
More than 1500 cells/µL	Dilute sample

Caution

Follow Universal Precautions with all biological specimens, regardless of whether the specimen is known to contain an infectious agent. (See References)

Sample Volumes

Use the following guidelines for sample volumes in each of the Cytofuge 2 concentrators:

	Maximum Volume Range	Optimum Volume Range
Filter Concentrator	50 to 300 µL	100 to 300 µL
One-well Cell Concentrator	300 to 1,600 µL	400 to 800 µL
Three-well Cell Concentrator	50 to 400 µL	100 to 200 µL

Pre-concentration

For best results, samples low in cellular content should be pre-concentrated. For example, if the original sample contains about 100 cells/µL, a 10x pre-concentration provides the 1,000 cells/µL, which is recommended for the Cytofuge 2.

1 Aliquot 10 mL of sample to a conical polypropylene centrifuge tube.

2 Spin the sample at 1000 to 1500 xg for 10 to 15 minutes in a conventional centrifuge.

3 Decant 9 mL of cell-free supernatant.

[1] In samples known for low cell populations (e.g. CSF), 50 to 100 cell/µL produces acceptable results.

4 Mix the cell pellet and remaining supernatant by vortexing or agitation of the tube.

5 Aliquot appropriate volume of the concentrated sample to Cytofuge concentrators.

Dilution

For samples with an extremely high cell density, best results are obtained if the samples are first diluted with either buffered saline or standard tissue culture media (for example Geys balanced salt solution), and then a drop or two of bovine serum albumin (BSA) is added to the diluted sample preparation to promote cell adhesion to the microscope slide.

CHAPTER 4

Operating Instructions

Quick Start Instructions

Details regarding each instruction can be found in the following sections.

Note

The Cytofuge 2 has no on-off switch, and therefore is normally left plugged in and on.

1 Assemble the number and type of concentrators required.

2 Install the concentrators in the rotor in a balanced arrangement.

3 Load the concentrators with sample. (Empty concentrators can be used for balance.)

4 Screw on the rotor cover.

5 To close the cover, firmly apply pressure on the cover directly above the latch until the gasket compresses completely and the latch engages with the cover.

6 Select **time** and **speed**.

7 Press **start**.

When the timed cycle is complete, the rotor stops; three beeps sound; and the interlock mechanism releases. The cover latch can then be squeezed to open.

8 Unscrew the rotor cover.

9 Remove the concentrators.

10 Aliquot fluid. (Cell Concentrators only)

11 Disassemble the concentrators.

12 Recover the slides for further processing.

Detailed Instructions

Opening and Closing the Cover

The electrically operated cover interlock mechanism prevents operation until the cover is completely closed and locked, and prevents the cover from being opened while the centrifuge is in operation. When the cover is completely closed and locked, an operating cycle can be initiated.

The centrifuge has a manually operated latch that holds the cover down after spinning is complete. The interlock is automatically released at the end of the operating cycle or by pushing the **Stop** or **Open** button. Squeeze the black latch pieces together to open cover.

Cover Interlock By-pass

Caution

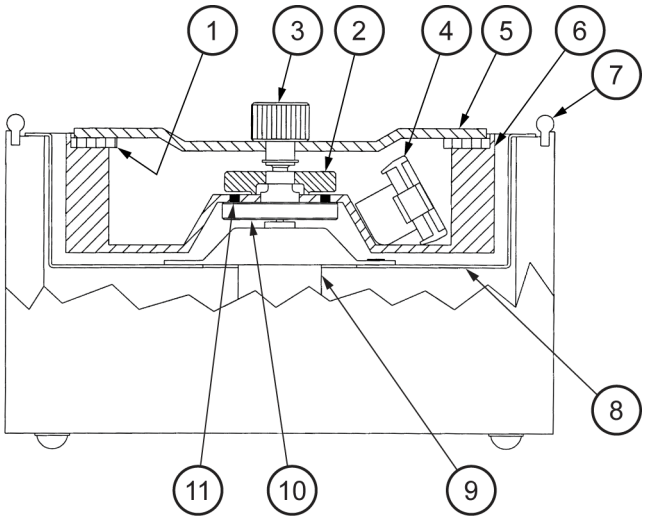
The cover interlock bypass is for emergency use only. Disconnect the power cord of the external power supply from the electrical outlet and ensure the rotor has come to a complete stop before using the interlock bypass. If the equipment is not used correctly, safety can be impaired.

The electronically operated cover interlock mechanism can be released manually by inserting the straightened end of a large paper clip or similar object into the small hole between the two buttons in the front of the latch cover (facing the instrument). Manually push the lock lever inward about one inch (25mm) to release the interlock mechanism if the **Stop** or **Open** button does not release the cover.

Access the Rotor

Access the rotor cover by turning the cover nut counterclockwise while holding the rotor itself to prevent turning. The rotor has four positions, allowing two or four concentrators to be centrifuged.

Figure 1 Cross-section of the Cytofuge 2



1. Rotor Gasket
2. Rotor Hold-Down Nut (3-lobed)
3. Cover Nut
4. Cell Concentrator (shown in rest position)
5. Rotor Cover
6. Rotor
7. Bowl Gasket
8. Cytofuge Bowl
9. Motor
10. Rotor Mount
11. Rotor Indexing Pin

Remove the Rotor

1 Hold the rotor with one hand and remove the rotor cover.

2 Remove the Rotor Hold-Down Nut (3-lobed) by turning it counterclockwise.

3 Lift the rotor straight out from the centrifuge bowl.

Replace the Rotor

Caution

Be careful when replacing the rotor. Confirm that the two locator pins are in the corresponding holes in the rotor. Do not over tighten the Rotor Hold-Down Nut (3-lobed). Make certain it is replaced with the flat surface facing up.

Caution

Never use any tool to tighten either the rotor hold-down nut (3-lobed) or the cover nut.

1 Place the rotor on the two rotor indexing pins, aligning the corresponding holes.

2 Tighten the rotor hold-down nut by turning it clockwise.

3 Replace the rotor cover.

Add Sample to the Cell and Filter Concentrator

Place assembled Cell and Filter Concentrators in the Cytofuge 2 rotor before loading sample. Process the specimen as quickly as possible following sample addition to prevent cells from settling.

Slowly add sample to the bottom of the funnel. Avoid getting droplets onto the walls of the funnel. Avoid exposing the filter material or the microscope slide to sample during the loading process. Do not overfill the device.

Note

In a properly loaded Concentrator, while in the "rest" position, the fluid does not contact the slide. During the first few rotations the Concentrators tilt to a vertical orientation, (noted by an audible click) bringing the fluid in contact with the microscope slide. The Concentrators remain upright until rotation has nearly stopped at which time they shift back to the rest position.

Caution

Addition of excess amounts of liquid (overfilling) to Cell or Filter Concentrator causes the fluid to spin out during centrifugation.

Spin the Sample

Caution

Never operate the Cytofuge 2 without the rotor cover in position.

1 Screw on the rotor cover.

2 To close the cover, firmly apply pressure on the cover directly above the latch until the gasket compresses completely and the latch engages with the cover.

3 Select the **time** and **speed**.

Cytofuge 2 operating parameters generally depend upon the size and specific gravity of the cells to be concentrated onto the microscope slide. The operator should experiment with different settings to achieve optimum performance for specific applications. The following are general guidelines:

Table 8 Cytofuge 2 Speed and Time Settings

Application	Speed Range	Time Range
Cytology	600 to 1000 rpm	2 to 4 minutes
Hematology	1000 to 2200 rpm	4 to 8 minutes
Microbiology	1600 to 4400 rpm	4 to 10 minutes

Note

— For fragile cells, reduce speed.
— For wet preparations, reduce time.
— For small particle (e.g. bacteria), increase speed and time.

4 Press the **start** button.

CHAPTER 5

Maintenance

Overview

Beckman Coulter recommends that instrument operators perform periodic inspections and preventative maintenance on all devices. Contact Beckman Coulter at any time if the instrument is not functioning correctly.

Caution

Disconnect the power cord of the external power supply from the electrical outlet before performing maintenance or inspection.

Warning

Do not expose the rotor to strong or concentrated acids, bases, esters, aromatic or halogenated hydrocarbons, ketones, strong oxidizing agents, or environmental influences, including natural ultra-violet radiation. Doing so will subject the rotor to corrosion or weakening of the construction.

Cleaning

Clean the outside surfaces and the control panel with a water-dampened absorbent tissue and mild detergent. Clean the inner surface or bowl, with a mild detergent and if necessary, a disinfectant, wiping with an absorbent tissue dampened with 70% alcohol or 10% bleach solution.

Caution

Do not spray cleaning solutions directly onto the centrifuge bowl or housing. Overspray can reach the motor bearings or internal circuitry, causing harm to the electronics and could also cause corrosion or weakening of the construction of the protective casing.

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. Cleaning and decontamination may be necessary as a safeguard before laboratory centrifuges, rotors, and any accessories are maintained, repaired, or transferred.

Inspecting the Rotor Speed

The rated speeds can be inspected with a stroboscope or photoelectric tachometer. Point the tachometer through the transparent cover at the reflective patch located near rotor

center. If the Cytofuge 2 fails to achieve operating speed (+5%), contact Beckman Coulter Customer Support.

Troubleshooting

Table 9 No Power Light

No Power Light		
Is the instrument completely plugged into the electrical outlet?	No ➔	Plug power cord of the external power supply into the electrical outlet.
Yes ⬇		
Is the electrical outlet working correctly?	No ➔	Try another electrical outlet.
Yes ⬇		
Is the barrel connector from the power adaptor completely plugged into the centrifuge?	No ➔	Plug the barrel connector of the external power supply into the centrifuge.
Yes ⬇		
Contact Beckman Coulter Customer Support.		

Table 10 Centrifuge Will Not Spin or Shuts Off

Centrifuge Will Not Spin/Shuts Off Prematurely		
Is the cover completely closed and cannot be opened manually?	No ➔	Completely close the cover.
Yes ⬇		
Contact Beckman Coulter Customer Support.		

Table 11 Centrifuge Does not Open at the End of the Cycle

Centrifuge Does not Open at the End of the Cycle
Follow Cover Interlock By-pass instructions in Chapter 4 to open the cover and retrieve samples, then contact Beckman Coulter Customer Support.

Service

Refer all service to qualified service personnel or Contact Beckman Coulter Customer Support at 1-800-854-3633.

Be sure to complete and return the warranty card as directed.

Decontamination before returning for service

Any instrument or accessory containing accumulated blood or other biological or chemical deposits must be cleaned before shipment for service. This decontamination is required by Federal Law (Title 48 and 49 of the Federal Regulations) and according to the Environmental Protection Agency's Regulations for Biohazard Waste Management. Beckman Coulter cannot perform decontamination.

Limited Warranty

Subject to the below exceptions and conditions, Beckman Coulter warrants to the original purchaser that the Equipment will be free from substantial defects in material, under normal use and service, for the period expiring twelve (12) months and (ii) Services will be performed in a workmanlike manner. As exclusive and sole remedy for breach of the warranty, Beckman Coulter will, at its discretion, repair or replace any Equipment unit or part covered under this warranty returned to Beckman Coulter or an authorized repair center. Repaired or replaced instruments supplied under this warranty carry only the remaining portion of the original warranty and repairs shall not interrupt or prolong this warranty. No warranty extended hereby shall apply to any instrument that has been damaged due to misuse, negligence, accident, or damage resulting from unauthorized repairs, alterations, or improper installation.

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APPENDIX A

Specifications

Specifications

Product No.	CF02
Model No.	M801-22
Speeds and Forces	600 rpm, 20 xg
	700 rpm, 27 xg
	850 rpm, 40 xg
	1,000 rpm, 55 xg
	1,300 rpm, 93 xg
	1,600 rpm, 140 xg
	2,200 rpm, 265 xg
	4,400 rpm, 1,060 xg
Cycle Times	2, 4, 6, 8, 10, and 30 minutes
Electrical	24Vdc, 1.7A Includes power supply for 100 to 240 VAC, 50/60 Hz
Dimensions	Height: 5.3 in. (13.5 cm)
	Diameter: 6.8 in. (17.3 cm)
	Weight: 4.75 lbs (2.2 kg)
Environmental	Indoor use (IP20)
	Altitude up to 2,000 m
	Operating temperature: 10°C - 40°C
	Storage temperature: 0°C - 60°C
	Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C
	Main supply voltage fluctuations not to exceed ±10% of the nominal voltage
	Transient over-voltages according to installation category II
	Pollution degree 2

Specifications

Specifications

APPENDIX B

References

References

1. CLSI. Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Third Edition." CLSI document M29-A3 [ISBN 1-56238-567-4]. CLSI, 940 West Valley Rd, Suite 1400, Wayne, Pennsylvania 19087-1898 USA, 2005.
2. CDC. Recommendations for prevention of HIV transmission in health care settings. MMWR (Suppl. No. 2S):2S-18S, 1987.
3. CDC. Updated: US Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV and HIV and Recommendations for Post Exposure Prophylaxis. Appendix A and B. MMWR 50 (RR-11): 1-42, June 29, 2001.

References

References

www.beckmancoulter.com