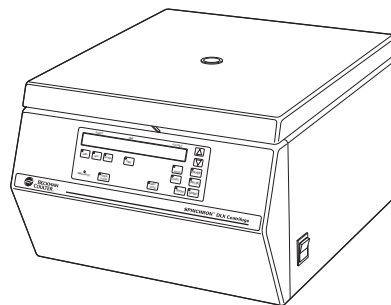


Spinchron™ DLX Benchtop Centrifuge

Instruction Manual



Symbol Symbol Symbole Símbolo	Simbolo 記号 符号	Title / Titel / Titre / Titolo / Titolo / 名称 / 名称
		Dangerous voltage Gefährliche elektrische Spannung Courant haute tension Voltaje peligroso Pericolo: alta tensione 危険電圧 危险电压
		Attention, consult accompanying documents Achtung! Begleitpapiere beachten! Attention, consulter les documents joints Atención, consulte los documentos adjuntos Attenzione: consultare le informazioni allegate 注意、添付資料を参照のこと 注意，请参阅附带的文件
		On (power) Ein (Netzverbindung) Marche (mise sous tension) Encendido Acceso (sotto tensione) 入（電源） 开（电源）
		Off (power) Aus (Netzverbindung) Arrêt (mise hors tension) Apagado Spento (fuori tensione) 切（電源） 关（电源）
		Protective earth (ground) Schutzleiteranschluß Liaison à la terre Puesta a tierra de protección Collegamento di protezione a terra 保護アース（接地） 保护接地
		Earth (ground) Erde Terre Tierra Scarica a terra アース（接地） 接地



SAFETY NOTICE

This safety notice summarizes information basic to the safe operation of the equipment described in this manual. The international symbol displayed above is a reminder that all safety instructions should be read and understood before installation, operation, maintenance, or repair of this centrifuge. When you see the symbol on other pages, pay special attention to the safety information presented. Observance of safety precautions will also help to avoid actions that could damage or adversely affect the performance of the centrifuge.

Safety During Installation and/or Maintenance

This centrifuge weighs 65.4 kg (144.0 lb). DO NOT attempt to lift or move the centrifuge without assistance from another person.

Be sure to use the anchoring system to secure the centrifuge in place. The anchoring system is designed to reduce the possibility of injury or damage which could result from centrifuge movement in the event of a major rotor mishap.

Any servicing of this centrifuge 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 and the centrifuge is disconnected from the main power source, 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 centrifuge 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 centrifuge.
- Never use a three-to-two wire plug adapter.
- Never use a two-wire extension cord or a two-wire non-grounding type of multiple-outlet receptacle strip.

Do not place containers holding liquid on or near the chamber door. If they spill, liquid may get into the centrifuge and damage electrical or mechanical components.

Safety Against Risk of Fire

Certain electrical circuits within this centrifuge are protected by fuses against overcurrent conditions. For continued protection against the risk of fire, replace only with the same type and rating specified.

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) in this centrifuge nor handle or store them within the 30-cm (1-ft) area surrounding the centrifuge.

Mechanical Safety

For safe operation of the centrifuge, observe the following:

- Use only the rotors and accessories designed for use in this centrifuge.
- Before starting the centrifuge, make sure that the rotor tie-down nut is securely fastened.
- Do not substitute a metal fastener for the plastic tie-down nut supplied with the rotor. If a tie-down nut comes off the shaft during centrifugation, the *plastic* nut furnished will break apart in the chamber, causing minimal damage to the centrifuge. A loose *metal* object could substantially damage the rotor, chamber, and lid, and could potentially escape the chamber into the laboratory, causing personal injury or property damage.
- 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 7.6-cm (3-in.) clearance envelope around the centrifuge while it is running. During operation do not come within the envelope except to adjust centrifuge controls, if necessary. Never bring any flammable substances within the 30-cm (1-ft) area surrounding the centrifuge. Never lean on the centrifuge or place items on the centrifuge while it is operating.

Chemical and Biological Safety

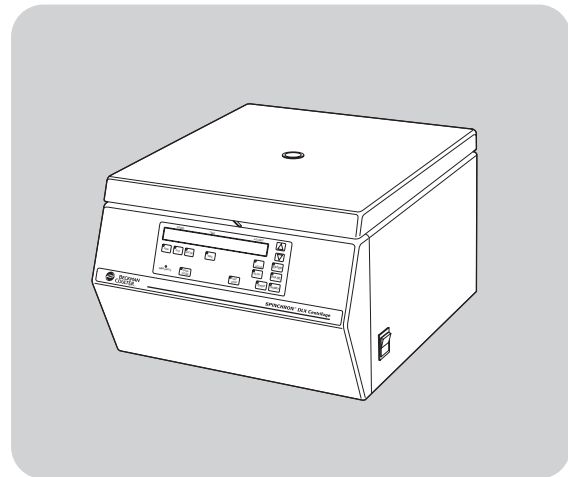
Normal operation may involve the use of solutions and test samples that are pathogenic, toxic, or radioactive. Such materials should not be used in this centrifuge, however, unless *all necessary safety precautions are taken*.

- Observe all cautionary information printed on the original solution containers prior to their use.
- Handle body fluids with care because they can transmit disease. No known test offers complete assurance that they are free of micro-organisms. Some of the most virulent—Hepatitis (B and C) and HIV (I–V) viruses, atypical mycobacteria, and certain systemic fungi—further emphasize the need for aerosol protection.
- Handle other infectious samples according to good laboratory procedures and methods to prevent spread of disease.
- Because spills may generate aerosols, observe proper safety precautions for aerosol containment. **Use only the appropriate rotors and adapters.** 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.

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

Spinchron™ DLX Benchtop Centrifuge

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CERTIFICATION

To ensure full system quality, Beckman Coulter Spinchron™ DLX centrifuges are manufactured in a registered ISO 9001 or 13485 facility. They have 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.

International symbols that may be displayed on the centrifuge are illustrated and described on the inside front cover of this manual.

SCOPE OF MANUAL

This manual is designed to familiarize you with the Beckman Coulter Spinchron DLX centrifuge, its functions, specifications, operation, and routine operator care and maintenance. We recommend that you read this entire manual, especially the SAFETY NOTICE and all safety-related information, before operating the centrifuge or performing instrument maintenance.

NOTE

A magnetized document holder (964987) is available, which can be attached to either side of the centrifuge for convenient storage of this manual, as well as applicable rotor manuals. The rotor tie-down torquing bar (356036) and emergency latch release hex wrench (929317) can also be kept in the document holder for easy access.

- Section 1 contains system specifications and a brief physical and functional description of the centrifuge, including the operating controls and indicators.
- Section 2 provides instructions for installing and connecting the centrifuge.
- Section 3 contains centrifuge operating procedures. For experienced users, a summary of operating procedures is provided at the end of the section.
- Section 4 lists possible error messages and/or malfunctions, together with probable causes and required corrective actions.
- Section 5 contains procedures for routine operator care and maintenance, as well as a brief list of supplies and replacement parts.
- A Program Library chart is provided as an appendix at the back of this manual. You can use this chart to record the parameters of a run for later duplication of the run conditions.

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 appropriate rotor manual is the sole responsibility of the user.

CONVENTIONS

Certain symbols are used in this manual to call out safety-related and other important information. These are reproduced and described below and on the inside of the front cover.

NOTES, CAUTIONS, AND WARNINGS

NOTE

Used to call attention to important information that should be followed during installation, use, or servicing of this equipment.

**CAUTION**

Used to indicate a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and/or mechanical damage. It is also used to alert against unsafe practices.

**WARNING**

Used whenever an action or condition may potentially cause personal injury or loss of life. Mechanical damage may also result.

**WARNING**

Indicates high voltage or risk of electric shock. Refer servicing of all areas displaying either symbol to service personnel.

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]) appear in brackets.
- *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 (▲ and ▼).

CFC-FREE CENTRIFUGATION



To ensure minimal environmental impact, no CFCs are used in the manufacture or operation of Spinchron DLX centrifuges.

RADIO INTERFERENCE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause interference, in which case the user will be required to correct the interference at his own expense.

CANADIAN REGULATIONS

This equipment does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe A prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

RECYCLING LABEL



Note: On the instrument, the triangle background is yellow rather than gray.

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:

- 1) the device was put on the European market after August 13, 2005 and
- 2) the device is not to be disposed 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.



Description

CENTRIFUGE FUNCTION, SPECIFICATIONS, AND SAFETY FEATURES

CENTRIFUGE FUNCTION

The Beckman Coulter Spinchron DLX is a nonrefrigerated compact benchtop centrifuge that generates centrifugal forces required for a wide variety of applications. Together with the Beckman Coulter rotors designed for use in this centrifuge, the centrifuge applications include:

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

The centrifuge is microprocessor-controlled, providing interactive operation. The centrifuge design features a brushless induction drive system, program memory that can repeat the previously used run parameters, and a choice of acceleration and deceleration rates. User messages alert the operator to conditions that may need attention.

SPECIFICATIONS



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

Speed

Setting range 0 to 3750 rpm (in 100-rpm increments)
or equivalent RCF

Time

Setting range 1 min to 9 hr 59 min (timed run),
or continuous,
or PULSE

Display (timed run) run time remaining

Display (continuous run) ∞ symbol and elapsed time

Acceleration nine acceleration profiles

Deceleration nine deceleration profiles

Dimensions

Width 54.6 cm (21.5 in.)

Depth, overall 66.0 cm (26.0 in.)

Depth at base 58.4 cm (23.0 in.)

Height, door closed 40.6 cm (16.0 in.)

Height, door open 96.8 cm (38.1 in.)

Weight 65.4 kg (144.0 lb)

Surface finish

Instrument housing urethane paint

Control panel overlay coated polycarbonate

Electrical supply Class I

Clearances required (sides and rear) 7.6 cm (3.0 in.)

Maximum heat dissipation into room

under steady-state conditions 0.9 kW (3701 Btu/hr)

Ambient temperature range 10 to 35°C

Humidity limitation <95% (noncondensing)

Noise level 1 m (3.3 ft) in front of centrifuge ≤62 dBA

Installation (overvoltage) category II

Pollution degree 2*

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

SAFETY FEATURES

The Spinchron DLX centrifuge has been designed and tested to operate safely indoors at altitudes up to 2 000 m (6 562 ft). Safety features include the following:

- The door has an electromechanical door-locking mechanism and a secondary (manual) lock to prevent 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, the rotor is at rest, and the manual lock is in the unlocked position. Two independent monitoring systems prevent the door from opening if the rotor is spinning.

- A steel barrier ring surrounds the aluminum rotor chamber to provide full operator protection.
- An imbalance detector monitors the rotor during the run, causing automatic shutdown if rotor loads are severely out of balance. At low speeds, an incorrectly loaded rotor can cause imbalance. Rotor instability can also occur if the centrifuge is moved while running, or if it is not resting on a level surface.
- An anchoring system is provided to secure the centrifuge in place. The anchoring system is designed to minimize the possibility of injury or damage that could result from centrifuge movement in the event of a major rotor mishap.

CENTRIFUGE CHASSIS

HOUSING

The centrifuge housing is made of sheet steel over a steel chassis and is finished with urethane paint. The control panel overlay is made of coated polycarbonate. Polyvinyl chloride lines the interior walls of the centrifuge housing for sound and temperature insulation.

DOOR

The structural steel door has two filtered air-intake ports for rotor cooling. An electromechanical door lock system, together with a manual lock, prevents run initiation unless the door is closed and latched. When a run is in progress, the door locks automatically and can be opened only when the power is on, the rotor is virtually stopped (spinning less than 40 rpm), and the lock is in the unlocked position. (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 tripped for sample recovery (see Section 4, TROUBLESHOOTING).

ROTOR CHAMBER

The aluminum rotor chamber (Figure 1-1) is coated with a chemical-resistant epoxy finish. The drive shaft (1) and neoprene rubber boot (2) surrounding the drive shaft are visible in the chamber bottom. A neoprene gasket (3) around the chamber top assures sealing. (Centrifuge gaskets have not been designed as bioseals for aerosol containment.)

During centrifugation, the rotor movement draws air through the filtered air-intake ports in the door into the chamber bowl, where it circulates around the rotor. Holes in the side of the bowl (4) allow air to flow out to the exhaust ports beneath the centrifuge. This air flow provides cooling for the rotor.



Figure 1-1. Interior View of the Spinchron DLX Centrifuge Rotor Chamber

DRIVE

The asynchronous three-phase direct-drive motor is brushless for clean, quiet operation. A tie-down nut is used to attach the rotor to the drive shaft. The resilient suspension ensures that loads will not be disturbed by vibration, and prevents damage to the drive shaft if an imbalance occurs during centrifugation. Maximum braking may be

selected to reduce deceleration time, allowing fast processing of samples; alternately, delicate gradients may be preserved using slower deceleration.

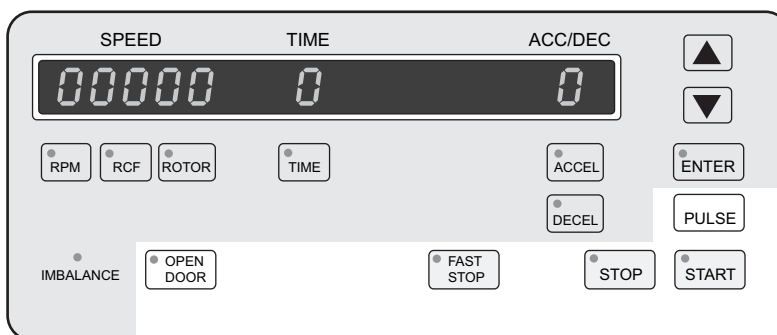
CONTROL PANEL

Mounted at an angle on the centrifuge front for easy visibility and access, the control panel comprises touch keys—system keys and parameter keys—and digital displays. An IMBALANCE LED at the lower left of the panel flashes if the rotor load is severely out of balance.

The power switch, a two-position rocker switch (off—O; on—I), is mounted on the right side of the centrifuge.

SYSTEM KEYS

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



[OPEN DOOR]

Unlatches the electromechanical lock and allows the door to be opened (when the manual lock is in the unlocked position); the centrifuge will accept this command *only when the rotor is completely stopped* and the LED is lit.

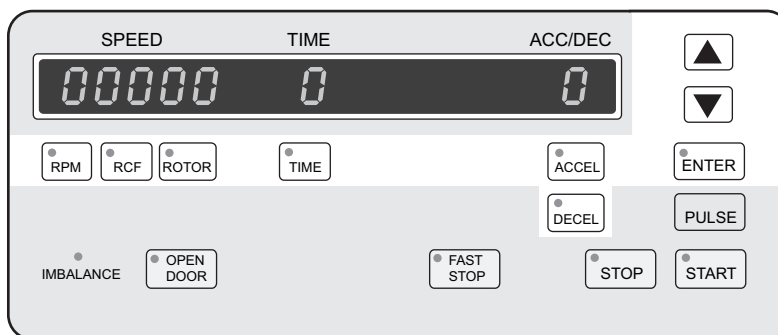
[FAST STOP]

Causes the centrifuge to decelerate to a complete stop at the maximum rate; deceleration cannot be interrupted—the centrifuge can only be restarted after the rotor stops and the door is opened and closed.

- [**STOP**] When pressed, the centrifuge decelerates to a complete stop according to the selected deceleration rate, deceleration can be terminated and the centrifuge restarted by pressing [**START**] again.
- [**START**] Causes a timed or continuous run to begin; can also be used to abort deceleration and restart the centrifuge.
- [**PULSE**] Causes the rotor to accelerate to set speed for short-duration runs (as long as the key is pressed). Deceleration, at maximum rate, begins when the key is released.

PARAMETER KEYS

Parameter keys are used to set run parameters (speed, rotor, time, acceleration, and deceleration rate). Each parameter key (except for the cursor keys) has an LED in the upper left corner that lights up to indicate operational readiness. The LEDs also blink if an incorrect parameter is entered.



- [**RPM**] Causes the last digit in the **SPEED** display (0) to flash, indicating that speed can be entered in revolutions per minute (rpm).
- [**RCF**] Selects speed setting by RCF; the corresponding rpm is automatically calculated and displayed during the run. If this key is pressed during the run, the **SPEED** display shows the RCF value.
- [**ROTOR**] When this key is pressed the number of the rotor used in the previous run is shown on the **SPEED** display. The list can be scrolled through, using the cursor keys, to select a rotor.

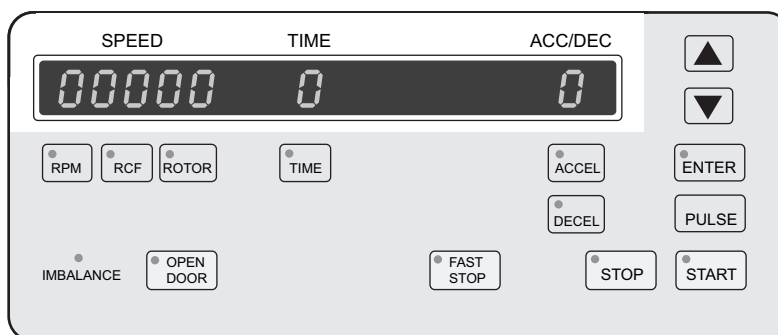
[TIME]	<p>Selects the run duration.</p> <ul style="list-style-type: none"> • <i>Timed run</i> — can be set up to 9 hours and 59 minutes; a minutes parameter exceeding 59 is automatically converted into hours. • <i>Continuous run</i> — continuous operation is activated if a run time of less than 0 or more than 9 hours and 59 minutes is selected (by pressing the cursor key after the display reaches 0 or 9:59).
[ACCEL]	<p>Enables entering one of nine preset acceleration rates, using the cursor keys. Rate selections are described in Table 3-1 (in Section 3).</p>
[DECEL]	<p>Enables entering one of nine preset deceleration rates, using the cursor keys. Rate selections are described in Table 3-1 (in Section 3).</p>
▲ and ▼ (Cursor Keys)	<p>Pressed to increment parameter values up or down.</p>
[ENTER]	<p>Pressed when all parameters are entered to enable [START]. Also press to verify parameter changes (speed, time, temperature, and deceleration rate) made while a run is in progress.</p>

DIGITAL DISPLAYS

When centrifuge power is turned on, digital displays show the operating parameters of the previous run. During operation, the displays serve a dual purpose.

- When run parameters are being set (input mode), displays show the *set* values (those selected by the operator). When a parameter key (such as **[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.

Error messages (see Section 4) also appear in the displays, when applicable.



SPEED

The contents of this display vary, depending on the operating mode.

- *In input mode*, displays the value of the parameter being set ([**RPM**], [**RCF**], or [**ROTOR**]). For example, if the [**ROTOR**] parameter key is pressed, a rotor number appears on the **SPEED** display.
- *During centrifugation*, displays the speed of the rotor in rpm; if the [**RCF**] key is pressed during operation, the RCF value is displayed.

TIME

The contents of this display vary, depending on the time mode selected.

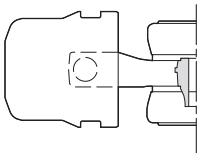
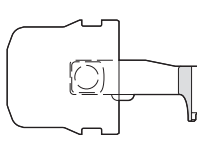
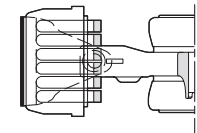
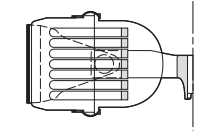
- *Timed run* (between 1 minute and 9 hours, 59 minutes) — begins counting down when the rotor starts spinning and continues the countdown until deceleration begins. Displays the remaining run time in hours and minutes.
- *Continuous run* — countdown time is not displayed. The infinity (∞) symbol, indicating continuous operation, lights up and the display shows time elapsed since the run began. After 9 hours and 59 minutes the timer resets to 0 and continues counting elapsed time.

ACC/DEC

Displays selected deceleration rate.

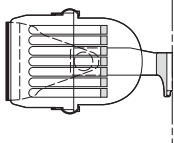
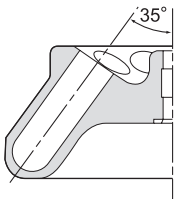
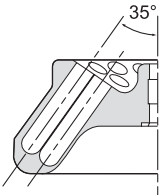
AVAILABLE ROTORS

Refer to the applicable rotor manuals for complete rotor descriptions.

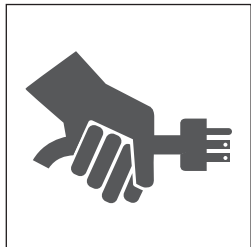
Rotor Profile and Description	Max RPM	Max RCF ($\times g$)	Max Capacity	Rotor Manual Number
GH-3.8A Swinging Bucket (4 place)  Buckets ($r_{\max} = 204$ mm) Carriers ($r_{\max} = 163$ mm)	3750 3250	3210 1924	4 \times 750 mL 4 \times 192 mL	GS6-TB-017
GH-3.8 Swinging Bucket (4 place)  Buckets ($r_{\max} = 204$ mm) Carriers ($r_{\max} = 163$ mm)	3750 3250	3210 1924	4 \times 750 mL 4 \times 192 mL	GS6-TB-003
PTS-DLXA Swinging Bucket (4 place)  Rack base, 100-mm tube ($r_{\max} = 173$ mm) Rack base, 75-mm tube ($r_{\max} = 152$ mm)	3250 3250	2050 1800	16 \times 10 mL (each carrier) 16 \times 7 mL (each carrier)	SP-TB-017
PTS-DLX Swinging Bucket (4 place)  Rack base, 100-mm tube ($r_{\max} = 173$ mm) Rack base, 75-mm tube ($r_{\max} = 152$ mm) Sector base, 100-mm tube ($r_{\max} = 170$ mm) Sector base, 75-mm tube ($r_{\max} = 160$ mm) Tube base, 16-mm tube ($r_{\max} = 176$ mm) Tube base, 13-mm tube ($r_{\max} = 176$ mm) Micro Plus carriers ($r_{\max} = 163$ mm)	3250 3250 3250 3250 3250 3250 3250	2050 1800 2010 1890 2080 2080 1920	16 \times 10 mL (each carrier) 16 \times 7 mL (each carrier) 7 \times 10 mL (each carrier) 7 \times 7 mL (each carrier) 20 \times 10 mL (each carrier) 20 \times 7 mL (each carrier) 4 \times 192 mL	SP-TB-016

Continued —

Description

Rotor Profile and Description	Max RPM	Max RCF ($\times g$)	Max Capacity	Rotor Manual Number
<p>PTS-2000 Horizontal (4 place)</p>  <p>Sector base, 100-mm tube ($r_{\max} = 170$ mm)</p> <p>Sector base, 75-mm tube ($r_{\max} = 160$ mm)</p> <p>Tube base, 16-mm tube ($r_{\max} = 176$ mm)</p> <p>Tube base, 13-mm tube ($r_{\max} = 176$ mm)</p> <p>Micro Plus carriers ($r_{\max} = 163$ mm)</p>	3250	2010	7 \times 10 mL (each carrier)	SP-TB-008
3250	1890	7 \times 7 mL (each carrier)		
3250	2080	20 \times 10 mL (each carrier)		
3250	2080	20 \times 7 mL (each carrier)		
3250	1920	4 \times 192 mL		
<p>GA-10 Fixed Angle, 35° (10 place)*</p>  <p>$r_{\max} = 123$ mm</p>	3750	1960	10 \times 50 mL	GS6-TB-009
<p>GA-24 Fixed Angle, 35° (24 place)*</p>  <p>Outer row ($r_{\max} = 123$ mm)</p> <p>Inner row ($r_{\max} = 108$ mm)</p>	3750	1960	12 \times 50 mL	GS6-TB-009
3750	1700	12 \times 50 mL		

*No longer manufactured.



Installation Requirements

**WARNING**

This centrifuge weighs 65.4 kg (144.0 lb). DO NOT attempt to lift or move it without assistance from another person.

INSTALLATION REQUIREMENTS

**WARNING**

Do not place the centrifuge near areas containing flammable reagents or combustible fluids. Vapors from these materials could enter the centrifuge's air system and be ignited. Never bring any flammable substances within the 30-cm (1-ft) area surrounding the centrifuge. Maintain a clearance envelope of 7.6 cm (3 in.) around an operating centrifuge. No persons should be within this clearance envelope while the centrifuge is operating.

SPACE AND LOCATION REQUIREMENTS

Carefully remove the centrifuge and accessories from the shipping container. Save the container and packing materials for possible future relocation or storage of the centrifuge.

- Select a location away from heat-producing laboratory equipment, with sufficient ventilation to allow for heat dissipation.
- Position the centrifuge on a level surface, such as a sturdy table or laboratory bench, which is able to support the weight of the centrifuge (65.4 kg/144.0 lb) and resist vibration.
- Allow a 7.6-cm (3-in.) clearance at each side and the back of the centrifuge to ensure sufficient air circulation. The centrifuge must have adequate air ventilation to ensure compliance to local requirements for vapors produced during operation. Dimensions are shown in Figure 2-1.

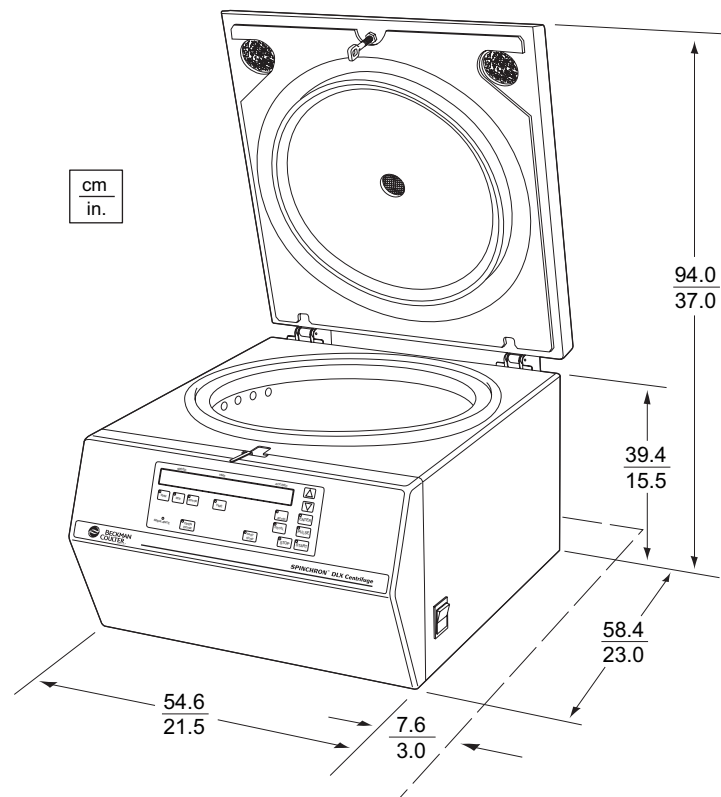


Figure 2-1. Dimensions of the Spinchron DLX Centrifuge

- Ambient temperature during operation should not exceed 35°C (95°F). Relative humidity should not exceed 95% (noncondensing).



CAUTION

Use the anti-rotation kit to secure the centrifuge to the bench or table. The anti-rotation kit is designed to minimize the possibility of injury or damage that could result from centrifuge movement in the event of a rotor mishap. Complete instructions (SP-TB-007) for installing the anti-rotation kit are included with the kit, which is shipped with the centrifuge.

ELECTRICAL REQUIREMENTS

100-volt centrifuge.	90–110 VAC, 12 A, 50/60 Hz
120-volt centrifuge.	108–132 VAC, 10 A, 60 Hz
230-volt centrifuge.	207–253 VAC, 6.3 A, 50 Hz
Electrical supply	Class I
Power cord	a 1.8-m (6-ft) power cord with grounded plug is supplied with the centrifuge

NOTE

In regions where a different plug is required to meet local electrical and safety requirements, contact your local Beckman Coulter representative.

Make sure the voltage imprinted on the name rating plate affixed to the back of the centrifuge agrees with the line voltage of the outlet used. With the power switch in the off (O) position, 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.

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.

- 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.

To ensure safety, the centrifuge should be wired to a remote emergency switch (preferably outside the room where the centrifuge is housed, or adjacent to the exit from that room), in order to disconnect the centrifuge from the main power source in case of a malfunction.

TEST RUN

NOTE

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

We recommend that you make a test run to ensure that the centrifuge is in proper operating condition after shipment. See Section 3 for instructions on operating the centrifuge.

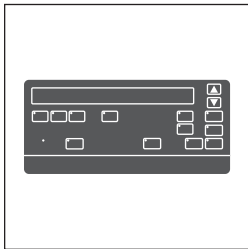
NOTE

After completing the test run, return the preaddressed warranty card included with this literature. This will validate the centrifuge warranty and ensure your receipt of further information regarding new accessories and/or modifications as they become available.

NAME RATING PLATE

When corresponding with Beckman Coulter regarding your Spinchron DLX centrifuge, always mention its model and serial number. The serial number is shown on the name rating plate affixed to the rear of the centrifuge, and is also on the inside of the door.

Operation



This section contains operating procedures for the Spinchron DLX centrifuge, using any of the rotors designed for use in this centrifuge. A summary is provided 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. Refer to the applicable rotor manual for instructions on preparing the rotor for centrifugation.



WARNING

The centrifuge must not be used in the vicinity of flammable liquids or vapors, and such materials should not be run in the centrifuge. Never bring any flammable substances within the 30-cm (1-ft) area surrounding the centrifuge. During operation you should not come within the 7.6-cm (3-in.) clearance envelope except to adjust centrifuge controls, if necessary. Do not lean on the centrifuge or place items on the centrifuge while it is operating.



WARNING

Operator error or tube failure may generate aerosols. Use only the appropriate rotors and adapters. Do not run toxic, pathogenic, or radioactive materials in this centrifuge without taking appropriate safety precautions. Biosafe hoods 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.

RUN PREPARATION

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. Refer to the applicable rotor manual for instructions on preparing the rotor for centrifugation.

Action

1. Ensure that the power cord is plugged into a wall receptacle that provides the correct voltage.
2. Press the power switch to on (I).
3. Move the manual lock lever to the left (unlocked).



4. Press [**OPEN DOOR**], then lift the door up.

Result

Power is available to the centrifuge.

Power is applied to the system and displays are lit.

Door remains in open position.



CAUTION

Never drop the rotor onto the centrifuge drive shaft. The shaft can be damaged if the rotor is dropped onto it or forced sideways.

5. Install the rotor or rotor yoke. *Be sure the base is seated on the drive shaft, with the pin in the rotor groove.*

The rotor is ready to load. (You can load fixed angle rotors either before or after installing the rotor in the centrifuge.)



NOTE

Always run the rotor with a balanced load; fill all four positions on a swinging bucket rotor yoke with buckets and/or carriers.

Action

6. Load the rotor according to the rotor manual.

Result**WARNING**

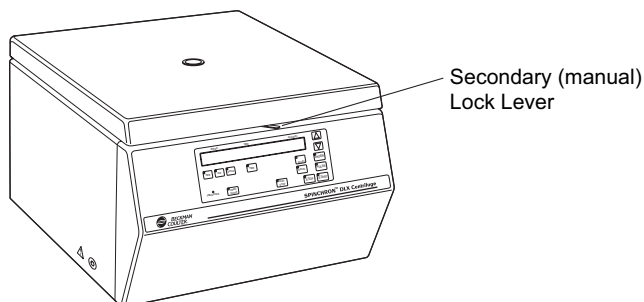
Do not substitute a metal fastener for the plastic tie-down nut supplied with the rotor. If a tie-down nut should come off the shaft during centrifugation, the *plastic* nut furnished will break apart in the chamber, causing minimal damage to the centrifuge. A loose *metal* object could substantially damage the rotor, chamber, and lid, and could potentially escape the chamber into the laboratory, causing personal injury or property damage.

7. Firmly fasten the tie-down nut on the shaft. Do not overtighten the nut.

The rotor is secured to the shaft.

8. Close the door. Push firmly down until you hear a clicking (latching) sound indicating that the door is latched.

9. Move the manual lock lever to the right (locked).



SETTING RUN PARAMETERS

When run parameters have been entered, as described below, they will be retained in the centrifuge memory and can be recalled for subsequent runs (only the last used parameters are retained). You can then use the recalled parameters for the current run or alter them as required.

SELECTING A ROTOR

Make sure the rotor is seated on the drive shaft and the tie-down nut is tight before each run.

Action

1. Press [**ROTOR**].
2. Press ▲ or ▼ until the correct rotor appears.

Result

The number of the rotor used in the previous run appears.

Rotor numbers are scrolled on the **SPEED** display.



3. When the selected rotor number is displayed, press [**ENTER**].

If the rotor is the same as that used in the previous run, the last-used parameter values for the selected rotor are displayed. You can use these parameters or set new values for the run.



SETTING RUN SPEED

You can set centrifuge speed, in either revolutions per minute (rpm) or relative centrifugal field (RCF), for up to the maximum rated speed of the selected rotor. During centrifugation, the **SPEED** display indicates the actual run speed of the rotor (in rpm). You can check the RCF during the run by pressing [**RCF**] while the centrifuge is running.)

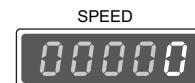
Setting RPM

Action

1. Press [RPM].
2. Press ▲ or ▼ to scroll through speeds until the required speed appears.

Result

The last digit on the **SPEED** display flashes.



The corresponding RCF will be automatically calculated by the centrifuge.

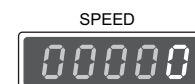
Setting RCF

Action

1. Press [RCF].
2. Press ▲ or ▼ until the required RCF appears.

Result

The last digit on the **SPEED** display flashes.



The corresponding rpm will be automatically calculated and the centrifuge will run at the calculated speed. (You can check the RCF during the run by pressing [RCF] while the centrifuge is running.)

SETTING RUN TIME

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

Action

1. Press [TIME].
2. Press ▲ or ▼ until the required time is displayed.

Result

The last digit on the **TIME** display flashes.



If you enter a minutes parameter that exceeds 59, it is converted into hours.

- *Timed run* — when the **TIME** display reaches zero, the run ends.
- *Continuous* — the infinity (∞) symbol lights up and time elapsed since the run start is displayed; the run continues until [STOP] or [FAST STOP] is pressed.

SETTING ACCELERATION AND DECELERATION RATES

You can select one of nine acceleration and nine deceleration rates that will maintain optimum separation of delicate samples. Select rates depending on the type of run you are performing—for pelleting runs, where sample mixing is not a concern, maximum brake can be used. If running delicate gradients, a lower brake setting may be needed. Acceleration and deceleration rates are listed in Table 3-1.

Table 3-1. Acceleration and Deceleration Rates (in Minutes:Seconds) to and from Maximum Speed. Times shown are for the rotor's maximum speed with the rotor fully loaded. (Times are approximate; actual times will vary depending on the rotor load, run speed, and voltage fluctuations.)

Accel/ Decel Rate	GS-3.8		GS-3.8A		PTS-DLX		GA-10 or GA-24	
	Accel	Decel	Accel	Decel	Accel	Decel	Accel	Decel
9	1:15	0:42	2:30	1:20	0:44	0:27	0:18	0:18
8	1:20	0:44	2:34	1:23	0:46	0:31	0:23	0:21
7	1:23	0:48	2:37	1:27	0:50	0:36	0:39	0:40
6	1:33	1:18	2:46	1:46	1:12	1:08	1:18	1:18
5	2:00	1:55	2:52	2:23	1:43	1:40	1:57	1:53
4	2:37	2:31	3:29	3:39	2:15	2:12	2:34	2:32
3	3:52	3:48	4:44	4:56	3:19	3:17	3:49	3:46
2	7:30	7:30	8:22	8:38	6:33	6:31	7:34	7:31
1	11:22	11:16	12:14	12:24	9:50	9:46	11:19	11:15

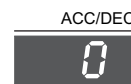
Setting an Acceleration Rate

Action

1. Press [ACCEL].
2. Press ▲ or ▼ until the selected rate is displayed.

Result

The ACC/DEC display flashes.



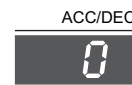
Setting a Deceleration Rate

Action

1. Press [DECEL].
2. Press ▲ or ▼ until the selected rate is displayed.

Result

The ACC/DEC display flashes.



STARTING A RUN

NOTE

For a short-duration run, press [ENTER] and then press the [PULSE] key. The rotor will accelerate to set speed and continue for as long as the key is pressed. Deceleration, at maximum rate, begins when you release the key.

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

NOTE

Long or repetitive runs may cause sample heating because the centrifuge is not refrigerated.

Action

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

2. Move the manual lock lever to the right (locked position).



3. Press [ENTER], then press [START].

Result



CAUTION

Do not lift or move the centrifuge while the rotor is spinning.

- The **SPEED** display indicates rotor speed in rpm. (You can check the RCF 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 remaining run time (in hours and minutes) for a timed run; or the infinity (∞) symbol and time elapsed since the run start. (When elapsed time reaches 9 hours and 59 minutes during a continuous run, it resets to 0 and continues counting.)
- The **ACC/DEC** display shows the deceleration rate selected for the run.



WARNING

Do not attempt to override the door interlock system while the rotor is spinning.

CHANGING PARAMETERS DURING A RUN

While a run is in progress, run parameters (speed, time, and 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.

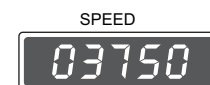
Use the parameter keys as described under ENTERING RUN PARAMETERS, above, to change parameters. You must press [ENTER] after you input each change. For example, you would change run speed during centrifugation as follows:

Action

1. Press [RPM].
2. Press ▲ or ▼ until the selected speed is displayed.
3. Press [ENTER].

Result

The **SPEED** display flashes.



The current speed will be displayed, changing to the new value as the rotor accelerates or decelerates to the new speed selected. The centrifuge will automatically calculate the corresponding RCF.

STOPPING A RUN

A timed run ends automatically when the **TIME** display counts down to zero. To end a run in progress for any reason:

Action

1. Press [STOP].
- (or)
- Press [FAST STOP].

Result

Normal deceleration begins, as selected by the deceleration rate.

Deceleration begins at the maximum rate (see Table 3-1). The deceleration process cannot be interrupted; the centrifuge can be restarted only after the rotor comes to a complete stop and the door is opened and closed.

Action

2. After the rotor stops spinning and the [OPEN DOOR] light comes on, move the manual lock lever to the left (unlocked).



3. Press [OPEN DOOR], then lift the door up.

UNLOADING

Result



CAUTION

The door interlock system will release the latch and allow the door to be opened when the rotor speed is 40 rpm or less. However, for operator safety, do not open the door until the rotor has come to a complete stop. Additionally, do not attempt to override the door interlock system while the rotor is spinning.



CAUTION

If disassembly reveals evidence of leakage, you should assume that some fluid escaped the rotor. Apply appropriate decontamination procedures to the centrifuge and accessories.

After completing a run, unload the rotor as described in the applicable rotor manual. It is not necessary to remove the rotor from the centrifuge between runs unless the rotor or chamber bowl needs to be cleaned. (If the rotor is left in the centrifuge between runs, make sure the rotor is seated on the drive shaft and the tie-down nut is tight before each run.)

NOTE

Accumulations of sample, dust, and/or glass particles from broken sample tubes can ruin rotor pins and cause rotor vibrations. To prevent these accumulations, remove the rotor and clean the centrifuge bowl daily. See CLEANING in Section 5.

SUMMARY OF RUN PROCEDURES

1. Press the power switch to on (I).
2. Move the manual lock lever to the left (unlocked), then press [OPEN DOOR] and lift the door up.
3. Install the rotor according to the applicable rotor manual. *Always run the rotor with a balanced load.*
4. Close the centrifuge door and push firmly down on it until you hear a clicking (latching) sound. Move the manual lock lever to the right (locked).
5. Enter run parameters:
 - Select a rotor number — [ROTOR], ▲ or ▼, [ENTER]
 - Set run speed — [RPM], ▲ or ▼; or [RCF], ▲ or ▼
 - Set run duration — [TIME], ▲ or ▼
 - Set acceleration rate (1 through 9) — [ACCEL], ▲ or ▼
 - Set deceleration rate (1 through 9) — [DECEL], ▲ or ▼
6. Check that all parameters are correct and the door is closed and latched, then press [ENTER], then [START].



CAUTION

Do not lift or move the centrifuge while the rotor is spinning.

7. Wait for the set time to count down to zero, or end the run by pressing [STOP] or [FAST STOP].



WARNING

Never attempt to override the door interlock system while the rotor is spinning.

8. *After the rotor stops spinning* and the [OPEN DOOR] light comes on, move the manual lock lever to the left (unlocked). Press [OPEN DOOR] to release the door latch. Lift the door to open it.
9. Unload the rotor according to the applicable rotor manual.



Troubleshooting

This section lists possible malfunctions, together with probable causes and corrective actions required. Maintenance procedures are contained in Section 5. For any problems not covered here contact Beckman Coulter Field Service.

NOTE

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

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 will decelerate to a stop and an error code will appear on the **SPEED** display. Messages may result from incorrect input (such as exceeding allowable speed for a rotor) or from an equipment malfunction. Refer to Table 4-1 to

Table 4-1. Error Message Chart.

If the recommended action does not correct the problem, notify Beckman Coulter Field Service.

Error Number	Problem	Result	Recommended Action
1 through 22, 25 and 26, 28 through 30, 32, 36, 39 and 40, 44 through 60, 63 through 68	Microprocessor or mechanical malfunction	Deceleration to full stop; run cannot be restarted	After rotor comes to a complete stop, turn the power off (O), then back on (I) to reset.
23 and 24, 27, 31, 33 through 35, 37 and 38, 41 through 43, 62	Microprocessor or mechanical malfunction	Deceleration to full stop; run cannot be restarted	After rotor comes to a complete stop, open and close the centrifuge door, then restart.
69 through 77	Microprocessor malfunction	Run cannot start until error is cleared	Turn the power off (O), then back on (I) to reset.
78 through 80	Error during closing of door	Run cannot start	<ol style="list-style-type: none"> 1. Remove debris in latch. 2. Close lid quickly. 3. Turn the power off (O), then back on (I) to reset.
81	"Door open" detected during run	Maximum deceleration to full stop	After rotor comes to a complete stop, close the centrifuge door, turn the power off (O), then back on (I) to reset.
82, 83	Door does not open	—	See access procedures, below.

determine the nature of the problem and recommended actions. If you are unable to correct the problem, call Beckman Coulter Field Service. To help diagnose and correct the problem, try to 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 (rotor in use, speed, load type, and so forth).
- Note any unusual environmental and/or operating conditions (ambient temperature, voltage fluctuations, and so forth).
- Add any other information that may be helpful.

OTHER POSSIBLE PROBLEMS

Possible malfunctions that may not be indicated by diagnostic messages are described in Table 4-2, 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, call Beckman Coulter Field Service.

Table 4-2. Troubleshooting Chart

Problem	Problem/Result	Recommended Action
Imbalance LED lights and rotor decelerates to stop	<ol style="list-style-type: none"> 1. Rotor is out of balance 2. Centrifuge is misaligned (tilted) 3. Centrifuge was moved during operation 4. Drive error (mechanical damage) 	<ol style="list-style-type: none"> 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 (within 6 grams) opposite each other. 2. Align the centrifuge on the bench or table. 3. After the rotor comes to a complete stop, open and close the centrifuge door, then restart. 4. Call Beckman Coulter Field Service.
Rotor cannot achieve set speed	<ol style="list-style-type: none"> 1. Line voltage below rating 2. Electrical failure 3. Motor failure 	<ol style="list-style-type: none"> 1. Have a qualified service person measure line voltage while the instrument is operating. 2. Make sure both ends of the power cord are securely connected; call Beckman Coulter Field Service 3. Call Beckman Coulter Field Service.
Door will not open	<ol style="list-style-type: none"> 1. Rotor spinning 2. Manual lock lever in locked position. 3. Power not on 4. Source power failure 5. Latch stuck 	<ol style="list-style-type: none"> 1. Wait until the rotor stops. 2. Move the lever to the left (unlocked). 3. Plug in the power cord; turn power on (I). 4. See access procedures, below. 5. See access procedures, below.
Displays are blank	<ol style="list-style-type: none"> 1. Power not on 2. Electrical failure 3. Fuse blown 	<ol style="list-style-type: none"> 1. Plug in the power cord; turn power on (I). 2. Make sure both ends of the power cord are securely connected; call Beckman Coulter Field Service. 3. Call Beckman Coulter Field Service.

ACCESSING THE ROTOR IN CASE OF POWER FAILURE

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

Action

1. Turn the power switch to off (O) and *disconnect the power cord from the main power source.*

Result

No displays or LEDs are lit.

2. Make sure that the rotor is not spinning.

No sound or vibration comes from the centrifuge.



WARNING

Never attempt to override the door interlock system while the rotor is spinning.

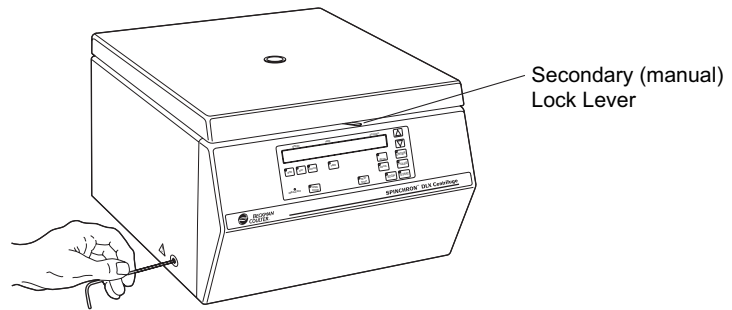
3. Move the manual lock lever to the left (unlocked).



Action

4. Insert the supplied hex wrench (929317) into the override key slot in the left side panel.

Result



5. Turn the hex wrench (either direction).

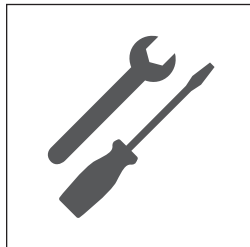
The latch “clicks” or the door pops open.

If the rotor is still spinning, *close the door and wait until it stops before attempting to remove it.*



WARNING

Never try to slow or stop the rotor by hand.



Care and Maintenance

For maintenance not covered in this manual, contact Beckman Coulter Field Service.



WARNING

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

GENERAL MAINTENANCE

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

- At least once a week (depending on usage) inspect the interior of the rotor chamber for accumulations of sample, dust, and glass particles from broken sample tubes. Clean as required (see CLEANING, below), as these accumulations can result in rotor vibrations.
- Regularly check the air intake and exhaust vents for obstructions. Keep vents clear and clean.

- To prevent the rotor from sticking, lubricate the drive shaft with Spinkote (306812) at least once a month, and after each cleaning.
- Refer to the applicable rotor manual for instructions on the care of rotors and other components and accessories.

NOTE

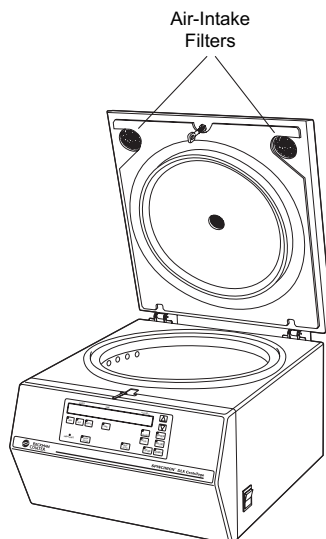
Before using any cleaning or decontamination methods except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment.

CLEANING



Frequent cleaning will ensure proper operation and prolong the life of the centrifuge. *Always clean up spills when they occur to prevent corrosives or contaminants from drying on component surfaces.*

- Remove the rotor from the centrifuge weekly and clean the bowl, drive shaft, shaft cavity, threads, and the tie-down nut using a mild detergent such as Beckman Solution 555™ (339555) and a soft brush. Dilute the detergent 10 to 1 with water. Rinse thoroughly and dry completely. Lubricate the drive shaft with Spinkote after cleaning.
- Keep the interior of the rotor chamber clean and dry by frequent wiping with a cloth or paper towel. To prevent accumulations of sample, dust, and/or glass particles from broken sample tubes from damaging rotor pins (causing rotor vibrations), remove the rotor and clean the centrifuge chamber daily. Spray the centrifuge chamber with an antistatic solution and wipe it clean. (Or use an antistatic wipe.)
- Clean the centrifuge case and door by wiping with a damp cloth or washing with Solution 555. Do not use acetone or other solvents.
- Remove the air-intake filters and inspect for dust and dirt. Wash them using a mild soap or detergent, such as Solution 555. Rinse thoroughly and squeeze excess water out, then air-dry before reinserting.



DECONTAMINATION



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

While Beckman Coulter has tested this method and found that it does 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.

TUBE BREAKAGE

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



CAUTION

Be careful when examining or cleaning the gasket or chamber, as sharp glass fragments may be embedded in their surfaces.

- Examine the gasket to make sure that it is free of glass particles. Carefully remove any glass particles that may remain. If glass is under the gasket, call Beckman Coulter Field Service to replace the gasket.
- Carefully wipe away any glass particles that remain in the bowl.

* Flammability hazard. Do not use in or near an operating centrifuge.

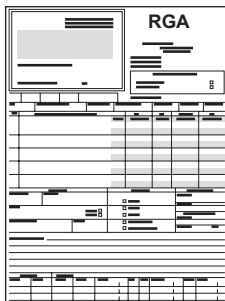
STORAGE AND TRANSPORT

If you are shipping both the centrifuge and a rotor, remove the rotor from the centrifuge and pack it in its original shipping container. A rotor left in the centrifuge can bend the drive shaft if the package is jarred during shipment.

STORAGE

Before storing a centrifuge for an extended period remove the rotor. Return the centrifuge to its original shipping container to protect it from dust and dirt. Temperature and humidity conditions for storage should meet the operating environment requirements described under SPECIFICATIONS in Section 1.

RETURNING A CENTRIFUGE



Before returning a centrifuge or accessory for any reason, prior permission (a Returned Goods Authorization form) must be obtained from Beckman Coulter, Inc. Contact your local Beckman Coulter office to obtain the RGA 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 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.***

SUPPLY LIST

NOTE

Publications referenced in this manual can be obtained by calling Beckman Coulter at 1-800-742-2345 in the United States, or by contacting your local Beckman Coulter office.

Contact Beckman Coulter Sales (1-800-742-2345 in the United States; worldwide offices are listed at the back of this manual) for information about ordering parts and supplies. For your convenience, a partial list is given below.

REPLACEMENT PARTS

Neoprene boot	358009
Rotor tie-down nut	366642
Tie-down nut O-ring (Buna N rubber)	927600
Torquing bar	356036
Hex wrench (latch release)	929317
Power cord (60-Hz, 120 VAC)	889097
Power cord (50-Hz, 230 VAC)	355810

SUPPLIES

Spinkote lubricant (2 oz)	306812
Silicone vacuum grease (1 oz)	335148
Beckman Solution 555 (1 qt)	339555
Magnetized document holder	964987

SPINCHRON DLX CENTRIFUGE WARRANTY

Subject to the exceptions and upon the conditions specified below and the warranty clause of the Beckman Coulter terms and conditions in effect at the time of sale, Beckman Coulter agrees to correct either by repair or, at its election, by replacement, any defects of material or workmanship which develop within one (1) year after delivery of a SPINCHRON DLX 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 makes no warranty concerning products or accessories not manufactured by it. In the event of failure of any such product or accessory, Beckman Coulter will give reasonable assistance to the Buyer in obtaining from the respective manufacturer whatever adjustment is reasonable in light of the manufacturer's own warranty.

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

DISCLAIMER

IT IS EXPRESSLY AGREED THAT THE ABOVE WARRANTY SHALL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND OF THE WARRANTY OF MERCHANTABILITY AND THAT 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.



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