

Grant bio

Refrigerated Laboratory Centrifuge LMC-4200R

Operating instructions

For version V.2GD



Contents

| | | |
|----------|--|-----------|
| 1 | Safety | 4 |
| 2 | General Information | 6 |
| 3 | Getting started..... | 7 |
| 4 | Operation of Centrifuge | 9 |
| 5 | Specifications | 12 |
| 6 | Guarantee and service..... | 13 |
| 7 | Declaration of Conformity | 15 |

1. Safety

The following symbols mean:



Caution: Read these operating instructions fully before use and pay particular attention to sections containing this symbol

GENERAL SAFETY

-  Use only as specified in the operating manual provided.
-  The unit should not be used if dropped or damaged.
-  The unit must be stored and transported in a horizontal position (see package label).
-  After transport or storage allow the unit to dry out (2-3 hrs) before connecting to the mains.
-  It is necessary to observe the safety area of 300 mm around the centrifuge in accordance with EN-61010-2-20. Persons and hazardous materials must not be located in the safety area whilst the centrifuge is in operation.
-  Use only original accessories (rotors, adaptors, etc.) provided by the manufacturer and ordered specifically for this model.

ELECTRICAL SAFETY

-  Connect only to the mains with a voltage corresponding to that on the serial number label.
-  Ensure that the switch and plug are easily accessible during use.
-  Do not plug the unit into the main outlet without grounding, and do not use extension lead without grounding.
-  Before moving the unit, disconnect it from the mains. To turn off the unit, disconnect the power plug from the mains outlet.
-  It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilled on or inside the equipment. If liquid is spilled inside the unit, disconnect it from the mains and have it checked by a competent person.

DURING OPERATION

- ☞ Do not centrifuge flammable or chemically vigorously reactive materials. If such liquids are spilled in the rotor or rotor chamber the centrifuge must be cleaned with a moist cloth and a mild soap solution.
- ☞ Do not use rotors with visible signs of corrosion, wear or mechanical damage.
- ☞ Do not fill in the containers after they are inserted in the rotor.
- ☞ Do not leave the operating unit unattended.
- ☞ Do not operate the unit in environments with aggressive or explosive chemical mixtures.
- ☞ Do not operate the unit if it is faulty or been incorrectly installed.
- ☞ Do not close ventilation outlet during the use.
- ☞ A liquid density at the maximum rotational speed should not exceed value mentioned in p. Specifications.
- ☞ For indoor use only.
- ☞ Do not use outside laboratory rooms.
- ☞ Before using any cleaning or decontamination method except those recommended by the manufacturer, check with the manufacturer that the proposed method will not damage the equipment.
- ☞ Do not make modifications to the design of the unit.

BIOLOGICAL SAFETY

- ☞ Without bioseal the centrifuge is not a biosafety system in accordance to EN61010-2-20 and cannot be used for centrifuging hazardous materials contaminated with toxic, radioactive or pathogenic micro-organisms.
- ☞ It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilled on or inside the equipment.

2. General Information

Refrigerated Laboratory Centrifuge LMC-4200R provides temperature control of biomaterial during cell suspension separation. Temperature control of the so-called “cold-shelf” is a gold standard for enzymologists and cell biologists because it ensures conditions necessary for reproducibility of sample preparation stage connected with cell destruction and extraction of its heat-labile components (metabolites, enzymes, hormonal factors, cytokines, etc.). Lack of temperature control at this stage can cause unpredictable results. LMC-4200R is a modern centrifuge designed for operation with microtest plates and tubes from 10 to 50 ml.

Features:

- User-friendly set up of centrifugation parameters (speed, temperature and time) and simultaneous display of both set and actual values.
- Safe operation is provided by metal protection chamber, automatic stop at imbalance and a motorised lock keeping the lid closed while the centrifuge is running.
- Low noise level (max. 65 dB(A)).
- Soft start and run-down of the rotor.
- Wide choice of rotors and adapters.

3. Getting started

3.1. Unpacking

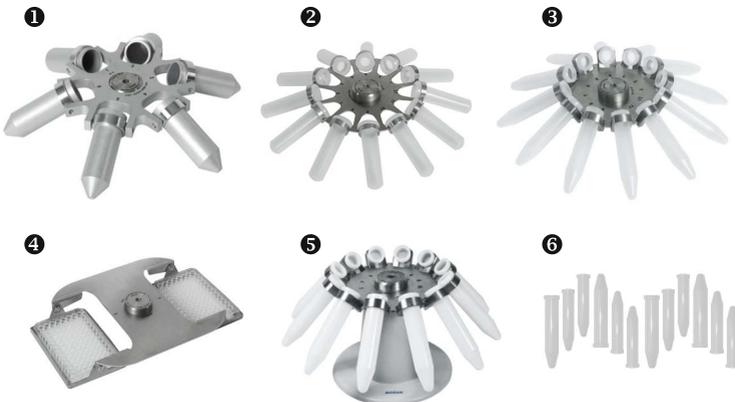
Remove packaging carefully, and retain for future shipment or storage of the unit.

3.2. The Laboratory The set includes: Standard set

- Refrigerated Laboratory Centrifuge LMC-4200R 1 pce.
- A spare fuse (inside the fuse holder) 1 pce.
- Power cord 1 pce.
- Wrench for rotor replacement 1 pce.
- Emergency opening tool 1 pce.
- Operating instructions, Declaration of Conformity 1 pce.

Optional accessories:

- Rotor R-6 ❶ on request
- Rotor R-12-10 ❷ on request
- Rotor R-12-15 ❸ on request
- Rotor R-2 ❹ on request
- Rotor support stand RR-U ❺ on request
- Adapter sets BN-13-75, BN-13-100 and BN-16-100 for R-12-15 ❻ on request



3.3. Set up:

- place the centrifuge on the even stable surface able to support its weight, away from direct sunlight;
- plug the mains power cord into the socket on the right panel of the unit, and position the centrifuge so that there is easy access to the power switch and connector;
- make sure that drain hose is plugged (see fig.4/3), to prevent process from the temperature abuse.
- it is necessary to observe the safety area of 300 mm around the centrifuge in accordance with EN-61010-2-2. Persons and hazardous materials must not be located in the safety area whilst the centrifuge is in operation.
- do not place any objects in front of the ventilation slots underneath, 300 mm behind and from the right side of the centrifuge (see fig.1) that could disrupt air circulation.

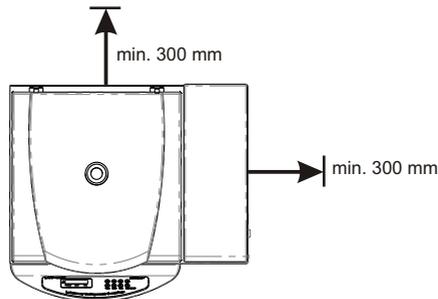


Fig.1 Centrifuge location requirements

3.4. Rotor replacement



Caution! Check the rotor and adapters for any signs of wear or corrosion and replace if necessary.

- Hold the rotor with one hand and with the help of the supplied wrench (13 mm) turn fixation nut (fig.2/1) counter-clockwise to release the rotor.



Caution! Do not hold the rotor by rings or adapters mounting when mounting and fixing it. Hold the rotor as shown on Fig. 2 (Correct).

- Replace the rotor and secure the new rotor carefully and turning the fixation nut tightly.

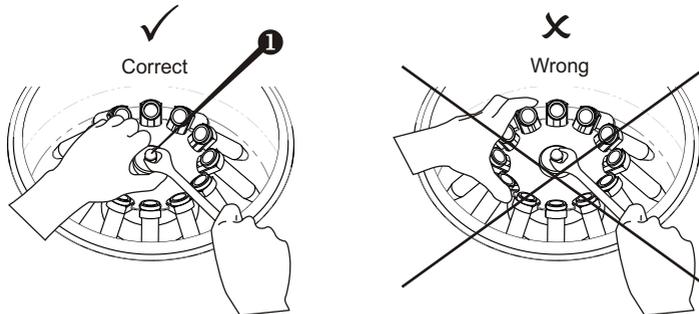


Fig.2 Rotor fixation

4. Operation

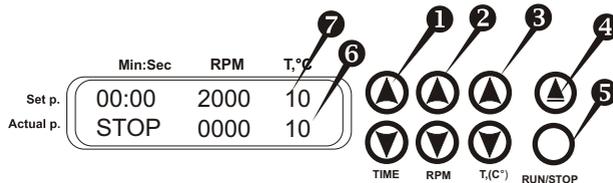


Fig.3 Control panel

Recommendations during operation



When loading use even numbers of tubes arranged symmetrically (facing one another) to give the unit even balance during operation. The opposite tubes must be filled up equally.

- Centrifuge containers must not be filled over the capacity specified by the manufacturer, see p. Specifications.
- Rotor must always be fixed securely. Stop the operation immediately with the **RUN/STOP** key if any unusual noise occurs during acceleration which can be due to improper rotor fixation.
- Some plastic tubes and microtest plates can be damaged at higher speeds. Refer to the tube material specifications to make sure that it will not get damaged at the set speed. Do not set speed higher than 2000 RPM when working with microtest plates!

4.1. Check the power cord for any signs of damage and replace if necessary. Connect the power cord to the mains outlet. Switch ON the power switch on the right panel of the unit.

Note! If the centrifuge lid is closed, after switch on, the lid will open (display shows OPEN readout on the lower line).



Caution! Do not switch ON and OFF more often than four times per hour. It is recommended by compressors producers to assure the proper compressor restarting.

4.2. The centrifuge turns on and the display shows the following readouts:

- previously set time, temperature and speed in the upper line (**Set p.**);

- mode indication (STOP - lid closed, rotor stopped) and current temperature and speed in the lower line (**Actual p.**).
- 4.3. Press the “▲” key (fig.3/④) and open the lid lifting it upwards with a hand (it is possible to open the lid only when the rotor is stopped).

Note! Repeat the shutting/opening cycle with an interval 3-5 sec in order to provide reliable operation of the electromechanical lid lock.

Note! The electromechanical lid lock allows opening the lid only when the centrifuge is connected to the power supply and is turned on. Do not force the lid to open when the centrifuge is switched off!
 - 4.4. Install the rotor in the centrifuge, if it is not installed.
- ⚠ Caution!** Check the rotor and buckets for any signs of wear or corrosion and replace if necessary.
- 4.5. Close the lid (the clicking sound of the lock and readings STOP in the lower line of the display indicate that the lid is closed).
 - 4.6. With the “▲” and “▼” T,°C keys (fig. 3/ ①) set the required temperature (in range -10...+25 °C (RT), increment 1 °C). Note that the temperature can also be adjusted during operation.

Note! For better temperature transmission with the “▲” and “▼” RPM keys (fig.3/②) set the rotor speed 500 RPM. Press **RUN/STOP** key (fig. 3/⑤) to start centrifugation.

Note! While the centrifuge is working drain hose must be plugged (fig.4/③), to prevent process from the temperature abuse.
 - 4.7. Check the set temperature achievement with the display. The actual temperature is shown in the lower line of the display (fig.3/⑦). Press **RUN/STOP** key (fig. 3/⑤) to stop centrifugation.
 - 4.8. Press the “▲” key (fig.3/④) and open the lid lifting it upwards with a hand (it is possible to open the lid only when the rotor is stopped).

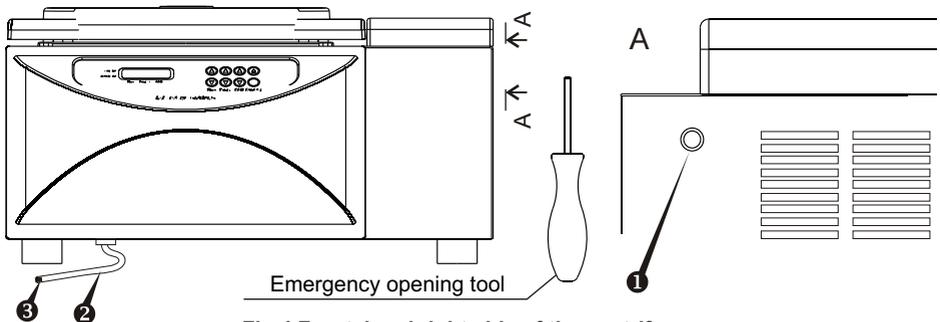


Fig.4 Frontal and right side of the centrifuge

- 4.9. Insert EVEN number of tubes/microtest plates in rotor facing one another. The loading in the opposite tubes must be equal.
- 4.10. With the “▲” and “▼” **RPM** keys (fig. 3/ ②) set the required speed (100-4200 RPM, increment 100 RPM) depending on rotor. Note that the speed can also be adjusted during operation.
- 4.11. With the “▲” and “▼” **TIME** keys (fig. 3/ ①) set the required time interval (0-90 min, increment 1 min).
- 4.12. Press **RUN/STOP** key (fig. 3/ ⑤) to start centrifugation. Blinking indication RUN and current speed is displayed in the lower line. The timer in the upper line starts countdown after the set speed is achieved (stable indication RUN).
- Note!** If the rotor imbalance occurs causing vibration the centrifuge stops automatically (indication IMBALANCE). After the rotor is stopped open the lid and remedy the cause of imbalance.
- 4.13. Centrifugation is stopped automatically after the set time elapses (while braking display shows blinking indication STOP). A sound signal is emitted after full stop of the rotor (press **RUN/STOP** key (fig.3/ ③) to stop the signal).
- 4.14. If necessary centrifugation can be stopped before the set time elapses by pressing **RUN/STOP** key. Lid opens after full stop of the rotor. The set time interval will be shown on the display.
- 4.15. Clean the ice and remove condensation water from the chamber regularly with a soft cloth (see p.6.4). For easy cleaning the centrifuge chamber is equipped with a drain hole and hose (fig.3/ ②).
- Note!** Be sure to cork the drain hose (Fig. 4/ ②) with a stopper (Fig. 4/ ③) in order to avoid the chamber temperature conditions rising.
- 4.16. At the end of operation open the lid lifting it upwards with a hand to dry the centrifuge chamber. Turn OFF the centrifuge with switch on the rear panel.
- 4.17. Disconnect the power cord from the mains outlet.
- Note!** The electrical lid lock allows opening the lid only when the centrifuge is connected to the power supply and is turned on. Do not force the lid to open when the centrifuge is switched off!
- 4.18. **Emergency opening (power interruption)**
- Disconnect the power cord from the mains outlet. Ensure the rotor rotation stopped.
 - To access the emergency opening slot on the right side of the unit insert a small tool for emergency unlocking (fig. 4/A, 4/ ①).
 - Press the small wrench till the click sounds and release the lid lock.
- Note!** With emergency stop (power interruption) it is necessary to wait for 3 min before connecting to power again.

5. Specifications

The unit is designed for operation in incubators and closed laboratory rooms at ambient temperature from +15°C to +35°C and maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.

5.1. Temperature specifications

- Temperature setting rangefrom -10°C... to +25°C
 - Temperature control rangefrom -10°C... to +25°C
 - Stable temperature maintenance rangefrom 25°C below ambient t_{amb} to +25°C
- Temp. range -10..-5°C depends on the ambient temperature, rotation speed and rotor type.

5.2. General specifications

- Speed range100 - 4200 RPM (increment 100 RPM)
- Max. density of material to be centrifuged.....1.2 g/ml
- Acceleration time up max. speed, not more20 sec
- Slowdown time, not more30 sec
- Maximum noise level, not more65 dB(A)
- Rotation directionclockwise
- Working diameter335 mm
- Timer1 - 90 min (increment - 1 min)
- Rotor imbalance automatic diagnostics (emergency stop, indication "IMBALANCE")
- DisplayLCD
- Nominal operating voltage/ power consumption.....230 V, 50/60 Hz / 990 W (4.3 A)
- Dimensions (WxDxH)635x580x335 mm
- Weight, not more62 kg

Table 1 Accessories description

| Optional accessories | Description | Tubes/microtiter plates manufacturer | Tubes/microtiter plates dimensions, ø x length (max.) |
|-----------------------------|--|---|--|
| Rotor R-6 | Centrifuge tube with cap, conical bottom | Greiner bio-one, Sarstead, Corning, Nunc | 29 x 115 mm |
| Rotor R-12-15 | Centrifuge tube with cap, conical bottom | Greiner bio-one, Sarstead, Corning, Nunc | 17 x 120 mm |
| Rotor R-12-10 | Centrifuge tube without cap, round bottom | Greiner bio-one, Sarstead, Corning, Nunc | 16 x 105 mm |
| Rotor R-2 | Standard 96-well microtiter plates or other plates | Greiner bio-one, Sarstead, Corning, Nunc | 128 x 85.6 x 45 mm (WxDxH) |

| Optional accessories | Number of places | Characteristics | Speed range in rpm | RCF |
|-----------------------------|-------------------------|------------------------|---------------------------|------------|
| Rotor R-6 | 6 | 50 ml | 0-4200 | 3370 x g |
| Rotor R-12-15 | 12 | 15 ml | 0-4200 | 3370 x g |
| Rotor R-12-10 | 12 | 10 -15 ml | 0-4200 | 3370 x g |
| Rotor R-2 | 2 | 96, 48, 16, 4 well | 0-2000 | 560 x g |
| Optional accessories | Description | | | |
| RR-U | Rotor holder | | | |

| Optional adapter sets | For rotor | Description | Tube dimensions, ø x length |
|------------------------------|------------------|------------------------|------------------------------------|
| BN-17-120 (standard) | R-12-15 | For 15 ml tubes | 17 x 120 mm |
| BN-16-90 (standard) | R-12-10 | For 10 – 15 ml tubes | 16 x 105 mm |
| BN-13-75 | R-12-10 | For vacutainers 2-5 ml | 13 x 75 mm |
| BN-13-100 | R-12-10 | For vacutainers 4-8 ml | 13 x 100 mm |
| BN-16-100 | R-12-10 | For vacutainers 8-9 ml | 16 x 100 mm |

Grant is committed to a continuous programme of improvement, specifications may be changed without notice.

6. Guarantee and service

6.1. Guarantee

When used in laboratory conditions according to this manual, this product is guaranteed for TWO YEARS (exclude items mentioned in Table below) against faulty materials or workmanship.

| Additional items |
|--|
| BN-16-90 standard adapter set for R-12-10 |
| BN-17-120 standard adapter set for R-12-15 |
| BN-13-75 adapter set for R-12-10 |
| BN-13-100 adapter set for R-12-10 |
| BN-16-100 adapter set for R-12-10 |
| Rotor holder RR-U |

All rotors and accompanying metal buckets have maximum operating life of 7 years from the date of use. The plastic buckets have an operating life of two years from the date of use.

6.2. Service & Maintenance

There are no user-serviceable parts inside the unit. For all maintenance and repairs (except as defined below) return to our service department in the UK or in other countries, our distributor.

6.3. Cleaning & Disinfection

Standard ethanol (75%) or other cleaning agents recommended for cleaning of laboratory equipment can be used for cleaning and disinfection of the unit.

It is necessary to clear away ice and remove condensate from the centrifuge cavity. For easy cleaning, the centrifuge chamber is equipped with a drain hole with tube (fig.4/②). Cleaning the chamber place the tube into an appropriate container and drain the fluid.



Note! Be sure to cork the drain hose (Fig. 4/ ②) with a stopper (Fig. 4/ ③) in order to avoid the chamber temperature conditions rising.

Condenser cleaning. Disconnect the unit from the mains. Unscrew four screws and remove a grate panel situated on the rear panel of the unit. Remove the dust with vacuum cleaner. Re-assamble the unit.

6.4.

Replacement of fuses

Disconnect from the outlet. Remove the power plug from the right side of the unit. Pull out the fuse holder by applying leverage in recess (fig.5/Ⓐ). Remove the fuse from the holder. Check and replace with the correct fuse if necessary (for 230V - 6.3A).

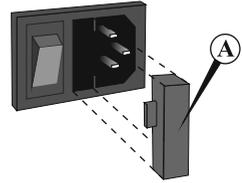


Fig.5 Fuse holder

Declaration of Conformity

Manufacturer: SIA BIOSAN
Ratsupites 7, build.2, Riga, LV-1067, Latvia

Equipment name/type number: LMC-4200R

Description of Equipment: Refrigerated Laboratory Centrifuge

Directives: EMC Directive 2004/108/EC
Low Voltage Directive 2006/95/EC

Applied Standards

Harmonized Standards:

EN 61326-1:

Electrical equipment for measurement,
Control and laboratory use - EMC
requirements
General requirements

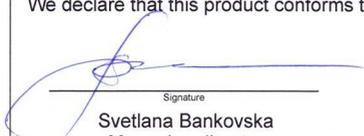
EN 61010-1:

Safety requirements for electrical
equipment for measurement, control
and laboratory use.
General requirements

EN 61010-2-020:

Particular requirements for laboratory
centrifuges.

We declare that this product conforms to the requirements of the above Directive(s)



Signature

Svetlana Bankovska
Managing director



Signature

Aleksandr Shevchik
Engineer of R&D



Date



Date

Grant bio

**Grant Instruments
(Cambridge) Ltd**

Shepreth
Cambridgeshire
SG8 6GB
UK

Tel: +44 (0) 1763 260811

Fax: +44 (0) 1763 262410

Email: scientificsales@grantinstruments.com

www.grantinstruments.com