



elmi Ltd.
laboratory equipment



ISO 9001:2008

Centrifuge CM-50



User's manual

Contents

| | Page |
|--|------|
| Contents..... | 1 |
| Introduction..... | 2 |
| Technical specifications..... | 2 |
| Delivery package..... | 2 |
| Applied rotor..... | 3 |
| Rotor assembly and usage..... | 3 |
| Preparation to work..... | 4 |
| Control description..... | 4 |
| Operation..... | 5 |
| Comparison table of RPM to RCF and vice versa..... | 6 |
| Troubleshooting..... | 7 |
| Emergency opening of centrifuge lid..... | 7 |
| Safety precautions..... | 8 |
| Disinfection and cleaning..... | 8 |
| Transportation and storage..... | 8 |
| Warranty statements..... | 8 |
| Certificate of approval..... | 9 |
| Certificate of sale..... | 9 |

Introduction

Dear users!

Centrifuge CM-50 is easy to use and reliable in operation. We ask you to carefully read the user manual and observe all the requirements of the maintenance and operation this will ensure a long and flawless exploitation of the device.

General information

CM-50 is a unique high-speed centrifuge designed to separate solutions into fractions. The device is used in analytical chemistry, microbiology, virology, clinical biochemistry, etc. Microprocessor control system provides smoothness of rotor rotation start, task entering and parameter reflection on the displays (time, braking level, rotor rotation speed in RPM or RCF units), blocking of lid during work, sound alarm and signals, sleep mode and automatic lid unblocking at the end of work. Built-in temperature and imbalance sensors protect the unit from overheating and dangerous imbalance.

Technical specifications

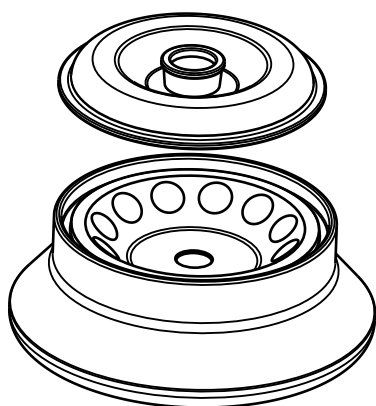
| | |
|--|------------------|
| Rotor rotation speed, RPM | 1000-15000 |
| Speed step selection, RPM | 1000 |
| Centrifugal force, RCF | 1000-15000 |
| Centrifugal force step selection, RCF | 1000 |
| Timer settings, min | 0.1-99 |
| Number of braking levels | 5 |
| Total possible imbalance of test tubes, gr | 1 |
| Environmental temperature, °C | 4-40 |
| Relative air moisture at 20°C, % | 80 |
| Power supply adapter, | 24V-3.75A |
| Power consumption, W | not more than 90 |
| Size of the device (length x width x height), mm | 200?180?145 |
| Weight | 3.1 |

Delivery package

| Item | Quantity |
|--|----------|
| Centrifuge..... | 1 |
| Rotor nut..... | 1 |
| Rotor key..... | 1 |
| Power supply adapter 24V- 3,75A 90W..... | 1 |
| Power cord..... | 1 |
| User manual..... | 1 |
| Packaging..... | 1 |

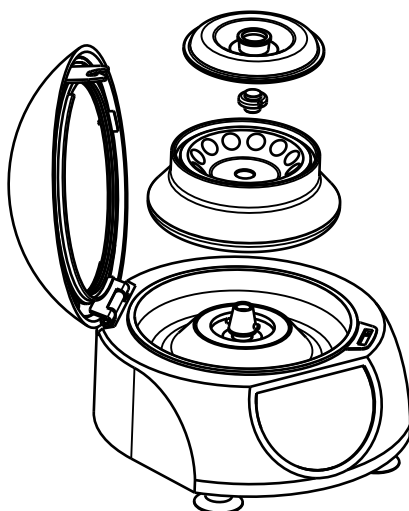
Rotor assembly and usage

Applied rotor



Highspeed rotor 50.01 for 12 test tubes with aerodynamic, hermetic lid.
Maximal rotation speed 15 000 rpm.
Maximal centrifugation force 15 000 rcf.
5 braking levels.
PUSH mode is valid.

Rotor assembly and usage



Assembly: put the rotor on the axis, note that the pins of the axis must get into the grooves of the rotor, then tighten the rotor nut with special key.

Usage: always load the rotor symmetrically. By minimizing the difference of weight between the filled test tubes, you reduce the wear of mechanical parts of the centrifuge. If the overall imbalance of test tubes exceeds 1 gram, centrifuge will not start and the display will show ER_db - imbalance error code.

Rotor 50.01 must be used with the aerodynamic, magnetic lid which seals the contents of the rotor, reduces noise level and the heating of test tubes.

Control description

Preparation to work

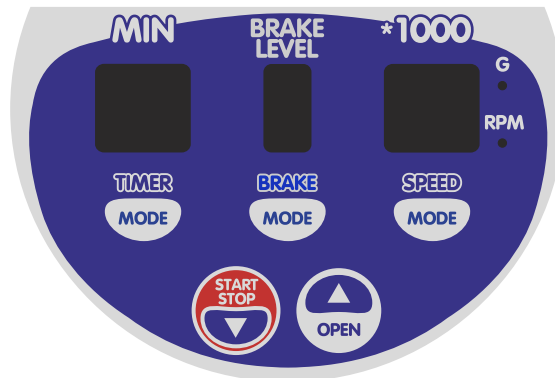
- Unpack the centrifuge.
- Inspect the appearance of the device, the adapter and the power cord for damage.
- Open the lid of the centrifuge with the emergency lid opening lever and remove the packaging material (see emergency opening of the centrifuge lid pg.7).
- In the cold season keep centrifuge at room temperature for at least 2 hours.
- Assembly the rotor it must rotate freely without jamming.
- Connect the centrifuge to the adapter and the adapter to the socket.
- The light indicators will light up.
- In the absence of faults or damage the centrifuge can be considered ready to work.

ATTENTION! In the presence of faults and damage, do not use the centrifuge without consulting a specialist.

ATTENTION! Network socket must correspond to the adapter plug. In case of non compliance with this condition the rules of electrical safety are violated.

Control description

On the front side of the centrifuge the control panel is situated with indicators and buttons that have the following functions:



- Increasing parameter / lid opening button.



- Decreasing parameter / starting and stopping button.



- Setting timer.



- Setting braking level.



- Setting speed.

ATTENTION! To change the PRM to G (RCF), or vice versa, Press and hold





button for 5 seconds.

Operation

Operation

Settings and adjustments of the parameters of the centrifuge are made on the turned on device with opened or closed lid. Do not forget to use the aerodynamic, magnetic lid with the rotor. During operation parameter adjustments are not possible.



1. Setting speed parameter:

Press the **SPEED** button and set the desired parameter value with   buttons.

2. Setting time parameter:






Press the **TIMER** button and set the desired parameter value with   buttons.

3. Setting brake level parameter:

Press the **BRAKE** button and set the desired parameter value with   buttons.

Braking levels (15000 rpm, full rotor)

| Level | Seconds |
|--------|---------|
| 1..... | 28 |
| 2..... | 20 |
| 3..... | 15 |
| 4..... | 13 |
| 5..... | 11 |

When all the parameters are entered to start the centrifuge close the lid and press the  button. If the settings were made with the lid closed then press the last set parameter button ,  or  and press the  button.

Thus the centrifuge will start and the timer will begin the countdown. Last minute of countdown is displayed in seconds. When the set time runs out centrifuge stops, alarms sounds and lid unblocks.

4. Modes:

Centrifuge -50 supports a special PUSH mode to make your work more effective and a sleep mode to minimize power consumption.

PUSH mode is in the speed range before 1 or after 15. Duration of centrifugation in PUSH mode is determined by the duration of  button retention period, as soon as the button is released,

the centrifuge stops with the set the braking level.

SLEEP mode - device goes into sleep mode automatically after 25 minutes of standstill. To exit sleep mode, just press any button.

ATTENTION! Do not forget to use the magnetic aerodynamic lid with the rotor!

Operation

Comparison table of rounds per minute (RPM) to relative centrifugal force (RCF) and vice versa

| | | | |
|----------|------------|------------|----------|
| 1 000 g | 3 834 rpm | 1 000 rpm | 68 g |
| 2 000 g | 5 422 rpm | 2 000 rpm | 272 g |
| 3 000 g | 6 641 rpm | 3 000 rpm | 612 g |
| 4 000 g | 7 669 rpm | 4 000 rpm | 1 088 g |
| 5 000 g | 8 574 rpm | 5 000 rpm | 1 700 g |
| 6 000 g | 9 392 rpm | 6 000 rpm | 2 449 g |
| 7 000 g | 10 145 rpm | 7 000 rpm | 3 333 g |
| 8 000 g | 10 845 rpm | 8 000 rpm | 4 353 g |
| 9 000 g | 11 503 rpm | 9 000 rpm | 5 510 g |
| 10 000g | 12 125 rpm | 10 000 rpm | 6 802 g |
| 11 000 g | 12 717 rpm | 11 000 rpm | 8 230 g |
| 12 000 g | 13 282 rpm | 12 000 rpm | 9 795 g |
| 13 000 g | 13 825 rpm | 13 000 rpm | 11 495 g |
| 14 000 g | 14 347 rpm | 14 000 rpm | 13 332 g |
| 15 000 g | 14 850 rpm | 15 000 rpm | 15 304 g |

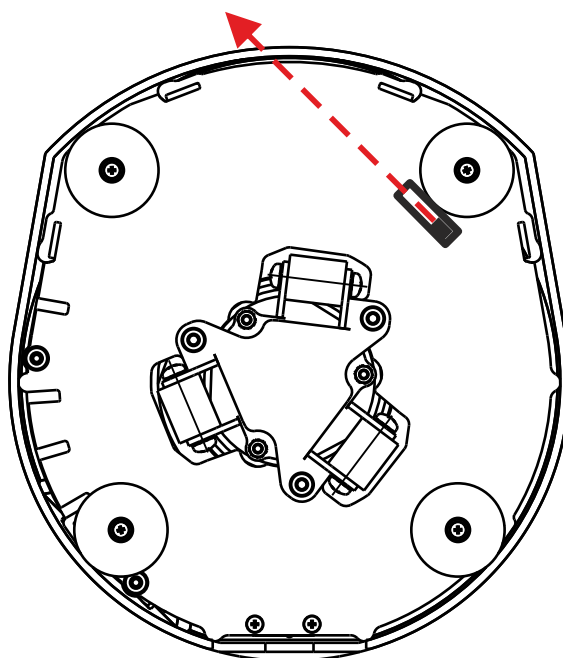
Troubleshooting

Error code table

| Error | Cause | Solution |
|-------------|--|---|
| No display. | No main power connection. Power failure | Plug in mains cable on both sides/ Check mains fuse of the building. |
| Er_OP | Lid not closed | Close and press on the lid till you hear a click. |
| Er_db | Total imbalance of test tubes is more than 1 gram. | Load rotor symmetrically. |
| Er_bd | Rotor is blocked. Engine failure. | Remove the rotor and delete the obstacle. Contact service |
| Er_td | Overheating. | Let the device cool down and check that the ventilation shafts are not blocked. |

Emergency opening of centrifuge lid

To open the lid of centrifuge in case of power failure or lock damage of the lid it is necessary to raise the centrifuge and to move the lever, which is located on the bottom of a centrifuge under the control panel, to the side as it is shown on the figure.



General information

Safety features

Service personnel are prohibited to:

- Plug the device in to a power outlet with configuration that differs from the power adapters configuration.
- Use the device with damaged adapter, power cord, rotor aerodynamic lid or housing.
- Move the device during centrifugation.
- Run the unit without rotor aerodynamic lid or housing.
- Load the rotor asymmetry.
- Use damaged tubes.

ATTENTION! Studied Samples may contain pathological material, including pathogens of serious diseases.

Disinfection and cleaning

Before you start disinfection or cleaning make sure the power adapter is unplugged. It is recommended to perform cleaning with water and universal washing liquids. Afterwards the machine should be carefully dried. Do not let the water get inside the centrifuge.

Transportation and storage

To insure safety during the transportation, transported equipment should be packed in the original manufacturers packaging or similar packaging substitute. Equipment can be transported by any kind of closed transport make sure that equipment is tightly fixed and transportation runs accordingly to regulations applied to this way of transport. Equipment should be stored in original manufacturers packaging in dry room with humidity not more than 80% and temperature range from +10 C up to +40 C. It is not recommended to store the equipment more than 36 months.

Warranty statements

- Warranty applies to 24 month period from the date of purchasing.
- Malfunctions arisen by the fault of manufacturer during warranty period, are removed free of charge.
- Warranty is not valid in the following cases:
 - If the serial number label of the manufacturer is damaged.
 - If damages appear as a result of the incorrect operation, transportation or storage.
- These documents are necessary if applying for warranty repair:
 - User manual with serial number of the machine.
 - Officially signed report, describing the reasons and conditions of equipment malfunction.
- Warranty repair could be performed only if the equipment is delivered in the original manufacturers packaging or equally safe packaging. Therefore please save the packaging after unpacking the device.
- If the above warranty requirements are disturbed, repair charges are applied to the consumer.
- For all further questions concerning exploitation and maintenance please contact manufacturer or product vendor.

General information

Certificate of approval

Centrifuge CM-50_____ N_____ has been inspected for the technical conditions and meets all regulations necessary for such class of device.

Quality control person_____.
(name) (signature)

Date of manufacture_____.

Place for stamp.

Certificate of sale

Organization _____.

Address _____.

Phone_____.

Vendor _____.
(name) (signature)

Date of sale _____.

Manufacturers' address.
21-136 Aizkraukles Str., Riga LV-1006
Tel: (+371) 6755 8743
Fax: (+371) 6755 1934
E-mail: info@elmi-tech.com
WWW: www.elmi-tech.com

