ELMI

USER MANUAL

Benchtop Centrifuge CM-7S Plus

Speed 3500 RPM

Low noise and heating

Force 2,300 x G

5 Brake settings

LCD Screen

ISO CERTIFIED 13485

ISO 9001:2015

FDA

UKAS MANAGEMENT SYSTEMS

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Content

Dear user!

Congratulations, you have acquired an ELMI centrifuge a product of advanced technology and high quality!

Centrifuge CM-7S is easy to use and reliable in operation. We ask you to Plus carefully read the user manual and observe all maintenance and operation instructions; this will ensure long and flawless use of the device.

Centrifuge CM-7S Plus is designed to separate solutions into fractions. The device is used in medicine, analytical chemistry, microbiology, virology, clinical biochemistry, etc.

Technical specification

Rotor rotation speed	100-3500 RPM
Maximal relative centrifugal force	2300 G
Accuracy of rotation speed maintenance	±2 %
Timer range	1-99 min.
Braking levels	6
Step-type behaviour of setting:	
rotor rotation speed	10 RPM
centrifugal force	10 G
time, sec	1
The level of noise 1 m in distance	no more than 61 db
Working range of temperatures	from +4 to +40 °C
Relative air moisture	80%
Total allowed imbalance of test tubes	no more than 7 g
Allowed deviations of voltage	110-240 V
Allowed deviations of frequency	50-60 Hz
Maximal consumable power	250 W
Size of the device (length x width x height)	430 x 410 x 220 mm
Weight	13.8 kg

Delivery Package

Item	Quantity
Centrifuge	1
Power cord	1
Rotor	1
Rotor key / emergency lid-opening key	1
Rotor nut and spacer	1
User manual	1
Packaging	1

General safety

- Use only as specified in the operating instructions provided.
- The unit should not be used if it has encountered a physical shock or has been dropped.
- 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 mains power.
- 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 to the mains only 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 an 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 spilt on or inside the equipment. If liquid is split 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.
- 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 unit.

Biological safety

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

Preparation for use

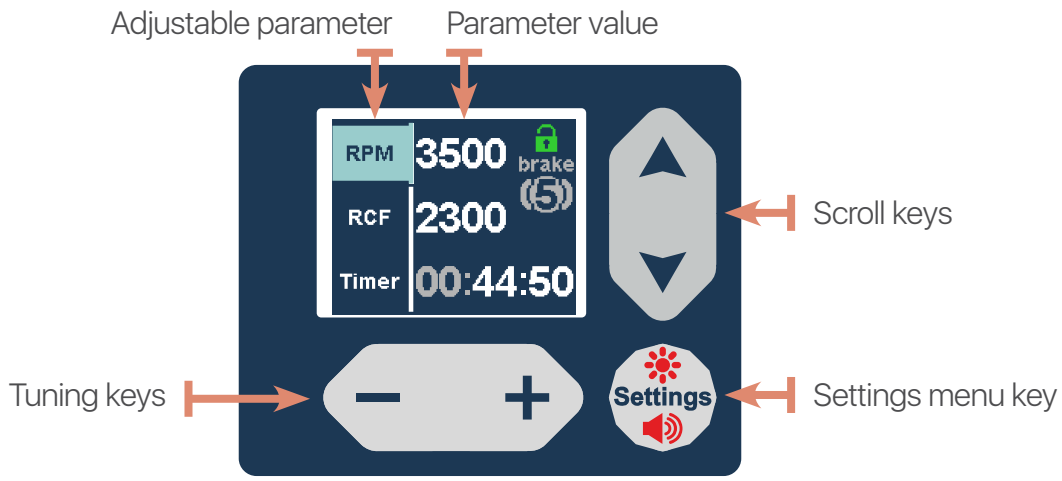
- Unpack the centrifuge trasportation or storage purposes.
- If the machine was stored at a temperature below 0°C, make sure that it is kept at room temperature for at least two hours before turning it on.
- Pleace the centrifuge onto a level, horizontal surface.
- Examine the power plug, power cord and appearance of centrifuge for damadge.
- Connect the power cord to the centrifuge, insert the plug in to the socket and press network switch at (I) symbol. Display will light up on the control panel.
- Open the lid by pressing the OPEN button.
- Check the rotor and make sure that rotor nut is securely fastened. Try rotating it by hand. There should be no noise or obstacles for smooth running.
- Check the adapters. All adapters must be equally positioned inside the brackets.
- Check the device's surroundings. A safety distance of 30cm must be observed around the centrifuge during operation.
- Check for other signs of damage or malfunction.

ATTENTION!
If there is any apparent damages or malfunctions, DO NOT TURN ON the centrifuge without consulting a specialist.

ATTENTION!
To finish the unpacking of centrifuge, pull the emergency opening lever to the side (as shown on the figure on page 7) and remove all packaging materials from the rotor bucket.

Preparation for use

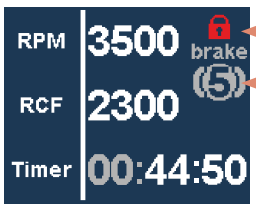
The centrifuge consists of a stainless steel casing with rotor mounted in it, electric motor and control system. otor is covered with a self locking transparent The r lid. A network switch is mounted in the back of the casing. A control panel on the front of the casing contains the display panel and buttons with the following functions:



Control panel

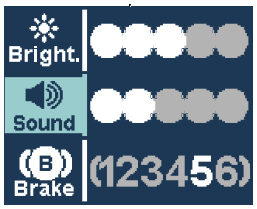
OPEN — Button to unlock the lid of centrifuge.

START STOP — Button to start the centrifugation or to end the cycle before the estimated time.



Lid lock indicator (green - opened, red - closed)

Braking level indicator



Display brightness, beeper volume and braking level can be adjusted in the Settings menu

Operation

Place the test tubes in the rotor adapters. Always load the rotor symmetrically by minimizing weight difference between filled test tubes, you reduce the wear on mechanical parts of the centrifuge. The total imbalance of test tubes should not exceed 7 grams.

For safety reasons, the centrifuge lid automatically locks when closed and unlocks at the end of centrifugation cycle. The lid can be unlocked with the **OPEN** button, but only with the rotor at a standstill.

Settings and adjustments to the parameters of the centrifuge must be made before the start of the centrifugation cycle, with opened or closed lid. During the centrifugation cycle, only the RPM (RCF) parameter can be adjusted.

1. **Setting rotor rotation speed/G-force parameter:** Select the RPM/RCF parameter with scroll keys and set the needed value with tuning keys.
2. **Setting time parameter:** Select the time parameter with scroll keys and set the needed value with tuning keys.
3. **Unlocking centrifuge lid:** Unlock centrifuge lid by pressing the **OPEN** button. For safety reasons, pressing this button during centrifugation will have no effect. After the end of centrifugation cycle, the lid unlocks automatically.
4. **Starting the centrifuge:** Close the centrifuge lid and start the centrifugation cycle by pressing the **START/STOP** button.
5. **Stopping centrifuge before estimated time runs out:** To stop the centrifuge before the end of centrifugation cycle, press the **START/STOP** button.
6. **Setting braking level:** To set the desired braking level, enter the settings menu and select a value from 1 to 6.

Braking levels have the folowing parameters

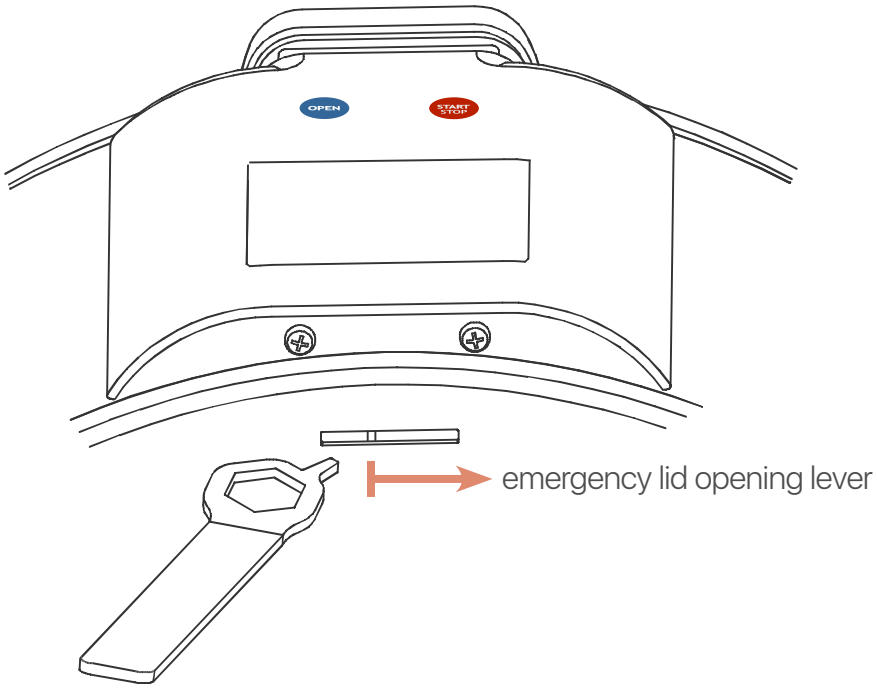
Braking level	Stopping time from 3500 RPM to 0
1.	30 sec
2.	45 sec (default setting)
3.	60 sec
4.	90 sec
5.	120 sec
6.	150 sec

ATTENTION!
Operation must be stopped immediately if there are any unusual noises or vibration.

ATTENTION!
Check the rotor and rubber seal for wear each time before starting the centrifuge.

Emergency opening of centrifuge lid

To open the lid of centrifuge in case of power breakdown or lid lock damage, disconnect the device from mains power supply, wait until the rotor comes to a standstill, then lift the centrifuge and insert the included emergency lid opening key in to the groove and move the lever to the side (as shown in the figure below). The lever is located on the bottom of the centrifuge, in the groove near the control panel.



Rotor assembly and usage

Assembly: Place the rotor on the axis. On top of the rotor place a special spacer - note that the pin of the spacer must align with the groove of the axis, then place the nut on the axis - and tighten it with the included rotor key. Before each start, check that the rotor is firmly tightened.

Disassembly is performed in reverse sequence.

Usage: Always load the rotor symmetrically. By minimizing the difference in weight between the filled test tubes, you reduce the wear on mechanical parts of the centrifuge. If the overall imbalance of test tubes in the rotor exceeds 7 grams, the centrifuge will start emergency braking it reaches 1000 rpm and the display will show when imballance error.

Do not use damaged rotors!

ATTENTION!
Samples may contain pathological material, including pathogens of serious diseases.
Always check test tubes for damage before centrifugation.

Applied rotors

ROTOR 6M | Universal rotor for 12 adapters.
Universal stainless steel rotor for 12 adapters.
Maximal volume of applied test tubes: 12 ml.
Maximal size of applied test tubes: (D x L) 16.8 x 115mm.
Top speed: 3500 rpm.
Allowed to sterilized in an autoclave at temperatures up to 134°C

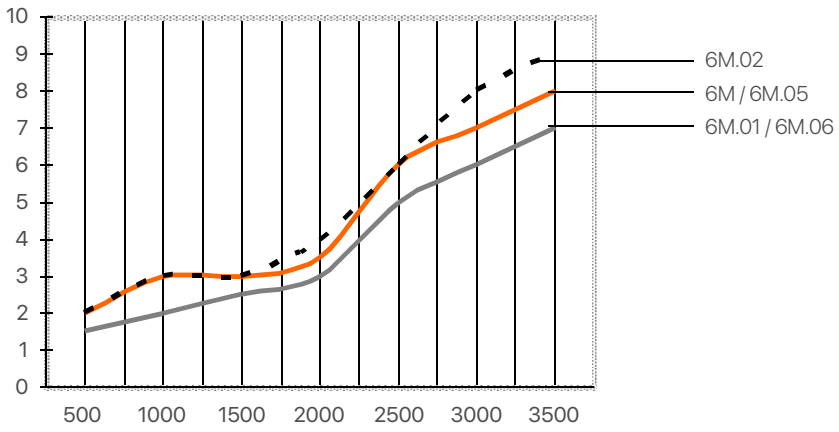
ROTOR 6M.01 | Universal rotor for 4 adapters.
Universal rotor for 4 adapters.
Maximal volume of applied test tubes: 50 ml.
Maximal size of applied test tubes: (D x L) 30 x 135 mm.
Top speed: 3500 rpm.

ROTOR 8M.02 | Universal rotor for 24 adapters.
Universal stainless steel rotor for 24 adapters.
Maximal volume of applied test tubes: 12 ml.
Maximal size of applied test tubes:
Inward row (D x L) 16.8 x 115 mm.
Outward row (D x L) 16.8 x 140mm
Top speed: 3500 rpm.
Allowed to sterilized in an autoclave at temperatures up to 134°C

ROTOR 6M.05
Universal stainless steel rotor for 12 adapters.
Maximal volume of applied test tubes: 15 ml.
Maximal size of applied test tubes: (D x L) 16.8 x 140mm.
Top speed: 3500 rpm.
Allowed to sterilized in an autoclave at temperatures up to 134°C

ROTOR 6M.06 | Universal rotor for 6 adapters.
Universal rotor for 6 adapters.
Maximal volume of compatible test tubes: 50 ml.
Maximal size of applied test tubes: (D x L) 30 x 135 mm.
Top speed: 3500 rpm.

Graph of test tube heating after 30 minutes of centrifugation



ROTOR 6M.01 / 6M.06	2	3	3	3.5	6	7	8
ROTOR 6M / 6M.05	1.5	2	2.5	3	5	6	7
ROTOR 6M.02	2	3	3	4	6	8	9

Error code table

Error code	Cause	Solution
"BLACK SCREEN"	No main power connection. Power failure	Check connection of the power cable.
THE LID IS NOT SHUT	Centrifuge lid is left open.	Close and press on the lid till you hear a click.
DISBALANCE	Total imbalance of test tubes is more than 7 gram.	Load rotor symmetrically.
PLEASE WAIT COOLING DOWN	Processor Control Board is overheated.	Give a little time and centrifuge will cool down automatically.
ROTOR SPINNING	Residual rotation of the rotor.	Wait until the rotor is motionless.

Disinfection and cleaning

Rotor and accessories must be cleaned once a week to avoid corrosion and changes to material.

Disconnect the centrifuge from mains power supply, remove rotor, and clean it separately. The rotor, rotor chamber, and the outside of the centrifuge should be cleaned with a moist cloth. Only use neutral agents to clean these parts. To disinfect, use an alcohol-based disinfectant (70% isopropanol/water mixture). If corrosive, toxic or radioactive liquids or pathogenic bacteria are spilled in the rotor or its chamber, the centrifuge must be decontaminated thoroughly.

Transportation and storage

To ensure safety during transportation, the equipment should be packed in the original manufacturer's packaging or similar packaging substitute.

Equipment can be transported in any kind of closed transport; make sure that equipment is tightly fixed and transported accordingly to transportation regulations. Equipment should be stored in original manufacturer's packaging in a dry room with humidity no more than 80% and temperature range of 10-40°C. It is not recommended to store the equipment more than 36 months.

Warranty statements

- Warranty applies to the 24 month period from the date of purchasing.
- Malfunctions that occur due to a fault of the manufacturer, during warranty period, are repaired free of charge.
- Warranty is is not valid in the following cases:
  - If the serial number label of the manufacturer is damaged.
  - If damage occurs as a result of incorrect operation, transportation or storage.
- These documents are necessary if applying for warranty repair:
  - User manual with serial number of the machine.
  - Official signed report, describing the reasons and circumstances of the equipment malfunctions.
- Warranty repair can be performed only if the equipment is delivered in the original manufacturer's packaging or equally safe packaging.
- Before returning for warranty repair, ensure that the device is fully cleaned, decontaminated and does not present any kind of health risk to our staff.
- If the above warranty requirements are not met, repair charges are applied to the customer.
- For all further questions concerning usage and maintenance, please contact the manufacturer or product vendor.

Certificate of approval

Centrifuge CM-7S Plus ___

Nº_____

has been inspected for the technical conditions and meets all regulations necessary for this 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 _____ .

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