Laboratory Equipment Manufacturer
www.mrclab.com

Multy purpose & Large Capacity Refrigeration Centrifuge

Operation Manual

LGCENR-514R

PLEASE READ THIS MANUAL CAREFULLY BEFORE OPERATION

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MRC.VER.01-5.14

Fig.1

①	Lid
②	Rotor
③	Control Panel
④	Display Panel
⑤	Emergency Lid Release

Contents

1. Introduction

The LGCENR-514R is a refrigerated bench-top centrifuge for use by trained professionals in routine, traning and research laboratory work in the biosciences, industry, hospital, and the chemistry field. Its varying rectangular bucket, round buckets and adapters make it specially well suited to centrifugation of centrifuge tubes. The following rotors are available for the LGCENR-514R

Before using the LGCENR-514R for the first time, please read the operating manual

You will see this symbol on your centrifuge and at a number of points throughout this manual. The texts it highlights to safety . Use the centrifuge only after having the safety notices

1.1 Delivery package

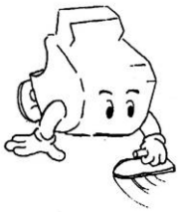
1 LGCENR 514R with
rotor 1 power cable
1 operating manual
1 set of fuse
1 set of T wrench

Package

Examine whether centrifuge has damage for package if it is arrived. If there are damage or lack of spare parts, contact with MRC science company immediately. Contact points were written on package box and user manual cover.

1.2 Notes for Installation

Stable and Flat place



Centrifuge should set up on the hard and flat floor. In case centrifuge is set up in inclined place, as it is rotated long hours in state of turning in inclined place, wheel is likely to be bent by heavy weight of rotor.

1. Introduction

Space requirements and proper circulation of air

The necessary space requirements can be found under dimension in the technical data chapter. The centrifuge must be set up in a suitable space, so that it is stable. During set up the required safety area of 3m around centrifuge. For proper circulation of air, the centrifuge should be established on the place that is defined with 15CM of both side and 10CM of space on back. If draft hole on the back of device is blocked by hiding with clothes or is blocked from other device, air circulation is difficult and especially avoids place that dust happens much.

Temperature, Humidity

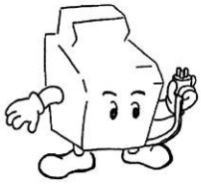
Centrifuge is influenced in temperature or external environment of humidity etc.. because is operated by highly electronic control system. Do not establish near direct ray of light or heating utensil. Proper temperature, humidity should be kept.

The place not to occur corrosive gas

Centrifuge is influenced in temperature or external environment of humidity etc.. because is operated by highly electronic control system. Do not establish near direct ray of light or heating utensil. Proper temperature, humidity should be kept.

Balance

Shaft of centrifuge must do horizontal work so that is verticality to ground. When need, to adjust horizontality of centrifuge with using horizontal gauge.



Electrical Requirements

Please use rated voltage registered in label of product for normal operation of device. Please inquire in the local supply of electric power company or customer support center in case of confirm whether engaged rural districts fit in rated voltage of product.

1. Introduction

Plug that protection ground connection pin is to product is offered, and this plug can insert to ground connection way electricity outlet for safety. Exchange this plug for ground connection in case of do not fit to busy outlet. This time, please take care lest should get shocked, and inquire to professional electrical engineer according to need. Ground connection way adaptor plug does not use absolutely to electricity outlet that ground connection monad is not

When errors happen, to cancel power connection, must establish emergency switch to drop in centrifuge. Laboratory way out lateral or outside is good.

2. Technical data

Line connection:	LGCENR-514R
Power supply :	220V /50, 60 Hz
Max. power requirement :	2.5kw
Max. rotational speed :	15,000 rpm (fixed angle rotor) 4,500 rpm (swing out rotor)
Max. centrifugal force :	25,200 xg (fixed angle rotor) 4,449 xg (swing out rotor)
Max. load :	4 x 750 ml
Timer :	99hrs 59min 59sec or Free Run
Temperature range :	-10 degree ~ +40 degree
Dimensions (W x D x H) :	723 x 665 x 387 mm
Weight excluding rotor :	95 kg
Noise level :	< 60 dB (A)
Overvoltage category :	II
Degree of contaminaton :	2

Technical specifications subject to change !

3. Rotors (Angle Rotor & Swing Rotor)

				
A1.5T-24	A1.5T-36	A15T-12	A50T-6	A50T-8
24 x 1.5/2.0 ml	24 x 1.5/2.0 ml	12 x 15 ml	6 x 50 ml	8 x 50 ml
15,000 rpm	14,000 rpm	15,000 rpm	15,000 rpm	15,000 rpm
20,250 xg	25,200 xg	25,029 xg	24,149 xg	24,841 xg
Rotor NO. : 12	Rotor NO. : 1	Rotor NO. : 4	Rotor NO. : 7	Rotor NO. : 13
Rad. : 7.9 cm	Rad. : 11.5 cm	Rad. : 9.5 cm	Rad. : 9.5 cm	Rad. : 9.8 cm
				
A85T-6	A0.2T-48	A10T-12	A15T-12C	A50T-6C
6 x 85 ml	48 x 0.2 ml	12 x 10 ml	12 x 15 ml	6 x 50 ml
15,000 rpm	12,500 rpm	15,000 rpm	15,000 rpm	15,000 rpm
23,143 xg	15,547 xg	21,382 xg	24,149 xg	23,017 xg
Rotor NO. : 6	Rotor NO. : 10	Rotor NO. : 2	Rotor NO. : 4	Rotor NO. : 5
Rad. : 9.6 cm	Rad. : 8.9 cm	Rad. : 8.4 cm	Rad. : 9.5 cm	Rad. : 9.1 cm
				
A10T-24	A85T-10	S750T-4B	S500T-4B	TM96-4S
24 x 10 ml	10 x 85 ml	4 x 750 ml	4 x 500 ml	4 x 500/750 ml
15,000 rpm	15,000 rpm	4,000 rpm	4,500 rpm	4,500 rpm
25,407 xg	23,143 xg	3,399 xg	4,278 xg	3,399 xg
Rotor NO. : 15	Rotor NO. : 14	Rotor NO. : 11	Rotor NO. : 8	Rotor NO. : 9
Rad. : 10.0 cm	Rad. : 12.7 cm	Rad. : 19 cm	Rad. : 18.9 cm	Rad. : 15.4 cm

4. Safety precautions and applicational limitations

For your personal safety, please be sure to comply with the following regulations unconditionally:

- The LGCENR-514R must only be use for the specified applications (see introduction). it must not be operated in explosive atmospheres. Explosive or highly reactive substances must not be centrifuged.

- When being moved from the cool room to a normal lab environment, the centrifuge must either warm up for half an hour in the cool room first or it must warm up for at least 3 hours in the lab before being connected to the supply system, in order to prevent damage by condensation.

- The centrifuge must not be moved or knocked while in operation.

- Improperly installed or serviced centrifuges must not be operated. Repairs must be carried out by Service personnel authorizes by MRC. Use only original Hanil spare parts and rotors.

- When working with pathogenic organism of a higher risk group, more than one aerosol-tight bioseal must be provided for. If the named liquids are spilled in the rotor chamber, the centrifuge must be thoroughly and professionally cleaned. Before using and cleaning or decontamination method other than that set out in section 4, "Maintenance and cleaning", please consult MRC to ensure the intended method will not damage the device.

- Rotors must always be properly secured. The centrifuge may only be operated with the rotor firmly tightened. For mechanical stability, all the places on the rotor must be fitted identical buckets.

- The rotor may only be loaded symmetrically. Opposing tubes should be of the same type and be filled equally. On the rotor you will find information concerning the weight that a completely filled bucket may not exceed.

- Prior to centrifugation, the tubes should in any case be visually inspected for material damage. Damaged tubes may not be centrifuged. This is because broken tubes can, in addition to sample loss, result in further damage to the centrifuge and accessories.

- Rotors showing clear signs of corrosion or mechanical damage must not be used. Check the accessories regularly.

- Rotors are high-grade components which have to withstand extreme stresses and strains. Aluminum rotors are largely protected from corrosion by the most common laboratory chemicals by means of an anodizing coating, though the protection is not unlimited. Protect the rotors from mechanical damage. Even minor scratches or cracks can result in serious internal material damage. Avoid damaging the rotors by the use of aggressive chemicals, such as: strong and weak alkalis, strong acids, solutions of mercury, copper and other heavy metal ions, chlorinated hydrocarbons, concentrated salt solutions and phenol. If the rotor is contaminated by aggressive substances, clean it immediately with a neutral rinsing solution.

- If the rotor is run for a length period of time, or more often with short centrifugation runs the sample tubes will become hot. Keep within the limits specified by the tube manufactures.

- Seal the tube lid down tight before centrifuging. The lids of unclosed tubes may rip off during centrifugation and damage the centrifuge.

4. Safety precautions and applicational limitations

- When using organic solvents e.g.phenol, chloroform) the durability of plastic tubes may be impaired.
- When closing the centrifuge lid do not place your fingers between the lid and the centrifuge, otherwise they may be trapped.

4.1 Electricity safety information

- Please use supply cord offered with equipment
- Supply cord inserts to electricity outlet that is grafted in near place. Extension code does not use. Please inquire to electricity professional engineer in case of confirm whether outlet is ground connection way.
- It can get shocked if connect wrong ground wire of equipment.
- Please set up equipment so that supply cord does not step on.
- Please take care so that ventilating openings is not blocked.
- Please do not insert any object on slot or hole of equipment.
- Please turn off power of equipment immediately if following circumstance happens, and select supply cord in outlet. Please inquire in our company customer support center.

  - Strange noise or smelling occasion in equipment
  - Occasion that supply cord is damaged or be worn away
  - Occasion that wall circuit breaker, fuse or other safety device is expired
  - Occasion that spill liquid in equipment
  - Occasion that water infiltrates in equipment
  - Occasion that some of equipment is damaged

4.2 Precaution

User access is possible area
This machine was designed so that user may approach in only safe area. Danger territory has lapped cover or protection apparatus that have removed using tool so that user may not approach. Please have not removed cover or protection apparatus absolutely.

4.3 Regulations

- Please be observed all cautions and guideline that is offered with equipment certainly.
- Ventilate properly and set up the equipment in place that has enough space.
  user description.

4. Safety precautions and applicational limitations

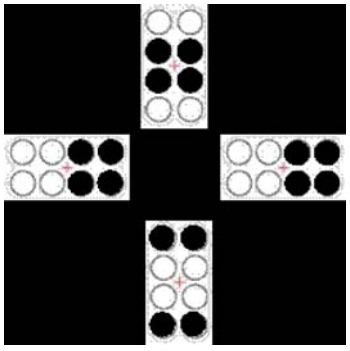
- Please refer to establishment guideline about size of minimum establishment space.
- Please use refined article and parts of MRC science industrial company. If use amiss consumer goods, performance can be fallen.
- Please select plug in outlet certainly before execute cleaning.
- Power cable that segregate the power of equipment was connected by plug-in unit in backside of equipment. Please select all cables on electricity outlet if want to shut off perfectly power of equipment.

4.4 Prevention of Over Speed

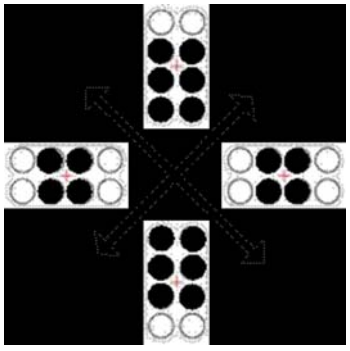
Be sure that Rotor speed is not more than maximum rotation speed. Don't over the maximum speed of rotor.
When the rotor is given to relative centrifugal force over the allowed seal intensity, the destruction of rotor occurs because the shape of rotor is designed so that rotor can stand an external force in accordance with the allowed seal intensity of the rotor

4.5 Arrangement of Tubes

Put samples measured exactly into tube each and load tubes symmetrically each other in the rotor. If the volume of opposite sample is different, the serious turbulence occurs during rotation and a motor, rotor and shaft are damaged.



Non-Symmetry



Symmetry

4. Safety precautions and applicational limitations

4.6 Use and storage condition

- Working conditions
  - Use encouragement within room temperature : 5℃ ~ 35 ℃
  - Maximum relative humidity : 30 %~ 85%
  - Air pressure : 500 ~ 1060 hpa

- Storage or conveyance conditions
  - Ambient temperature : -10℃ ~ +40℃
  - Relative humidity : 10 %~ 90%
  - Air pressure : 500 ~ 1060 hpa

4.7 Centrifuge Rotor Safety

[Improper Rotor Care]

Bucket failure from swing rotor causing centrifuge damage

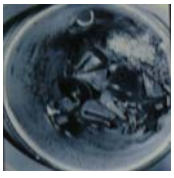
Results of improper maintenance could be:

- Expensive
- Destructive
- Dangerous
- Easily Avoided

Chamber damage after a metallic rotor failure

Main causes of rotor failure are:

- Sample leakage causing imbalance at high speed
- Overloading – average sample density is greater than 1.2g/ml for the rotor at max RPM
- Stress corrosion – parts of the rotor break away
- Fatigue – as the metallic rotors age they become more brittle



Titanium rotor failure due to over speed

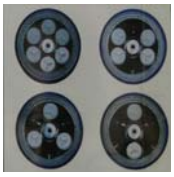
Lack of maintenance will cause:

- Corrosion due to use of high alkali solution in metallic rotors
- Failure due to overspeeding of the rotor
- Destruction of your centrifuge and rotor

[Proper Rotor Care]

Rotor care before a run:
CHECK....

- Are the tubes and bottles in good condition?
- Are all o-rings in place and lubricated?
- Are buckets properly seated on hangers?
- Are tubes and bottles balanced?
- Is the rotor lid tightened and secured on rotor?
- Is the rotor secured to the centrifuge drive?



Tube loading

Rotor care after a run:

- Always remove adapters
- Clean up spills, wash in warm water with mild detergent
- Rinse in distilled water
- Dry rotor and store upside down

Rotor lid should be tied down

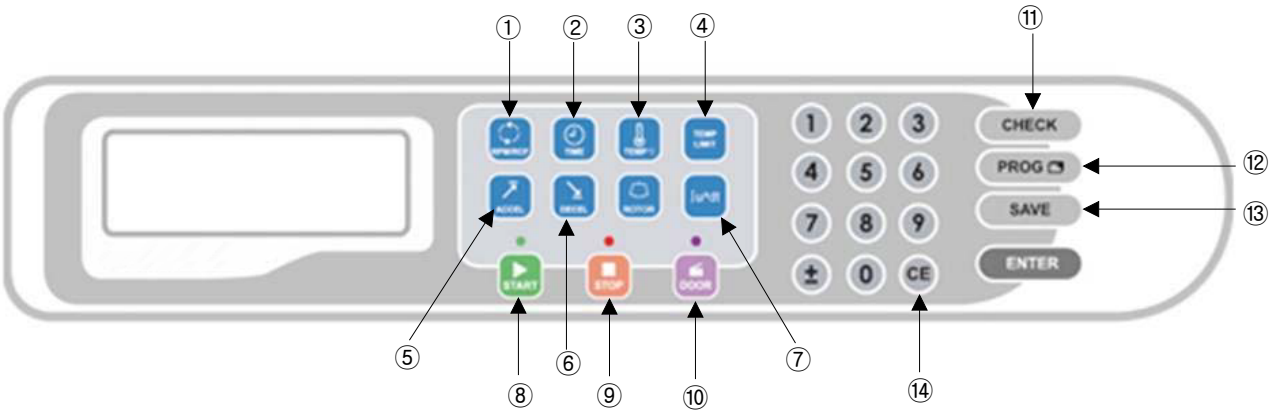
Regular maintenance:

- Wash and dry the rotor
- Lubricate all o-rings with vacuum grease
- Lubricate metal rotor threads with anti-galling grease
- Lubricate centrifuge spindle with silicone grease (Prevents rotor from sticking to spindle)

Removement part kit

5. Operation

Explanation for control board



No.	BUTTON (INDICATOR)	FUNCTION
①	[RPM / RCF]	It is displayed RPM/RCF setting value - RPM Setting / Display Unit : 1 RPM - RCF Setting / Display Unit : 1 xg
②	[TIME]	It is displayed TIME setting value and it can set to 99hrs5 9minutes and 59sec 0:0:0 =>Free Run Function. It used to change and store each functional parts.
③	[TEMP]	It is displayed TEMP setting value and it can set to -10℃ and+40 ℃
④	[TEMP LIMIT]	In order to conserve sensitive material for temperature, you can keep temperature of inside chamber
⑤	[ACC]	It is displayed acceleration step and user can use accelerating time changing random to 0~9 step It is displayed
⑥	[DEC]	It is displayed deceleration step and user can use accelerating time changing random to 0~9step.
⑦	[PULSE]	This function is designed for spin down of 1.5ml & 0.2ml tubes.
⑧	[START]	It used to start the machine.
⑨	[STOP]	It used to stop the machine.
⑩	[DOOR]	It used to open the lid.
⑪	[CHECK]	On operating, can check set value It is displayed stored
⑫	[PROG]	It is displayed stored number and it can stored up to 100 places
⑬	[SAVE]	Can save set value
⑭	[CE]	Can erase set value when user set wrong

5. Operation

5.1 Automatic rotor recognition

Set up rotor into chamber, then you can see display for auto recognition rotor no., max rpm, after closing door.
If you set up other rotor, new max rpm is to be displayed automatically.

5.2 Input value of rpm, time, temperature

RPM	Press down rpm key ( ) and input rpm value, then press down enter key (ENTER).
TIME	Press down time key ( ) and input time value, then press down enter key (ENTER).
TEMPERATURE	Press down temp. key ( ) and input temp. value, then press down enter key (ENTER).

5.3 Input braking steps value

You can control for speed of accel & decel time

Acceleration	Press down accel key ( ) and input accel value, then press down enter key (ENTER).
Deceleration	Press down decel key ( ) and input decel value, then press down enter key (ENTER).

5.4 Storage of input value

You can save setting value

Press down save key (SAVE) and input save no. at the same time, you can see choice mode "yes" or "no" in display window.
If you want yes, press down accel key ( ).
If you want no, press down key ( ).

5. Operation

5.5 Start operation

Press down start key ( ).

5.6 Recall function

You can recall storage no.

Press down prog. key (PROG) and input saved no., then press down enter key (ENTER).
If you want start, press down start key ( ).

5.7 Temp. limit

In order to conserve sensitive material for temperature, you can keep temperature of inside chamber by using temp.limit key ( ).

(Example)

Now setting temperature 4 ℃, if you press down temp.limit key ( ), then input ± 10 ℃, Centrifuge LGCENR-514R can be operated within temperature range -6 ~ 14 ℃ inside chamber.

5.8 Pulse function

This function is designed for spin down of 1.5ml & 0.2ml tubes.
After input rpm, press down pulse key ( ), then rpm rise up quickly up to setting value, after that, at once, stop mode is to be processed automatically. It takes about 1~2 minutes.

5.9 Check function

You can check your setting values during operation.

Press down check key (CHECK), setting value is displayed in window.

5.10 Rotor function

You can check radius of rotor, max rpm, on condition of stop mode.

Press down rotor key ( ), max rpm & radius is displayed in window.

6. Maintenance and cleaning

- Product maintenance procedure was recorded in user description offered with product.
- Please do not enforce maintenance procedure for product by method that is not clarified in user description.
- Please do not enforce any maintenance procedure that is not referred explicitly in user description offered with equipment.
- Please do not use jet-type cleaner. If use cleaner that is not approved, performance of equipment can be fallen or cause critical situation.
- Please use offer width and cleaning article to clear statement of user description.
- Please keep these articles where child's hand does not touch.
- Please have not removed fixedcover or protection apparatus absolutely with screw. Spare parts inside of frame are not parts that maintains or fix.

6.1 Device

The outer surfaces of the centrifuge and the rotor chamber should be cleaned regularly with warm rinsing solution. Before cleaning, unplug, then take off the rotor and clean it separately. The rotor chamber should be cleaned only with a damp cloth. Use only neutral agents for cleaning and disinfection (e.g. Extran neutral, 0% alcohol, Melisepol, Sterillium). Do not allow any liquid to get into the gap at the motor shaft outlet. To ensure the long life and safe operation if your centrifuge, avoid aggressive chemicals which may damage the rotor, buckets and rotor chamber. Check your unit once a month for corrosion and damage.

The rubber seals in the rotor chamber should be rinsed off thoroughly with water and rubbed with glycerin after each clean.

6.2 Rotors

The rotors, buckets, tube holders and adapters should be cleaned once a month or when necessary with a neutral cleaning agent (e. g. Extan neutral, RBS neutral, Teepol 610s, 70% alcohol, Meliseptol, Sterillium) to prevent residues of the material being centrifuged from changing the properties of the centrifuge and its accessories. The rotor must be taken off for this.

Never place components in disinfectants or cleaning agents which contain sodium hypochlorite/chlorine or are oxidants. This will cause the material to change. Disinfection with glutaraldehyde solution is possible. We recommend Cidex activated glutaraldehyde solution. The plastic adapters and rubber plates are dishwasher safe.

6. Maintenance and cleaning

Check the tube holders and buckets for residues and corrosion . For thorough cleaning, remove the rubber plates from tube holders and buckets and clean all parts separately.

Then refit the rotor and bolt it into place with the supplied rotor key. Check the rotor, tube holders and buckets once a month for mechanical damage.

All rotors, buckets, adapters, caps and tube holders can be autoclaved (121℃, 20 min).

The aerosol-tight cap, including silicon sealing ring, rubber mats and rectangular bucket adapters are subject to normal wear and must be replaced when a visual inspection reveals wear.

Do not unbolt the rectangular bucket adapters from each other.

On the swing-bucket rotor make sure, in particular, that the pegs and grooves of the buckets are free of dirt. They should be lightly lubricated with pivot grease provided with each swing-bucket rotor) so the buckets can swing freely.

The aerosol-tight buckets must not be stored with their caps sealed!

6.3 Refrigerated centrifuges

Clean condensation water and ice buildup regularly from the rotor chamber by defrosting), using a soft, absorbent towel.

Regularly empty and clean the condensation water collector. Remove this from the left. Please clean the condensation water drain regularly.

6.4 Glass breakage

When centrifuging glass tubes, please observe that high speeds/rcf's increase the risk of glass breakage. Please follow the manufacturer's instruction concerning the maximum speed/rcf of centrifuge tubes. In the event of glass breakage, carefully remove all splinters and all ground glass from the rotor, the buckets, the adapters and the rotor chamber. You may need to replace the rubber mats and adapters to prevent further damage.

Fine splinters of glass may otherwise scratch the surface of the rotors and buckets, reducing their resistance to chemicals. The air turbulences within the rotor chamber produce a very fine black powder of abraded metal. In addition to causing damage to the rotor chamber, rotor, buckets, the power also containments the samples.

Check the rotor bores regularly for residues and damages.

6. Maintenance and cleaning

6.5 Returning devices

When returning centrifuges, please ensure that these devices are fully decontaminated so that they do not present a health risk to our service staff.

You will find additional information and a blank of the decontamination confirmation at www.mrclab.com.
Do also consult your laboratory safety officer about a suitable decontamination method.

Please fill out the decontamination confirmation and place it together with the device when it is to be sent back to MRC.

7. Troubleshooting

Error	Display	Cause	Remedy
No display.	None	- not connecting main power - failure of power supply	- check the power cable - check the main fuse in laboratory and device
No running.	No rotor	- No rotor. - errors in drive or rotor recognition function	- Tighten the rotor - put off the main power and turn on it again
Not open the lid.	None	- failure of power supply	- stop the running and open the lid by emergency lid key
Not close the lid perfectly.	To close the door	- no working of lid pin - lid is not closed perfectly	- push the DOOR key and open the lid and then close it
On acceleration, the device is tremble and switch is off.	** Imbalance Error! **	- not load evenly - not tighten the rotor with shaft - device is rock from side to side or it is not placed in even place	- check the rotor and load - more tighten the rotor - place a device in even place
Failure of power supply	** Power Failure! **	- Failure of power supply	- check a outlet
Motor overheat	** Motor Overheat **	- motor overheat	- stop the device and down the temperature

If the suggested remedy repeatedly fails, please contact Service.