

Large Capacity, High-Speed Centrifuge

2236R

User Manual



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1. Safety warnings and cautions

1.1. Safety Label

Labels attached to the main body provide usage and safety information.

Label	Instruction
	Mark indicating danger and warning
	Attention and warning for electric shock
	Mark indicating Biohazard warning
	Mark indicating earth grounding
	Indicate a hole for manual lid opening in case of emergency
	Attention and warning for rotor coupling

1.2. Safety precautions

Before using this product, be sure to read this manual to prevent malfunctions that may occur during operation.

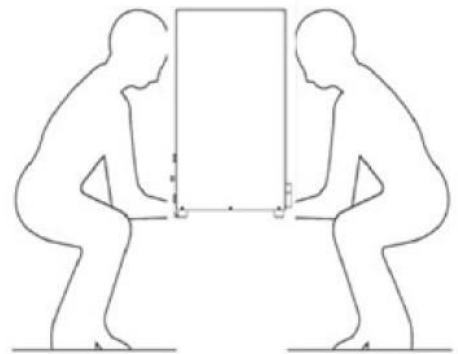
1. Always make sure that the device is fixed on a level surface that can withstand shaking and weight of the device during operation and placed on a safe table
2. Do not move the product during operation, and leave a safe space within 30cm around the centrifuge for user safety.

-At all times, the location of the device should have enough space around the device for proper air circulation.
3. Always install the equipment in a place where temperature and humidity can be controlled.
4. Before connecting the power, the rated voltage should be checked.
5. Using only Gyrozen Co., Ltd's rotors, components and accessories ensures optimal performance and safety. We cannot guarantee the reliability or safety of any damage or accidents resulting from the use of components and accessories not provided by us.
6. Before using the device, make sure that the rotor and rotor lid are securely locked.
7. Check that the rotor is properly positioned on the motor shaft by turning it manually.
8. Do not stop the rotor by hand while the machine is in use.
9. Manual lid opening is only used when rotation is completely stopped.
10. If the density of the whole sample is greater than 1.2 g/ml, the maximum rotational speed should be reduced to avoid rotor failure.
11. sample should be filled up to the recommended volume by tube manufacturer. Otherwise, the tube may break or the sample solution may flow.
12. In order to avoid unbalanced rotors, tubes should always be symmetrically filled with well-balanced(weight, material, density and volume) samples. (Please refer to 4.3 Sample Tube Loading) If necessary, they can be paired using water to achieve balance.
13. The operating speed should not be higher than the respective guaranteed g values of the centrifuge, rotor, bucket or adapter and sample tube. In particular, the guaranteed g value of the sample tube should not be neglected.
14. The rotor should be cleaned and dried after every use for long life and safety.

15. Always disconnect the power supply during regular inspection and service to avoid electric shock.
16. Always centrifuge biological material and use a validated disinfection procedure.
17. Do not centrifuge flammable, toxic, radioactive, explosive, or corrosive substances.
18. If it is necessary to use toxic or radioactive substances or pathogenic microorganisms belonging to WHO Risk Group II, the national regulations of "Laboratory Bio-safety Manual" must be observed.
19. This device is used in research use only and must be operated by a professional who has received professional education, training and specialized skills for the using procedure.

1.3. Lifting and carrying

When moving the product, more than two people should grab it from the front and back as shown in Figure.



1.4. Transport, Storage, Use conditions

Use Conditions	Storage and transport conditions
-Indoor use	-Ambient Temperature: -10 ~ 40°C
-Room Temperature: 5 ~ 40 °C	-Relative humidity: 10 ~ 90 %
-Relative humidity: 30 ~ 80 %	-Atmospheric pressure: 500 ~ 1,060 hPa
-Atmospheric pressure: 500 ~ 1,060 hPa	

2. Product description

2.1. Intended Use

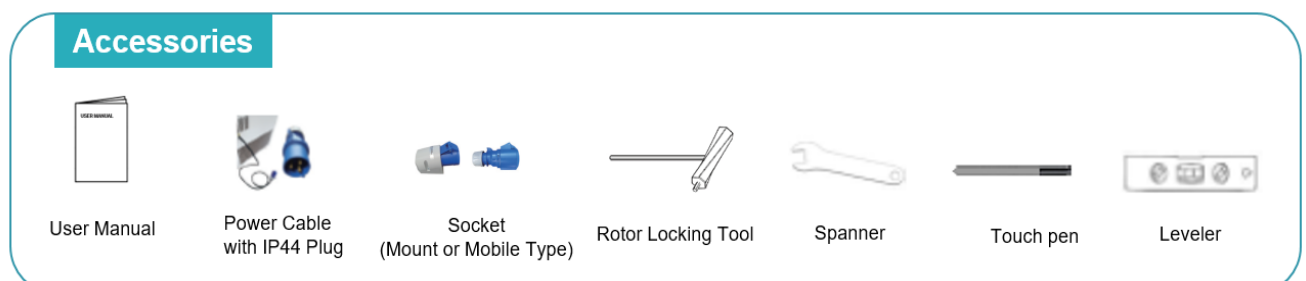
The device is used mainly in the laboratory to separate the components through centrifugal force.

2.2. Product overview

- | | |
|-----------------------------------|-----------------------------------|
| 1. Lid | 5. Drain hole |
| 2. Power cable with IP44 Plug | 6. Control Panel |
| 3. Chamber | 7. Power switch |
| 4. Emergency Manual Lid Open hole | 8. Height adjustable fixed wheels |



2.3. Accessories



※ Rotor sold separately (refer to 8. Rotor and accessory information)

2.4. Technical Specification

Max. RPM / Fixed angle	22,000 rpm
Max. RPM / Swing-out	5,000 rpm
Max. RCF / Fixed angle	54,111 xg
Max. RCF / Swing-out	5,394 xg
Max. capacity / Fixed angle	6 x 1,000 ml, 30 x 1.5/2.0 ml
Max. capacity / Swing-out	4 x 250 ml, 48 x 15 ml, 16 MTPs
Temp. setting range (°C)	-20 ~ +40
FASTCOOL button	Yes
Time control	Pulse, timed < 100 hr or continuous
Time counting modes	Selectable, at set speed or from starting
RCF/RPM conversion	Yes
Noise level(dB)	≤56
ACC/DEC	9/10 steps
Program memory	100
Parameters on display window	Simultaneous display of all parameters of set and actual figures
Display	7" LCD Touch Screen
Automatic rotor Identification	Yes
Imbalance cut-off	Yes
Safety lid lock	Yes
Lid drop protection	Yes
Power supply(V/Hz)	230 V~, 50 Hz (110V optional)
Power requirement	4,000 VA
Dimension(W x D x H, mm)	824 x 634 x 1,049
Weight without rotor (kg)	240
CE mark	Yes
Cat. No.	GZ-2236R

 **This instrument has following functions for safety.**

1. Automatic rotor identification function.
2. Automatic detection and alarms for imbalance, excess speed and heating.
3. User ID and protocol management with historical tracking
4. Holding or changing of time and temperature possible while running

3. Product assembly and installation

3.1. Product installation

1. After purchasing the centrifuge, remove the packaging box and protective film and check the components.

► Accessories : centrifuge / user manual / power cord & plug / Rotor Locking Tool /

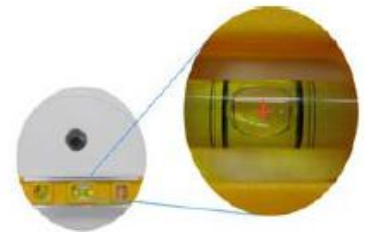
Lubricant(grease) / leveler / spanner / Touch pen / Wall outlet socket

2. Place the device on a flat and hard place, place a leveler on the top of the device, and keep the water droplets inside the device level.

► Adjust the level of the machine by turning the red gear of the wheel

According to the method below so that all water droplets inside the

Levelers are within the black lines on both sides.



3. Turn the height-adjusting red gears of the four movable wheels at the bottom of the machine to increase the height. Adjust to do the 1st equilibrium work.

(Refer to 3.4 Rotor mounting and removal, and after installing the rotors, complete the final equilibration work)

► The height adjustment red gear is interlocked with the rubber feet

To fix the device on the floor of the installation site.

► You can easily operate the red gear by using the provided spanner.

► High and low rubber feet fixed: counterclockwise

► Lift rubber feet: clockwise



4. When moving the device yourself, be careful not to damage the four height-adjustable wheels on the bottom of the device.

► Before moving the device, check the condition of the wheels first and then move the device while they are unlocked. If moved while locked, the wheels and levelers may be damaged.



Locked



Unlocked

► When moving the device in the areas below, please be careful as there is a risk of wheel damage.

- Steep slope
 - Uneven surfaces (e.g., sidewalk blocks, tactile paving blocks for the disabled, etc.)
 - Stepped thresholds (e.g., guard thresholds, fire door thresholds, elevator thresholds, etc.)
 - Other sections with a height difference of 10 mm or more
- Please be careful not to push or pull with force while the wheels are caught on the ledge while moving the device, as this may cause the leveler to come off or the wheels to break.



3.2. Power connection

1. After checking the power cable connected to the IP44 plug located on the right rear side of the main body provided by the manufacturer. Connect the IP44 plug to the power socket.

▶ Please check the rated voltage(230V~, 50/60Hz) to be used.



[Power Cable with IP44 Plug]



Socket-Mount or Mobile Type

2. Push the power switch button on the right side of the main body upward in the ON direction.

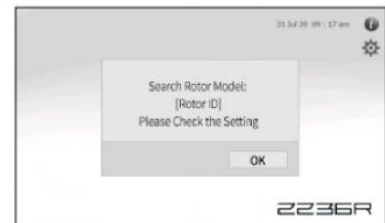
▶ The display screen appears as Now Lading

→ Loading images..SD Card Found



3. Click OK on the pop-up window that appears on the display window.

▶ Press OK → Move to UNLOCK screen.



5. Press UNLOCK on the display window.

▶ Press UNLOCK → move to main screen.



Attention! Electrical requirements.

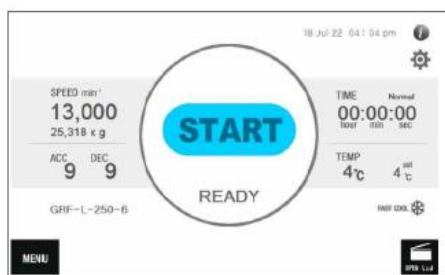
220V power is used, and if the voltage change by more than $\pm 10\%$ from the standard Voltage, precise reliability cannot be obtained during operation. In addition, it is necessary to ensure that constant power is supplied to avoid any damage to various parts in the centrifuge. This device is intended to be used at 220V voltage at the time of shipment.

3.3. Lid Open

Can be used to open lids. Lid opening can be confirmed through the LID icon on the main screen.

1. With the lid closed, press OPEN LID.

► When Lid is open, the Lid icon will appear on the main screen.



[When the lid is closed]



[When the lid is open]

Attention! Motorized Lid Closure System

The lid lock system of this product is locked with only a light touch, so do not apply excessive Force.

3.4. Rotor mounting and removal

- Before assembling the rotor, remove foreign matter or moisture from the motor shaft and rotor with a dry cloth.

[Swing-Out Rotor]

- Align the rotor to the central axis of the chamber and rotate it by using the provided Rotor Locking Tool.

► Rotor mounting: clockwise

► Rotor separation : counterclockwise

► Hold the rotor wing with one hand and use the tool with the other hand to install or remove.

- Attach a bucket suitable for the sample tube to the rotor latch.

► When using, the rotor must be equipped with the same bucket.

► Be careful not to have any dust or foreign substances in the joint area Between the rotor and bucket.



- ▶ Manually rotate the rotor to check that all installed buckets are smoothly spread out, and if the spreading is not smooth or the spreading angle is not the same, apply Lubricant(grease) to the joint of the rotor and bucket(rotor clasp)

[Fixed Angle Rotor]

- Align the rotor to the central axis of the chamber and rotate it using the provided rotor Locking Tool.



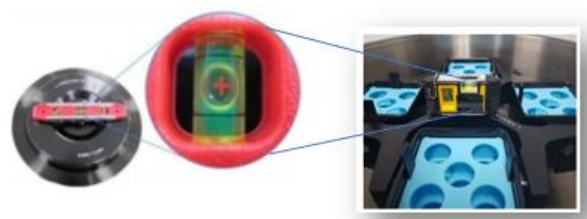
- ▶ Rotor mounting : clockwise
 - ▶ Rotor separation : counterclockwise
 - ▶ Hold the rotor with one hand and install or remove it with the other hand by using a tool.
- Put the sample tube suitable for the rotor, close the rotor lid, and then turn the lid nut clockwise to fix it.



- ▶ Rotor Lid installation : clockwise
- ▶ Rotor lid separation : counterclockwise
- ▶ Hold the rotor with one hand and rotate the lid nut with the other hand to combine or separated the lid.

[Balance Adjustment-Final]

- Mount the rotor and place the bubble leveler on the middle of the Top of a rotor
- confirm that air bubbles of all three windows of the bubble leveler are Within the black lines.



[Check Rotor connection]

Before use, make sure that the rotor is securely fastened to the motor shaft.

[Check Rotor Lid installation]

If you operate a fixed angle rotor, make sure that the rotor lid is properly locked. If not, it may occur very loud noise and serious damage.

3.5. Sample Tube Loading

1. Before loading sample tubes, check the water drop or any dirt in the rotor hole or adaptor, bucket.
 - ▷ If there is any foreign matter or moisture, remove it with soft dry cloth.
2. Tubes should always be symmetrically filled with well-balanced(weight, material, density and volume) samples.

If an appropriated balance is not provided, unexpected accidents can result from a damaged rotor or centrifuge.

▷ Use appropriate centrifuge tubes and avoid exceeding the maximum recommended g-force by the tube manufacturer.

▷ sample should be filled up to the recommended volume by tube manufacturer.

if the manufacturer of the tube has not specified the maximum level, fill the tubes so that the centrifuged substance does not run out of the vessel during centrifugation.

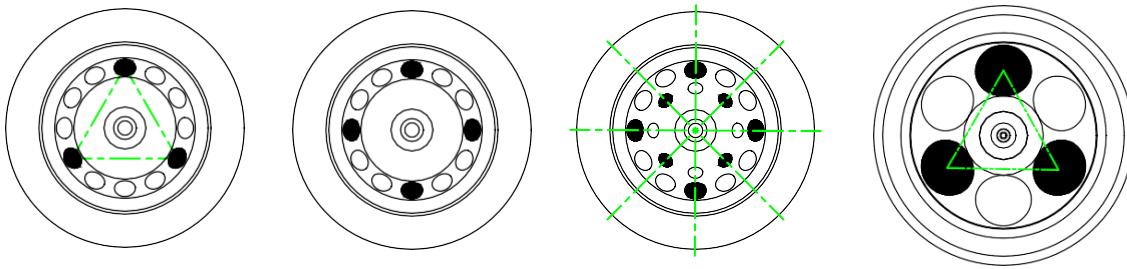
Note!

For the safety, the instrument has 'Imbalance Cut-off' function to sense the imbalance of the loaded tubes.

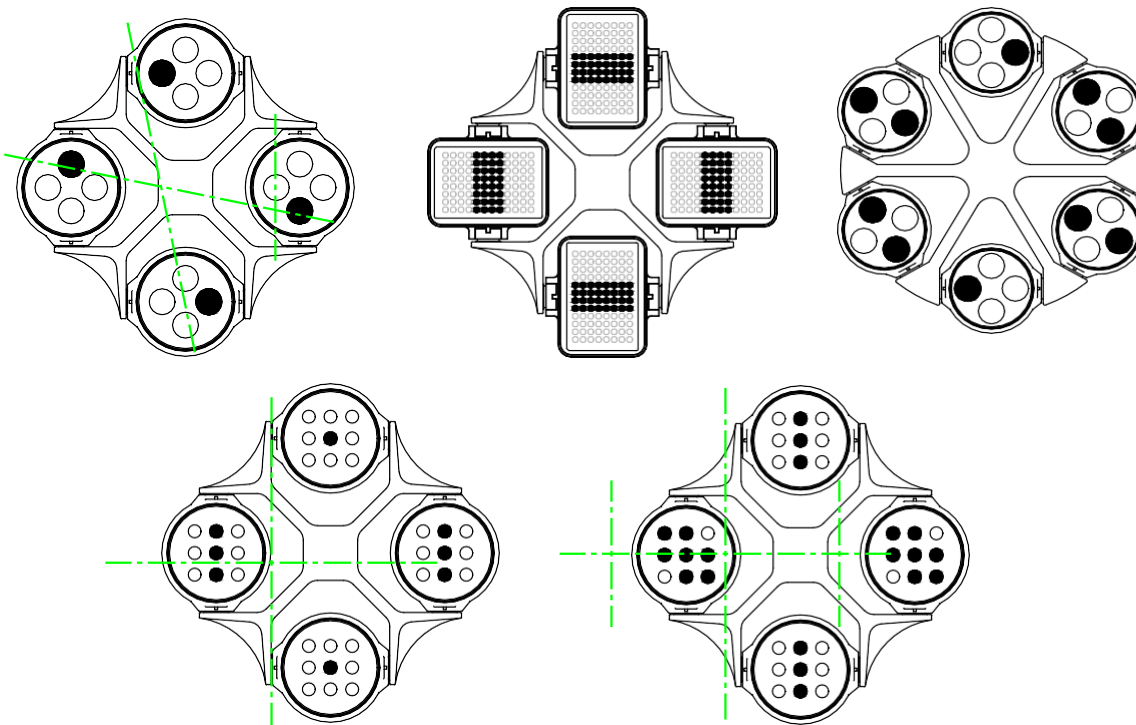


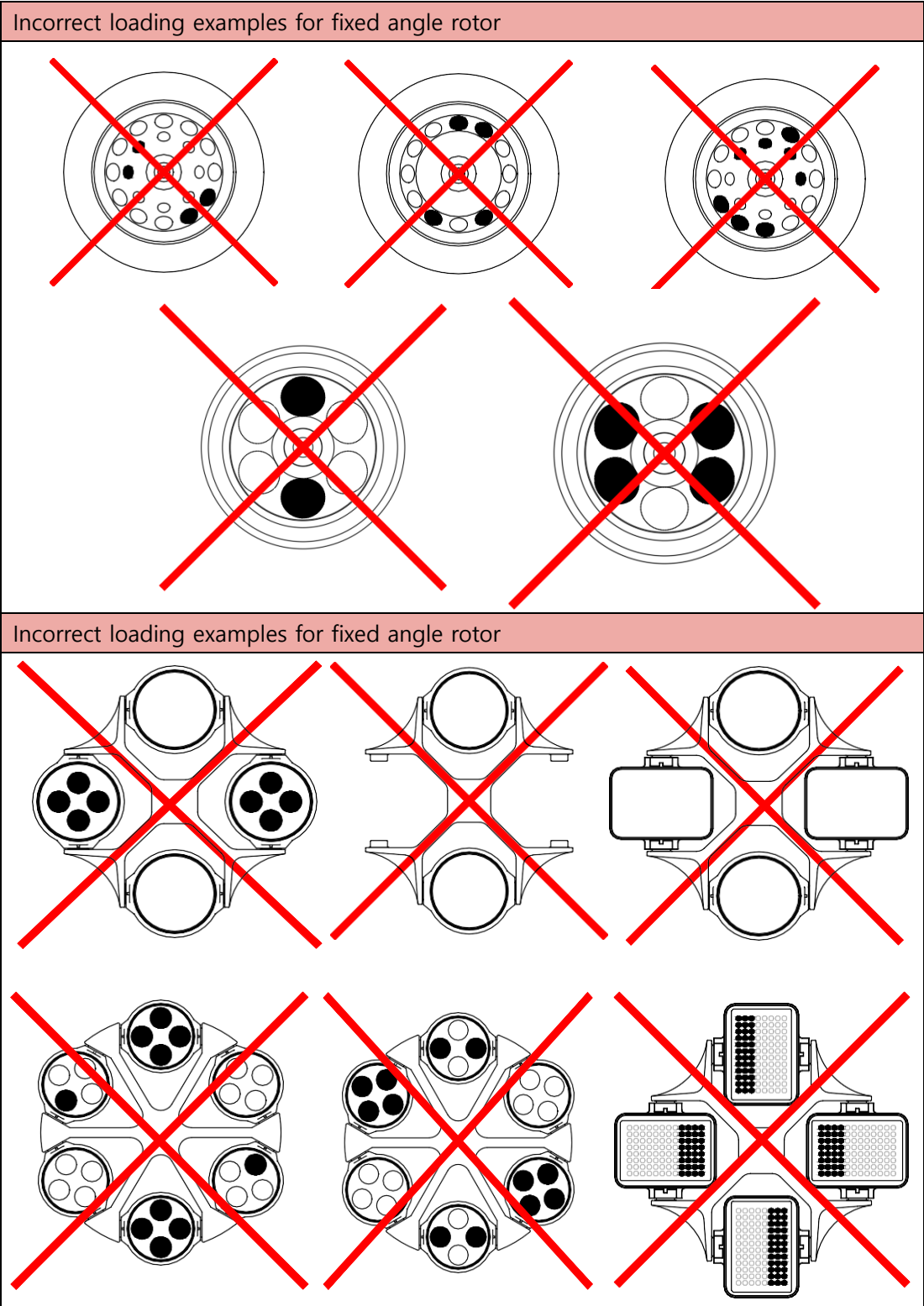
- Always load all 4 positions of the swing-bucket rotor with buckets.
- Ensure that the tube type matches your rotor to avoid potential problems.
- If the density of the whole sample is greater than 1.2 g/ml, the maximum rotational speed should be reduced to avoid rotor failure. otherwise, unexpected accidents can result from a damaged rotor or centrifuge.

Correct loading examples for fixed angle rotors



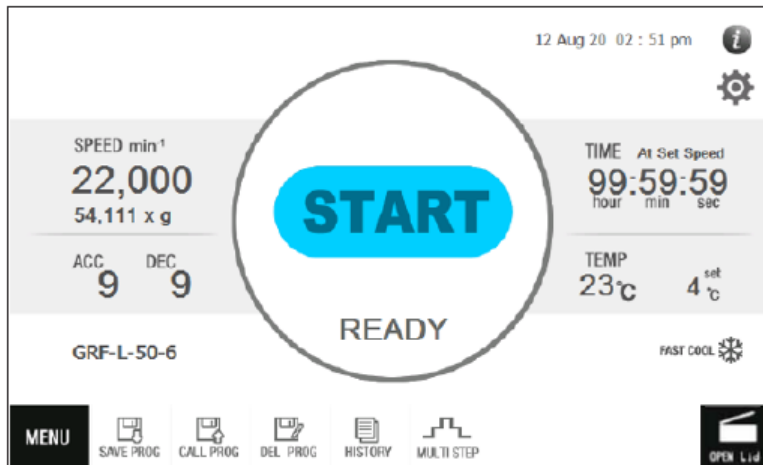
Correct loading examples for swing out rotors





4. Method of usage and precautions

4.1. Control Panel



☐ SPEED

The rotation speed is expressed in RPM/RCF, and the maximum RPM is 22,000 and the maximum RCF can be set up to 54,111 xg. Also the maximum RPM/RCF value according to the rotor is automatically calculated and displayed as a set value(setspeed)

☐ TIME

The time can be set in hours, minutes and seconds, up to 99 hours 59 minutes 59 seconds or continuously (display window : 0:00:00), Also, after starting the operation, the time change appears as ALL(time increases with start) and At the set speed(time increases after reaching the set speed)

☐ TEMP

Temperature can be set from -20°C to 40°C. It also supports a fast cool function that can reach a set

☐ ACC/DEC

In the case of start and stop, acceleration speed can be set in 9 steps and deceleration speed in 10 steps(natural deceleration : 0)

☐ Start/Stop

For start and stop motion.

☐ OPEN LID

If the lid is closed, you can open the lid.

□ MENU

You can save / load / delete programs, operation log information, and MULTISTEP.

□ INFORMATION

You can check product information.

1. Press on INFORMATION icon ()



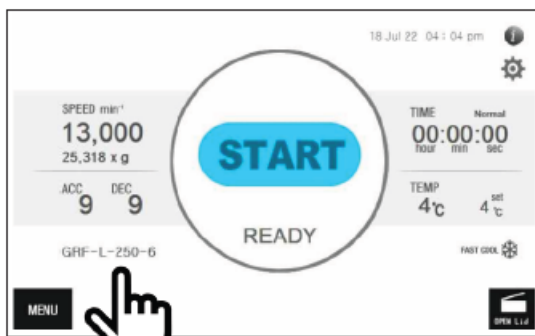
[2236R information screen]

□ Rotor List

The rotor number installed in the chamber is displayed.

1. Press the Rotor No.(ex.GRF-L-50-6)

► Rotor No. Press → move to Rotor List screen.



No	Name	RPM	RCF	Radius	Capacity
1	GRF-L-250-6	13000	25318xg	134mm	6x250ml
2	GRF-L-85-6	20000	44496xg	99.6mm	8x85ml
3	GRF-L-1000-4	8000	12071xg	168.7mm	4x1000ml
4	GRF-L-1000-6	7000	10825xg	197.6mm	6x1000ml
5	GRF-L-50-8	20000	46062xg	103mm	8x50ml
6	GRF-L-50-8	17000	35541xg	110.0mm	8x50ml
7	GRF-L-m2.0-30	22000	52163xg	95.4mm	30x2.0ml
8	GRF-L-50-6	22000	54111xg	100mm	8x50ml
9	GRF-L-500-8	10000	17654xg	158mm	6x500ml
10	GRS-L-r250-4	4000	3134xg	178.2mm	4x250ml
11	GRF-L-m2.0-36	20000	50086xg	112mm	36x2.0ml
12	GRF-L-60.2-64	12000	10803xg	67.1mm	64x0.2ml
13	GRF-L-c15-12	20000	46062xg	103mm	12x15ml
14	GRS-L-250-4	5000	5394xg	193mm	4x250ml
15	GRF-L-15-12	20000	44720xg	100mm	12x15ml

[Rotor List screen]

□ Setting

Volume. You can set Touch Calibration, Clock, and PW.

1. Press on the Setting()

► Click the setting icon to display the option screen.

2. Press the desired setting mode.

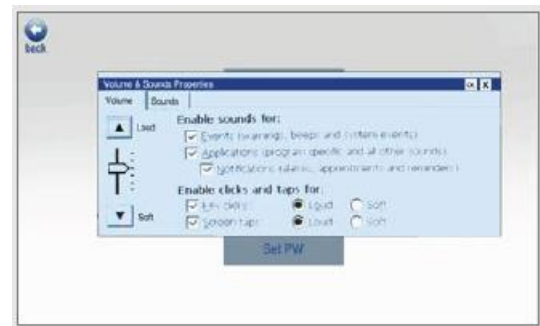
► When you click the setting mode,

a new window appears.



☐ Volume

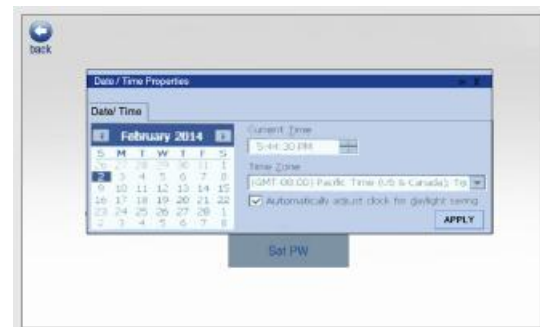
You can set the volume and sound level.

☐ Touch Calibration

You can adjust the touch screen sensitivity.

☐ CLOCK

You can set the current time

☐ SET PW

You can set a password for the startup screen.

► When SET PW is set, the login screen appears with power on.

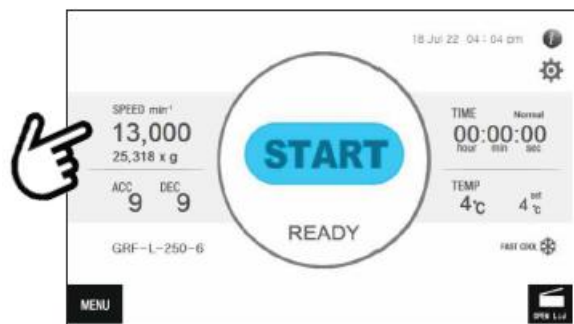


4.2. Speed setting

Rotation speed is displayed in RPM/RCF, RPM can be set up to 22,000 and RCF can be set up to 54,111 xg. The RCF values for RPM are interlocked and automatically calculated.

1. Press SPEED

► The SPEED setting screen appears.



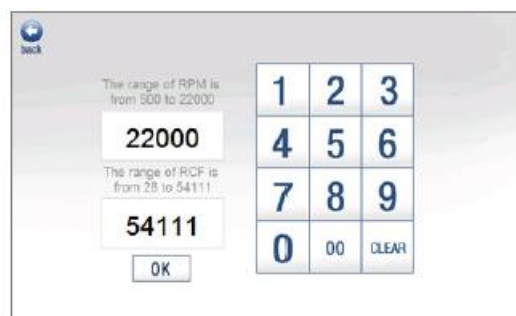
2. After pressing the RPM or RCF display, enter the setting

Value using the numeric keypad and select OK.

► If you click OK, the speed setting value is Finally saved.

► If you enter the setting value incorrectly, press the [CLEAR]

Button. RPM display is changed to 0.



4.3. Time setting

The time can be set in "hours", "minutes" and "seconds", and can be set up to 99:59:59 seconds or continuously (display window 0:00:00). Also, after starting the operation, the time change appears as

Normal (time increases with start) and at set SPEED (time increases after reaching set speed)

1. Press on TIME.

► The TIME setting screen appears.



2. Press HH:MM:SS individually on the time display,
enter the setting Value using the numeric keypad
and press OK.

► If you click OK, the time setting value is finally set.

► If you enter the setting value incorrectly, press the [CLEAR]



RPM display is changed to 0.

AT SET SPEED mode

For exact time control, this instrument can be set with AT SET SPEED mode with counts the run time once the actual run speed value and stops when the deceleration begins.



* ALL mode : From t0 to t2

* [AT SET SPEED] mode : From t1 to t2

4.4. Temperature setting and fast cool operation.

[Temperature setting]

The temperature setting range can be set from -20°C to 40°C. In addition, for temperature sensitive samples, this button supports the Fast Cool function to reach temperatures below room temperature in a short.

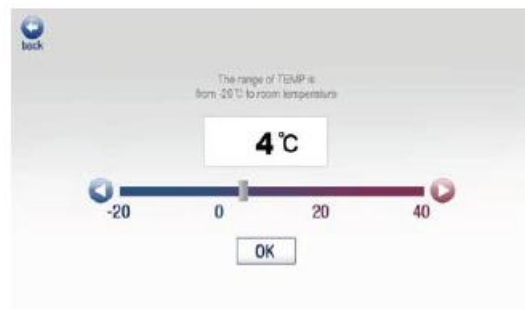
1. Press on TEMP

► The temperature setting screen appears.



2. Select the desired temperature by moving the temperature scale bar left/right then press OK.

► When you press OK, the temperature setting value is finally saved.



3. Fast cool operation

After entering the set temperature according to the General temperature setting method, press Fast Cool. When quick cooling is required.

► It reaches the set temperature while rotating at 1,000rpm

(Slow rotation accelerated air circulation in the chamber to speed cooling)



Attention! Fast Cool operation

The Fast Cool function works with the rotor mounted. Do not use the fast cool function when the rotor is not fully secured or the sample tube is inserted asymmetrically.

4.5. Acceleration / deceleration(ACC/DEC) setting

Acceleration speed can be set up to 9 steps and deceleration speed up to 10 steps.
(natural deceleration:0) to protect sensitive samples and clean layer separation.

1. Press on ACC/DEC

► The ACC/DEC setting screen appears.

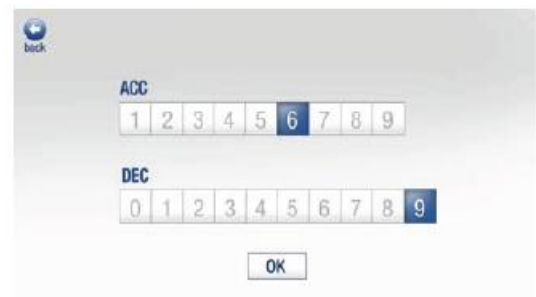


2. Select ACC or DEC value to set and press OK.

► If you click OK, the ACC/DEC setting value is

Finally saved.

► ACC(DEC) can be set from 1(0) to 9 levels.



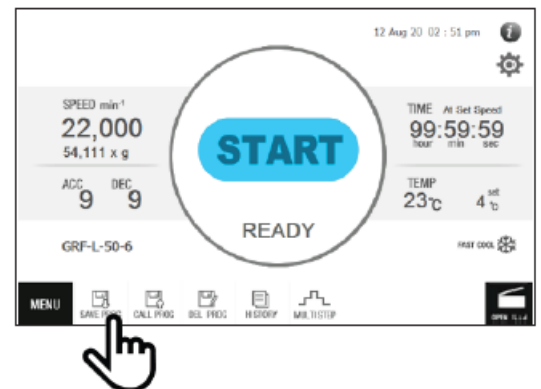
(ACC 9 : Fastest acceleration section, DEC 0, natural deceleration)

4.6. Save, recall and delete programs

Save the program

When operating the device under various conditions, setting values such as speed and time can be saved in advance and then recalled and used immediately as needed.

1. If you want to save the program, enter the setting values (speed, time, temperature, acceleration/deceleration, etc.),
Press MENU, and select SAVE PROG.



2. Enter the name / user / password and click OK.

- ▶ A "Saving program : Are you sure?" message window appears.



3. Click OK if you want to save.

- ▶ Click OK to save the program.
- ▶ If you want to cancel the saved value, press CANCEL.



Program call

Program call is designed to call the program stored between 1 and 100 times.

1. To call a program, press MENU and then CALL PROG.

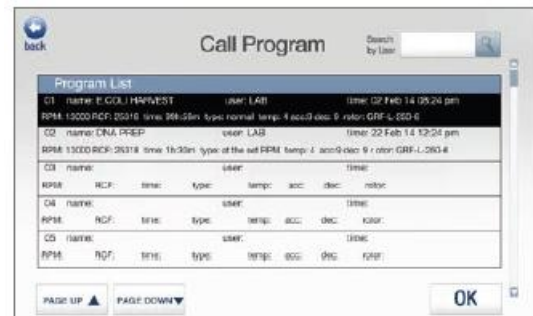
► The display window shows the program screen.



2. Select the saved program value and press OK.

► The display window moves to the setting to program call.

► The called program value appears on the main screen.

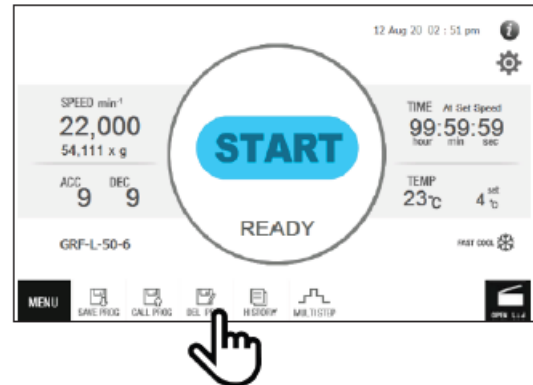


Delete program

You can delete stored programs.

1. To call a program, press MENU and then CALL PROG.

► The display window shows the program screen.



2. Select the program you want to delete and click OK.

► The PW screen appears.



3. Enter PW and press OK.

► Click OK to complete program deletion.

► Press Back to move to the main screen.



4.7. HISTORY

You can check the activated setting value.

1. Press MENU and then HISTORY.

► The HISTORY window appears.



back

DATE	RPM	RCF	TIME	TEMP	ROTOR
02 Feb 14 11:20pm	13000	25318	0:01:00	4	GRF-L-250-6
02 Feb 14 10:20pm	13000	25318	0:01:00	4	GRF-L-250-6
02 Feb 14 09:20pm	13000	25318	0:01:00	4	GRF-L-250-6
01 Feb 14 11:20pm	13000	25318	0:01:00	4	GRF-L-250-6
01 Feb 14 10:20pm	13000	25318	0:01:00	4	GRF-L-250-6
01 Feb 14 09:20pm	13000	25318	0:01:00	4	GRF-L-250-6
01 Feb 14 08:20pm	13000	25318	0:01:00	4	GRF-L-250-6
01 Feb 14 07:20pm	13000	25318	0:01:00	4	GRF-L-250-6
01 Feb 14 06:20pm	13000	25318	0:01:00	4	GRF-L-250-6

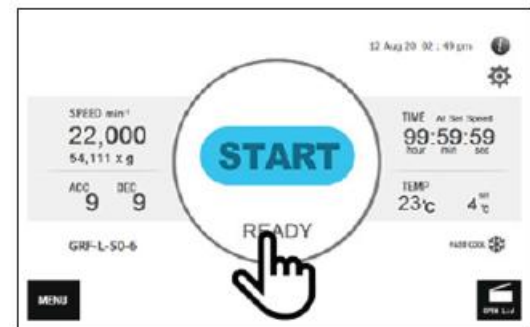
Page ▲ Page ▼

4.8. Start/Stop

Can be used to start or stop motion.

[Start]

1. After setting the speed and time, press START.

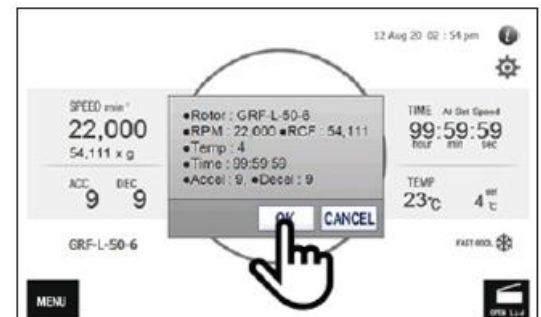


► When you press the START button, a message window for confirming the setting value appears.

2. Click OK on the setting value confirmation message window.

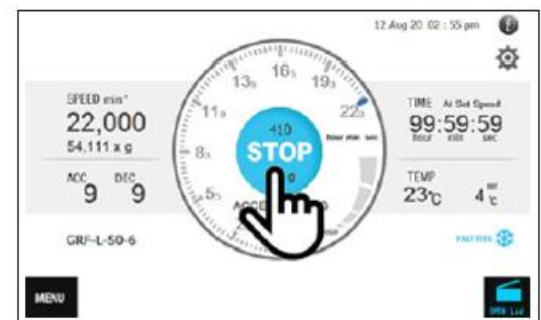
► Press OK to start operation.

► Press CANCEL to cancel the operation.



[Stop]

1. If you want to end during operation, press STOP.



If you are in a situation of power failure or abnormal power-off.

You must have to check all stop of machine working before power-up.

4.9. MULTI STEPS

This is a function for continuously using up to 5 different conditions(speed, time, temperature, ACC/DEC), Time mode changes to "At set speed" time mode.

1. To set MULTI STEPS, press MENU and then MULTISTEPS.

► Enter MULTI STEPS mode→MULTI STEP indicator appears

At the top of SPEED.

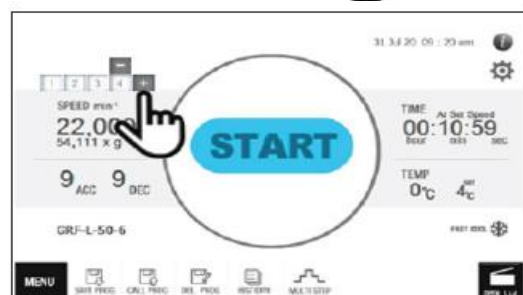
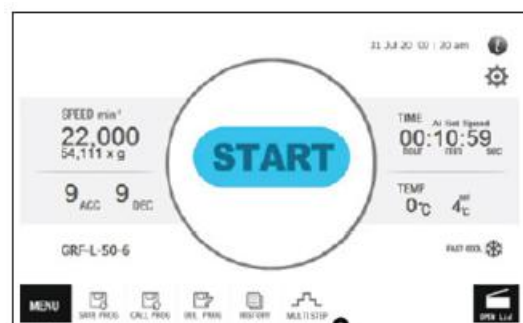
2. Press "+" to add a STEP, enter the set value

(speed, time, temperature, ACC/DEC) and press

"-" to delete a STEP

► Click "+" to add STEP.

► Click "-" to delete the STEP.



4.10. In case of emergency, manual lid opening

This method is used to remove the sample mounted on the rotor when the lid cannot be opened automatically because the main body is not supplied with power.

1. Make sure the inner rotor is completely stopped.
2. Grab and remove the manual lid opening cap in the center of the front of the main body and check the hole.
3. Push the provide Manual Lid Open Tool vertically and turn it counterclockwise.



- ▶ Counterclockwise rotation → Lid Open / Clockwise rotation → Lid closed.
- ▶ Lid opens manually with the sound of the gear motor.

Attention! Manual Lid Open

Manual lid opening must be performed after the machine has completely stopped rotating.

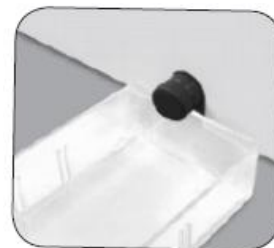
If this is not followed, be careful as it may damage the sample and the user. Do not close the lid immediately after emergency opening, wait for the power supply to start, and use it in a normal way.

4.11. Open drain hole

This centrifuge is equipped with a drain hole which allows water or condensate to be discharged from inside the chamber. If there is condensate or water inside the chamber, remove the drain cap and drain the water through the drain hole to keep dry in the chamber.

1. Place the drain container under the drain cap located on the right side of the body.

► The discharge container is not provided separately.



2. Open the drain cap located on the left side of the main body by turning it counterclockwise.
Any moisture or condensate in the chamber is removed.



3. Wait until all the condensate in the chamber is drained.



4. After draining the moisture in the chamber, turn the drain cap clockwise to tighten.

► Close the drain cap until it is completely in close contact with the drain hole entrance.



[Close the drain cap]

Please close the drain cap after fully tightening before using the product. Operating with the drain cap is not fully closed, cooling air is discharged to the outside through the drain hole, which reduces cooling efficiency.

5. Maintenance

[Body]

1. If the exterior is contaminated, wash it with soapy water on a soft cloth and wipe it with a dry cloth to prevent moisture from remaining.
 2. Do not use chemicals such as alcohol, benzene, benzol, or thinner as they may damage it.
 3. Be careful not to scratch the surface while cleaning or moving the external surface.
- ▶ If there is a flaw on the surface, there is a possibility of rust.
 - ▶ If rust is formed by leaving it for a long time in a wet condition, remove it with a neutral detergent and wipe it with a dry cloth.

[Chamber]

1. After use, always dry the inside of the chamber.
2. When the chamber is contaminated, wipe with a mild detergent and wipe with a soft cloth to prevent moisture.

[Rotating Shaft]

1. If rotation is unstable due to foreign substances on the shaft, it may cause imbalance problems due to high-speed rotation, so it must be kept clean.
2. After completing the experiment, remove the rotor from the rotating shaft, dry it with a dry cloth, and keep it dry.
3. If the rotor does not separate from the rotating shaft, do not remove the rotor with excessive force and contact a service center.

[Rotor]

1. If an acid, basic solution spills from the tube, immediately wipe it with a soft cloth moistened with warm water and store in a dry place.
2. Check the solution contamination of the tube hole of the fixed angle rotor or the bucket of the swing-out rotor from time to time and keep it dry. It is recommended to store it upside down when not in use for a long time.

6. Troubleshooting

6.1. Check List

Symptom	Check List
There is no power.	Refer to [3.2 Power Connection] and check if the power plug is disconnected.
The centrifuge not starting	If Lid is not closed, it will not work. Refer to [3.3 Lid open] and check the Lid status of the lamp and close the lid well.
Lid does not open.	If the power supply is interrupted, refer to [3.2 Power connection] and check the power plug connection. If it is not resolved in a short time, open the lid manually by referring to [4.10 manual Lid opening in Emergency] for sample protection.
Lid does not close.	Check if there is any foreign material on the lid clasp, if there is, remove the foreign material and close the lid.
Vibration and noise appear during operation.	If the installation location of the body is unstable, check the level of the body and whether it is fixed, and re-install it horizontally on a flat surface.
	If the rotor installation is poor, check the exterior of the rotor after removing the rotor, and stop using the rotor immediately if there is any damage. Also, if the mounting method is wrong, refer to [3.4 Rotor mounting and removal] and install the rotor correctly.
	If the tube insertion is asymmetric or the weight is not correct, refer to [3.5 Mounting the sample tube] to check the tube weight and insert it symmetrically.

6.2. Error message information

If the problem persists after taking the following measures, please contact the service center.

Error Message	Description	Action to take
RPM Sensing error !	If the speed does not reach 200 rpm within 2 seconds after motor starts to operate, this message may appear.	- Check the rotor rotation through the lid's center window.
Open door error During operation !	- Occurs when Lid is opened during operation	- Check the lid closed. - Check the Lid lamp status.
Motor temperature error !	Occurs when the motor overheats.	- If there is any heat generating device around the centrifuge, remove it, and check if the centrifuge vent is blocked or blocked with foreign substances, and take measures so that the heat generated from the centrifuge can be dissipated smoothly by opening it about 30cm apart. - Turn off the power, stop using it for about an hour(open the lid at this time), and turn the power on again to check.
Input low voltage error!	It occurs when the supply voltage is less than -10%	- Check the supply voltage. - If it is less than -10% of the rated voltage, install an AVR and supply the rated voltage(220V)
Input high voltage error!	It occurs when the supply voltage is over +10%	- Check the supply voltage. - If it is more than +10% of the rated voltage, install an AVR and supply the rated voltage(220V)
RPM rising error!	1,000RPM than the set speed occurs when something is wrong.	Turn off the power and turn it on again to check the operation status again.

Error Message	Description	Action to take
Imbalance error!	Occurs when the sample balance is not correct.	- Check if the weight of the sample inserted in the rotor is the same and that it is inserted symmetrically. - Check if there is any imbalance in the device due to the level of the floor, and if there are any factors that cause the device to move, remove and reinstall to balance. - Remove the rotor and wipe off any foreign matter on the shaft and the connection part, and check if there is any bending of the motor shaft. - Check if the tube or bottle is crushed or spilled.
Rotor Connect error!	Occurs when the sensor is Defective or the motor cannot Rotate.	- Check if the rotor is rotating through the lid center window. - Turn the rotor by hand and check the RPM change in the display window.
Inner high temperature Error!	Occurs when the temperature is high.	- Turn the power off and turn it on again to check the operation status again.
Inner temperature Sensor error!	Occurs when the internal Temperature sensor is not Recognized.	- Turn the power off and turn it on again to check the operation status again.
Motor temperature sensor error!	Occurs when the temperature Sensor in the motor is not recognized.	- Turn the power off and turn it on again to check the operation status again.
Compressor temperature Sensor error!	Compressor temperature Sensor, Compressor overheating	- Turn the power off and turn it on again to check the operation status again.

7. Equipment disposal



Directive 2012/19/EU is the basis for the disposal of waste electrical and electronic equipment (WEEE) within the European Community.

This equipment is marked with the crossed out wheeled bin symbol to indicate that this equipment must not be disposed of with unsorted waste.

The waste disposal guidelines of the individual EC countries might vary. If necessary, contact your supplier.

8. Rotors and Accessories



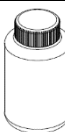
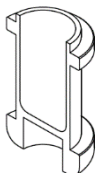
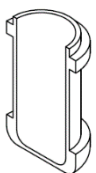
If the density of the whole sample is greater than 1.2 g/ml, the maximum rotational speed should be reduced to avoid rotor failure.

otherwise, unexpected accidents can result from a damaged rotor or centrifuge.

Fixed Angle Rotor, GRF-L-1000-6

- Capacity : 6 x 1,000 mL
- Max. RPM / RCF : 7,000 / 10,825
- Hole angle from axis during rotation : $\angle 25^\circ$
- Hole dimension ($\varnothing \times L, \text{mm}$) : 98 x 144
- Hole bottom type : Flat
- Supplied with a lid



Tube			
Tube capacity(mL)	250	500	1,000
Tube Dimension ($\Phi \times L, \text{mm}$)	61.5 x 128	69 x 168	97 x 168
Adapter			None
Cat No.	GAS-250(1000)	GAS-500(1000)	-
Max. radius (mm)*	164.1	183.4	197.6
Max. RCF (g-force)*	8,990	10,047	10,825

* Depending on the size of cap, there is a possibility of not fit-in.

Fixed Angle Rotor, GRF-L-1000-4

- Capacity : 4 x 1,000 mL
- Max. RPM / RCF : 8,000 / 12,071
- Hole angle from axis during rotation : $\angle 25^\circ$
- Hole dimension ($\varnothing \times L, \text{mm}$) : 98 x 144
- Hole bottom type : Flat
- Supplied with a lid



Tube			
Tube capacity(mL)	250	500	1,000
Tube Dimension ($\Phi \times L, \text{mm}$)	61.5 x 128	69 x 168	97 x 168
Adapter			None
Cat No.	GAS-250(1000)	GAS-500(1000)	-
Max. radius (mm)*	135.2	154.5	168.7
Max. RCF (g-force)*	9.674	11.055	12.071

Fixed Angle Rotor, GRF-L-500-6

- Capacity : 6 x 500 mL
- Max. RPM / RCF : 10,000 / 17,664
- Hole angle from axis during rotation : $\angle 25^\circ$
- Hole dimension ($\varnothing \times L, \text{mm}$) : 70 x 137
- Hole bottom type : Flat
- Supplied with a lid



Tube		
Tube capacity(mL)	250	500
Tube Dimension ($\Phi \times L, \text{mm}$)	61.5 x 128	69 x 168
Adapter		None
Cat No.	GAS-250(500)	
Max. radius (mm)*	138.3	158
Max. RCF (g-force)*	15,462	17,664

Fixed Angle Rotor, GRF-L-250-6

- Capacity : 6 x 250 mL + 6 x 15 mL
- Max. RPM / RCF : 13,000 / 25,318
- Hole angle from axis during rotation : $\angle 25^\circ$
- Hole dimension ($\varnothing \times L, \text{mm}$) : 62 x 100 (250 mL) / 17.1 x 94 (15 mL)
- Hole bottom type : Flat (250 mL) / Round (15 mL)
- Supplied with a lid



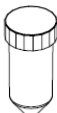
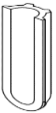
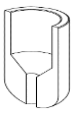
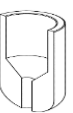
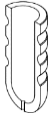
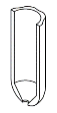
Tube									
Tube capacity(mL)	1.5~2.0	2.0mL with screw cap	5 mL conical	5 mL conical	4~7 mL VT	8~10 mL VT	15	15 mL conical	25mL conical
Tube Dimension ($\Phi \times L, \text{mm}$)	11 x 38	10.1x46	16 x 59	16 x 67	13 x 75	16 x 100	16 x 120	17 x 120	28.8 x 83
Adapter									
Cat No.	GAM-m2.0-9(250)		GAM-c5-4(250)		GAM-7-8(250)	GAM-10-7(250)	GAM-15-4(250)	GAM-c15-4 (250)	GAS-c25(250)
Max. radius (mm)*	129	129	126.5	126.5	131	131	129	126.5	115
Max. RCF (g-force)*	24,374	24,374	23,901	23,901	24,751	24,751	24,374	23,901	21,728

Tube									
Tube capacity(mL)	25mL conical	30	50	50 mL conical	50 mL conical(Skirted)	85	100	250 mL	15 mL
Tube Dimension ($\Phi \times L, \text{mm}$)	28.8 x 78.5	25.7 x 101.4	29 x 108	29.5 x 118	29.5 x 118	38 x 106	44 x 115	60 x 163	61.5 x 128
Adapter								None	None
Cat No.	GAS-c25(250)	GAM-30-3(250)	GAM-50-2(250)	GAS-c50(250)	GAS-sc50(250)	GAS-85(250)	GAS-100(250)	-	-
Max. radius (mm)*	115	128	115.5	114.5	120.5	118	120	134	131.3
Max. RCF (g-force)*	21,728	24,185	21,823	21,634	22,768	22,295	22,673	25,318	24,808

Fixed Angle Rotor, GRF-L-85-6

- Capacity : 6 x 85 mL
- Max. RPM / RCF : 20,000 / 44,496
- Hole angle from axis during rotation : $\angle 25^\circ$
- Hole dimension ($\varnothing$ x L,mm) : 38.5 x 100
- Hole bottom type : Round
- Max. height for tube fit (mm) : 125
- Supplied with a lid



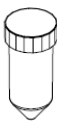
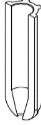
Tube								
Tube capacity(mL)	15	15mL conical	25mL conical	25mL conical	30	50	50 mL conical	85 mL
Tube Dimension (Φ x L, mm)	16 x 120	17 x 120	28.8 x 83	28.8 x 78.5	25.7 x 101.4	29 x 108	29.5 x 118	38 x 106
Adapter								None
Cat No.	GAS-15(85)	GAS-c15(85)	GAS-c25(85)	GAS-c25(85)	GAS-30(85)	GAS-50(85)	GAS-c50(85)	-
Max. radius (mm)*	92.5	90.5	80.9	80.9	92.2	93.5	91.5	99.5
Max. RCF (g-force)*	41,366	40,472	36,178	36,178	41,232	41,813	40,919	44,496

* Depending on the size of cap, there is a possibility of not fit-in.

Fixed Angle Rotor, GRF-L-50-8

- Capacity : 8 x 50 mL
- Max. RPM / RCF : 20,000 / 46,062
- Hole angle from axis during rotation : $\angle 30^\circ$
- Hole dimension ($\varnothing$ x L,mm) : 29.5 x 93.2
- Hole bottom type : Round
- Max. height for tube fit (mm) : 120
- Supplied with a lid



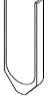
Tube						
Tube capacity(mL)	15	15mL conical	25mL conical	25mL conical	30	50
Tube Dimension (Φ x L, mm)	16 x 120	17 x 120	28.8 x 83	28.8 x 78.5	25.7 x 101.4	29 x 108
Adapter						None
Cat No.	GAS-15(50)	GAS-c15(50)	GAS-c25(50)	GAS-c25(50)	GAS-30(50)	-
Max. radius (mm)*	93.5	96	81	81	96.5	103
Max. RCF (g-force)*	41,813	42,931	36,223	36,223	43,155	46,062

* Depending on the size of cap, there is a possibility of not fit-in.

Fixed Angle Rotor, GRF-L-c50-8

- Capacity : 8 x 50 mL Conical
- Max. RPM / RCF : 17,000 / 35,541xg
- Hole angle from axis during rotation : $\angle 25^\circ$
- Hole dimension ($\varnothing \times L, \text{mm}$) : 29.8 x 108.6
- Hole bottom type : Conical
- Max. height for tube fit (mm) : 130
- Supplied with a lid and O-ring inserted



Tube						
Tube capacity(mL)	15mL conical	25mL conical	25mL conical	30	50	50 mL conical
Tube Dimension ($\Phi \times L, \text{mm}$)	17 x 120	28.8 x 83	28.8 x 78.5	25.7 x 101.4	29 x 108	29.5 x 118
Adapter						None
Cat No.	GAS-c15(c50)	GAS-c25(c50)	GAS-c25(c50)	GAS-30(c50)	GAS-50(c50)	-
Max. radius (mm)*	105.2	94.1	94.1	106.4	107.3	110
Max. RCF (g-force)*	33,990	30,404	30,404	34,378	34,669	35,541

* Depending on the size of cap, there is a possibility of not fit-in.

Fixed Angle Rotor, GRF-L-50-6

- Capacity : 6 x 50 mL
- Max. RPM / RCF : 22,000 / 54,111
- Hole angle from axis during rotation : $\angle 30^\circ$
- Hole dimension ($\varnothing \times L$,mm) : 29.5 x 92.2
- Hole bottom type : Round
- Max. height for tube fit (mm) : 113
- Supplied with a lid and O-ring inserted



Tube		
Tube capacity(mL)	30	50
Tube Dimension($\Phi \times L$, mm)	25.7 x 101.4	29 x 108
Adapter		None
Cat No.	GAS-30(50)	-
Max. radius(mm)*	96.7	100
Max. RCF (g-force)*	52,326	54,111

Fixed Angle Rotor, GRF-L-c15-12

- Capacity : 12 x 15 mL Conical
- Max. RPM / RCF : 20,000 / 46,062
- Hole angle from axis during rotation : $\angle 25^\circ$
- Hole dimension ($\varnothing \times L$,mm) : 17.2 x 107.2
- Hole bottom type : Conical
- Max. height for tube fit (mm) : 125
- Supplied with a lid and O-ring inserted



Tube			
Tube capacity(mL)	5mL conical	5mL conical	15 mL conical
Tube Dimension($\Phi \times L$, mm)	16 x 59	16 x 67	17 x 120
Adapter			None
Cat No.	GAS-c5(c15)	GAS-c5(c15)	-
Max. radius(mm)*	75.8	75.8	103
Max. RCF (g-force)*	33,898	33,898	46,062

Fixed Angle Rotor, GRF-L-m2.0-30

- Capacity : 30 x 1.5/2.0 mL
- Max. RPM / RCF : 22,000 / 52,163
- Hole angle from axis during rotation : $\angle 45^\circ$
- Hole dimension ($\varnothing$ x L,mm) : 11.1 x 39
- Hole bottom type : Round
- Max. height for tube fit (mm) : 52
- Supplied with a lid



Tube				
Tube capacity(mL)	0.2	0.5	1.5/2.0	2.0mL with screw cap *
Tube Dimension (Φ x L, mm)	6 x 8	8 x 30	11 x 38	10.1 x 46
Adapter			None	None
Cat No.	GAS-m0.2(2)	GAS-m0.5(2)	-	-
Max. radius(mm)*	79	86	96.4	96.4
Max. RCF (g-force)*	42,748	46,536	52,163	52,163

* Depending on the size of cap, there is a possibility of not fit-in.

Swing Rotor, GRS-L-r250-4

- 4 loadings
- Max. RPM : 4,000
- Angle from axis during rotation: $\angle 90^\circ$
- Rotor ID ring underneath the rotor body



**250 mL Rectangular Bucket,
GLB-r250-r250**

Max. RPM / RCF : 4,000 / 3,134

Max. Radius (mm) : 175.2

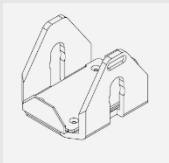
Hole dimension (w x d x h, mm) : 86 x 70.3 x 98.5

Max. height for tube fit (mm) : 130

Hole bottom type : Flat

Tube								
Tube capacity (mL)	1.5/2.0	2.0~4 mL VT	4~7 mL VT	14 mL	8~10 mL VT	15mL	15 mL conical	50mL
Tube Dimension (Φ x L, mm)	11 x 38	13 x 75	13 x 100	15.7 x 96	16 x 100	16 x 120	17 x 120	29 x 108
Adapter								
Cat. No.	GAM-m2.0-20(r250)	GAM-5-12(r250)	GAM-5-12(r250)	GAM-15-12(r250)	GAM-15-12(r250)		GAM-c15-9(r250)	GAM-50-4(r250)
Rack capacity (ea / 4)	20 / 80	12 / 48	12 / 48	6 / 24	12 / 48		9 / 36	4 / 16
Rack hole dimension (Φ x L, mm)	11.3 x 39	13.5 x 58	13.5 x 80	17.5 x 59	17.5 x 90		9 / 36	4 / 16
Rack hole bottom type	Round	Round	Round	Round	Round		Conical	Round
Max. height tube fit(mm)	126	128	128	128	128		128.5	128
Max. radius (mm)*	170.2	173.2	173.2	173.2	173.2		173.7	173.2
Max. RCF(g-force)*	3,045	3,095	3,095	3,095	3,095		3,107	3,095

Tube							
Tube capacity (mL)	25 mL conical	25 mL conical	50 mL conical	50 mL conical (skirted)	15 mL	85 mL	250 mL
Tube Dimension (Φ x L, mm)	28.5 x 83	28.5 x 78.5	29.5 x 118	29.5 x 118	16 x 120	38 x 106	61.5 x 128
Adapter							
Cat. No.	GAM-c50-3(r250)		GAM-c50-3(r250)	GAM-sc50-4(r250)	GAM-85-2(r250)		GAS-250(r250)
Rack capacity (ea / 4)	3 / 12		3 / 12	4 / 16	2 / 8		1 / 4
Rack hole dimension (Φ x L, mm)	30.5 x 60	30.5 x 90	30.5 x 90	29.8 x 93.5	17 x 86.5	38.5 x 86.5	62.5 x 87
Rack hole bottom type	Conical		Conical	Flat	Round		Flat
Max. height tube fit (mm)	128.5		128.5	3107	126.5		127
Max. radius (mm)*	128.5		173.7	170.2	171.7		172.2
Max. RCF (g-force)*	3,107		3,107	3,045	3,071		3,080



**Microplate Holder Bucket,
GLP-mw-r250**

Max. RPM / RCF : 4,000 / 2,737

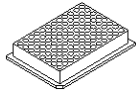
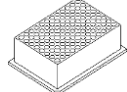
Max. Radius (mm) : 153

Hole dimension (w x d x h, mm) : 86.5 x 128.5 x 80

Max. height for tube fit (mm) : 80

Hole bottom type : Flat bottom with Stainless steel & ABS pad

Max.load per bucket(Plate and contents) : 330 g

Tube		
Tube capacity (mL)	MTP	DWP
Tube Dimension (Φ x L, mm)	86 x 128 x 15	86 x 128 x 60
Bucket capacity(ea / 4)	2 / 8	1 / 4

Swing Rotor, GRS-L-250-4

- 4 loadings
- Max. RPM : 5,000
- Angle from axis during rotation : $\angle 90^\circ$
- Rotor dimension / weight ($\varnothing \times L, \text{mm} / \text{g}$) : 266.4 x 83.5 / 1,780



**250 mL Round Bucket,
GLB-250-250**

Max. RPM / RCF : 5,000 / 5,394
 Max. Radius (mm) : 193
 Hole dimension ($\varnothing \times L, \text{mm}$) : 62 x 109
 Max. height for tube fit (mm) : 153
 Hole bottom type : Flat

Tube									
Tube capacity (mL)	1.5~2.0 mL	2.0 mL screw cap	5 mL conical	5 mL conical	4 ~ 7 mL VT	8~10mL VT	15 mL	15 mL conical	25 mL conical
Tube Dimension ($\Phi \times L, \text{mm}$)	11 x 38	10.1 x 46	16 x 59	16 x 67	13 x 75	16 x 100	16 x 120	17 x 120	28.5 x 83
Adapter									
Cat. No.	GAM-m2.0-9(250)		GAM-c5-4(250)		GAM-7-8(250)	GAM-10-7(250)	GAM-15-4(250)	GAM-c15-4(250)	GAS-c25(250)
Rack capacity (ea / 4)	9 / 36		4 / 16		12 / 48		9 / 36	4 / 16	3 / 12
Adaptor hole Dimension ($\Phi \times L, \text{mm}$)	11 x 39		17.2 x 52		17.5 x 90		17.5 x 90	30.2 x 90	30.5 x 60
Adaptor hole Bottom type	Round		Conical		Round		Conical	Round	Conical
Max. height tube fit(mm)	150		151		5338		150	190	153
Max. radius (mm)*	150		191		190		190	191	193
Max. RCF(g-force)*	5,311		5,338		5,311		5,338	5,338	5,394

* Depending on the size of cap, there is a possibility of not fit-in.

Tube									
Tube capacity (mL)	25 mL conical	30 mL	50 mL	50 mL conical	50 mL conical (Skirted)	85 mL	100 mL	250 mL conical	250 mL
Tube Dimension (Φ x L, mm)	28.5x78.5	25.7x101.4	29 x 108	29.5x118	29.5x118	38x106	44x115	60x163	61.5x128
Adapter									None
Cat. No.	GAS-c25 (250)	GAM-30-3(250)	GAM-50-2(250)	GAS-c50(250)	GAS-sc50 (250)	GAS-85(250)	GAS-100(250)	GAS-100(250)	-
Rack capacity (ea / 4)	3 / 12	3 / 12	2 / 8	1 / 4	1 / 4	1 / 4	1 / 4	1 / 4	1 / 4
Adaptor hole Dimension (Φ x L,mm)	30.5 x 60	26 x 85	29.5 x 90	29.8 x 98	29.8 x 93	38.5 x 96	44.2 x 93	61.5x44.5	-
Adaptor hole Bottom type	Conical	Round	Round	Conical	Flat	Round	Round	Conical	-
Max. height Tube fit(mm)	153	148	148	153	148	148	148	151.5	153
Max. radius (mm)*	193	188	188	193	188	188	188	191.5	193
Max. RCF (g-force)*	5,394	5,255	5,255	5,394	5,255	5,255	5,255	5,352	5,394

* Depending on the size of cap, there is a possibility of not fit-in.

9. CE declaration of conformity

GYROZEN®

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DECLARATION OF CONFORMITY

We, GYROZEN Co., Ltd. hereby declare under our sole responsibility of the manufacturer that the product(s) listed below conform to the European Union directives and standards identified in this declaration.

Noi, GYROZEN Co., Ltd. dichiariamo sotto la nostra esclusiva responsabilità del produttore che i prodotti elencati di seguito sono conformi alle direttive e agli standard dell'Unione Europea identificati in questa dichiarazione.

Nosotros, GYROZEN Co., Ltd. por la presente declaro bajo nuestra responsabilidad del fabricante exclusiva que el producto (es) en la lista por debajo de ajustarse a las normas y las directivas de la Unión Europea, identificadas en esta declaración.

Wir, GYROZEN Co., Ltd. hiermit unter eigener Verantwortung des Herstellers, dass das Produkt (s), die unter die Richtlinien der Europäischen Union und Normen, die in dieser Erklärung.

**Description of Product
Model Name**

Centrifuge
2236R

Relevant Directives/ Harmonised Standards

Machinery	2006/42/EC	as last amended	EN ISO 12100:2010
Low Voltage	2014/35/EU	as last amended	IEC 61010-1:2010/A1:2016 IEC 61010-2-020:2016
EMC	2014/30/EU	as last amended	EN 61326-1:2013 EN 55011:2016/A1:2017 EN 61000-3-2:2014 EN 61000-3-3:2013/A1:2017
RoHS	2011/65/EU	as last amended	EN IEC 63000:2018

Conformity Assessment Procedure

Annex VIII, Internal Checks on the manufacture

**Authorised Representative &
Person authorized to compile the
technical file**

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August 23, 2023



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