User Manual

Personal Micro Centrifuge

mini

GYROZEN

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Personal Micro Centrifuge

mini

Personal Micro Centrifugea Manufacturer

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UM-mini(E)(Rev.6) 2023.05.22

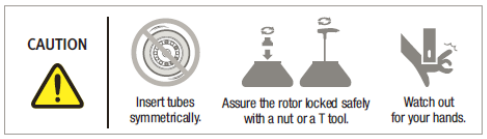
CONTENTS

This user manual contains detailed instructions to operate the Centrifuge mini. For proper use and maintenance, be sure to read the instructions.

1. Safety warnings and cautions

1.1 Safety Label

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

Label	Instruction
	Caution sign for electric shock hazard
	Mark indicating manual lid open position
	Rotor / Tube insertion and lid closing caution signs

1.2 Safety precautions

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

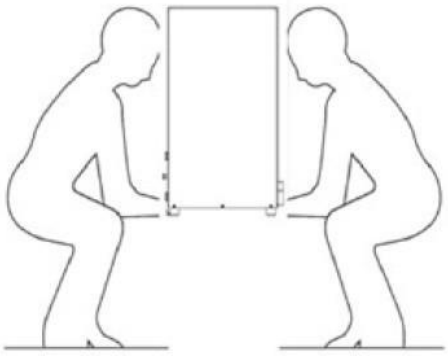
1. Always make sure that the device is fixed on a level surface that can withstand shaking and weight of the device during operation and placed on a safe table
2. Do not move the product during operation, and leave a safe space within 30cm around the centrifuge for user safety.

   -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. Do not use unauthorized rotors or accessories.
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 door opening is only used when rotation is completely stopped.
10. Permissible speeds and special specific gravity should not be used. 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. When holding the sample, do not exceed 80% of the total volume of the tube. 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 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℃
-Room Temperature: 5 ~ 35 ℃	-Relative humidity: 10 ~ 90 %
-Relative humidity: 30 ~ 85 %	-Atmospheric pressure: 500 ~ 1060 hPa
-Atmospheric pressure: 500 ~ 1060 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
2. Chamber
3. Power Socket & Switch
4. Display & Control Panel
5. Manual Lid Open Hole

2.3 Accessories

User Manual

AC Power Cord

Adaptor for 02ml(12ea)

- Cat No.GZ-1312, Microcentrifuge includes Fixed Angle rotor GRF-m2.0-12 and 12 of 0.2 mL adaptors.

- The 0.5 mL adaptors and PCR tube rotor is optional.

2.4 Technical Specification

Max. RPM/RCF	13,500rpm / 12,300 xg (GRF-m2.0-12)	6,000 rpm / 1,850 xg (GRA-s0.2-32)
Max. Capacity	12 x 2.0 ml tube	4 x 8 tube PCR strips
Time control	Pulse or Timed ≤ 30min	
RCF/RPM conversion	Yes	
Noise level(dependent on the rotor)	≤ 56 dB	
Acc. time to max. speed	≤ 12 sec	
Dec. time from max. speed	≤ 16 sec	
Display	White LCD	
LCD display parameters	RPM(RCF), Operation status, Lid Open /Close, Min(sec)	
Automatic lid release at completion	Yes	
Safety lid lock	Yes	
Power supply (V / Hz)	220~230V/ 50/60Hz(110V optional)	
Power requirement (VA)	110	
Dimension (W x D x H, mm)	208 x 245 x 145	
Weight without rotor (kg)	4.4	
CE Mark	Yes	
Cat. No.	GZ-1312	

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

1. Dual lid lock prevents lid opening during operation
2. Lid drop protection

3. Installation

3.1 Power On/OFF and Lid Release

3.1.1 Power On/Off

1. After connecting the AC power cord at the power socket on the back of the instrument, put the plug into the outlet.

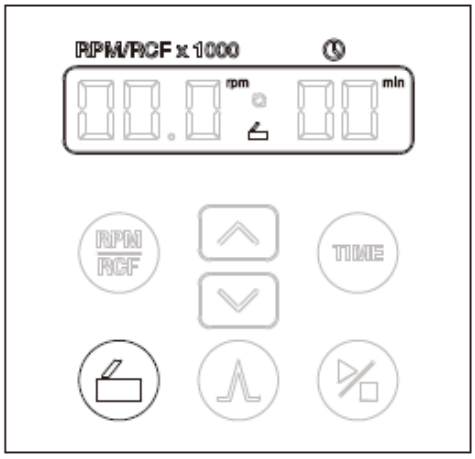
▶ Check the proper power

2. Turn on a power switch on the back of the instrument

▶ With beeping sound, right before setting value is displayed

3.1.2 Lid Release

1. When the lid is closed, touch the [LID] button to open the lid.



▷ Close the lid until hearing clank shut.

▷ When the lid is open, the display status changes from to

▷ The lid is automatically opened with end alarm when the operation is completed.

√ The lid will not open if the centrifuge is running.
√ If the lid is opened, the centrifuge will not start even with pressing [START] button.
√ Power failure : If the lid does not open due to a power failure during operation, it can be opened manually. Please refer to '4.6. Manual Lid-lock release'. But DO NOT use the Manual Lid-lock release as regular procedure to open the centrifuge. Use it only if a malfunction or power failure occurs and only when you have made sure that the rotor has stopped spinning.

3.2 Install and Remove a Rotor

Before installing a rotor

- If necessary, remove any dust, foreign objects or residue from the chamber.
- Wipe the motor shaft and rotor hub from the bottom side of the rotor with a clean cloth.
- Inspect the rotor and rotor lid, both must be clean and undamaged.

3.2.1 Fixed Angle Rotor

Installation

1. Place the rotor over the mort shaft and let it slide down slowly
2. To install the rotor, rotate the Rotor Locking Nut clockwise until tightly assembled.

▶ Grasp the rotor with one hand when you install the rotor using the Rotor Locking Nut.

3. After placing the sample tubes into the holes of the rotor, close the rotor lid until hearing clank shut.

Remove

1. Lift the snap-fit knob of rotor lid and open the lid.
2. Remove samples, adapters.
3. To remove the rotor, rotor the Rotor Locking Nut counterclockwise.

   ▶ Grasp the rotor with one hand when you remove the rotor using the Rotor Locking Nut.
4. Pull the rotor directly upwards and away from the motor shaft with both hands. Make sure do not tilt the rotor while lifting it.

[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.

3.3 Sample Tube Loading

1. Before loading sample tubes, check the water drop or any dirt in the rotor hole or adaptor, bucket.

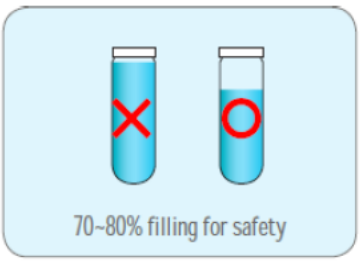
   ▷ If there is any foreign matter or moisture, remove it with soft dry cloth.

2. Load the compartments evenly. Balance opposite loads.

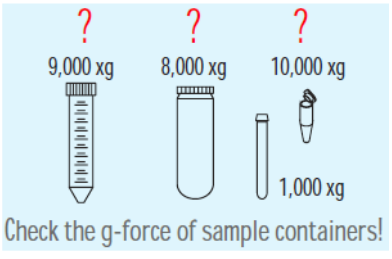
   ▷ Tubes should be placed in the rotor with same amount of samples at symmetrical positions. (Refer to below examples)

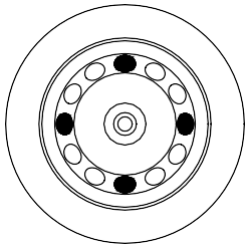
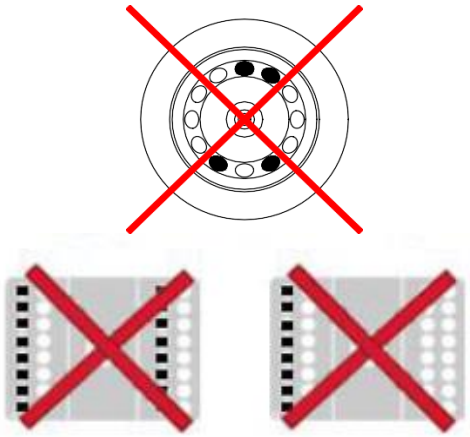
   ▷ If the number of samples is not in pair, please load the control tubes at each symmetrical position. Otherwise, it results noise and vibration, which eventually damage the instrument.

   ▷ If the samples contests exceed 80% of total capacity of the tube, it may cause spillage of the sample and the tube breakage. For safety, fill the 70~80% of the tube volume at the maximum.



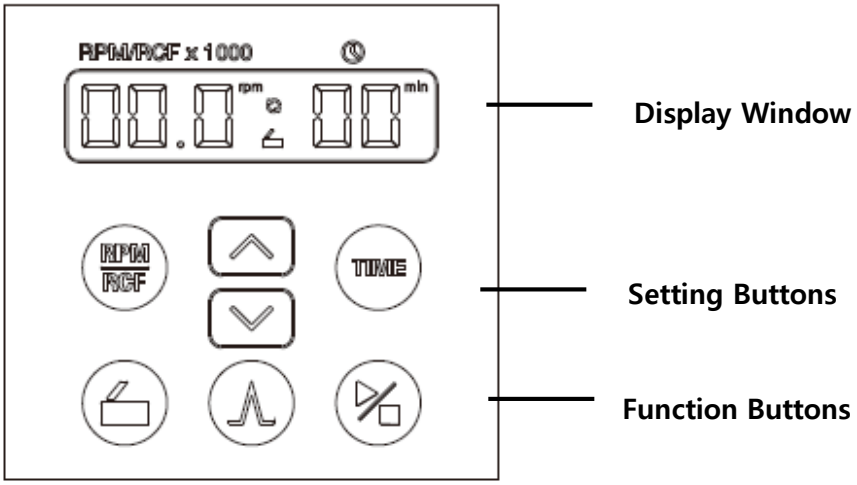
Make sure that the tubes and bottles used in the centrifuge are
√ fit in the rotor and the tubes or bottles do not touch the rotor lid or bucket caps.
√ rated to or above the selected RCF to be spun at
√ used at their minimum fill volume and not above their maximum fill volume
√ undamaged and not used above their design life (age or number of runs)



Correct loading examples	Incorrect loading examples
	

4 Operation

4.1 Key functions of control panel



Display Window

☐ Shows speed, time, status of running and the status of lid opening or closing.

☐ RPM/RCF Modes are displayed as rpm and rcf.

☐ While running,  is flickering.

☐  appears when the lid is opened and  appears when the lid is closed.

☐ Time is displayed as 'min'

Setting Buttons

☐ When setting up the RPM/RCF and Time, you can put the set value with up and down button.

Function Buttons

☐ Lid For opening the lid of unit

☐ PULSE Use for quick spin down

☐ Start/Stop Use to start and stop operation

4.2 Setting the RPM / RCF value

▶ The rotation speed is indicated as RPM (Rotation Per Minute) / RCF (Relative Centrifugal Force)

▶ The speed range of mini is 1,200 ~ 13,500 rpm and 100 ~12,300 xg.

▶ Display value: multiply 1,000 to check real value. (Example: RPM display value 13.5 indicates RPM 13,500)

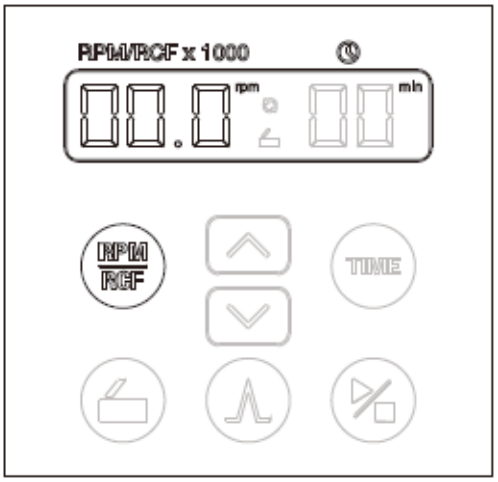
▶ Speed setting unit : 100 rpm / 100 xg (0.1 on the display LCD)

1. Press the [RPM / RCF] button once.

   ▷ If you touch a [PRM /RCF] button once, RPM mode is activated.

   ▷ If you touch a [PRM /RCF] button twice, RCF mode is activated.

2. Press the up and down buttons to change input value



3. After 5 seconds from pressing the input value, the setting value is saved.

▷ If you do not touch the number for 5 seconds, the setting mode is cleared.

Note!

When the PCR rotor is installed, please keep in mind that do not over speed at the max. 6,000 rpm / 2,400 rcf.

4.3 Setting the time value

▶ Time control : 1 min. ~ 30 min.

▶ Time setting unit : 1 min.

▶ Time is down-counted after starting centrifugation.

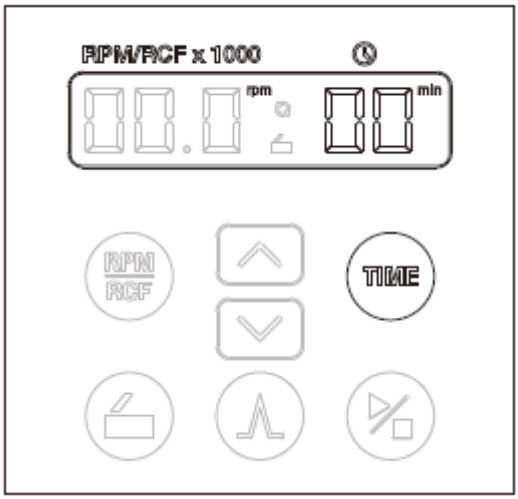
1. Press the [TIME] button once.

   ▷ 'MIN' value on LED is flickering.

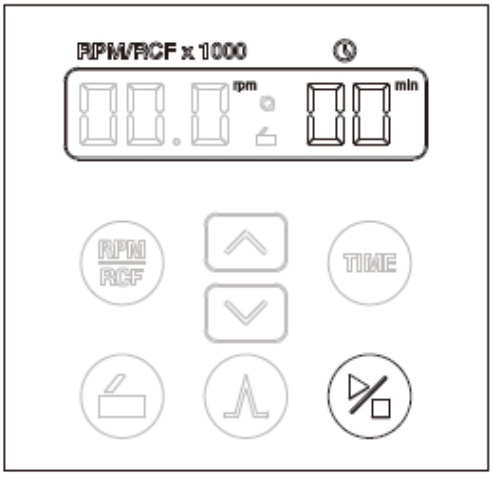
2. Press the ^ up and v down buttons to change the input value.

3. After 5 seconds from pressing the input value, the setting value is saved.

▷ If you do not touch the number for 5 seconds, the setting mode is cleared.



4.4 Start / Stop



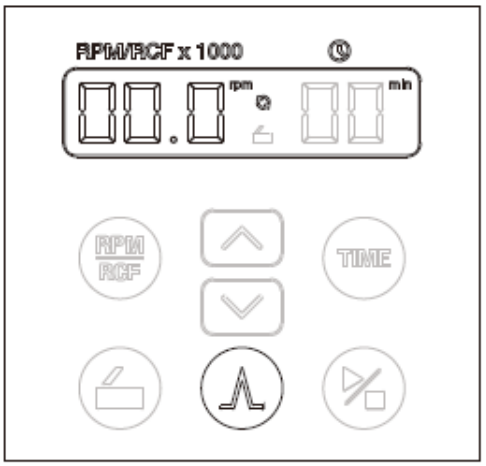
1. After setting RPM / RCF, Time, press [START / STOP] button.

▷ The instrument is running only when the lid is closed.

▷ Press the [START/STOP] button to stop manually during operation.

4.5 Pulse

This is a short-run centrifugation mode for quick and short spin down.



1. Press the [PULSE] button and hold.
2. While pulse key is pressed, it rotates to the Max. RPM of the rotor and decelerates immediately when pulse key is released.

   ▷ when the running is stopped, the lid is opened automatically with beeping sound.

4.6 Manual lid-lock release

When the lid of the instrument is not opened automatically or by pressing the [Lid] button due to an accidental power shut-off or any unexpected causes, you can manually open the lid by following the instruction.

1. Check if the rotor in the centrifuge is completely stopped through the window.
2. After pulling the instrument forward about 10com, find the Manual open hole at the bottom of the instrument.
3. Insert the Manual lid open tool or spikes into the hole and and pull the spikes at until the lid is released.

Manual opening should be performed only when spinning is completely stopped. Otherwise, harmful damage will be accompanied to not only operators but samples.

After opening the lid manually, it is recommended to wait until normal electricity comes back.

5 Maintenance

5.1 Unit

1. Clean the outside the instrument with dry soft cloth. If necessary, dip the cloth in neutral detergent and clean contaminated area. Keep completely dry after cleaning.
2. Do not use any volatile chemicals such as alcohol and benzene, etc.
3. Be careful not to make scratches on the surface of the instrument. The scratches can cause corrosion on the surface of the instrument.
4. If any rust appears, clean it with neutral detergents and keep dry.

5.2 Chamber

1. Keep dry inside the chamber after every use.
2. If the chamber is contaminated, dip the cloth in neutral detergent and clean contaminated area.

5.3 Motor shaft

1. Always make special attention to clean the motor shaft to avoid any imbalance problem due to the contaminants.
2. After using the instrument, take out the rotor from the shaft, and clean the shaft with dry soft cloth to keep dry.

5.4 Rotor

1. Corrosion and surface treatment of the rotor
    a. Corrosion will occur if the acid or alkaline solution react to rotor. If the balance of the rotor weight is not fit by the corrosion, it can cause severe vibration and noise during high-speed rotation and result in damage to the drive shaft.
    b. Rotor has a good corrosion resistance. But corrosion rate is related with humidity, salt content and the amount of impurities in the atmosphere.

c. Against Carbonate, chromate, acetate and sulfide (etc.) such as neutral aqueous solution, rotor has good corrosion resistance. But in the chloride solution, corrosion resistance will be bad. In the oxidation solution, depending on the increase of hydrogen ion concentration, the corrosion is increased. In the sulfate, phosphoric etc., acid, erosion takes place quickly and eroded in particular regard to hydrochloric acid.

2. Maintenance of rotor

a. Cleaning

If solution gets on the rotor that flows from the tube, immediately wipe it with a soft cloth moistened with warm water. Be careful not to let the rotor surface specially treated to flawless formation.

b. Dry

Please dry with caution places like narrow groove of the rotor. If using a hair dryer to use in the home, it is more effective.

c. Storage

Keep the rotor in a clean, dry place. In particular, separate angle rotor with the lid and turn over the body.

5.5 Movement of instrument

1. If you need to move or ship the instrument, be cautions to protect the motor shaft from any physical impact or turbulence.
2. Do not mount a rotor in any cases of movement. Fill inside the chamber with proper materials to keep the motor shaft on place and not to be influenced by physical pressure.

6 Trouble shooting

6.1 Check List

Symptom	Check List
Power failure	Connect the AC Power cord and make sure that the line is completely connected between the instrument and power outlet. Check the power switch is turned on. (Please refer to 3-1. Power On/Off and Lid Release)
Don't run	If the lid is not closed completely, the instrument can't run. Check the Lid LED on the display window and close the lid completely.
Can't open the lid	If the power is out, check the main fuse for the laboratory to supply the power. If it is not solved in shortly, manually open the lid with manual lid open tool for sample safety. (Refer to 5.9 Manual Lid-lock release)
Can't close the lid	Remove the dirt at the lid latch and try again. If not work, using the manual lid open tool
Noise and vibration during operation	Please check the balanced status of both the table and the instrument.
	Please re-check the 1. The balanced way of installing of the rotor into the motor shaft 2. The completeness of fixing of the Rotor
	Check the balances of samples in the rotor. (Please refer to 4.3) If the sample ba

6.2 Error code

If there is any error code with beeping sound, press [START/STOP] button to stop the beeping sound and press [ENTER] button to release of the error status.

Error code	Description	Troubleshooting
Error 1	RPM sensor	- Shut off the power supply, and then, turn on the power switch again to check the instrument. - If the error code shows continuously although you try to operate again, please contact the technical support team.
Error 2	Lid open	- If the lid opens during the instrument running or is troubled in lid sensor, this message is appeared. - Remove the dirt at the lid latch and then close the lid completely again. - If the error code persist, please contact the technical support team .
Error 3	Motor overheating	- If the motor is overheated, this message is appeared. - Shut off the power supply for an hour, and then turn on the power switch for checking the instrument. - If the error code persist, please contact the technical support team.
Error 4	Low voltage	- If the power input of Power supply (V/Hz) is 10% less than required power, this message is appeared. - Shut off the power supply and then check the voltage of the Power supply (V/Hz). - Check if the centrifuge is connected to the power strip. If yes, connect the centrifuge to wall outlet.
Error 5	High voltage	- If the power input of Power supply (V/Hz) is 10% more than required power, this message is appeared. - Shut off the power supply and then check the voltage of the Power supply (V/Hz).
Error 6	Over speed	- If the instrument is spun with over speed, there will be some problems in the overload of motor and the output of motor. - Shut off the power supply, and then, turn on the power switch again to check the instrument.
Error 7	System error	- Turn off the power and turn it on to check the operation status. - If the problem persists, contact the service center.

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

Fixed Angle Rotor, GRF-m2.0-12

- Capacity : 12 x 1.5/2.0 mL
- Max. RPM / RCF : 13,500 / 12,300
- Hole angle from axis during rotation : ∠ 45°
- Hole dimension (Ø x L,mm) : 11.1 x 39
- Hole bottom type : Round
- Max. height for tube fit (mm) : 50
- Supplied with a plastic snap fit lid, No ID ring

Tube				
Tube capacity (mL)	0.2	0.5	1.5/2.0	2.0 mL 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)	-	-
Adaptor hole dimension (Φ x L,mm)	6.5 x 23	8 x 31	-	-
Adaptor hole bottom type	Open	Open	-	-
Max. radius (mm)*	43.5	50.5	60.4	60.4
Max. RCF (g-force)*	8,863	10,290	12,300	12,300

Fixed Angle Rotor, GRF-m2.0-12-b

- Capacity : 12 x 1.5/2.0 mL
- Max. RPM / RCF : 13,500 / 12,300
- Hole angle from axis during rotation : ∠ 45°
- Hole dimension (Ø x L,mm) : 11.1 x 39
- Hole bottom type : Round
- Max. height for tube fit (mm) : 50
- Supplied with a anodized aluminum lid and two O-rings inserted, No ID ring

Tube				
Tube capacity (mL)	0.2	0.5	1.5/2.0	2.0 mL 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)	-	-
Adaptor hole dimension (Φ x L,mm)	6.5 x 23	8 x 31	-	-
Adaptor hole bottom type	Open	Open	-	-
Max. radius (mm)*	43.5	50.5	60.4	60.4
Max. RCF (g-force)*	8,863	10,290	12,300	12,300

Fixed Angle Rotor, GRF-m1.8-10

- Capacity : 10 x 1.8 mL Cryotube
- Max. RPM / RCF : 13,500 / 12,300
- Hole angle from axis during rotation : ∠ 45°
- Hole dimension (Ø x L,mm) : 12.8 x 32
- Hole bottom type : Flat
- Max. height for tube fit (mm) : 50
- Supplied with a plastic snap fit lid, No ID ring

Tube	
Tube capacity (mL)	1.8 mL cryotube
Tube dimension (Φ x L, mm)	12.5 x 45
Max. radius (mm)	60.4
Max. RCF (g-force)	12,300

Fixed Angle Rotor, GRA-s0.2-32

- Capacity : 4 x 8-Tube PCR strips, 32 x 0.2 mL
- Max. RPM / RCF : 6,000 / 1,850
- Hole angle from axis during rotation : ∠ 45°
- Hole dimension (Ø x L,mm) : 6.5 x 3
- Hole bottom type : Open
- Max. height for tube fit (Up) : 10
- Max. height for tube fit (Down) : 12

Tube		
Tube capacity (mL)	0.2	8-Strip tube
Tube dimension (Φ x L, mm)	6 x 8	6 x 8
Max. radius (mm)	Inner : 36.8 Outer : 46	Inner : 36.8 Outer : 46
Max. RCF (g-force)	Inner : 1,554 / Outer : 1,850	Inner : 1,554 / Outer : 1,850

9 CE declaration of conformity

GYROZEN®

www.gyrozen.com

DECLARATION OF CONFORMITY

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

Nous, GYROZEN Co.,Ltd, déclarons sous notre seule responsabilité que le produit (s) indiqués ci-dessous sont conformes aux directives de l'Union européenne et les normes définies dans la présente déclaration.

Nosotros, GYROZEN Co.,Ltd, por la presente declaro bajo nuestra responsabilidad 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, dass das Produkt (s), die unter die Richtlinien der Europäischen Union und Normen, die in dieser Erklärung.

Description of Product	Centrifuge
Model Name	mini(1312)

Relevant Directives/ Harmonised Standards

Machinery	2006/42/EC	as last amended	EN ISO 12100:2010
Low Voltage	2014/35/EU	as last amended	EN 61010-1:2010+A1:2019 EN 61010-2-020:2017
EMC	2014/30/EU	as last amended	EN 61326-1:2013 EN 55011:2016 EN 61000-3-2:2014 EN 61000-3-3:2013
RoHS	2011/65/EU	as last amended	EN IEC 63000:2018

Test Report. Ref.

ICRT-TR-S190179-0A
ICRT-TR-E191287-0A
RT22R-S0902

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May 10, 2022

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Doc No.: DOC-mini(1312)(Rev.2)

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