Personal Micro Centrifuge

mini

User's Manual

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UM-mini(E)(Rev.1)

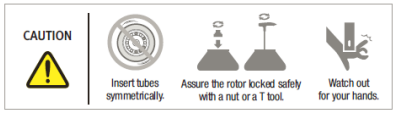
Content

This manual is for the users who operate the device for the first time.
This manual provides information on the detailed instructions, precaution, troubleshooting and maintenance care.

1. Meanings of Symbols & Safety Precautions

1.1 Safety Labels on Instrument

The labels on the instrument represent safety instructions and directions.

Symbol	Meaning	Symbol	Meaning
	Indicate a hole for manual door opening in case of emergency		Attention and warning for electric shock
Symbol		**Meaning**	
		Attention and warning for correct way of sample balancing in the rotor. Attention and warning for rotor coupling. Attention and warning for door opening and closing.	

1.2 Safety Precautions

Before using the instrument, please read this operation manual to ensure correct usage. Incorrect handling of the instrument could possibly result in personal injury or physical damage on the instrument or its accessories.

1. ALWAYS locate the instrument on a flat, rigid and stable table capable of withstanding the weight of the instrument and its spinning operation.
2. ALWAYS make a safety zone of 30 cm around the centrifuge to indicate that neither hazardous materials nor persons should be permitted within the area during operation.
   - ALWAYS position the instrument with enough space on each side of instrument to ensure proper air circulation.
3. ALWAYS install the instrument within a temperature and humidity controlled environment. (Permissible ambient temperature: +5°C ~ +35 °C, Relative humidity: ≤ 85%)
4. Before connecting the power, check the rated voltage.
5. Should not use unapproved rotors and associated accessories.
   - Only use rotors from Gyrozen Co., Ltd. with appropriate centrifugal tubes and

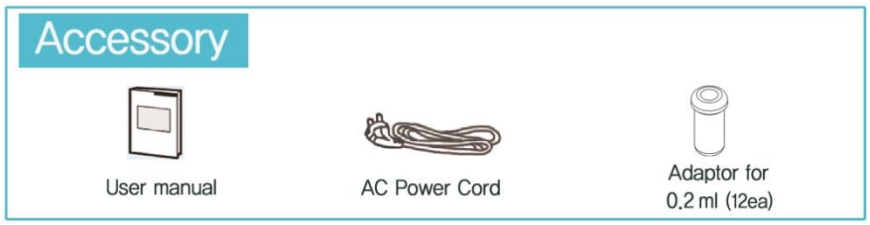
suitable adaptors to embrace sample containers tightly enough inside rotors.

6. Before operating the instrument, check if the rotor and the rotor lid are securely fastened.
   - Should operate the instrument with a rotor properly installed and secured to the motor shaft.
7. Mount the rotor on the motor shaft properly, check it with spinning manually.
8. Do not stop the rotor by touching with hand during the instrument is running.
9. Emergency door open should be performed only when spinning is completely stopped.
10. Should not exceed the rated speed or specific gravity. Samples whose density is greater than 1.2g/ml must have reduced maximum rotational speed to avoid rotor failure.
11. The sample content should not exceed 80% of total capacity of a tube. Otherwise, it would cause spillage of sample fluid and even the tube breakage.
12. ALWAYS load the tubes symmetrically with evenly weighted samples to avoid rotor imbalance. If necessary, use the water blank to counterbalance the unpaired sample.
13. The operation speed should not exceed the highest value of the individual guaranteed g-forces of each centrifuge, rotor, bucket or adaptors and sample container, especially the guaranteed g-force of sample container should not be neglected.
14. The rotors should be cleaned and kept dry after every use for longer life and safety.
15. ALWAYS disconnect the power supply prior to maintenance care and service to avoid electrical shock.
16. ALWAYS use proven disinfection procedures after centrifuging biohazardous materials.
17. Should not centrifuge flammable, toxic, radioactive, explosive, or corrosive materials.
18. When it is necessary to use toxic or radioactive materials or pathogenic micro-organisms which belong to the Risk Group II of WHO: "Laboratory Bio- safety Manual," should follow national regulations.

- ✓ Do not place dangerous materials within 30 cm distance around the instrument, and that is also recommended by IEC 61010-2-020.
- ✓ Use the emergency door open function only when the door button on the control panel is dumb under the condition of complete stop of rotor running.
- ✓ Never try to open or move the instrument if it is not completely stopped.
- ✓ If the power input is more than +/- 10% of the recommended voltage or fluctuates frequently, it may cause malfunction of the instrument and often result serious damage.
- ✓ Install the instrument at the place without any kinds of corrosive gases.

2. Product Description & Technical Specifications

2.1 Product Description



2.2 Technical Specifications

Max. RPM/RCF	13,500 rpm/ 12,300 xg (GRF-m2.0-12)	6,000 rpm/ 1,850 xg (GRA-s0.2-32)
Max. capacity	12 x 2.0 ml tubes	4 x 8-tube PCR strips
Time control	Pulse or timed ≤30 min	
RCF/RPM conversion	Yes	
Noise level (dependent on rotor)	≤56 dB	
Acc. time to max. speed	≤12 sec	
Dec. time from max. speed	≤16 sec	
Parameters on display window	RPM(RCF), Oper Status, Door Open/Close, Min(sec)	

Display	Blue LCD
Safety lid lock	Yes
Automatic door release at completion	Yes
Power supply (V/Hz)	220V/50~60Hz (110V optional)
Power Requirement (VA)	110VA
Dimension (W x D x H)	208 x 245 x 145 mm
Weight without rotor	4.4 kg
CE MARK	Yes
Cat. No.	GZ-1312

- Cat No. GZ-1312, Microcentrifuge includes Fixed Angle rotor GRF-m2.0-12 and 12 of 0.2ml adaptors.
- The 0.5ml adaptors and PCR tube rotor is optional.

3. Installation

3.1 Power On/Off and Door Release

3.1.1 Power On/Off

Action

1 Connect the AC power cord to the power socket on the back of the instrument and put the plug into the outlet.

▶ Check the proper power.

2 Turn on the instrument by pressing the power switch on the back of the instrument. Turn on the switch [I].

3.1.2 Door Release

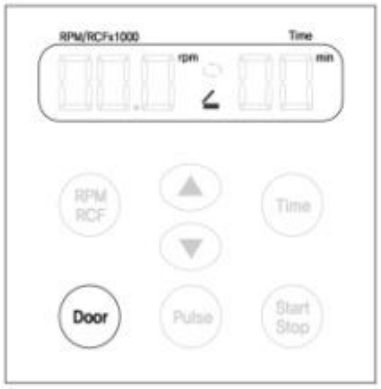
- For door opening, [DOOR] button is used.
- Display shows the status of door (open, closed ▬).

Action

1 Press the [DOOR] button to open the closed centrifuge door (▬).

▶ When the door is open, the display status changes from ▬ to .

▶ The door is automatically opened with end alarm when the operation is completed.



Note!

- The door is not opened while the instrument is running.
- If the door is opened, the instrument could not be operated even with pressing the 'Start' button.
- Power Failure: If there is any power failure during the operation, door is not opened with 'Door' button. Door can be opened only when the operation is completely stopped and the power is on again. If you want to open the door at the power failure, please refer to '4.6 Emergency Door Open'.

3.2 Rotor Coupling and Disassembling

3.2.1 Fixed Angle Rotor

Action

1 Before coupling a rotor, clean the motor shaft, rotor, and chamber with soft dry towel.

▶ If you find any foreign substances, they must be removed from the motor shaft, rotor and chamber.

2 Mount a proper rotor into the motor shaft and fix it using Rotor Locking Nut.

▶ To assemble the rotor, rotate the Rotor Locking Nut **clockwise** until tightly assembled.

▶ To disassemble the rotor, rotate the Rotor Locking Nut **counterclockwise**.

▶ Grasp the rotor with one hand and assemble or disassemble 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.

▶ When you open the lid, lift the snap-fit knob.

Note!

- When the PCR rotor is coupled, please do not speed over 6,000 rpm/2,400 rcf.

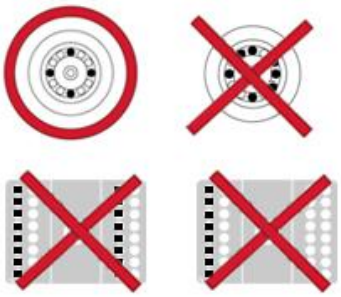
3.3 Positioning of Sample Tubes

Action

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

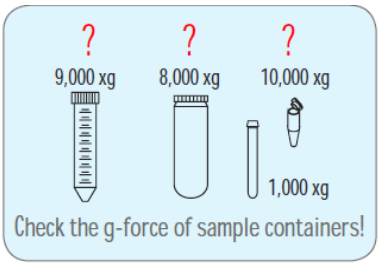
▶ If you find any water drops or dirt in the rotor hole or adaptor, remove them with soft and dry cloth.

2 The sample tubes should be placed in the rotor holes in a balanced way.



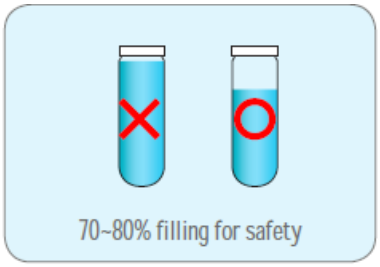
▶ The sample tubes should be loaded symmetrically with the density and the weight considered to avoid imbalance.

▶ In case the number of samples cannot make balance in weight, please use control tubes. Otherwise, it can cause noise or vibration, which may damage the instrument.



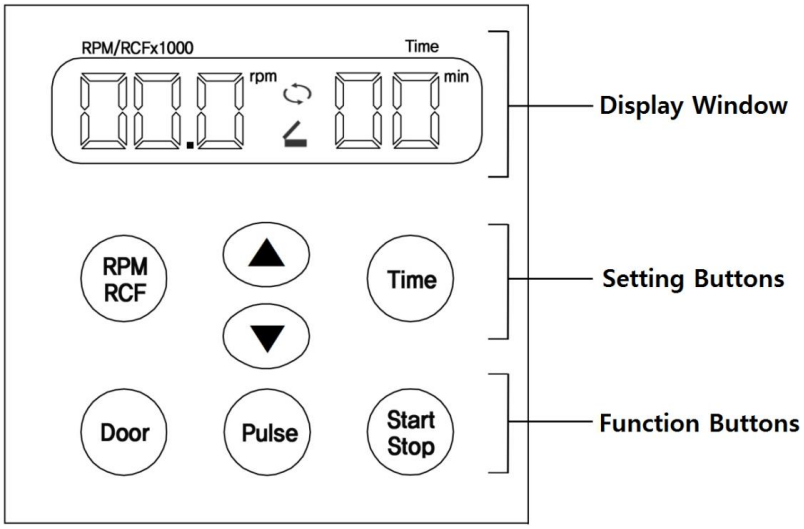
▶ Only use appropriate centrifugal tubes and do not exceed the speed beyond the tube's max g-strength.

▶ If the sample contents 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.



4. Operation

4.1 Key Functions of Control Panel



Display Window

- Shows speed, time, status of running and the status of door opening or closing.
- RPM/RCF Modes are displayed as rpm and rcf.
- While running, ↻ is flickering.
- ▙ appears when the Door is opened and ▬ appears when the Door 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

- Door For opening instrument door
- Pulse For quick spin down
- Start/Stop Commend start and stop operation

4.2 Setting Speed

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

4.2.1 Setting the RPM Value

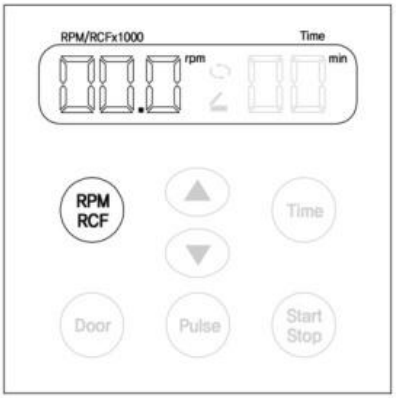
Action

1 Press the [RPM/RCF] once.

▶ The RPM mode is activated by pressing [RPM/RCF].

▶ If the RCF mode is selected, press [RPM/RCF] once more.

▶ The input RPM value flickers on the display window and can be set here.



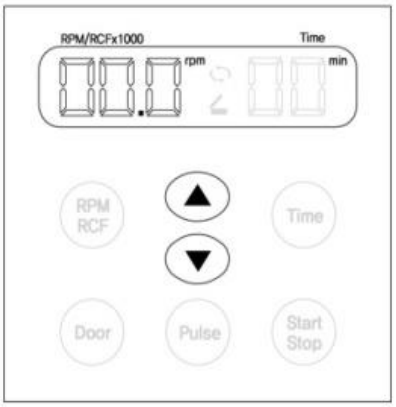
2 Press the [▲▼] buttons to change input value.

▶ RPM setting unit: 0.1 unit (0.1=100rpm)

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

▶ If you want to check the input value, press [RPM/RCF] button.

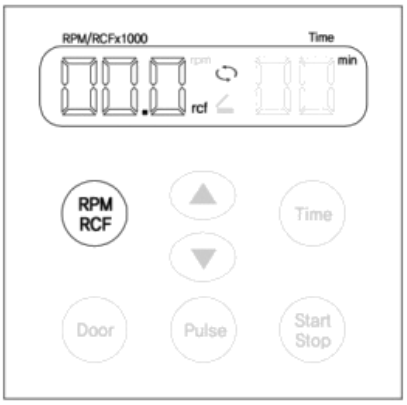
▶ If you do not press the [▲▼] button for 5 seconds, the setting mode is cleared.



4.2.2 Setting the RCF Value

Action

1 Press [RPM/RCF] twice.

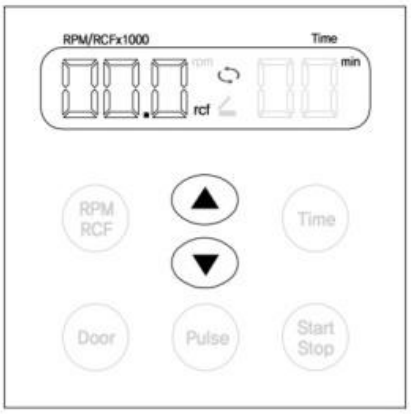


▶ The RCF mode is activated by pressing [RPM/RCF] twice.

▶ If the RPM mode is selected, press [RPM/RCF] once more.

▶ The input RCF value flickers on the display window and can be set here.

2 Press the [▲▼] buttons to change input value.



▶ RCF setting unit: 0.1 unit (0.1=100rcf).

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

▶ If you want to check the input value, press [RPM/RCF] button.

▶ If you do not press the [▲▼] button for 5 seconds, the setting mode is cleared.

Note!

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

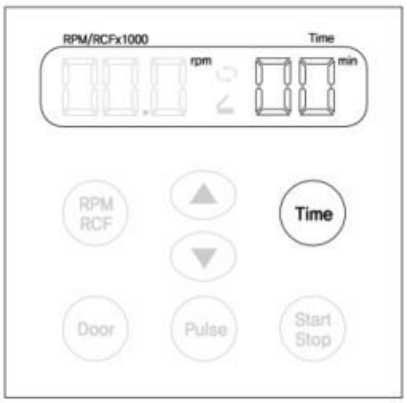
4.3 Setting the Time Value

- Time control: 1 min. ~30 min.
- Time setting unit: 1min.

Action

1 Press the [TIME] button once.

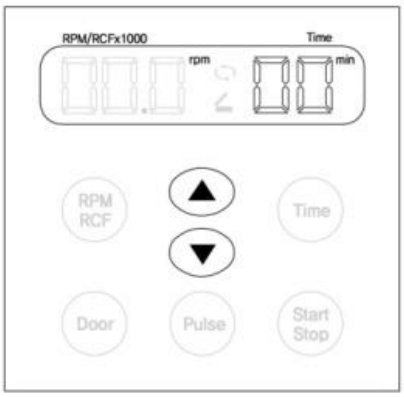
▶ 'min' on LED is flickering.



2 Press the [▲▼] buttons to change input value.

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

▶ If you do not press the [▲▼] button for 5 seconds, the setting mode is cleared.



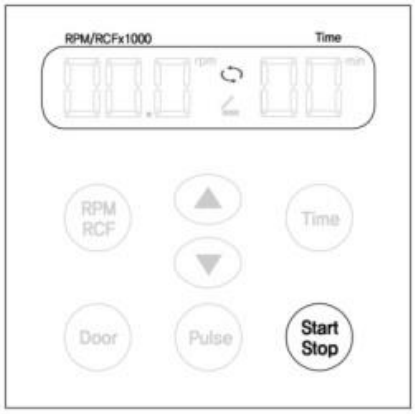
4.4 Start/Stop

Action

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

▶ The running starts only when the door is closed.

▶ In case of pressing the [Start /Stop] button while running, the running is stopped



4.5 Pulse

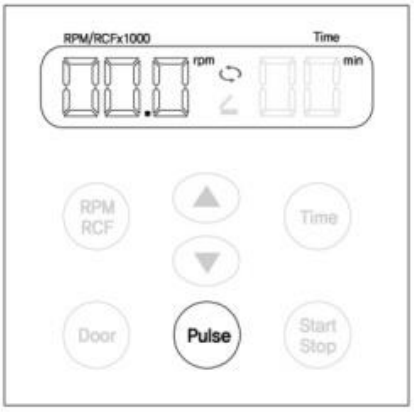
➢ It is for quick spin down.

Action

1 Touch the [Pulse] button.

▶ If you press 'Pulse' button and release at the point you want to stop, the centrifuge decelerates immediately.

▶ When the running is stopped, the door is opened automatically with beeping sound.



4.6 Emergency Door Open

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

Action

1 Check if the rotor in the centrifuge is completely stopped.

2 After pulling the instrument forward about 10cm, find the "Emergency Door Open Hole" at the bottom of the instrument

3 Insert spikes (a car key, scissors and etc.) 2~3 cm into the "Emergency Door Open" hole and pull the spikes at the opposite direction of the arrow.

▶ After the door is opened, it is recommended to wait until electricity gets back to normal.

Caution!

- The manual door release should be performed only when spinning is completely stopped. If not, it could bring about harmful damage to the operators or the samples.

5. Maintenance

5.1 Outer part of Instrument

1. Clean the outside of the instrument with dry soft cloth. If necessary, dip the cloth in neutral detergent and clean any contaminated area. Keep completely dry after cleaning.
2. Do not use any volatile chemicals such as alcohol, benzene, benzole, and thinner, etc.
3. Be careful not to make scratches on the surface of the instrument.
   - Scratches may cause corrosion on the surface of the instrument.
   - Any parts with rust should be cleaned with neutral detergents and kept dry.

5.2 Chamber

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

5.3 Shaft

1. Always keep the motor shaft clean to avoid any imbalance problem caused by 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.
3. If the rotor cannot be easily removed from the shaft, do not pull the rotor by force and call a service engineer authorized by GYROZEN Co., Ltd.

5.4 Rotor

1. If any parts become contaminated, clean them with soft wet cloth and keep the rotor dry.
2. Be careful not to make scratches inside or on the surface of rotors. Any small scratches can cause corrosion of the rotor and big damage to the instrument.
3. While the instrument is not used, remove the rotor from the motor shaft and stand it upside down.

5.5 Transportation of Instrument

1. If you need to move or ship the instrument, be cautious 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

➢ If any problems occur in the centrifuge, please check the following list before contact your local GYROZEN partner.

Symptom	Checklist
Power failure	Make sure the AC Power cord completely connects the instrument to the power outlet. Check the power switch is on. Please refer to [3.1.1 Power On / Off].
Can't be started.	If the door is not closed completely, the instrument does not run. Check the door status on the display window and close the door completely if not. Please refer to [3.1.2 Door Release].
Can't open the door.	If the power is out, check the main fuse for the laboratory to supply the power. If it is not solved shortly, open the door with the manual door release tool. Please refer to [4-6. Emergency Door Open].
Can't close the door.	Remove the dirt at the door latch and keep the door completely closed. If the door is not closed by any reasons, please contact GYROZEN service team.
Noise and vibration during running	Please check if the table and the instrument keep level.
	Please recheck the three coupling status on the following. 1. Balanced coupling of the rotor to the motor shaft 2. Complete fixing of the rotor by the Rotor Locking Nut 3. Fastening of the Rotor Lid and the rotor. Please refer to [3.2 Rotor Coupling and Disassembling].
	Check the balanced positioning of the samples in the rotor. Please refer to [3.3 Positioning of Sample Tubes].

6.2 Error code

➢ The following error messages comes up with 5 times beeping sound. Check into the current status by referring to the following information.

	Possible Causes	Actions
Error 1	Motor	• If the speed does not reach 200 rpm within 2 seconds after motor starts to operate, this message may appear. • Check whether the motor is normally working or not. • If the error message does not disappear, please contact a Service Engineer of your local GYROZEN's partner.
Error 2	Door Open	• If the door opens while spinning or has any trouble in the door sensor, this message may come up. • Remove the dirt at the door latch and close the door completely. Check the door closing status on the display window. • If the error message does not disappear, please contact a Service Engineer of your local GYROZEN's partner.
Error 3	Motor Overheating	• If the motor is overheated, this message may come up. • Keep off the power supply for an hour, and turn on the power to check up the instrument. • If the error message does not disappear, please contact a Service Engineer of your local GYROZEN's partner.
Error 4	Low Voltage	• If the power input (V/Hz) is at least 10% lower than the recommended power, this message may come up. • Turn off the power supply and check the voltage of the Power supply (V/Hz). • Use AVR to provide proper power.
Error 5	High Voltage	• If the power input (V/Hz) is at least 10% higher than the recommended, this message may come up. • Turn off the power supply and check the voltage of the Power supply (V/Hz). • Use AVR to provide proper power.
Error 6	Overspeed	• If the instrument spins faster than allowed (1,000 rpm higher than the set speed), it may cause overload to motor capacity or any trouble in the output of motor. • Turn off and on the power supply to check up the

		instrument. • If the error message does not disappear, please contact a Service Engineer of your local GYROZEN's partner.
Error 7	System	• If the installed software has any bugs, this message may come up. • Contact a Service Engineer of your local GYROZEN's partner and get the firmware upgrade. • Wire disconnection or tuning of the instrument must be performed only by a Service Engineer authorized by GYROZEN Co., Ltd.

7. Ordering Information for Rotors & Accessories

Fixed Angle Rotor, GRF-m2.0-12

12 x 1.5/2.0 ml
∧ 45°
Hole diameter (mm) : 11.1
Max. height for tube fit (mm) : 42

Tube			
Tube capacity (ml)	0.2	0.5	1.5/2.0
Adaptor			None
Cat. No.	GAS-m0.2(2)	GAS-m0.5(2)	-
Adaptor bore (Φx L, mm)	6.5 x 23	8 x 31	-
Radius (mm)	43.5	50.5	60.4
Max. RPM		13,500	
Max. RCF (g-force)	8,863	10,290	12,300

Fixed Angle Rotor, GRF-m1.8-10

10 x 1.8 ml Cryotube
∧ 45°
Hole diameter (mm) : 12.8
Max. height for tube fit (mm) : 50

Tube			
Tube capacity (ml)	0.2	0.5	1.8 ml Cryotube
Adaptor			None
Cat. No.	GAS-m0.2(2)	GAS-m0.5(2)	-
Adaptor bore (Φx L, mm)	6.5 x 23	8 x 31	-
Radius (mm)	43.5	50.5	60.4
Max. RPM		13,500	
Max. RCF (g-force)	8,863	10,290	12,300

PCR Rotor, GRA-s0.2-32

4 x 8-tube PCR strips, 32 x 0.2 ml
∧ 45°
Hole diameter (mm) : 6.5

Tube		
Tube capacity (ml)	0.2	8-tube PCR strip
Radius (mm)	1st : 38.6 / 2nd : 46	
Max. RPM	6,000	
Max. RCF (g-force)	1st : 1,554 / 2nd : 1,850	

8. CE

GYROZEN www.gyrozen.com

Doc No. : 2007090046(1) / 2007080029/ CTK0034-RS-0001

EC Declaration of Conformity

CE

We, Gyrozen Co., Ltd.

B-Station, 544-1, Bongmyeong-dong, Yuseong-gu, Daejeon 305-301, Korea

(30-12 Gyeryong-ro 141-gil, Yuseoung-gu, Daejeon 305-301, Korea)

declare under our sole responsibility that the product;

Model Name: mini

Description of Product: Microcentrifuge

to which this declaration relates is in conformity with the following standard(s) directives or other normative document(s);

EN 61010-1(2001): Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements

EN 61010-2-020(2006): Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2: Particular requirements for laboratory centrifuges

EN 61326-1(2006): Electrical equipment for measurement, control and laboratory use - EMC requirements

EN 55011(2007): Industrial, scientific and medical (ISM) radio-frequency equipment
Radio disturbance characteristics Limits and methods of measurement

following the provisions of Directives;

2004/108/EC: Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC

2006/95/EC: Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits

2011/65/EU: Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Issued date: April 10, 2014

S. K. Kim, President

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