

USER MANUAL

Multi-Purpose, High Speed Centrifuge

1248R / 1580R



GYROZEN

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This user manual contains detailed instructions to operate the Centrifuge 1248R/1580R. 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
	<p>Mark indicating danger and warning</p>
	<p>Caution sign for electric shock hazard</p>
	<p>Mark indicating earth grounding</p>
	<p>Mark indicating manual lid open position</p>
	<p>Rotor / Tube insertion and lid closing caution signs</p>

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.

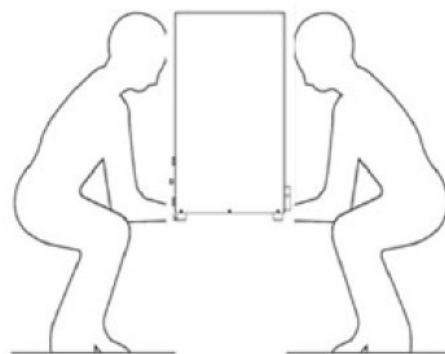
-At all times, the location of the device should have enough space around the device for proper air circulation.
3. Always install the equipment in a place where temperature and humidity can be controlled.
4. Before connecting the power, the rated voltage should be checked.
5. Do not use unauthorized 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

- Indoor use
- Room Temperature: 5 ~ 40 °C
- Relative humidity: 30 ~ 85 %
- Atmospheric pressure: 500 ~ 1060 hPa

Storage and transport conditions

- Ambient Temperature: -10 ~ 40°C
- Relative humidity: 10 ~ 90 %
- 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. Power Socket
3. Display & Control Panel
4. Power Switch
5. Manual Lid Open Hole
6. Drain Hole



2.3 Accessories



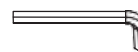
User Manual



AC Power Cord



Rotor Locking Tool
(Manual Lid Open Tool)



6mm wrench

※ Rotor sold separately (Refer to 8. Rotor and accessories)

2.4 Technical Specification

Model		1248R	1580R
Max. RPM/RCF	Fixed angle	12,000rpm / 16,582 xg	15,000 rpm / 25,910 xg
	Swing out	5,000 rpm / 5,394 xg	
Max. Capacity	Fixed angle	6 x 85 ml	6 x (250 & 15 ml)
	Swing out	4 x 250 ml / 250 ml conical	4 x 750 ml
Temp. range(°C)		-20 ~ + 40*	
FASTCOOL button		Yes	
Time control		Pulse, Timed < 100 hr or continuous	
Time counting		Selectable, at set speed or from starting	
RCF/RPM conversion		Yes	
Noise level		≤ 60 dB	
ACC/DEC ramps		9 / 10	
Program memory		100	
Control (CPU)		Microprocessor controlled	
Display		White LCD	
LCD display parameters		RPM(RCF), Operation status, Lid Open /Close, Hour : Min, Temp, ACC, DEC	
Parameter input type		Touch	
Parameter input method		Numeric	
Time display		hr : min	
Time control interval (increment)		1 min	
RPM control interval		1	
RCF control interval		1	
Min. adjustable speed(RPM)		500	
Adjustment of volume and repetition of alarm sound		Yes	
Key lock function		Yes	
Rotor identification		Automatic	
Imbalance cutoff		Yes	

Imbalance tracking (accumulated counting)	Yes	
Accumulation of total operation time	Yes	
Lid structure	Triple (ABS / Steel / ABS)	
Safety lid lock	Yes	
Lid drop protection	Yes	
Motorized lid open & close	Yes	
Refrigerant	R404a	
Chamber material	Stainless steel	
Power supply (V / Hz)	220 V / 50Hz	
Power requirement (VA)	2.5 K	
Dimension (W x D x H, mm)	655 x 620 x 357	770 x 650 x 390
Weight without rotor (kg)	78	93
CE Mark	Yes	
Cat. No.	GZ-1248R	GZ-1580R

* Plus temperature can not be controlled.

Prerequisites are required for above room temperature.

Please contact the technical support team for details.

☞ This instrument has following functions for safety.

1. Automatic rotor identification function.
2. Automatic detection and alarms for imbalance, excess speed and heating.
3. Dual lid lock prevents lid opening during operation
4. Lid drop protection
5. Key lock function to prevent set value changes during operation
6. Imbalance cut off

3. Unpacking

Motor Protecting Devices (3ea of screw bolts) are installed at the bottom of each instrument for keeping the motor on place. As depicted in the following pictures, the length of one bolt in the front bottoms is longer than the instrument's feet for operator in order to recognize the wobbly status. These bolts and nuts should be removed before the installation of the instrument.

1. Open the box and lift out the instrument carefully.
2. Two people should keep the system horizontally to lift up on the flat table.
3. To disassemble the Motor Protecting Devices, use the provided 6mm wrench and unscrew and remove all 3 bolts. It is now ready for installation.



☞ Place the instrument on the solid and flat table.

4. Installation

4.1. Power On/OFF and Lid Release

4.1.1. Power On/Off

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



(1248R)



(1580R)

- ▶ Check the proper power

2. Turn on a power switch on the left side of the instrument

- ▶ With beeping sound, right before setting value is displayed
- ▶ The default values are Max.rpm 10 min, ACC 7, DEC 7 and 25 °C




[Automatic Rotor Recognition] System

When the rotor is installed and the lid is closed, it moves to the main screen after the rotor scan process (Display screen: ROTOR SCAN...). When the lid is opened, it moves to the main screen without the rotor scan process. After entering the operation setting value and touching the [Start] button, the operation starts after the rotor scan process.

If the rotor is not installed, the "Error 9" will be appeared. This message will be cleared after rotor installing and running.



4.1.2. 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 opened, the lid LED turns on.
- ▷ When the lid is closed, the lid LED turns off.



- √ 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.
- √ To maintain the temperature of the sample, the lid does not open automatically after the operation is over.
- √ Power failure : If the lid does not open due to a power failure during operation, it can be opened manually. Please refer to '5.10. 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.

[Motorized Lid Closure] system

The lid lock system of this centrifuge is locked with a soft touch, so do not excessively force to close.

4.2. 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.

4.2.1. Swing-Out Rotor

Installation

1. Place the rotor over the motor shaft and let it slide down slowly.
2. Insert the Rotor Locking Tool into the center hole of the rotor.
3. To install the rotor, hold the rotor well with one hand and rotate the Rotor Locking Tool clockwise until tightly clamped.
4. Make sure that the rotor is properly installed by lifting it slightly. If the rotor can be pulled up, then it must be re-clamped to the motor shaft.
5. Make sure that a full complement of buckets is installed before operating the rotor.
6. Check that the rotor and buckets spin freely by turning it manually. If not, please apply the Lubricant (grease) at the bolts of swing out rotors.



Remove

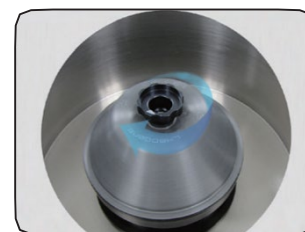
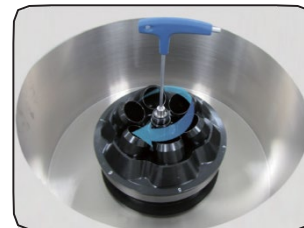
1. Remove samples, adapters or buckets.
2. Insert the Rotor Locking Tool into the center hole of the rotor.
3. To remove the rotor, hold the rotor well with one hand and rotate the Rotor Locking Tool counterclockwise.
4. Grasp the rotor with both hands.
5. Pull the rotor directly upwards and away from the motor shaft with both hands.

Make sure do not tilt the rotor while lifting it.

4.2.2. Fixed Angle Rotor

Installation

1. Place the rotor over the motor shaft and let it slide down slowly.
2. Insert the Rotor Locking Tool into the center hole of the rotor.
3. To install the rotor, hold the rotor well with one hand and rotate the Rotor Locking Tool clockwise until tightly clamped.
4. Make sure that the rotor is properly installed by lifting it slightly. If the rotor can be pulled up, then it must be re-clamped to the motor shaft.
5. Put the rotor lid on the rotor. Make sure the rotor lid is put centered on the rotor.
6. Turn the rotor lid knob clockwise to close the lid.



Remove

1. Remove samples, adapters.
2. Turn the rotor lid knob counterclockwise.
3. Insert the Rotor Locking Tool into the center hole of the rotor.
4. To remove the rotor, hold the rotor well with one hand and rotate the Rotor Locking Tool counterclockwise.
5. Grasp the rotor with both hands.
6. 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]

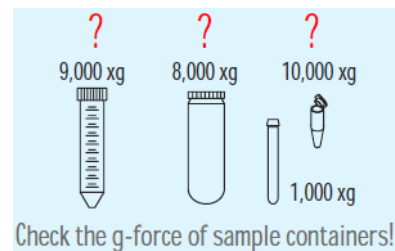
If you operate a fixed angle rotor, make sure that the rotor lid is properly locked. If not, it may occur very loud noise and serious damage.

4.3. Sample Tube Loading

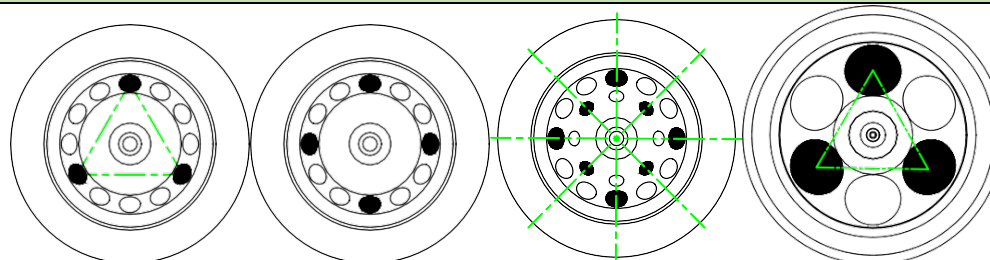
1. Before loading sample tubes, check the water drop or any dirt in the rotor hole or adaptor, bucket.
 - ▷ If there is any foreign matter or moisture, remove it with soft dry cloth.
2. Load the compartments evenly. Balance opposite loads.
 - ▷ Tubes should be placed in the rotor with same amount of 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.
 - ▷ When using swing out rotors, weigh the bucket content (adaptor and tube). Make sure do not exceed the maximum compartment load nor the weight difference limit for adjacent buckets if there is one for the rotor.

Make sure that the tubes and bottles used in the centrifuge are

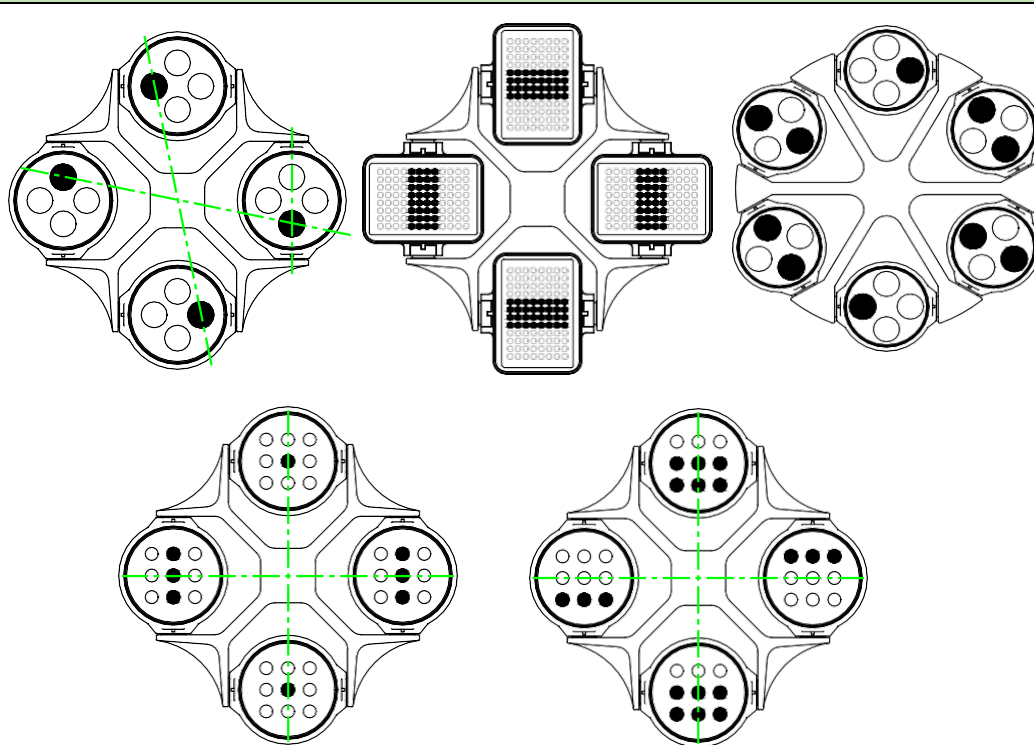
- ✓ fit in the rotor and the tubes or bottles do not touch the rotor lid or bucket caps.
- ✓ rated to or above the selected RCF to be spun at
- ✓ used at their minimum fill volume and not above their maximum fill volume
- ✓ undamaged and not used above their design life (age or number of runs)



Correct loading examples for fixed angle rotors

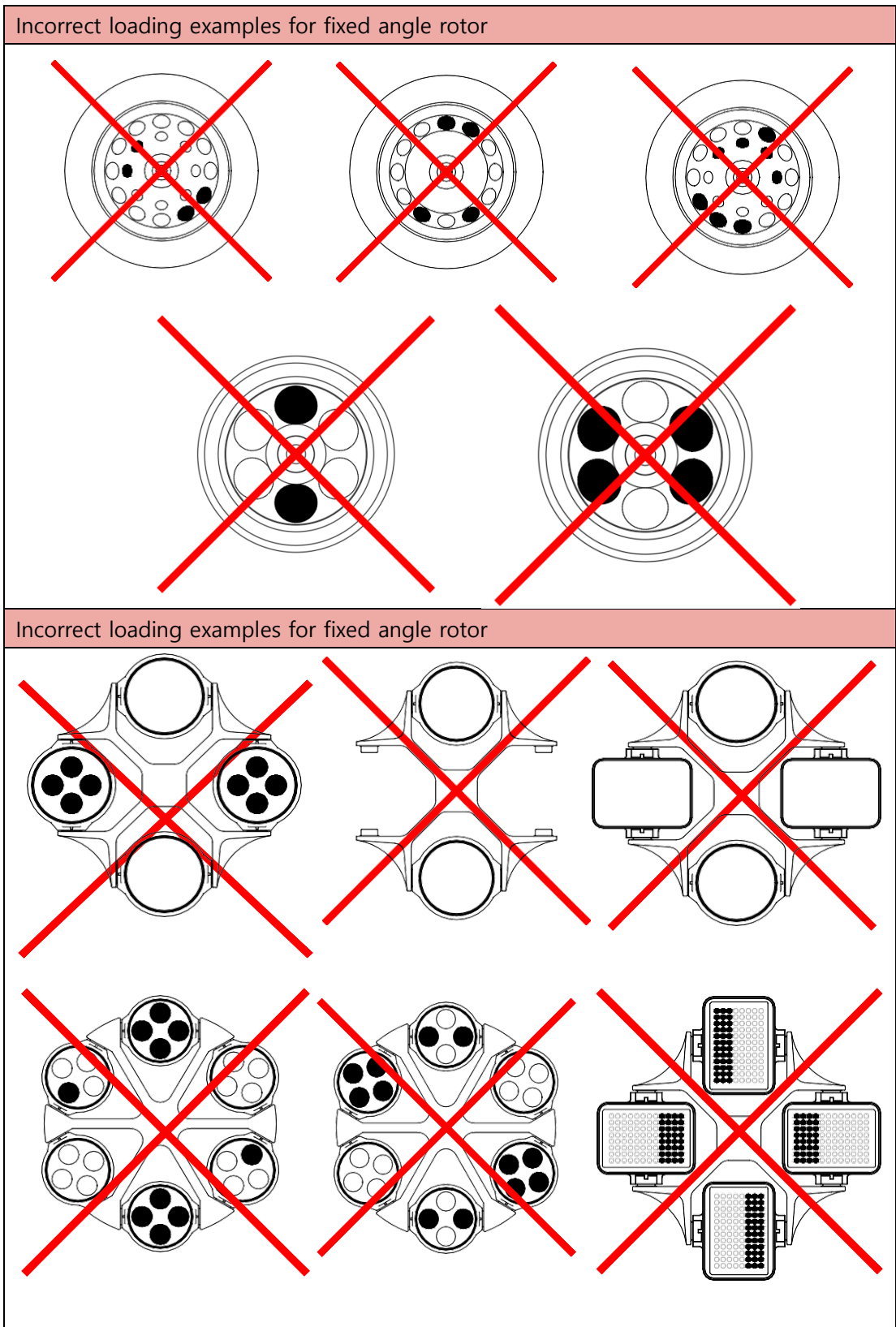


Correct loading examples for swing out rotors

**Caution!**

Incorrect loading can lead to damage. Always load the sample tubes symmetrically to avoid imbalance, noisy spinning and possible damage. A full complement of buckets needs to be installed before operating swing out rotor.

->For safety, the "Imbalance Cut Off" function will be occurred, if there is imbalance of loading tubes (Error 8, Imbalance error). Please refer to 7. Trouble Shooting.



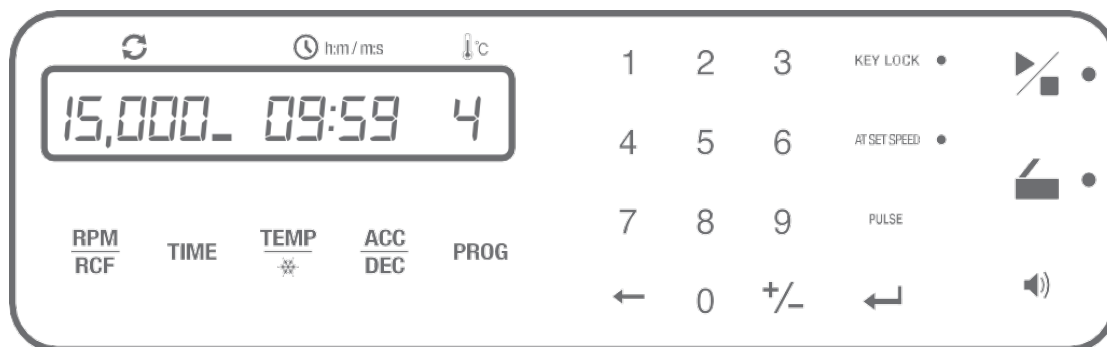
4.4. Drain Hole

This centrifuge is equipped with a drain hole which allows water or condensate to be discharged from inside the chamber. Before the centrifuge starts, check if the drain hole on the left side of the instrument is completely tightened. If not, refrigeration efficiency could be getting lowered.



5. Operation

5.1 Key functions of control panel



- RPM/RCF For automatic conversion of RPM/RCF and to set the speed
- TIME Use to set time, available range up to 99hrs 59min (00:00 or continuous)
- TEMP Use to set temperature (-20°C ~ 40°C)

Use to reach rapid refrigeration up to the setting temperature
(Touch for more than 2 seconds)
- ACC/DEC Use to set the acceleration & deceleration level from 1 to 9 steps

'0' in deceleration step means natural deceleration. Larger number
means faster acceleration or deceleration
- PROG Use to save a set of setting values or recall the saved program number
- KEY LOCK Use for key lock mode

- AT SET SPEED Use to count the run time once the actual run speed reaches to the set speed value
- PULSE Use for quick runs
- Enter Use for completion of data setting
- Start/Stop Use to start and stop operation
- Lid Use to open instrument lid
- Sound Use to set the number of sound and volume

5.2 Setting the RPM/RCF value

▶ Speed setting unit : 1 rpm / 1 xg

1. Touch 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. Touch the number buttons to change input value
 - ▷ If you do not touch the number for 15 seconds, the setting mode is cleared.
3. Touch the [ENTER] button to complete the setting.
 - ▷ Touch [ENTER] to save the setting value.
 - ▷ If wrong number is entered, touch [←] button and change the value again.

5.3 Setting the time value

The time can be set in "hours" and "minutes", and a maximum of 99:59 or continuous operation (set at 00 minutes and 00 seconds) is possible. It also supports AT SET SPEED time mode (counting time after reaching the set speed) for accurate time management.

5.3.1 Setting the AT SET SPEED mode

1. Touch the [AT SET SPEED] button once.

▷ AT SET SPEED mode → LED on (Time counting after reaching at the set speed)

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

5.3.2 Setting the 'MIN / HOUR' value

- ▶ Time setting unit : 1hr / 1min
- ▶ Time is down-counted after starting centrifugation.

1. Touch the [TIME] button once.

▷ 'MIN' value on LED is flickering.

2. Touch the number buttons to change the minute value.

- ▷ If you do not touch the number button for 15 seconds, the setting mode is cleared.
- ▷ If wrong number is entered, touch [←] button and change the value again.
- 3. Touch the [ENTER] button to pass the 'HOUR' value setting.
- 4. Touch the number buttons to change the hour value.
 - ▷ If you do not touch the number button for 15 seconds, the setting mode is cleared.
 - ▷ If wrong number is entered, touch [←] button and change the value again.
- 5. Touch the [ENTER] button to complete the setting.

5.4 Setting temperature and FASTCOOL

The temperature can be set from -20°C to +40°C.

In addition, for temperature-sensitive samples, a Fast Cool function is supported to quickly reach below room temperature.

5.4.1 Setting temperature

- ▶ Temperature can be set from -20 °C to 40 °C
- ▶ Temperature setting unit : 1 °C



1. Touch the [TEMP] button. Default or latest temperature value blinks on the display window.
2. Touch the number buttons to change the temperature.
3. Touch the [ENTER] button to complete setting.

√ If you want to keep the temperature below zero or above room temperature, please contact the service center as prerequisites are required.

5.4.2. Fast cool

1. Setting the temperature. (Please refer to 5.4.1 Setting temperature)
2. After installation of the rotor and closing the lid, press the [TEMP] button for more than 2 seconds.
 - ▷ For fast cooling, the instrument is refrigerated down to the set temperature in a short time. During the fast cooling, the rotor runs at low speed. (1,000rpm)
 - ▷ The elapsed time is displayed on the display window.

- ✓ If you'd like to load your sample tubes before pressing the [Fast cool] button, please check if the sample is safe during spinning at 1,000rpm.
- ✓ Before starting fast cooling, please check the rotor coupling and symmetry of sample tubes.

5.5 Acceleration / Deceleration

The centrifuge offers a total of 9 acceleration lamps (numbered 1 through 9) and total of 10 deceleration lamps or braking curves (numbered 0 through 9) for centrifuging samples with a selected speed.

1. Touch [ACC/DEC] button.
2. Touch the number buttons to change input ACC value.
 - ▷ Input the desired level of ACC from 1 to 9.
 - (Level 9 : The fastest acceleration)
 - ▷ If you do not touch the number button for 15 seconds, the setting mode is cleared.
 - ▷ If wrong number is entered, touch [←] button and change the value again.
3. To set the ACC level, touch the [ENTER] button.
4. Touch the number buttons to change DEC value.
 - ▷ Input the desired level of DEC from 0 to 9.

(Level 0 : Natural deceleration / Level 9 : The fastest acceleration)

- ▷ If you do not touch the number button for 15 seconds, the setting mode is cleared.
 - ▷ If wrong number is entered, touch [←] button and change the value again.
5. To set the DEC level, touch the [ENTER] button.

5.6 Program Saving & Recalling

5.6.1. Program saving

1. Set the parameters for time, temperature, speed. (Refer to 5.2 ~5.5)
2. Touch the [PROG] button twice.
 - ▷ 'SAVE' is turned on the display window.
3. Set the program number you want using the number buttons.
 - ▷ If you do not touch the number button for 15 seconds, the setting mode is cleared.
 - ▷ Save up to 100 programs. (Program numbers from 00 to 99)
 - ▷ If wrong number is entered, touch [←] button and change the value again.
4. Touch the [ENTER] button to complete the saving.

5.6.2. Program recalling

1. To recall the saved program, touch the [PROG] button once.
 - ▷ 'CALL' is turned on the display window.
2. Set the program number you want to recall using the number button, and then touch the [ENTER] button.
 - ▷ If you do not touch the number button for 15 seconds, the setting mode is cleared.
 - ▷ If wrong number is entered, touch [←] button and change the value again.

5.7 Start / Stop

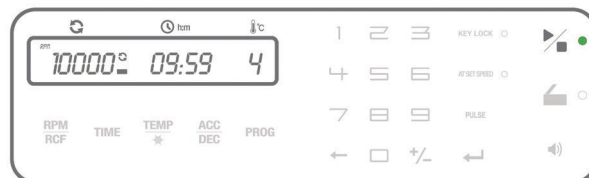
5.7.1. Start

1. After setting RPM / RCF, Time and Temp, touch [START / STOP] button.

▷ During operation, a 'start LED' is turned on.

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

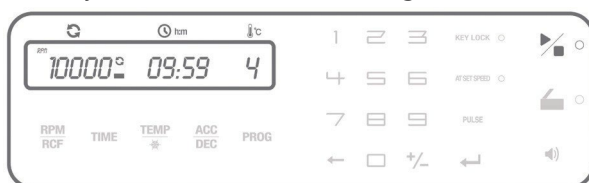
▷ If you touch the [ENTER] button during operation, you can check the setting parameters for the run.



5.7.2 Stop

1. Touch the [START/STOP] button to stop manually during operation.

▷ If you touch the [START/STOP] button twice, the operation will stop with DEC 9



5.8 Change settings during operation.

It supports speed/time/temperature/ACC/DEC setting value change function during operation.

1. If you want to change the setting value during operation, press the mode button

you want to change and input the setting value to be changed.

▶ Speed / time / temperature / ACC / DEC setting values can be changed during operation.

▶ The changed time input value does not reflect the initial time setting value.

5.9 Key Lock function

Key lock function to prevent set value changes during operation

1. Touch [KEY LOCK] button during operation.

▶ Key lock mode is set. Only the [KEY LOCK] button is activated.



2. Touch [KEY LOCL] button, when the key lock mode is set.

▶ Key lock mode is released with "unLOCK" on the display.

5.10 Repeat count and sound pitch of end alarm

You can adjust the repeat count and sound pitch of end alarm.

5.10.1 Setting the sound pitch of End alarm

1. Touch [SOUND] button.

▷ 'Sound LEVEL_03' appears on the display window.

2. Touch the number buttons to change the value for the pitch of sound

3. Save the value by touching [ENTER] button

▷ Sound level : 0 ~10 (0 : silent)



5.10.2 Setting the Repeat Count of End Alarm

1. Press the [AT SET SPEED] button for more than 2 seconds.

▷ 'Sound rPt' appears on the display window.



2. Touch the number buttons to change the value for the repeat count.

3. Save the value by touching [ENTER] button.

▷ The number of finishing sound : 0 ~ 99 (0 : silent, 99 : 99times)

5.11 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 desired RPM and decelerates immediately when pulse key is released.

5.12 Manual lid-lock release

For manual lid-lock release, you can use the Manual lid open tool when the instrument is completely stopped. The lid can be unlocked manually with the Manual lid open tool through the Manual lid open hole.

1. Find the Manual open hole in the front body of the instrument and take out the white rubber closure.
2. Insert the Manual lid open tool into the hole and turn it counterclockwise 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.

5.13 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 at the bottom of the drain cap located on the right side of the main body.



2. If you open the drain cap by turning it counterclockwise, water or condensate in the chamber is flowing out.



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



4. Turn the drain cap clockwise to tighten the drain after draining the chamber.



- ▶ Close the drain cap until it is fully connected to the drain hole entrance.
- ▶ Be sure to check that the seal-ring is installed in the drain cap.

[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.

6. Maintenance

6.1 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.

6.2 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.
3. After refrigeration, turn the drain knob to remove moisture from the inside of the chamber (Refer to 5.11 Open drain hole)

6.3 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.

6.4 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.

6.5 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.

7. Trouble shooting

7.1 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 4-1. 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 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 <ol style="list-style-type: none"> 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
Rotor stuck	Apply the Lubricant to motor shaft. And after few minutes, try to remove the rotor again. If not work, do not try too hard. Contact the service center.
Decelerates too slowly	Check if the deceleration step is 0. If yes, change the step. The higher the number, the faster the deceleration. (Refer to 5.5 Acceleration /Deceleration)
Can't set the RPM value	Check the rotor's maximum value. Can be checked on the rotor(Swing-out rotor) or rotor lid(Fixed Angle rotor).

7.2 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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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. Check the lid LED on the display window. - If the error code persist, please contact the technical support team .
Error 3	Motor overheating	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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. - Use AVR to provide proper power.
Error 5	High voltage	<ul style="list-style-type: none"> - 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). - Use AVR to provide proper power
Error 6	Over speed	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Turn off the power and turn it on to check the operation

		<p>status.</p> <ul style="list-style-type: none"> - If the problem persists, contact the service center.
Error 8	Imbalance error	<ul style="list-style-type: none"> - Check the installation status of instrument and rotor/bucket. - Check weight-balances of samples (Please refer to. 4.3. Sample Tube Loading) and then turn off and on the instrument for checking. - For swing rotor, apply the lubricant to the area where the bucket is installed. - If the error code persist, please contact the technical support team .
Error 9	Rotor ID /RPM sensor error	<ul style="list-style-type: none"> - If the rotor recognition is failed, this message is appeared. - Check if the lid is closed. (Check the lid LED status, it should be off) - Check the rotor installation status. - Detach the rotor and clean the bottom of rotor and chamber. Then, install the rotor again and check if the problem still persists. - If the error code persist, please contact the technical support team .
Error 11	Chamber Temp. Error	<ul style="list-style-type: none"> - If the temperature is not reached to setting degree within an hour, this message is appeared. - Turn power off and turn on again. - If the error code persist, please contact the technical support team .
Error 12	Temp. Sensor Error	<ul style="list-style-type: none"> - If there is any problem with temperature sensor, this message is appeared. - Turn power off, and clean the temperature sensor in the chamber. - If the error code persist, please contact the technical support team .
Error 15	Motor Temp. Sensor Error	<ul style="list-style-type: none"> - If there is any problem with motor temperature sensor, this message is appeared. - Turn power off, and clean the temperature sensor in the chamber. - If the error code persist, please contact the technical support team .
Error 16	Compressor Temp. sensor Error	<ul style="list-style-type: none"> - Check the surrounding environment where the centrifuge is installed. -> Whether the centrifuge is installed in direct sunlight.

		<ul style="list-style-type: none"> -> Is there sufficient space around the centrifuge? (at least 30cm) -> Are there any devices that generate heat? -> check if there is any dust in the vent. If yes, remove it. - If the error code persist, please contact the technical support team.
Error 17	Communications Error	<ul style="list-style-type: none"> - If there is any communication error between the main board and the IO board, this message is appeared. - Turn the power off and on again to check that the error still persists. - If the error code persist, please contact the technical support team.
Error 20-27	Lid Lock Error	<ul style="list-style-type: none"> - If the sensors or cables of the lid lock system do not normally work, this message is appeared. - Turn off the centrifuge and insert T-wrench to the Manual open hole. Turn the T-wrench counterclockwise. (Please refer to 5.12 Manual lid lock release) - If the error code persist, please contact the technical support team.

8. 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.



9. Rotors and Accessories

Fixed Angle Rotor, GRF-G-250-6

- Capacity : 6 x 250 mL + 6 x 15 mL
- Max. RPM / RCF : 8,000 (9,588; 9,395)
- Hole angle from axis during rotation : $\angle 25^\circ$
- Hole dimension (\varnothing x L, mm) : 62 x 100 (250 mL) / 17.1 x 94 (15 mL)
- Hole bottom type : Flat (250 mL) / Round (15 mL)
- Max. height for tube fit (mm) : 130 (250 mL) / 120 (15 mL)
- Supplied with a lid


















* Only for 1580R

Tube		
Tube capacity (mL)	15	250
Tube Dimension (\varnothing x L, mm)	16 x 120	61.5 x 128
Max. radius (mm)	131.3	134
Max. RCF (g-force)	9,395	9,588

Fixed Angle Rotor, GRF-G-85-6

- Capacity : 6 x 85 mL
- Max. RPM / RCF (1580R) : 12,000 / 17,709
- Max. RPM / RCF (1248 / 1248R / 1580) : 10,000 / 12,298
- Hole angle from axis during rotation : $\angle 34^\circ$
- Hole dimension (\varnothing x L, mm) : 38.5 x 100
- Hole bottom type : Round | Max. height for tube fit (mm) : 122
- Supplied with a lid










Tube								
Tube capacity (mL)	15	15 mL conical	25 mL conical	25 mL conical	30	50	50 mL conical	85 mL
Tube Dimension (\varnothing x L, mm)	16 x 120	17 x 120	28.8x83	28.8x78.5	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)	-
Adaptor hole dimension (\varnothing x L, mm)	17 x 94	17 x 98	29.5 x 62.5	29.5 x 62.5	26 x 85.4	29 x 95	29.5 x 98	-
Adaptor hole bottom type	Round	Conical	Conical	Conical	Round	Round	Conical	-
Max. radius (mm)	103	101	87	87	102.5	104	102	110
Max. RPM (1580R)	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Max. RCF (g-force)	16,582	16,260	14,006	14,006	16,502	16,743	16,421	17,709
Max. RPM (1248 / 1248R / 1580)	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Max. RCF (g-force)	11,515	11,292	9,727	9,727	11,460	11,627	11,404	12,298

Fixed Angle Rotor, GRF-G-50-8

- Capacity: 8 x 50 mL | Max. RPM / RCF (1580R): 15,000 / 25,910
- Max. RPM / RCF (1248 / 1248R / 1580): 12,000 / 16,582
- Hole angle from axis during rotation: $\angle 30^\circ$
- Hole dimension ($\varnothing \times L$, mm): 29.5 x 93.2
- Hole bottom type: Round | Max. height for tube fit (mm): 120
- Supplied with a lid and O-ring inserted














				
Tube				
Tube capacity (mL)	15	15 mL conical	30	50
Tube Dimension ($\varnothing \times L$, mm)	16 x 120	17 x 120	25.7 x 101.4	29 x 108
Adapter				None
Cat No.	GAS-15(50)	GAS-c15(50)	GAS-30(50)	-
Adaptor hole dimension ($\varnothing \times L$, mm)	17 x 94	17 x 105	26 x 83.8	-
Adaptor hole bottom type	Round	Conical	Round	-
Max. radius (mm)	93.5	96	96.4	103
Max. RPM (1580R)	15,000	15,000	15,000	15,000
Max. RCF (g-force)	23,520	24,149	24,249	25,910
Max. RPM (1248 / 1248R / 1580)	12,000	12,000	12,000	12,000
Max. RCF (g-force)	15,053	15,455	15,520	16,582

Fixed Angle Rotor, GRF-G-c50-8

- Capacity: 8 x 50 mL Conical | Max. RPM / RCF (1580R): 13,000 / 20,784
- Max. RPM / RCF (1248 / 1248R / 1580): 10,000 / 12,298
- Hole angle from axis during rotation: $\angle 25^\circ$
- Hole dimension ($\varnothing \times L$, 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)	15 mL conical	25 mL conical	25 mL conical	30	50	50 mL conical
Tube Dimension ($\varnothing \times L$, 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)	-
Adaptor hole dimension ($\varnothing \times L$, mm)	17 x 105	27.1 x 14.1	27.1 x 14.1	26 x 83.8	27.9 x 11	-
Adaptor hole bottom type	Conical	Conical	Conical	Round	Round	-
Max. radius (mm)	105.2	94.1	94.1	106.4	107.3	110
Max. RPM (1580R)	13,000	13,000	13,000	13,000	13,000	13,000
Max. RCF (g-force)	19,877	17,779	17,779	20,103	20,273	20,784
Max. RPM (1248 / 1248R / 1580)	10,000	10,000	10,000	10,000	10,000	10,000
Max. RCF (g-force)	11,761	10,520	10,520	11,896	11,996	12,298

Fixed Angle Rotor, GRF-G-c15-12

- Capacity: 12 x 15 mL Conical
- Max. RPM / RCF (1580R): 15,000 / 25,910
- Max. RPM / RCF (1248 / 1248R / 1580): 12,000 / 16,582
- 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)	5 mL conical	5 mL conical	15 mL conical
Tube Dimension ($\varnothing \times L$, mm)	16 x 59	16 x 67	17 x 120
Adapter			None
Cat No.	GAS-c5(c15)	GAS-c5(c15)	-
Adaptor hole dimension ($\varnothing \times L$, mm)	14.8 x 20	14.8 x 20	-
Adaptor hole bottom type	Conical	Conical	-
Max. radius (mm)	75.8	75.8	103
Max. RPM (1580R)	15,000	15,000	15,000
Max. RCF (g-force)	19,067	19,067	25,910
Max. RPM (1248 / 1248R / 1580)	12,000	12,000	12,000
Max. RCF (g-force)	12,203	12,203	16,582

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

- Capacity: 30 x 1.5/2.0 mL
- Max. RPM / RCF (1580, 1580R): 15,000 / 24,249
- Max. RPM / RCF (1248, 1248R): 12,000 / 15,520
- Hole angle from axis during rotation: $\angle 45^\circ$
- Hole dimension ($\varnothing \times L$, mm): 11.1 x 39
- Hole bottom type: Round
- Max. height for tube fit (mm): 52
- Supplied with a lid and two V-rings inserted



				
Tube				
Tube capacity (mL)	0.2	0.5	1.5/2.0	2.0 mL screw cap
Tube Dimension ($\varnothing \times L$, 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 ($\varnothing \times L$, mm)	6.5 x 23	8 x 31	-	-
Adaptor hole bottom type	Open	Open	-	-
Max. radius (mm)	79	86	96.4	96.4
Max. RPM (1580R / 1580)	15,000	15,000	15,000	15,000
Max. RCF (g-force)	19,872	21,633	24,249	24,249
Max. RPM (1248 / 1248R)	12,000	12,000	12,000	12,000
Max. RCF (g-force)	12,718	13,835	15,520	15,520














Angle Rotor, GRA-G-15-24

- Capacity : 24 x 15 mL
- Max. RPM / RCF : 4,000 / 3,134
- Hole angle rotation : $\angle 45^\circ$
- Hole dimension ($\varnothing \times L$, mm) : 20.4 x 14
- Supplied with 24 sleeves



15 mL Sleeve
GLB-15/10A

Hole dimension ($\varnothing \times L$, mm) : 18 x 87
 Max. height for tube fit (mm) : 125 (120 for conical / wider cap)
 Hole bottom type : Flat bottom with rubber pad
 Supplied with 3.0 mm thick NBR pad

Tube								
Tube capacity (mL)	2.0 ~ 4 mL VT	4 ~ 7 mL VT	5 mL conical	5 mL conical	14 mL	8 ~ 10 mL VT	15	15 mL conical
Tube Dimension ($\varnothing \times L$, mm)	13 x 75	13 x 100	16 x 59	16 x 67	15.7 x 96	16 x 100	16 x 120	17 x 120
Adapter						None	None	None
Cat. No.	GAS-3(f15)	GAS-5(f15)	GAS-c5(f15)	GAS-c5(f15)	GAS-10(f15)	-	-	-
Adapter hole dimension ($\varnothing \times L$, mm)	13.5 x 61	13.5 x 85	14 x 20	14 x 20	16.5 x 7	-	-	-
Adapter hole bottom type	Round	Open	Conical	Conical	Round	-	-	-
Max. radius (mm)*	155.2	167.2	139.9	139.9	161.1	175.2	175.2	175.2
Max. RCF (g-force)*	2,776	2,990	2,503	2,503	2,882	3,134	3,134	3,134

Swing Rotor, GRS-G-r750-4

- 4 loadings
- Max. RPM : 3,600
- Angle from axis during rotation : $\angle 90^\circ$
- Supplied with a lubricant



* Only for 1580 / 1580R

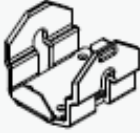


750 mL Rectangular Bucket
GLB-r750-r750

Max. RPM / RCF : 3,600 / 2,898
Max. Radius (mm) : 175.2
Hole dimension (w x d x h, mm) : 99 x 99 x 98
Max. height for tube fit (mm) : 165
Hole bottom type : Flat



Tube									
Tube capacity (mL)	2.0 ~ 4 mL VT	4 ~ 7 mL VT	14 mL	8 ~ 10 mL VT	15	5 mL conical	5 mL conical	15 mL conical	50
Tube Dimension (Φ x L, mm)	13 x 75	13 x 100	15.7 x 96	16 x 100	16 x 120	16 x 59	16 x 67	17 x 120	29 x 108
Adapter									
Cat. No.	GAM-5-30(r750)	GAM-5-30(r750)	GAM-15-20(r750)	GAM-15-20(r750)	GAM-15-20(r750)	GAM-c15-16(r750)	GAM-c15-16(r750)	GAM-c15-16(r750)	GAM-50-8(r750)
Rack capacity (ea / 4)	30 / 120	30 / 120	8 / 32	20 / 80	20 / 80	16 / 64	16 / 64	16 / 64	8 / 32
Rack hole dimension (Φ x L, mm)	13 x 56.5	13 x 85	17.2 x 57	17.2 x 85	17.2 x 85	17.5 x 32	17.5 x 32	17.5 x 85	29.5 x 85
Rack hole bottom type	Round	Round	Round	Round	Round	Conical	Conical	Conical	Round
Max. height tube fit (mm)	136	136	136	136	136	139	139	139	136
Max. radius (mm)*	197	197	197	197	197	200	200	200	197
Max. RCF (g-force)*	2,894	2,894	2,894	2,894	2,894	2,898	2,898	2,898	2,854

Tube								
Tube capacity (mL)	25 mL conical	25 mL conical	50 mL conical	50 mL conical (skirted)	250 mL	250 mL conical	500 mL conical	500
Tube Dimension (Φ x L, mm)	28.5 x 83	28.5 x 78.5	29.5 x 118	29.5 x 118	29.5 x 118	60 x 163	96.2 x 147	73.5 x 142
Adapter								
Cat. No.	GAM-c50-5(r750)	GAM-c50-5(r750)	GAM-c50-5(r750)	GAM-c50-5(r750) <small>with GRS-adapter</small>	GAS-250(r750)	GAS-c250(r750)	GAS-c500(r750)	GAS-500(r750)
Rack capacity (ea / 4)	5 / 20	5 / 20	5 / 20	5 / 20	1 / 4	1 / 4	1 / 4	1 / 4
Rack hole dimension (Φ x L, mm)	29.5 x 58.5	29.5 x 58.5	29.5 x 85	29.5 x 67.5	62.5 x 87	61 x 93	98 x 94	74.1 x 92.5
Rack hole bottom type	Conical	Conical	Conical	Flat	Flat	Conical	Conical	Flat
Max. height tube fit (mm)	139	139	139	147.5	147	165	165	155
Max. radius (mm)*	200	200	200	151.6	197	200	200	196.5
Max. RCF (g-force)*	2,898	2,898	2,898	2,712	2,854	2,898	2,898	2,847



Microplate Holder Bucket
GLP-mw-r750

Max. RPM / RCF : 3,600 / 2,485
 Max. Radius (mm) : 171.5
 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

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)	4 / 16	1 / 4

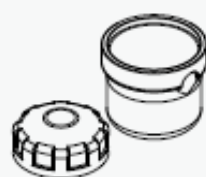
Swing Rotor, GRS-G-750-4

- 4 loadings
- Max. RPM: 4,000
- Angle from axis during rotation: $\angle 90^\circ$
- Supplied with a lubricant


Bio-Safe

Manufacturer Validated

* Only for 1580 / 1580R

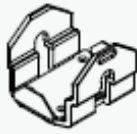


750 mL Round Bucket
GLB-750-750 /
GLBB-b750-750 (with a cap)

Max. RPM / RCF: 4,000 / 3,667
Max. Radius (mm): 205
Hole dimension ($\varnothing \times L$, mm): 99 x 107
Max. height for tube fit (mm): 140 (w / cap), 165 (w / o cap)
Hole bottom type: Flat
Supplied with a cap and O-ring. No cap version is available



Tube									
Tube capacity (mL)	2.0 ~ 4 mL VT	4 ~ 7 mL VT	8 ~ 10 mL VT	14 mL	15	5 mL conical	5 mL conical	15 mL conical	50
Tube Dimension ($\varnothing \times L$, mm)	13 x 75	13 x 100	16 x 100	15.7 x 96	16 x 120	16 x 59	16 x 67	17 x 120	29 x 108
Adapter									
Cat. No.	GAM-5-24(750)	GAM-5-24(750)	GAM-10-21(750)	GAM-15-19(750)	GAM-15-19(750)	GAM-c15-14(750)	GAM-c15-14(750)	GAM-c15-14(750)	GAM-50-7(750)
Rack capacity (ea / 4)	24 / 96	24 / 96	21 / 84	7 / 28	19 / 76	10 / 40	10 / 40	14 / 56	7 / 28
Rack hole dimension ($\varnothing \times L$, mm)	13.2 x 58	13.2 x 85	16 x 85	17.2 x 59	17.2 x 85	17 x 37	17 x 37	17 x 85	29.2 x 87
Rack hole bottom type	Round	Round	Round	Round	Round	Conical	Conical	Conical	Round
Max. height tube fit (mm)	136	136	136	136	136	140	140	140	136
Max. radius (mm)*	201	201	201	201	201	205	205	205	201
Max. RCF (g-force)*	3,595	3,595	3,595	3,595	3,595	3,667	3,667	3,667	3,595

Tube							
Tube capacity (mL)	50 mL conical	50 mL conical (skirted)	250	250 mL conical	500 mL conical	500	750
Tube Dimension ($\varnothing \times L$, mm)	29.5 x 118	29.5 x 118	61.5 x 128	60 x 163	96.2 x 147	73.5 x 142	97 x 152
Adapter							None
Cat. No.	GAM-c50-5(750)	GAM-c50-5(750)	GAS-250(750)	GAS-c250(750)	GAS-c500(750)	GAS-500(750)	-
Rack capacity (ea / 4)	5 / 20	5 / 20	1 / 4	1 / 4	1 / 4	1 / 4	1 / 4
Rack hole dimension ($\varnothing \times L$, mm)	29.2 x 88	29.2 x 70	62.3 x 87	60.5 x 125	95.6 x 58	75.5 x 98.7	-
Rack hole bottom type	Conical	Flat	Flat	Conical	Conical	Flat	-
Max. height tube fit (mm)	140	122	136	165	165	155	165
Max. radius (mm)*	205	190.7	201	205	205	201.5	205
Max. RCF (g-force)*	3,667	3,411	3,595	3,667	3,667	3,604	3,667



Microplate Holder Bucket
GLP-mw-r750

Max. RPM / RCF : 4,000 / 3,068
 Max. Radius (mm) : 171.5
 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

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)	4 / 16	1 / 4

Swing Rotor, GRS-G-r250-4

- 4 loadings
- Max. RPM: 4,000
- Angle from axis during rotation: $\angle 90^\circ$
- Supplied with a lubricant



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	15	15 mL conical	50
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-15-12(r250)	GAM-c15-9(r250)	GAM-50-4(r250)
Rack capacity (ea / 4)	20 / 80	12 / 48	12 / 48	12 / 48	12 / 48	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	17.5 x 90	17.5 x 90	30.2 x 90
Rack hole bottom type	Round	Round	Round	Round	Round	Round	Conical	Round
Max. height tube fit (mm)	115	120	120	120	120	120	120	120
Max. radius (mm)*	170	173.2	173.2	173.2	173.2	173.2	175.2	173.2
Max. RCF (g-force)*	3,041	3,095	3,095	3,095	3,095	3,095	3,134	3,095

Tube							
Tube capacity (mL)	25 mL conical	25 mL conical	50 mL conical	50 mL conical (slanted)	15	85	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-c50-3(r250)	GAM-8c50(r250)	GAM-85-2(r250)	GAS-250(r250)	
Rack capacity (ea / 4)	3 / 12	3 / 12	3 / 12	4 / 16	2 / 8	1 / 4	
Rack hole dimension (Φ x L, mm)	30.5 x 60	30.5 x 60	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	Conical	Flat	Round	Flat	
Max. height tube fit (mm)	120	120	120	126	120	130	
Max. radius (mm)*	175.2	175.2	175.2	172	172.5	173	
Max. RCF (g-force)*	3,134	3,134	3,134	3,077	3,086	3,095	



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

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)	4 / 16	1 / 4



Swing Rotor, GRS-G-250-4

- 4 loadings
- Max. RPM : 5,000
- Angle from axis during rotation : $\leq 90^\circ$
- Supplied with a lubricant



250 mL Round Bucket
GLB-250-250

Max. RPM / RCF : 5,000 / 5,394
 Max. Radius (mm) : 193
 Hole dimension (Ø x L, mm) : 62 x 109
 Max. height for tube fit (mm) : 153
 Hole bottom type : Flat

Tube									
Tube capacity (mL)	1.5 ~ 2.0	2.0 mL screw cap	5 mL conical	5 mL conical	4 ~ 7 mL VT	8 ~ 10 mL VT	15	15 mL conical	25 mL conical
Tube Dimension (Φ x L, 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-m2.0-9(250)	GAM-c5-4(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	9 / 36	4 / 16	4 / 16	8 / 32	7 / 28	4 / 16	4 / 16	1 / 4
Rack hole dimension (Φ x L, mm)	11 x 39	11 x 39	17.2 x 52	17.2 x 52	13.5 x 60	16 x 80	17.5 x 103.5	17.2 x 106.5	29.5 x 61.5
Rack hole bottom type	Round	Round	Conical	Conical	Round	Round	Round	Conical	Conical
Max. height tube fit (mm)	150	150	153	153	150	150	150	153	153
Max. radius (mm)*	190	190	193	193	190	190	190	193	193
Max. RCF (g-force)*	5,311	5,311	5,394	5,394	5,311	5,311	5,311	5,394	5,394
Tube									
Tube capacity (mL)	25 mL conical	30	50	50 mL conical	50 mL conical (skirted)	85	100	250 mL conical	250
Tube Dimension (Φ x L, mm)	28.5 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
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-c250(250)	-
Rack capacity (ea / 4)	1 / 4	3 / 12	2 / 8	1 / 4	1 / 4	1 / 4	1 / 4	1 / 4	1 / 4
Rack hole dimension (Φ x L, mm)	29.5 x 61.5	26 x 85	29.5 x 90	29.8 x 98	29.8 x 93	38.5 x 96	44.2 x 93	61.5 x 44.5	-
Rack hole bottom type	Conical	Round	Round	Conical	Flat	Round	Round	Conical	-
Max. height tube fit (mm)	153	148	148	153	148	148	148	153	153
Max. radius (mm)*	193	188	188	193	188	188	188	193	193
Max. RCF (g-force)*	5,394	5,255	5,255	5,394	5,255	5,255	5,255	5,394	5,394

Swing Rotor, GRS-G-100-6

- 6 loadings
- Max. RPM : 4,000
- Angle from axis during rotation: $\angle 90^\circ$
- Supplied with a lubricant



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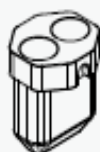


100 mL Bucket with a Cap
GLBB-b100-100

Max. RPM / RCF : 4,000 / 3,105
 Max. Radius (mm) : 173.6
 Hole dimension (Ø x L, mm) : 47 x 99
 Max. height for tube fit (mm) : 120 (w/ cap) / 130 (w/o cap)
 Hole bottom type : Flat
 Supplied with a cap and O-ring. No cap version is available












Tube									
Tube capacity (mL)	1.5 ~ 2.0	2.0 mL screw cap	5 mL conical	5 mL conical	2.6 ~ 7	4 ~ 10	15	15 mL conical	15 mL conical
Tube Dimension (Φ x L, mm)	11 x 38	10.1x46	16 x 59	16 x 67	13 x 75	16 x 100	16 x 120	17 x 120	17 x 120
Adapter									
Cat. No.	GAM-m20-6 (b100)	GAM-m20-6 (b100)	GAM-c5-3 (b100)	GAM-c5-3 (b100)	GAM-7-5 (b100)	GAM-10-5 (b100)	GAM-15-3 (b100)	GAM-c15-3 (b100)	GAS-c15 (b100)
Rack capacity (ea / 6)	6 / 36	6 / 36	3 / 18	3 / 18	5 / 30	5 / 30	3 / 18	3 / 18	1 / 6
Rack hole dimension (Φ x L, mm)	11 x 39	11 x 39	17.2 x 52	17.2 x 52	13.5 x 60	16 x 60	17.5 x 105	17.2 x 106.5	17.2 x 106.5
Rack hole bottom type	Round	Round	Conical	Conical	Flat	Flat	Flat	Conical	Conical
Max. height tube fit (mm)	115	115	75	75	115	115	120	120	120
Max. radius (mm)*	168.6	168.6	110.1	110.1	168.6	168.6	170.6	173.6	173.6
Max. RCF (g-force)*	3,016	3,016	1,969	1,969	3,016	3,016	3,052	3,105	3,105

Tube								
Tube capacity (mL)	25 mL conical	25 mL conical	30	50	50 mL conical	50 mL conical (Skirted)	85	100
Tube Dimension (Φ x L, mm)	28.8 x 83	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
Adapter								
Cat. No.	GAS-c25 (b100)	GAS-c25 (b100)	GAS-30 (b100)	GAS-50 (b100)	GAS-c50 (b100)	GAS-sc50 (b100)	GAS-85 (b100)	GAS-100 (b100)
Rack capacity (ea / 6)	1 / 6	1 / 6	1 / 6	1 / 6	1 / 6	1 / 6	1 / 6	1 / 6
Rack hole dimension (Φ x L, mm)	17.2x52	17.2x52	26x86	29.5 x 95.9	30 x 100	29.8x100	38.5 x 96.4	44.2 x 93
Rack hole bottom type	Conical	Conical	Round	Conical	Conical	Flat	Round	Round
Max. height tube fit (mm)	118	118	118	118	120	120	118	118
Max. radius (mm)*	172.1	172.1	172.1	171.6	171.6	171.6	172.1	168.6
Max. RCF (g-force)*	3,079	3,079	3,079	2,737	2,737	2,737	3,079	3,016



50 mL Conical Bucket
GLB-dc50-100




Max. RPM / RCF : 4,000 / 3,105
 Max. Radius (mm) : 173.6
 Hole dimension (Ø x L, mm) : 30 x 89
 Max. height for tube fit (mm) : 125
 Hole bottom type : Conical

Tube						
Tube capacity (mL)	15 mL conical	25 mL conical	25 mL conical	30	50	50 mL conical
Tube Dimension (Ø x L, 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(50)	GAS-c25(c50)	GAS-c25(c50)	GAS-30(c50)	GAS-50(c50)	-
Bucket capacity (ea / 6)	2/12	2/12	2/12	2/12	2/12	2/12
Adaptor hole dimension (Ø x L, mm)	17 x 105	27.1 x 14.1	27.1 x 14.1	26 x 83.8	27.9 x 11	-
Adaptor hole bottom type	Conical	Conical	Conical	Round	Round	-
Max. radius (mm)	171	137	137	162.4	162.6	173.6
Max. RCF (g-force)	3,059	2,451	2,451	2,905	2,909	3,105

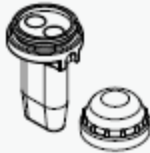


15 mL Dual Round Bucket
with a Cap
GLB-bd15-100

Max. RPM / RCF : 4,000 / 3,032
 Max. Radius (mm) : 169.5
 Hole dimension (Ø x L, mm) : 17 x 87
 Max. height for tube fit (mm) : 115 (w/ cap) / 127 (w/o cap)
 Hole bottom type : Round
 Supplied with a cap and O-ring

Tube			
Tube capacity (mL)	15 mL glass	15 mL open top	15
Tube Dimension (Ø x L, mm)	16 x 100	16 x 114	16 x 120
Bucket capacity (ea / 6)	2 / 12	2 / 12	2 / 12
Max. height tube fit (mm)	115	115	115
Max. radius (mm)	169.5	169.5	169.5
Max. RCF (g-force)	3,032	3,032	3,032

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15 mL Dual Conical Bucket
with a Cap
GLBB-bdc15-100

Max. RPM / RCF : 4,000 / 3,105
 Max. Radius (mm) : 173.6
 Hole dimension (Ø x L, mm) : 17 x 97.5
 Max. height for tube fit (mm) : 120 (w/ cap) / 125 (w/o cap)
 Hole bottom type : Conical
 Supplied with a cap and O-ring. No cap version is available

Tube				
Tube capacity (mL)	5 mL conical	5 mL conical	14 mL	15 mL conical
Tube Dimension (Φ x L, mm)	16 x 59	16 x 67	15.7 x 96	17 x 120
Adapter				None
Cat No.	GAS-c5(c15)	GAS-c5(c15)	GAS-14(c15)	-
Bucket capacity (ea / 6)	2 / 12	2 / 12	2 / 12	2 / 12
Adaptor hole dimension (Φ x L, mm)	14.8 x 20	14.8 x 20	16 x 7.8	-
Adaptor hole bottom type	Conical	Conical	Round	-
Max. radius (mm)	120.5	120.5	156.5	173.6
Max. RCF (g-force)	2,156	2,156	2,799	3,105



Vacutainer 10 mL Bucket
GLB-15-8-100

Max. RPM / RCF : 4,000 / 3,059
 Max. Radius (mm) : 171
 Hole dimension (Ø x L, mm) : 17 x 86
 Hole bottom type : Flat with rubber pad
 Max. height for tube fit (mm) : 115
 Supplied with 3.0 mm thick NBR rubber pad

Tube									
Tube capacity (mL)	2.0~4 mL VT	4~7 mL VT	5 mL conical	5 mL conical	14 mL	8~10 mL VT	15 mL glass	15 mL open top	15
Tube Dimension (Φ x L, mm)	13 x 75	13 x 100	16 x 59	16 x 67	15.7 x 96	16 x 100	16 x 100	16 x 114	16 x 120
Adapter						None	None	None	None
Cat No.	GAS-3(f15)	GAS-5(f15)	GAS-c5(f15)	GAS-c5(f15)	GAS-14(f15)	-	-	-	-
Bucket capacity (ea / 6)	8 / 48	8 / 48	4 / 24	4 / 24	4 / 24	8 / 48	8 / 48	8 / 48	2 / 12
Adaptor hole dimension (Φ x L, mm)	13.5 x 61	13.5 x 85	14 x 20	14 x 20	16.5 x 7	-	-	-	-
Adaptor hole bottom type	Round	Open	Conical	Conical	Round	-	-	-	-
Max. height tube fit (mm)	88	115	75	75	103.5	115	115	115	125(center)
Max. radius (mm)*	144	171	130	130	159.5	171	171	171	171
Max. RCF (g-force)*	2,576	3,059	2,325	2,325	2,853	3,059	3,059	3,059	3,059

10. CE declaration of conformity

GYROZEN®

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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
Model Name

Centrifuge
1580R

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 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
RoHS	2011/65/EU	as last amended	EN IEC 63000:2018

Test Report. Ref.

ACTS-2019-SC-014
E19WD-150
RT22R-S0912

**Authorized Representative &
Person authorized to compile the
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February 25, 2022



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Doc No.: DOC-1580R(Rev.1)

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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.

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Description of Product Model Name	Centrifuge 1248R		
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

Test Report. Ref.

ACTS-2019-SC-168
E19WD-393
RT22R-S0910

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February 25, 2022


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