
Operation Manual

M 13

Micro Centrifuge

Date of purchase _____

Serial No. _____

hanil

Research Use Only

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Contact Us

If you have any questions, contact Hanil Scientific Inc. or place of purchase.

techsupport@ihanil.com / sales@ihanil.com

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1. General Considerations

1.1 Safety

Follow precautions and all the safety requirements described on this user manual to prevent any damages, failure of equipment and injury

1. The centrifuge should be installed on flat surface to maintain level.
Abnormal vibration is caused when the device is installed on an inclined surface.
2. Check the voltage to be used, before connecting the centrifuge to the power source.
3. Only use rotors, parts, and accessories provided by Hanil Scientific Inc. Hanil Scientific Inc. is not responsible for damages of the device and accidents caused by using parts and accessories not recommended.
4. Do not exceed the maximum rated speed of the rotor or buckets or accessories in use.
5. Make sure to prepare necessary safety measures before using samples that are toxic or radioactive samples or pathogenic or samples or infectious blood.
6. If the centrifuge is contaminated by toxic or radioactive samples or infectious blood samples, remove contaminants completely and take needful actions such as ventilation or isolation of centrifuge.
7. Substances that may generate volatile or explosive vapor can not be centrifuged.
8. The balancing work of samples should be done in advance before operation.
9. Before operation, rotor and chamber should be dry.
10. Do not attempt to slow or stop the spinning rotor by hand.
11. Roter must be firmly tightned with a flat head screwdriver.
12. Do not block vents.
13. Do not insert foreign objects into the holes of the device.
14. Repairs must be carried out by a technologist authorized by Hanil scientific Inc.
15. According to IEC61010-2-020 maintain a 30cm“clearance envelope”around the centrifuge while the rotor is spinning.
16. Please contact the place of purchase or Hanil Scientific Inc. (techsupport@ihanil.com/sales@ihanil.com) for product repairs.
17. Turn the power switch off after using the device.
18. Unplug the power plug before cleaning or left unused for a long period of time.

1. General Considerations

1.2 Usage condition

Ambient temperature 5°C ~ 35°C
Maximum relative humidity 30% ~ 85%
Air pressure 500 ~ 1060 hpa

1.3 Safety label



Risk of electric shock



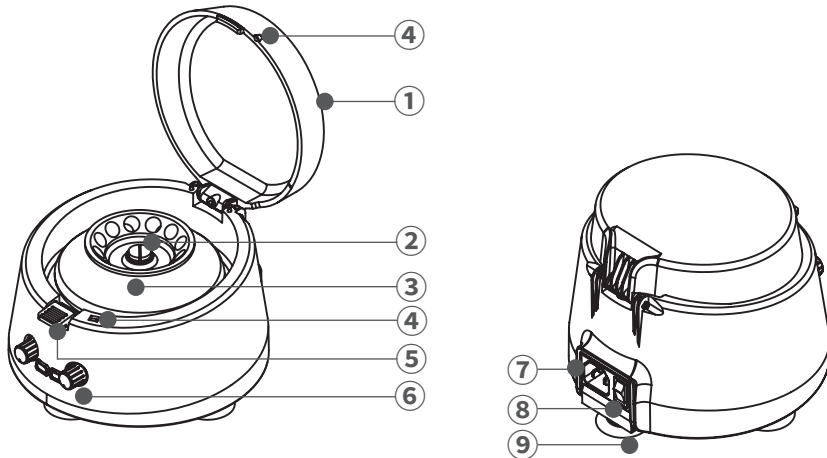
Rotation direction of the rotor.

1.4 Electric safety information

1. Use a power cord only provided with the device.
2. Use sockets with a protective earth conductor and suitable power cord.
3. If extension cord is needed, make sure it is suitable for the device.
4. Do not place anything on the power cable
5. Do not block vents.
6. If you have the following emergencies, shut off the power supply and unplug the power cord from outlet and contact your place of purchase or Hanil Scientific Inc.
 - Unusual noises or smell from the device.
 - Damage or wear of a power cord.
 - Breakdown of circuit breaker, fuse or safety device.
 - If you spill liquid on the device.
 - If centrifuge has been damaged.

2. Product Description

2.1 Appearance



- ① Lid : Lid protects samples inside the chamber, and protects rotor from breaking away when danger.
- ② Rotor locking screw : Screw connects the rotor to the motor shaft.
- ③ Rotor : Rotor holds the sample tubes.
- ④ Lid sensor : Lid sensor detects whether lid is closed.
- ⑤ Lid open button : Press the button to open lid.
- ⑥ Control Panel : Keys and knobs for operating the centrifuge.
- ⑦ Power socket : Socket is where the power cable connected.
- ⑧ Power switch : Switch allows the device to be turned on or off.
- ⑨ Absorbent rubber : Four rubber feet fix the device on the laboratory bench.

2.2 Delivery Package

- ① Standard offering
 - M 13 main body
 - Powercable
 - Usermanual
- ② Optional products [See Page 16 (7. Rotors & Acc.)]
 - (A0.2-32) 32 x PCR tube or 4 x strip angle rotor
 - (A 5.0 - 6) 6 x 5mL fixed angle rotor
 - (A 2.0 - 12) 12 x 2mL fixed angle rotor
 - 0.5 ml tube adaptor for (A2.0 - 12 rotor)
 - 0.2 ml tube adaptor for (A2.0 - 12 rotor)

2. Product Description

2.3 Technical Specifications

Max. RPM - (rotor)	13,500 RPM - (A2.0 - 12)	6,000RPM - (A0.2 - 32), (A5.0 - 6)
Max. RCF	12,032 xg	
Time	≤ 15 min, Pulse	
Acc. time to max. speed	≤15 sec	
Dec. time from max. speed	≤8 sec	
Tube Capacity	1.5/2.0ml x 12	
Power supply	AC110/220V, 50/60Hz	
Dimension (W x D x H, mm)	189 x 202 x 129	
Weight without rotor (kg)	1.5	

※ This device does not provide automatic recognition of the rotor.
So do not exceed 6,000 RPM when using the (A0.2 - 32, A5.0 - 6) rotor.

※ RCF Table

RPM	A2.0 - 12			A0.2 - 32		A5.0 - 6
	0.2mL	0.5mL	1.5/2.0mL	0.2mL Inner line	0.2 mL Outer line	5mL
3,000	443	545	594	313 ~ 443	464 ~ 560	654
5,000	1,230	1,509	1,649	870 ~ 1,231	1,289 ~ 1,556	1,817
6,000	1,773	2,191	2,377	1,253 ~ 1,773	1,857 ~ 2,241	2,616
8,000	3,151	3,877	4,226	N / A 6,000RPM [Max.]		
10,000	4,924	6,058	6,603			
12,000	7,090	8,724	9,508			
13,500	8,973	11,042	12,032			

* RCF value was calculated based on the bottom of the rotor hole.

* RCF value can differ from the length of the tube inserted in the rotor.

3. Installation

3.1 Packing Inspection



- Check packing conditions very carefully before unpacking.
- Contact Hanil Scientific Inc. immediately if damages found.
- Check the delivery for completeness.

· You can get contact details on packing box or the bottom of the manual.

3.2 Installation

Installation on hard and flat ground.

- Centrifuge should be installed on hard and flat place.
- If the centrifuge is installed in an inclined place, the shaft may be bent due to the weight of the rotor.

Good ventilation.

- For air circulation and safety, maintain a 30cm “clearance envelope” around the centrifuge while the rotor is spinning.



Constant temperature/humidity

- Centrifuge equipped with the sensitive electronic software which is fragile with humidity and temperature.
- Must avoid direct ray or heater and be put in the ambience of controlled temp. and air.

Avoid corrosive gas

- Install the centrifuge in a place where corrosive gas is not generated.
- Sulfur dioxide gas and chlorine gas may cause corrosion.

Leveling

- The shaft should be put exactly vertical on the horizontaliy flat ground by the leveling tool.

3. Installation

3.3 Connect Power



- Connect the device to voltage sources which correspond to the electrical requirements on the label attached to the device.
- Use sockets with a protective earth conductor and provided power cord.

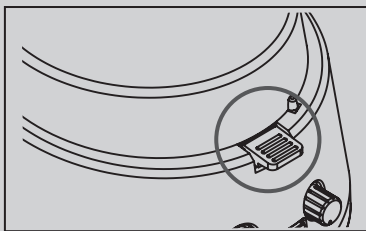
1. Connect the power cable to the power socket on the back side of the device and plug the cord into the power outlet.
2. Switch the centrifuge on using the power switch on the back side of the device.

3.4 Opeing/Closing the lid

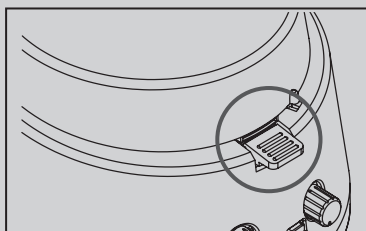
1. Press the lid button to open the lid.
▶ Closing the lid : Press the lid down until it clicks.



Press the lid down until it clicks.



(O)



(X)

When lid is not closed completely, the device does not operate.

3. Installation

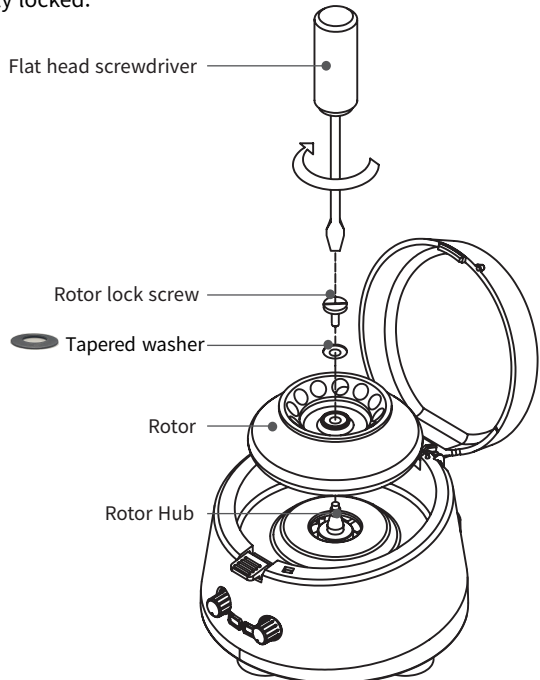
3.5 Loading and Removal of the Rotor



- This device is equipped with a rotor .
- Only use rotors, parts, and accessories provided or validated by Hanil Sciedntific Inc.
- Do not use defective rotor.

Follow the steps below to remove or replace the rotor.

1. Using a flat head screw driver, turn the rotor locking screw counter-clockwise and pull it completely out with the washer under the screw.
2. Lift up the rotor from the motor shaft.
3. Load the rotor into the motor shaft.
4. Align the washer with the hole at the top of the rotor.
5. Insert the rotor lock screw into the screw hole in the center of the rotor and turn it clockwise using a flat head screwdriver to completely lock it.
6. Check that the rotor is completely locked.



3. Installation

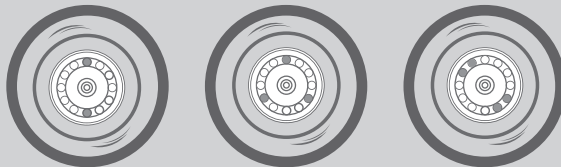
3.6 Loading tubes



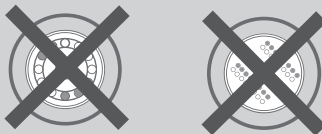
- Always use the same type of tube .
- Tubes should be loaded symmetrically .
- Do not exceed the maximum rated speed of the tube .
- Same volume and density of sample should be put on tubes .
- Check symmetric loading by balancing tubes with scales .

1. Check the inside of the rotor hole for moisture or foreign matters.
2. Tubes must be loaded symmetrically.

Correct
Arrangement

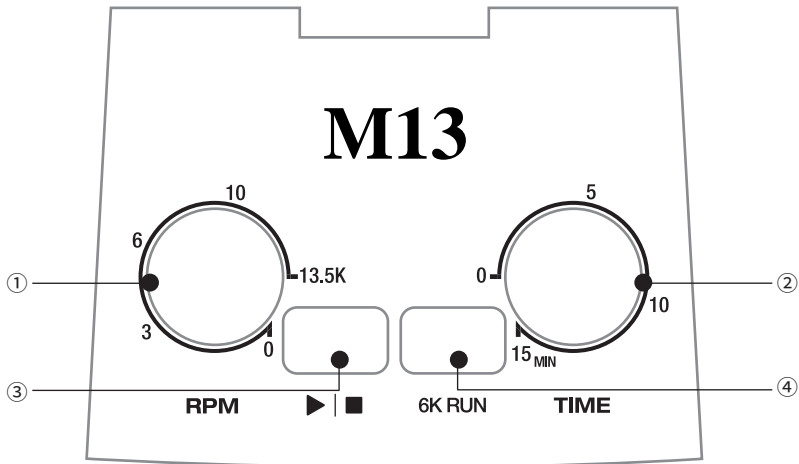


Wrong
Arrangement



4. Operation

4.1 Control Panel



Button		Description
①	RPM setting knob	Rotate clockwise or counter-clockwise to set the RPM value.
②	Time setting knob	Rotate clockwise or counter-clockwise to set the run time. (To use pulse function, set the time to '0' and press the start key.)
③	Start /Stop button	Start or stop the centrifugation.
④	6K Run button	After loading the rotor, press this button to start operation at 6,000 RPM

※ When using a A0.2 - 32(PCR strip rotor) or A5.0 - 6 rotor do not exceed 6,000RPM.

4. Operation

4.2 Setting RPM

[A2.0-12 rotor]

1. Rotate the 'RPM setting knob' clockwise or counter-clockwise to set the RPM value.
 - ▶ 0~13,500 RPM

[A0.2-32 rotor/A5.0-6 rotor]

1. Press the 6K RUN button to start operation at 6,000 RPM.
 - ▶ Do not exceed 6,000 RPM.

4.3 Setting Run Time

1. Rotate 'Time setting knob' clockwise or counter-clockwise to set the run time.
 - ▶ 0~15 min

4.4 Starting/End the Centrifugation

[Start]

1. After setting the RPM and run time, close the lid and press the start button.
 - ▶ If the lid is not completely closed, it will not operate.
 - ▶ When the set time is over, the device will decelerate and stop with beeping sound.

[Stop]

1. While operation, press the Start/Stop button to stop operation.
 - ▶ While operation, rotate the RPM setting knob to '0' to stop operation.
 - ▶ When the lid opens during operation, operation will stop.

4.5 Pulse

1. Starting the centrifuge with setting the time knob to '0' will reach the RPM that is set and decelerate to stop.
 - ▶ Turning the RPM setting to '0' while centrifuge is operating, deceleration will progress to stop.
 - ▶ Opening the lid while centrifuge is operating, deceleration will progress to stop with beeping sound.

5. Maintenance

1. Regularly inspect the rotor chamber and the motor shaft.
2. Rotate the shaft with your hand to make sure it rotates smoothly.
3. Use the stopwatch to check the time setting for accuracy
4. If you find any damages, do not use the device. Contact Hanil Scientific Inc.
5. Be careful not to get any foreign substances on the sensor.
6. Check the rotor hole regularly for any foreign materials.
7. Use a damp cloth and neutral detergent to clean and disinfect the device and the rotor.

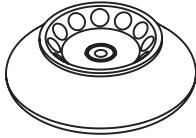
6. Troubleshooting

6.1 General Errors

Problem	Recommended Action
Power failure	Check the power cord connection.
Error sound doesn't stop	When opening the lid, error sound activated. Press the 6K Run button to stop the error sound.
Lid cannot be opened	Press the 'Lid open button'.
Lid cannot be closed	Remove the dirt on the lid latch and close the lid again. Check the lid latch for damage.
Unusual noise and vibration	Check the device whether it is installed on the hard and flat place.
	Reload the rotor symmetrically. Reload the tubes symmetrically. Tighten the clamping of the rotor with flat head screw driver by turning clockwise

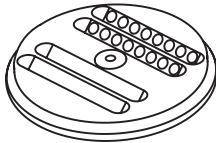
7. Rotors and Accessories

7.1 Rotor information



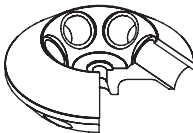
Fixed Angle Rotor, A2.0-12
 12 x 1.5/2.0 ml
 ∟ 45°
 Hole diameter (mm) : 11.5
 Max. height for tube fit (mm) : 48

Tube			
Tube capacity	0.2 ml	0.5 ml	1.5/2.0 ml
Adaptor			None
Cat. No.	TR0.2	TR0.5	-
Adaptor bore (Φ x L, mm)	6 x 21	8 x 37	-
Radius (mm)	44	54	59
Max. RPM	13,500		
Max. RCF (xg)	8,965	11,003	12,032



PCR Rotor, A0.2-32
 4 x 8-tube PCR strips, 32 x 0.2 ml
 ∟ 45°
 Hole diameter (mm) : 6.5

Tube		
Tube capacity	0.2 ml	8-tube PCR strip
Radius (mm)	Inner line : 31.13 ~ 44.06 Outer line : 46.13 ~ 55.68	
Max. RPM	6,000	
Max. RCF (xg)	Inner line : 1,773 / Outer line : 2,241	



Fixed Angle Rotor, A5.0-6
 6 x 5.0 ml
 ∟ 50°
 Hole diameter (mm) : 16.5
 Max. height for tube fit (mm) : 60

Tube	
Tube capacity	5.0 mL
Radius (mm)	52
Max. RPM	6,000
Max. RCF (xg)	2,616

7. Rotors and Accessories

7.2 Rotor Chemical resistance

Rotor for M13(A2.0-12, A0.2-32, A5.0-6) are made of acetal.

Therefore, chemical resistance must be checked before sample centrifugation.

※ Examples of samples that should not be used.

Acetic acid	Hydrogen peroxide
Ammonia	Nitric acid
Bromine	Phosphoric acid
Butyric acid	Sulfate
Chloride	Sulfuric acid
Hydroxide	NAOH
Chlorine	DMSO
Formic acid	HCL

MEMO



RECYCLABLE

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