User Manual

M15R

Micro Centifuge

Where Purchased :

Date of Purchase :

hanil

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M15R
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www.ihanil.com

The appearance or specifications of the device is subject to partial change for improvement.

Original Instruction

UM-M15R(E)(Rev.1), 20220526

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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 damage and failure of device and loss of lives.

1. The device should be installed on flat surface to maintain level.
2. Check the voltage to be used, before connecting the device 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 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. Substances that may generate volatile or explosive vapor can not be deviced.
7. The balancing work of samples should done in advance before operation.
8. To ensure safe use of the device, do not expose the device to strong acids, strong bases, cesium, salt, or alkaline detergents.
9. If the device is contaminated by toxic or radioactive samples or infectious blood samples, remove contaminants completely and take needful actions such as ventilation or isolation of device.
10. Before operation, rotor and chamber should be dry.
11. Do not attempt to slow or stop the spinning rotor by hand.
12. Only device with rotor and rotor door firmly tightened.
13. Do not block vents.
14. When serving the device, be sure to remove contaminants in advance.
15. Please contact the place of purchase or Hanil Scientific Inc. for product repairs.
16. According to IEC61010-2-020 maintain a 30cm “clearance envelope” around the device while the rotor is spinning.
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.
19. Don't lean against the device

1. General Considerations

1.2 Transport & Storage

- The device and the accessories must only be stored in dry rooms.
- Only lift and transport the device with sufficient number of helpers.

-Use Condition-

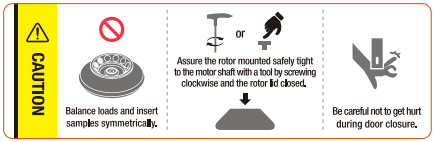
Indoor Use

Ambient temperature 5°C~40°C
Maximum relative humidity 30%~85%
Air pressure 500~1060hpa

-Transport-

Ambient temperature -10°C~40°C
Maximum relative humidity 10%~90%
Air pressure 500~1060hpa

1.3 Safety label on the Device



Insert tube symmetrically.
Firmly tighten the rotor door.
Watch your figers when close the door.

Caution/Warning

Warning for electric shock

Ground connection

1.4 Electric safety

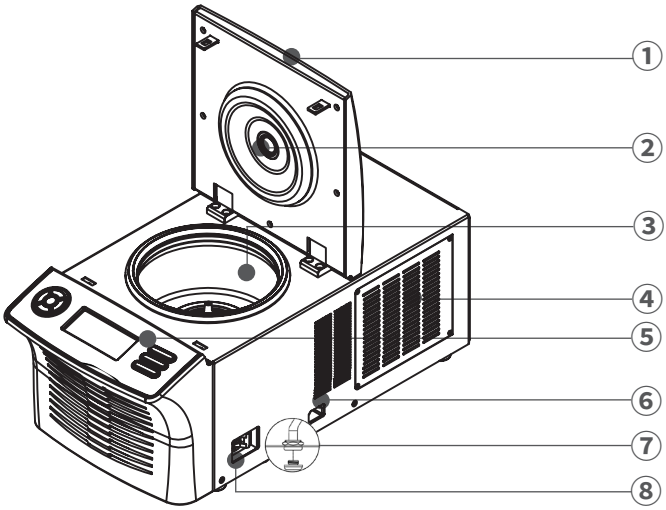
1. It is recommended that switchgear or circuit breakers and overcurrent protection devices be installed near the device.
2. Use a power cord only provided with the device.
3. Use sockets with a protective earth conductor and suitable power cord.
4. Do not use an extension cord.
5. Do not place anything on the powercable.
6. If you have the following emergencies, shut off the power supply and unplug the powercord from outlet and contact your place of purchase.
   - Unusual noises or smell from the equipment.
   - Damage or wear of a power cord.
   - Breakdown of circuit breaker, fuse or safety device.
   - If you spill liquid on the equipment.
   - If the equipment has been damaged.

2. Product Description

2.1 Intended Use

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

2.2 Structure



① Door
② RPM measuring window
③ Chamber
④ Ventilation slots
⑤ Display & control panel
⑥ Power Socket
⑦ Drain cap
⑧ Power Swithch

2.3 Delivery package

- Device
- Power cable
- Operating manual
- T-wrench

2. Product Description

2.4 Technical Specifications

Max. RPM	15,000 rpm
Max. RCF	21,583 xg
Time	< 100 min, pulse, continuous
Max. Capacity	10 x 5.0 mL
ACC/DEC steps	9/10 steps
Acc. time to max. speed	≤15 sec
Dec. time from max. speed	≤15 sec
Temperature range	-10°C to 40°C
Fast cool function	Yes
Program memory	10
Noise level	< 60 dB
Imbalance cutoff / tracking	Yes
Rotor identification	manual
Dimension (W x D x H, mm)	285.2 x 593.3 x 281
Weight without rotor	33 kg
Power requirement (VA)	2.5 kVA
Power input (V, Hz)	220-230V~ 50/60Hz
Cat. No.	M15R

3. Installation

3.1 Packing Inspection

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

▶ You can get contact details on the packing box or manual.

3.2 Installation

Installation on hard and flat ground.
- Centrifuge should be installed on a 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 ventailation.
- 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 the 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 hotizontaliy flat ground by the leveling tool.

3. Installation

3.3 Power Connection

- 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 right side of the device and plug the cord into the outlet.
2. Switch the centrifuge on using the power switch on the right side of the device.

3.4 Opening/Closing the Door

- If the door is not closed, the device does not operate.

Opening the door

1. Press the Door button

Closing the door

1. Put both hands on the lid and close it with a light force.

3. Installation

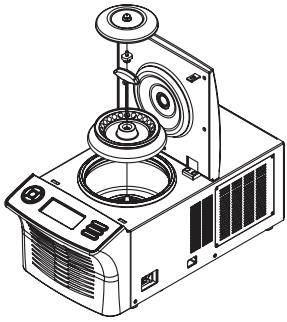
3.5 Installing/Removing the Rotor

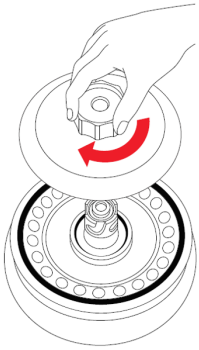
- Since this product is equipped with a rotor, no additional installation work is required.
- Use only rotors produced by Hanil Scientific Inc.
- Do not use rotors that are corroded or have mechanical defects.
- Be sure to install the rotor lead before use.

When removing or replacing the rotor, follow the procedure below.

1. Before installing the rotor, remove any foreign matter and moisture from inside the chamber, motor shaft and rotor.
► When installing the rotor, the temperature of the rotor and motor shaft should be at room temperature (10~30℃).

2. Insert the rotor you want to fit into the motor shaft.
3. Hold the rotor with one hand and turn it clockwise using the rotor locking tool with the other hand to tighten it completely.
► Rotor tightening: Rotating with a Rotor Locking Tool and rotating clockwise
► Rotor Separation: Rotating with a Rotor Locking Tool and rotating counterclockwise





3. Installation

3.6 Rotor ID.

- For this machine the user must input the rotor ID manually.
- The rotor ID must be entered correctly so that it can be centrifuged within the maximum speed.

1. Press the Setup/Enter button.

2. Press the left or right button to change to the rotor ID setting mode.

▶Rotor Id. Setting mode : Rotor flashes on the display.

3. Press the up or down button to enter the rotor ID.

4. Press the Setup/Enter button to save the settings.
► Press Setup/Enter button → Save speed setting

Rotor ID.

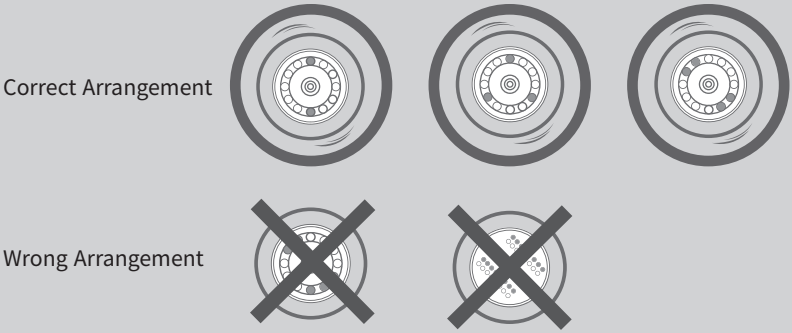
Rotor	Rotor ID
AE-2.0-24	1
AE-0.2-32	2
AE-5c-10	3

3. Installation

3.7 Loading Tubes

- Only use tubes provided or approved by Hanil Scientific Inc.
- Always use the same type of tube.
- Tubes should be loaded symmetrically.
- Do not exceed the maximum rated speed of the tube.
- Same volume of sample should be put on tubes.
- Check symmetric loading by balncing tubes with scales.

1. Check the maximum load for each tube.
2. Put tubes into rotor holes.
3. Tubes located opposite each other must be the same type and contain the same quantity.



4. Operation

4.1 Control Panel

No.	Button	Description
①	Up	Up the values when setting parameters
②	Down /Fast cool	Down the values when setting parameters /Pre-cooling the rotor and chamber
③	Left	Left button is used to select parameter
④	Right	Right button is used to select parameter
⑤	Setup/Enter	Setup/Enter button can be pressed to go into setup mode or complete the setting parameters
⑥	Display	State of RPM/RCF/Program/Time/Temperature
⑦	Call/Save	Call or save a program
⑧	Door	When the door button is pressed, the door opens
⑨	Start/Stop/Pulse	Start/Stop/Pulse centrifugation

4. Operation

4.2 Setting RPM/RCF

1. Press the Setup/Enter button.

2. Press the Left or Right button until the RPM/RCF display(rpm) flashes.
   ▶ RPM setting mode: RPM(rpm) display flashes.
   ▶ RCF setting mode: RCF(xg) display flashes.

3. Press Up or Down button until the desired RPM/RCF is displayed.

4. Press the Setup/Enter button.

4.3 Setting Run Time

1. Press the Setup/Enter button.

2. Press the Left or Right button until the Time display(0' 00'') flashes.
   ▶ Setting run time in hours: 00' flashes
   ▶ Setting run time in minutes: 00'' flashes

3. Press Up or Down button until the desired run time is displayed.

4. Press the Setup/Enter button.

4. Operation

4.4 Setting Temperature

1. Press the Setup/Enter button.

2. Press the Left or Right button until the 'Temperature' display(-00℃) flashes.

3. Press Up or Down button until the desired temperature is displayed.

4.5 Fast Cool

If the samples are "temperature sensitive", it is critical to pre-cool the centrifuge and the rotor.

1. Set the desired Temperature. [Refer to 4.4 Setting Temperature]

2. Press the Down button more than 2sec.

▶ A rotor rotates with 1,500 rpm and the device is refrigerated down to the set temperature in a short time.

4. Operation

4.6 Setting Acceleration/Deceleration

1. Press the Setup/Enter button.

2. Press the Left or Right button until the Accel/Decel display(0) flashes.
▶ Accel rate setting mode: Accel display flashes(0).
▶ Decel rate setting mode: Decel display flashes(0).

3. Press the Setup/Enter button.

4.7 Start/Stop a centrifugation

[Start]
1. Check all parameters are correct.

2. Press the Start/Stop/Pulse button.

[Stop]
1. Press the Start/Stop/Pulse button to stop centrifugation.
▶ The centrifugation stops when the set run time has been reached.

4. Operation

4.8 Short Run

The [Short] button is for when press & hold, to accelerate up to maximum speed and decelerate when the button is not pressed.

1. Set the desired run speed. [Refer to. 4.6 Setting RPM/RCF]

2. Press the Short button more than 2 sec.

▶ While pressing [Short], the equipment will accelerate up to maximum RPM.

▶ By stop pressing the [Short], the equipment will decelerate to stop.

4.9 Saving/Calling up a Program

[Saving]

1. Set the RPM(or RCF) / Run time / Accel, Decel rate

2. Press the Left of Right button until Prog display flashes(0).
▶ You can save 10(0~9) programs.

3. Press Up or Down button until the desired program number is displayed.

4. Press the Enter button.

[Calling up]

1. Press the Setup/Enter button.

2. Press the Left of Right button until Prog display flashes(0).

3. Press Up or Down button until the desired program number is displayed.

4. Press the Enter button.

5. Maintenance

5.1 Care Instructions

1. Regularly inspect the rotor chamber for check the motor shaft is normal.

2. Regularly check the rotor and accessories to be sure there is no damage.

3. Rotate the motor shaft with your hand to make sure it turns smoothly.

4. To prevent the rotor from sticking, lubicate the rotor drive hole which contacts motor shaft regularly.

5.2 Cleaning

• Before cleaning the centrifuge, be sure to switch off the device and disconnect the power cord.

[Oustside of the device]

1 Clean the outside of deivice with a soft and dry cloth.
▶ If the device is contaminated, use a mild cleaning fluid to clean.
2. Do not use aggressive chemicals on the device such as alchol, benzene, acetone or phenol.
3. Make sure do not scratch the surface of deivice when cleaning it.
▶ Do not use a metal sponge.
▶ If the device is rusted, remove it with a mild detergent and wipe it with a dry cloth.

[Chamber]

1. If the rotor chamber is not dry, wipe moisture from the chamber with a dry cloth.
2. If the rotor chamber is dirty, clean it with a mild fluid to clean.

[Rotor]

1. After centrifugation, remove the rotor from the chamber and keep it upside down.
2. If any sample is spilt inside the rotor, clean it and dry well.

[Disposal]

1. In case of product is to be disposed of, the local wastes laws and regulations are to be observed.

6. Troubleshooting

6.1 Possible Problems

Problems	Recommended Action
Power failure	- Check the power cord connection. - Check the power fuse of the device.
Centrifugation cannot be started	- Check the lid is closed completely.
Door cannot be opened	- Press the ‘Door' button. - Check the power connection.
Door cannot be closed	- Remove the dirt at the door latch and close the lid. - Check the lid latch is not damaged.
Unusual noise and vibration	- Check the device is installed on the hard and flat place
	- Reinstall the rotor symmetrically. - Reinstall the tubes symmetrically. - Tighten the rotor lid firmly by turning the rotor lid handle clockwise.

6. Troubleshooting

6.2 Error Codes

Code	Message	Cause	Recommended Action
E1	Imbalance error	• Asymmetrical arrangement of tubes. • Different volume of sample .	• Check the tightness of rotor loading. • Check the proper loading of tubes. • Check the stable ground or worktable.
E2	Over speed error	• 2% over the set RPM.	• Check controller and motor. • Switch power on/off and re-start.
E3	Motor over-heat	• Temp. hike inside of motor.	• Check the stator of motor. • Switch power off, restart after 1 hour.
E4	Motor error	• Motor operation error	• Switch power on/off and re-start.
E5	Door open (Operating)	• Lid open during operation	• Contact the Technical support team.
E7	System error	• System error	• Contact the Technical support team.
E10	Inner Temperature Over OR Inner temperature sensor error	• Occurs when the set temperature is not reached • Inner temperature sensor error	• Make sure there is enough space around the ventilation slots. • Switch power on/off and re-start.
E11	Motor tempterature sensor error !	• Motor temperature sensor error	• Switch power on/off and re-start.
E12	HI voltage Error	• High voltage	• Switch power on/off and re-start.
E13	Low voltage Error	• Low voltage	• Switch power on/off and re-start.
E15	RPM sensing error	• RPM Sensor error • Rotor identification error	• Switch power on/off and re-start.
E16	Compressor tempterature sensor error !	• Compressor tempterature sensor error	• Switch power on/off and re-start.
E17	Communi-cation error	• Occurs when Main and IO board are disconnected	• Switch the device off and contact the Technical support team.

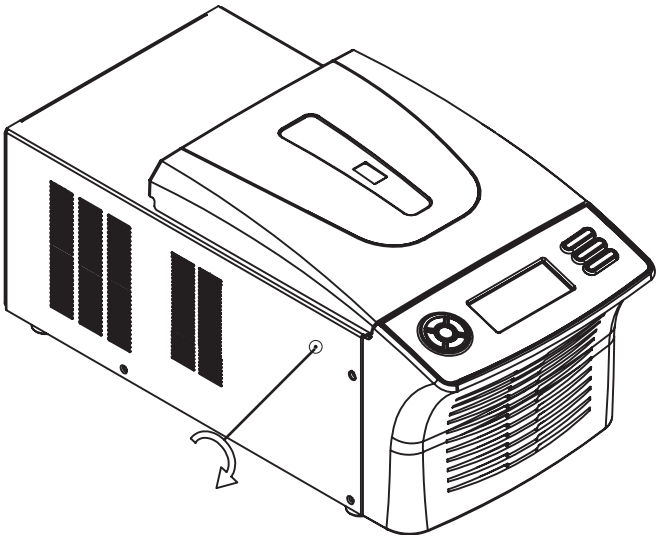
6. Troubleshooting

6.3 Emergency Door Open

If the device door cannot be opened, you can activte the emergency open manually.

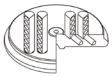
1. Wait for rotor to stop before activating the emergency open.

2. Insert the T-wrench into the emergency open hole and turn it clockwise until the door is opened.



7. Rotor

7.1 Rotor

Rotor		Tube Capacity	Required Adaptor	Bore Ø x L (mm) Radius (mm)	Max. RPM(rpm) Max. RCF (xg)
 **AE-0.2-32** (PCR Strip Rotor)	Hole angle : ∠45° Max. Capacity : 32 x 0.2 mL Size (ø x H) : ø172 x 38.5 mm	0.2mL 0.2mL strips	-	6.5 x 17 55.5	12,500 **9,852**
AE-2.0-24	Hole angle : ∠45° Max. Capacity : 24 x 1.5/2.0 mL Size (ø x H) : ø172 x 38.5 mm Max. height for tube fit : 56 mm Incl. a lid A2.0MP-24 incl. plastic lid	1.5/2.0 mL	-	11 x 38 83.7	15,000 **21,206**
		0.5mL	TR0.5	8 x 37 78.5	15,000 19,747
		0.2mL	TR0.2	6 x 21 68.5	15,000 17,231
AE-5c-10	Hole angle : ∠50° Max. Capacity : 5 x 5.0 mL Size (ø x H) : ø167.2 x 57.4 mm Incl. a lid	5.0mL	-	17 x 53.8 83.6	15,000 **21,853**

8. Declaration of Conformity

hanil

DECLARATION OF CONFORMITY

We, Hanil Scientific Inc. 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, Hanil Scientific Inc., 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, Hanil Scientific Inc., 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, Hanil Scientific Inc., hiermit unter eigener Verantwortung, dass das Produkt (s), die unter die Richtlinien der Europäischen Union und Normen, die in dieser Erklärung.

Description of Product	**Centrifuge**
Model Name	M15R

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 613126-1:2013 EN 55011:2016/A1:2017
RoHS	2011/65/EU	as last amended	EN IEC 63000:2018
Additional applied standards			IEC 61326-1:2012, CISPR 11:2015/A1:2016/A2:2019

Test Report. Ref.

ACTS-2020-SC-080
KES-EM-20T0629
RT22R-S0949

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