
Operating Manual

Ultra 5.0

Ultra Centrifuge

Date of Purchase	
Serial No.	
Place of purchase	

hanil

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Contact Us

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The specification of the device in this manual is subject to change for improvement.

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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 centrifuge should be installed on a flat surface to maintain level.
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 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 centrifuged.
7. The balancing work of samples should done in advance before operation.
8. 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 the device.
9. Before operation, rotor and chamber should be dry.
10. Do not attempt to slow or stop the spinning rotor by hand.
11. Only centrifuge with rotor and rotor lid firmly tightened.
12. Do not block vents.
13. When serving the centrifuge, be sure to remove contaminants in advance.
14. Please contact the place of purchase or Hanil Scientific Inc. for product repairs.
15. According to IEC61010-2-020 maintain a 30cm "clearance envelope" around the centrifuge while the rotor is spinning.
16. Turn the power switch off after using the device.
17. Unplug the power plug before cleaning or left unused for a long period of time.

1. General Considerations

1.2 Transport & Storage



- The device and the accessories may only be stored in dry rooms

-Storage-

Ambient temperature 5°C~35°C

Maximum relative humidity 30%~85%

Air pressure 500~1060hpa



- Only lift and transport the device with sufficient number of helpers.

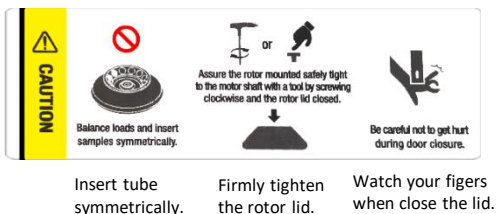
-Transport-

Ambient temperature -10°C~40°C

Maximum relative humidity 10%~90%

Air pressure 500~1060hpa

1.3 Safety label attached to a product



Mark indicating danger and warning.



Mark indicating a place in danger of electric shock.



Mark indicating earth grounding

1.4 Electric safety information

1. This device should be installed for permanent use.
2. It is recommended that switchgear or circuit breakers and overcurrent protection devices be installed near the equipment.
3. Use a power cord only provided with the equipment.
4. Use sockets with a protective earth conductor and suitable power cord.
5. Do not place anything on the power cable
6. Do not block vents.
7. If you have the following emergencies, shut off the power supply and unplug the power cord from the outlet and contact your place of purchase or Hanil Scientific Inc. Technical Service Team.
 - 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 Structure



- ① Display: The display shows time, speed, temperature, Acc/Dec, rotor Id.
- ② Keypad : Time, and speed can be set.
- ③ lid: lid protects the inside of the chamber.
- ④ Power switch : On/off the centrifuge

2.2 Delivery package

- ① Ultra 5.0 Main body
- ② Power Cable
- ③ Operating manual
- ④ Optional items: Rotors

2. Product description

2.3 Technical Specifications

Max. RPM	50,000 rpm
Max. RCF	254,340 xg
Max. Capacity	6 x 250 mL
ACC/DEC	10 / 10 steps
Temperature range	-10°C to 40°C
Time control	< 100 hr, continuous
Program memory	100
Noise level	≤ 65 dB
Vacuum system	Yes
Rotor identification	Automatic
Dimension (W x D x H, mm)	710 x 1,000 x 1,260
Weight without rotor	450 kg
Power requirement (VA)	5.0 kVA
Power input (V, Hz)	220V+ / 60 Hz (110V, 50 Hz optional)
Cat. No.	UL-5.0

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 packing boxes or back of the manual.

3. Installation

3.2 Installation

3.2.1 Selecting the location



- Installation must be done by the authorized Hanil Scientific Inc.
- Observe the following instructions for installation.

1. Install the device on a hard and flat floor.

- The device 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.

2. Adequate ventilation.

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

3. Temperature/Humidity

- Centrifuge equipped the sensitive electronic software which is fragile with humidity and temperature. Refer to [1.2 Transport & Storage].
- Must avoid a place exposed to direct ray, heater and high humidity.

4. Avoid the corrosive gas

- Install the device in a place where corrosive gas is not generated.
- Do not place dangerous substances capable of generating flammable or explosive vapors near the device.

3. Installation

3.2 Installation

3.2.2 Leveling



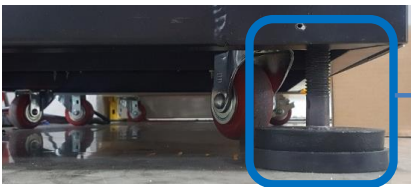
- Imbalance of the device causes vibration, noise and error during operation.

After locating the device on a flat and hard place, make sure the device is level.

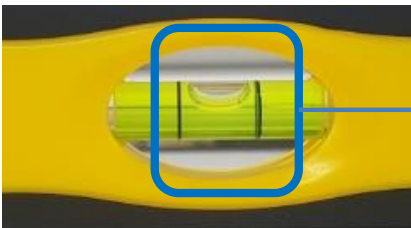
1. Place the leveler on the top of the device.



2. Turn each of the foot levelers which is at the bottom of the device until the device is level.
 - All bubbles must be located in the center of the leveler.



Foot leveler



Bubble located in the center

3. Installation

3.2 Installation

3.2.3 Power Connection

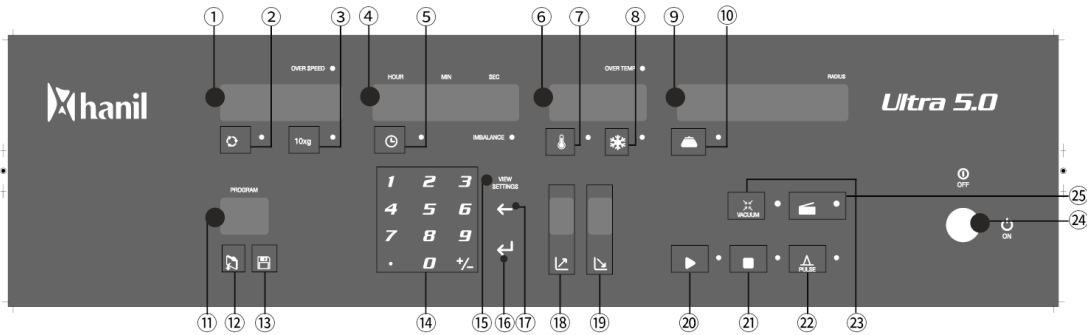


- Connect the device to voltage sources which correspond to the electrical requirements on the label attached to the device.

1. Plug the power cord into the outlet.
2. Switch the centrifuge on using the power switch key on the top of the device.

4. Operation

4.1 Operation Panel



Button	Function
①	Speed Display
②	RCF
③	RCF
④	Time Display
⑤	Time
⑥	Temp Display
⑦	Temp
⑧	Fast cool
⑨	Rotor Display
⑩	Rotor ID
⑪	Program Display
⑫	Program Call
⑬	Program Save
⑭	Keypad
⑮	View setting

Button	Function
⑯	Enter
⑰	Cancel
⑱	Acc
⑲	Dec
⑳	Start
㉑	Stop
㉒	Pulse
㉓	Power Key
㉔	Lid LED

4. Operation

4.2 Opening and closing the lid



- The lid can only be opened if the centrifuge is switched on.
- Do not reach with your fingers between the housing and lid.
- Close the lid completely before operation.

•Opening the lid

MUST open the lid after releasing the vacuum. [Refer to 4.17 Releasing vacuum]

Push the lid handle up side.

•Closing the lid

Pull the lid handle down.

4.3 Loading and removal of the rotor



- Only use rotors, parts, and accessories provided by Hanil Scientific Inc.
- Do not use scatched or cracked rotor.

This drive shaft of this model is designed to self-lock rotor coupling, triggered by centrifugal force while spinning. This system does not need additional coupling action to lock rotor.



Jut (rotating)



Flat (stop)

Loading

1. Clean the motor shaft and chamber.
2. Load the rotor vertically onto the drive shaft.
3. Place the rotor lid on the rotor body.
4. Insert the wrench into the center hole of the rotor lid and turn it clockwise.
5. Check the rotor to make sure it loaded firmly.

Unloading

1. Insert the wrench into the center hole of the rotor lid and turn it counterclockwise.

4. Operation

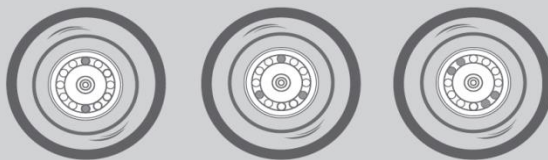
4.4 Loading tubes



- 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 balancing 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.

Correct arrangement



Wrong arrangement



4.5 Rotor ID identification






- Before starting centrifugation, the rotor ID must be recognized.



1. Press the Rotor ID button after installing a rotor.

4. Operation

4.6 Setting RPM/RCF

- ① Press the RPM () button or RCF () button.
- ② Press the numeric key to set desired RPM/RCF.
- ③ Press the Enter () button.
 - ▶ RCF display shows the number multiplied by 10.
Ex.) If you input 1xg, the display shows 10xg.

4.7 Setting run time

- ① Press the Time () button.
- ② Press the numeric key to set desired run time.
- ③ Press the Enter () button.

4.8 Setting AT SET SPEED mode

At Set SPEED mode

: Time display begins to count the run time once the actual run speed reaches to the set speed value and stops when the deceleration begins)

- ▶ Time LED lights up means AT SET SPEED mode is active.
- ▶ When at set speed mode is disabled, press the time button for 3 seconds to activate the mode.

4. Operation




4.9 Setting Normal mode

Normal mode

: Time display begins to count the run time when the acceleration begins and stops when the deceleration begins.

- ▶ Flickering TIME led means the Normal mode is active.
- ▶ When Normal is disabled, press the time button for 3 seconds to activate the Normal mode.



4.10 Setting Acceleration/Deceleration rate

- ① Press the Accel () button or Decel () button.
- ② Press the numeric key to set desired ACC./DEC. step.
- ③ Press the Enter () button.

- ▶ ACC/DEC steps: 0~9 steps.
- ▶ The higher the number, the faster the acceleration or deceleration rate.

4. Operation


4.11 Setting Temperature

- ① Press the Temp. () button.
- ② Press the numeric key to set desired temperature.
 - ▶ Temperature range: -10°C ~ 40 °C
- ③ Press the Enter () button.


4.12 Fast Cool

1. Setting the desired temperature.
2. After installation of the rotor and closing the lid of device, press the [Fast cool] button
 - ▶ For fast cooling, the device is refrigerated down to the set temperature in a short time.
 - ▶ If you want to stop Fast cool, press the Stop button.

4.13 Starting a centrifugation run

- ① Check the all parameters are correct and the lid is closed.
- ② Press Start () button.



4.14 End the centrifugation

- ① Press Stop () button to stop centrifugation.



4. Operation

4.15 Saving / Recall a program


Saving a program

- ① Set the centrifugation time/speed/Accel/Decel values.
- ② Press Save () button.
 - ▶ You can store 100 programs on the device: 0~99
- ③ Select the program slot by pressing the numeric keys and press the Enter () button.

Recall a programs

- ① Press the Call () button.
- ② Press the program slot by pressing the numeric keys
- ③ Press the Enter () button to call up a program.

4.16 Releasing Vacuum

- ① Press Vacuum () button to release the vacuum after centrifugation.
 - ▶ Before pressing the vacuum button, check the rotor is stopped completely.

4.17 Pulse



- Recognize the rotor ID, before using the pulse function.

It is for quick and short spin down.

After reaching the set speed, the centrifuge is decelated and stopped.

1. Set the desired speed.
2. Set the desired Acc. and Dec. step.
3. Press the Pulse button.

5. Maintenance

5.1 Care instructions

- The following procedures should be performed regularly.
 - ① Regularly inspect the rotor chamber for check the motor shaft is normal.
 - ② Rotate the shaft with your hand to make sure it turns smoothly
 - ③ Use the stopwatch to check that the time setting is correct
 - ④ If you find any damages, do not use the device. Contact Hanil Scientific Inc.

5.2 Cleaning



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

• Outside of the device

- ① Clean the outside of device 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 alcohol, benzene, acetone or phenol.
- ③ Use the stopwatch to check that the time setting is correct
- ④ Make sure do not scratch the surface of the device 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, remove it from the chamber with a dry cloth.

• Rotor

- ① To prevent corrosion, take out the rotor from the rotor chamber after use.
- ② If any sample is spilt inside the rotor, wash and dry the rotor well.

• Disposal

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

6. Troubleshooting

6.1 General errors

Problem	Recommended Action
Power failure	Check the power cord connection. Check the power fuse of the device.
Device cannot be started	Check the lid is closed completely.
Lid cannot be opened	Press the 'Lid open button'.
Lid cannot be closed	Remove the dirt at the lid latch and close the lid. Check the lid latch is not damaged.
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 wrench by turning clockwise

6. Troubleshooting

6.2 Error Messages

Error Code	Possible causes	Recommended Action
Error 1	Motor active error	<ul style="list-style-type: none">- This error occurs when 100 rpm is not reached within 10 seconds after startup.▶ Check the Vacuum led.▶ Check the device lid is closed completely.▶ Restart the centrifugation.
Error 2	Lid open error	<ul style="list-style-type: none">▶ Check the device lid is closed completely.▶ Check the lid led.
Error 3	Motor over heating	<ul style="list-style-type: none">- This error occurs when motor is overheated.▶ Shut off the power supply for an hour, and then turn on the power switch for checking the instrument.▶ Remove any objects that are near device.
Error 4	Low voltage	<ul style="list-style-type: none">- This error occurs when the power input of power supply (V/Hz) is 10% less than required power.▶ Shut off the power supply and then check the voltage of the Power supply (V/Hz).▶ Use AVR to provide proper power.
Error 5	High voltage	<ul style="list-style-type: none">- This error occurs when the power input of power supply (V/Hz) is 10% more than required power.▶ 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">- This error occurs when the device is spun with over speed.▶ Emergency stop is activated automatically. So wait for the rotor to stop completely.
Error 7	Firmware program	<ul style="list-style-type: none">- This error occurs when firmware fails.▶ Restart the device.
Error 9	Rpm sensing	<ul style="list-style-type: none">- This error occurs when RPM sensor or motor fails.▶ Turn the installed rotor by hand for checking RPM display is working or not.

6. Troubleshooting

6.2 Error Messages

Error Code	Possible causes	Recommended Action
Error 10	Rotor ID error	- This error occurs when the rotor is uninstalled or rotor recognition is failed. ▶ Check the rotor is installed firmly and touch the Rotor ID button.
Error 11	Chamber temperature	- This error occurs when chamber is not reached to setting temperature within an hour. ▶ Turn off the device and wipe the temperature sensor.
Error 12	Chamber temperature sensor	- This error occurs when there is a faulty in the temperature sensing of chamber. ▶ Turn off the device and wipe the temperature sensor.
Error 15	Motor temperature sensor	- This error occurs when the motor temperature sensor can't recognize. ▶ Turn the power OFF and turn it back ON
Error 17	Communication error	- This error occurs when insecure communication arises among Main-Display-I/O ▶ Turn the power OFF and turn it back ON
Error 20~27	Lid error	- This error occurs when lid sensor fails to operate correctly. ▶ Turn the power OFF and turn it back ON
Error 36	Save error	- This error occurs when there is no communication with the storage device. ▶ Turn the power OFF and turn it back ON
Error 40	Dip switch error	- This error occurs when the model is selected incorrectly. ▶ Turn the power OFF and turn it back ON
Error 41	Vacuum sensor error	- This error occurs when the vacuum sensor fails to operate correctly. ▶ Turn the power OFF and turn it back ON

6. Troubleshooting

6.2 Error Messages

Error Code	Possible causes	Recommended Action
Error 42	Settable range	- This error occurs when the user enters a value that is greater than the settable range. ▶ Refer to the 2.3 Technical specifications and enter the correct values.
Error 43	Inverter error	- This error occurs when the inverter connection is incorrect. ▶ Turn the power OFF and turn it back ON
Error 44	Restart error	- This error occurs when the start button is pressed while the motor is rotating. ▶ Wait for the rotor to stop completely and press the start button.
Error 45	Time setting error	- This error occurs when run time set to '0' in AT SET SPEED mode. ▶ Set run time again.

7. Rotor

7.1 Angle rotors

Rotor		Tube Capacity Bottom Type	Bore Ø x L (mm) Radius (mm)	Max. RPM (rpm) Max. RCF (xg)
 A2.0U-24	Hole angle : $\angle 40^\circ$ Max. Capacity : 24 x 1.5/2.0 mL Size (Ø x H) : $\varnothing 180 \times 88$ mm Max. height for tube fit : 47.1 mm Incl. a screw type lid	1.5/2.0 mL -	6.5 x 17 55.5	40,000 146,680
 A10U-12	Hole angle : $\angle 26^\circ$ Max. Capacity : 12 x 10 mL Size (Ø x H) : $\varnothing 180 \times 90$ mm Max. height for tube fit : 71.5 mm Incl. a screw type lid	10 mL Round	17 X 70 85	45,000 192,430
 A13.5U-8	Hole angle : $\angle 26^\circ$ Max. Capacity : 8 x 13.5 mL Size (Ø x H) : $\varnothing 165.5 \times 91.3$ mm Max. height for tube fit : 84.4 mm Incl. a screw type lid	13.5 mL Round	16.3 X 83 73	50,000 204,030
 A13.5U-12	Hole angle : $\angle 26^\circ$ Max. Capacity : 12 x 13.5 mL Size (Ø x H) : $\varnothing 189 \times 90.5$ mm Max. height for tube fit : 83.4 mm Incl. a screw type lid	13.5 mL Round	16.3 X 83.4 87	50,000 243,160
 A38.5-6	Hole angle : $\angle 29^\circ$ Max. Capacity : 6 x 38.5 mL Size (Ø x H) : $\varnothing 198 \times 112$ mm Max. height for tube fit : 98.9 mm Incl. a screw type lid	38.5 mL Round	25.6 x 92 91	50,000 254,340
 A50U-8	Hole angle : $\angle 30^\circ$ Max. Capacity : 8 x 50 mL Size (Ø x H) : $\varnothing 213 \times 110$ mm Max. height for tube fit : 107.3 mm Incl. a screw type lid	50 mL Round	29 x 100.5 98	30,000 98,784
 A94U-6	Hole angle : $\angle 25^\circ$ Max. Capacity : 6 x 94 mL Size (Ø x H) : $\varnothing 219.7 \times 119$ mm Max. height for tube fit : 110.7 mm Incl. a screw type lid	94 mL Round	38.5 x 105 99.4	35,000 136,377
 A250U-6	Hole angle : $\angle 25^\circ$ Max. Capacity : 6 x 250 mL Size (Ø x H) : $\varnothing 280 \times 130$ mm Max. height for tube fit : 126.9 mm Incl. a screw type lid	250 mL Flat	60 x 101 129	20,000 57,792

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