User Manual

Supra R17

High Speed Centrifuge

Place of Purchase

Serial No.

Date of Purchase

hanil

Supra R17
Research Only Use

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If you have any questions, contact our Technical Support Center.
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www.ihanil.com

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

INDEX

1. Safety Precautions

1.1 Safety

Follow precautions and all the safety requirements described on this user manual to prevent any damage, failure of the 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 the usage of non-recommended parts and accessories.
4. Do not exceed the maximum rated speed of the rotor or buckets in use.
5. Make sure to take necessary safety precautions before using toxic, radioactive, pathogenic samples or even infectious blood.
6. Substances that may generate volatile or explosive vapor should not be used in the centrifuge.
7. The balancing work of samples should be 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 required actions such as ventilation or isolation of device.
10. Before operation, the rotor and chamber should be dry.
11. Do not attempt to slow down or stop the spinning rotor by hand.
12. Firmly tighten the rotor lid to the rotor.
13. Do not block the ventilation slits.
14. When using the device, be sure to remove contaminants in advance.
15. For product repair, please contact Hanil Scientific Inc. or your place of purchase
16. According to IEC61010-2-020 maintain a safety clearance of 30cm around the device while the rotor is spinning.
17. Switch off the power after using the device.
18. Unplug the power cable before cleaning or when the device is left unused for a long period of time.
19. Don't lean against the device

1. Safety Precautions

1.2 Storage & Transport

Storage
Ambient temperature：5℃ ~ 35℃
Maximum relative humidity：30% ~ 85%
Air pressure：500 ~ 1060 hpa

Transport
Ambient temperature：-10℃ ~ 40℃
Maximum relative humidity：10% ~ 90%
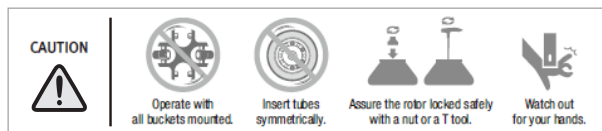Air pressure：500 ~ 1060 hpa

1.3 Safety label on the Device

Attention and warning for electric shock

Attention and warning

Earth grounding

CAUTION

Operate with all buckets mounted.

Insert tubes symmetrically.

Assure the rotor locked safely with a nut or a T tool.

Watch out for your hands.

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 encounter the following emergencies, switch off the power supply and unplug the power-cord from the 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 Structure
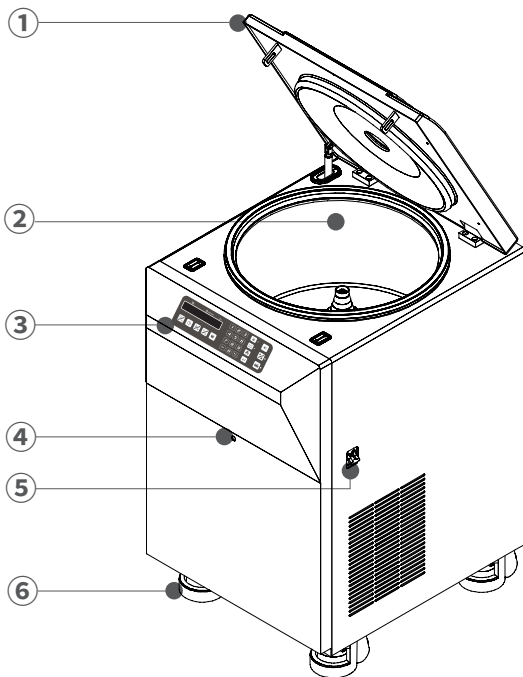
① Lid
② Chamber
③ Display & Control panel
④ Emergency lid open hole
⑤ Power switch
⑥ Caster

2. Product Description

2.2 Delivery Package

① User manual
② Power code
③ Rotor locking tool(Emergency lid open tool)
④ Grease(Lubricant)
⑤ Bubble leverler
⑥ Spanner

2. Product Description

2.3 Technical Specifications

Max. RPM / Fixed angle	17,000 rpm
Max. RCF / Fixed angle	34,249 xg
Max. capacity	6 x 250 mL
ACC/DEC ramps	9/10 steps
Temperature range	-20°C to 40°C
Fast cool	Yes
Time control	Pulse, Timed ≤99 hr 59 min continuous
Noise level	≤ 56 dB
Program memory	100
Imbalance cutoff / tracking	Yes / -
Rotor identification	Automatic
Dimension (W x D x H, mm)	473 x 600 x 840
Weight without rotor	114 kg
Power requirement (VA)	2.5 kVA
Power input (V, Hz)	220V, 50/60 Hz (110V optional)
Cat. No.	SU-R17

3. Installation

3.1 Packing Inspection

⚠ •Check packing conditions carefully, before unpacking.
•Contact Hanil Scientific Inc. immediately if any damage is found.
•Check the delivery for completeness

▶ Our contact information is written on the box and on the outer cover of the manual.

3.2 Installation

3.2.1 Environmental Requirement

Installation on hard and flat ground
•The Centrifuge should be installed on a hard and flat floor.
•If the centrifuge is installed on an inclined floor, the shaft may bend due to the weight of the rotor.

Good ventilation
•For air circulation and safety, maintain a safety clearance of 30cm around the device while the rotor is spinning.

Constant temperature/humidity
•The Centrifuge is equipped with a sensitive electronic software which can react easily to humidity and temperature.
•Avoid direct light or heater, place the device in the ambiance of controlled temperature and air.

Avoid any 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 placed exactly vertical on a horizontaliy flat bench by the leveling tool.

# 3. Installation

3.2 Installation

3.2.2 Balance Adjustment

Imbalancing of the device itself causes vibration, noise and error during operation. Check the level of the floor surface with a Bubble Leveler before installation.

▶ After locating the device on the solid and flat floor, check the horizontality with
 a Bubble Leveler.

1. Place the Bubble Leveler on top of the device.
 ▶ Try to locate all bubbles in the center of the Bubble Leveler with rotating the red gear
   which is in caster of the device.
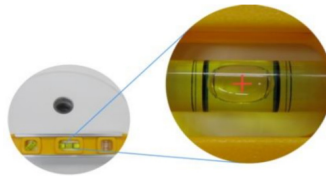
2. Adjust the height of four-wheel, which is at the bottom of the device, with rotating the red gear (which is in caster of the device) for the first balance adjustment.
▶ For fixing a wheel: rotate the red gear counterclockwise with a spanner
▶ For loosing a wheel: rotate the red gear clockwise with a spanner
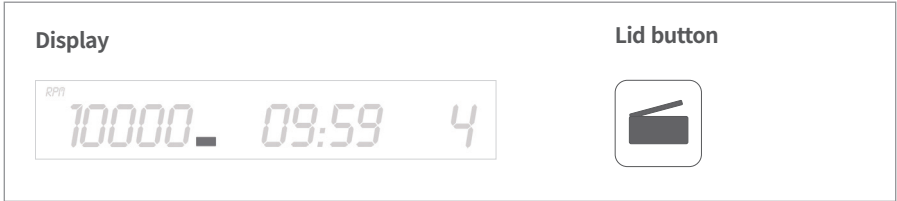
3. Installation

3.3 Power Connection

⚠️ •Connect the device to a voltage source which corresponds to the electrical requirements on the label attached to the device.
•Use sockets with a protective earth conductor and provided power cord.

1. After connecting the AC Power cord at the power socket on the right back of the device, turn on the earth leakage breaker switch.
2. Turn on a power switch on the right side of the device.
▶ With beeping sound, right before setting value is displayed.
▶ The default values are Max. rpm, 10 min, ACC 7, DEC 7 and 25°C.

- The lid is not opened while the device is running.
- If the lid is opened, the device could not be operated even with pressing the 'Start' button.
- For operational safety, this device has the automatic rotor recognition function.

3. Installaion

3.4 Opening/Closing the Lid

Display	Lid button
RPM 10000_ 09:59 4	

For opening the lid, press the [LID] button.
▶ Should touch the [LID] button when the lid is closed (Lid LED shows off)
▶ Close the lid until hearing clank shut.
▶ When the lid is opened, the lid LED turns on.

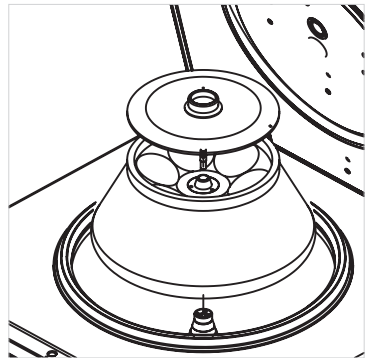# 3. Installation

3.5 Installing/Removing the Rotor

⚠️ • Only use rotors , parts , and accessories provided by Hanil Science Inc.
    • Do not use scratched or cracked rotor in use.

1. Before installing the rotor, remove any foreign object or moisture.

2. Load the rotor vertically onto the motor shaft.

3. Turn the lid handle until it secured.
   ▶ Installing : Turn the handle clockwise
   ▶ Removing : Turn the handle counterclockwise

⚠️ **When you run a fixed angle rotor, make sure that the rotor lid is tightly closed. If you don't close the rotor lid completely, it will be crushed.**

3. Installaion

3.6 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 a scale.

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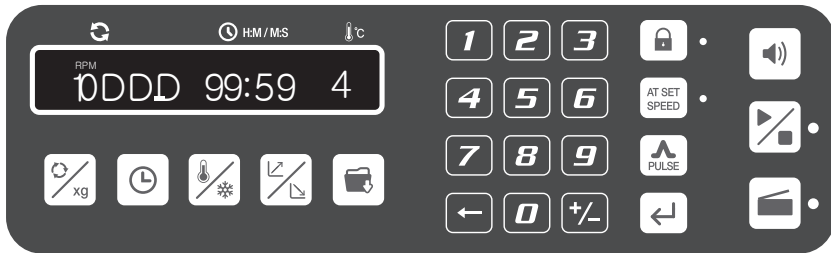

Correct Arrangement
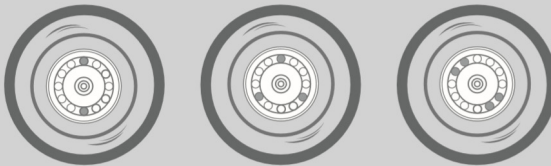
Wrong Arrangement
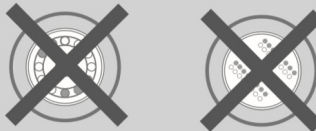
4. Operation

4.1 Control Panel

Button		Description
	RPM/RCF	For automatic conversion of RPM/RCF and to set the speed
	TIME	Use to set time, available range up to 99 hour 59 min (00:00: 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 for 'Fast Cool'.)
	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.
	Pulse	Use for quick runs
	PROG	Use to save a set of setting values or recall the saved program number
	Lid	Use to open device lid
	Start/Stop	Use to start and stop operation

4. Oeration

Button		Description
🔒	Keylock	Use for key lock mode
AT SET SPEED	AT SET SPEED	Use to count the run time once the actual run speed reaches to the set speed value 다.
🔊	Sound	Use to set the number of sound and volume

4.2 Setting RPM/RCF

Display	Button
RPM 10000_ 09:59 4	↻ / xg
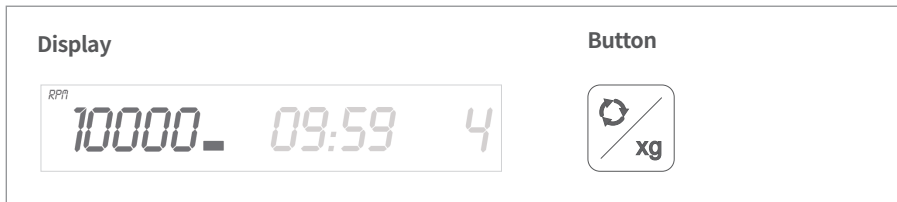
1. Press the [RPM/ RCF] button once or twice.
▶Press once: RPM mode / Press twice: RCF mode

2. Press the numeric buttons until the required RPM/RCF is display.
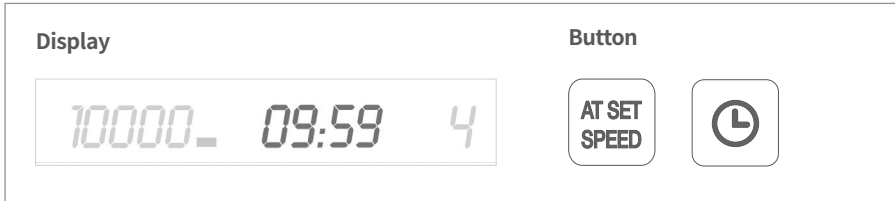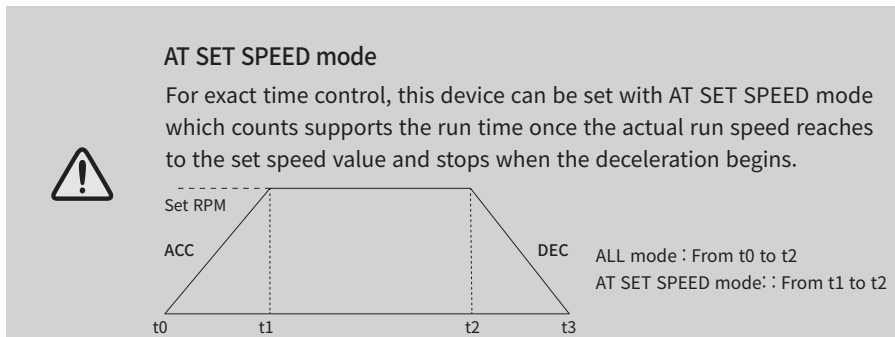▶If you do not press the number button for 15 seconds, the setting mode is cleared.
▶If wrong number is entered, touch [←] button and change the value again.

3. Press the Enter button.

4. Oeration

4.3 Setting Run Time

Display	Button
10000_ 09:59 4	AT SET SPEED 🕐

4.3.1 Setting AT SET SPEED mode

⚠️ **AT SET SPEED mode**
For exact time control, this device can be set with AT SET SPEED mode which counts supports the run time once the actual run speed reaches to the set speed value and stops when the deceleration begins.

Set RPM

ACC   DEC

ALL mode : From t0 to t2
AT SET SPEED mode : : From t1 to t2

t0   t1   t2   t3

1. Press the [AT SET SPEED] button.

### 4.3.2 Setting Run "Minute" / "Hour"

1. Press the [TIME] button once.
▶'MIN' value on LED is flickering.

2. Press the numeric 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. Press the [Enter] button to pass the 'Hour' valus setting.

4. Operation

3. Press the numeric 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.

4. Press the [Enter] button.

4.4 Setting Temperature and Fast cool

Display	Button
10000 09:59 4	❄ 🌡
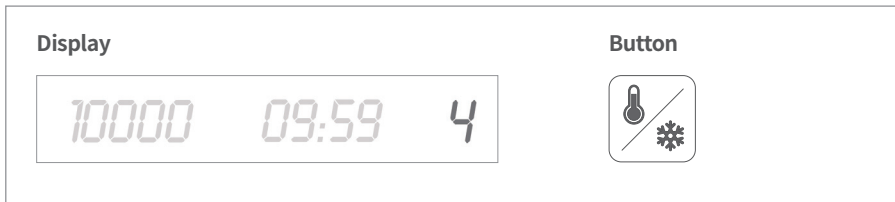
4.4.1 Setting Temperature

1. Press the [TEMP] button. Default or latest temperature value blinks on the display window.

2. Press the numeric buttons to set temperature.
▶If you touch [+/-] button, you can set -(minus) degree values.
▶If you touch [+/-] button twice, -(minus) degree is cleared.
▶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. Press the [Enter] button.

4.4.2 Setting Fast cool

1. Set the temperature. [Refer to the '4.4.1']

2. After loading the rotor, close the lid of the device.

3. Press the [Temp] button for more than 2 seconds.
▶For fast cooling, the device is refrigerated down to the set temperature in a short
   time or setting time. During the fast cooling, the rotor runs at low speed (1,000 rpm).
▶The passed time is showed on the display window.

4. Operation

## 4.5 Setting Acceleration/Deceleration

Use the adjustment function of acceleration (level: 1~9) & deceleration levels (level: 0~9) to protect sensitive samples.

Display	Button
10000_ 09:59 99	
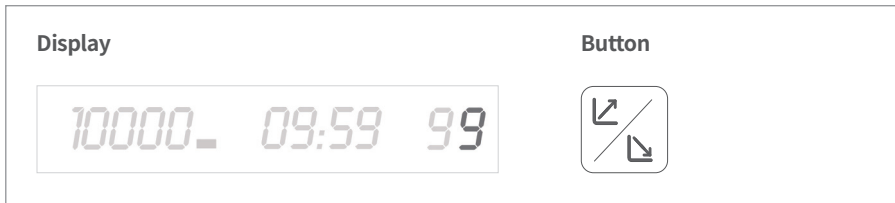
1. Press the [ACC/DEC] button.
2. Press the numeric buttons to change ACC value.
3. Press the [Enter] button.
4. Press the numeric buttons to change DEC value.
5. Press the [Enter] button.

▶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.

4.6 Start / Stop the a centrifugaton

Display	Button
10000° 09:59 4	
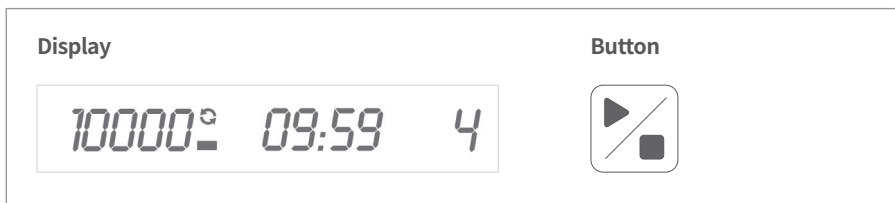
4.6.1 Stat

1.After setting the parameters, touch [Start/Stop] button.
▶During running, a 'Start LED' is turned on.
▶The device is running only when the lid is closed.
▶When you touch the [Enter] button during operation, display window shows the saved setting parameters.

4. Operation

4.6.2 Stop

1. Press the [Start/Stop] button.
▶When you touch the [Start/Stop] button twice, the operation is stopped with DEC 9.

4.7 Pulse(Short spin)

It is for quick and short spin down.

Display	Button
RPN 10000_ 09:59 4	⋀ PULSE
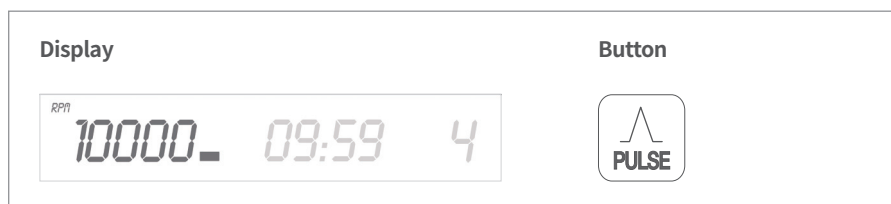
It is for quick and short spin down.
After reaching the set speed, the centrifugation is decelated and stopped.

1. Set the desired speed.
  ▶ Refer to [4.3 Setting Speed]

2. Press the Pulse button.

4. Operation

4.8 KEY LOCK

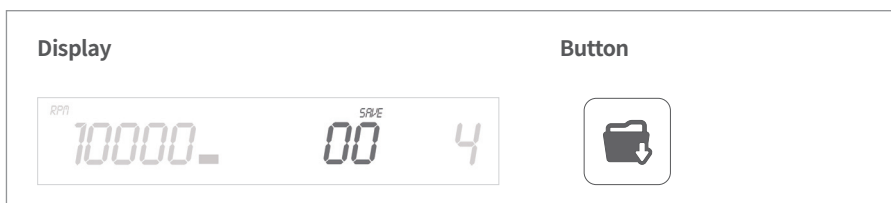| Display	Button
RPM 10000_ 09:59 4	🔒

1. Touch [KEY LOCK] button.
▶All input buttons except for [KEY LOCK] button can be locked for protocol security
(lock: LED on/ unlock: LED off)
▶If you touch the [KEY LOCK] button again in the key lock mode, the key lock mode is cleared.

4.9 Saving/Calling up a Program

Display	Button
RPM 10000_ SAVE 00 4	📁

4.9.1 Saving a Program

1. Set the parameters.

2. Press the [PROG] twice.
▶'SAVE' is turned on the display window.

3. Press the numeric buttons to change input Program number.
▶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. Operation

## 4.9.2 Calling up a Program

1. Press the [PROG] button once.
▶'CALL' is turned on the display window.

2. Press the numeric buttons to select program number you want to recall 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.

4.10 Setting Sound Pitch

Display	Button
Sound LEVEL_ 03	🔊
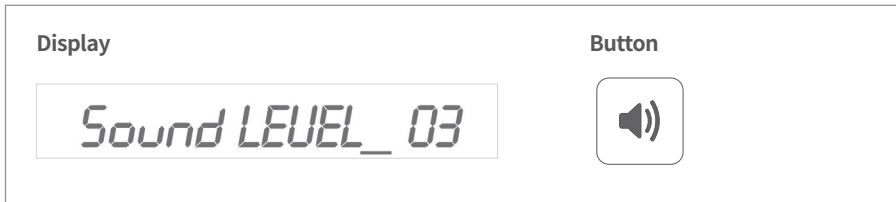
1. Touch [SOUND] button.
▶'Sound LEVEL_03' appears on the display window.

2. Press the numeric buttons to change the value for the pitch of sound.

3. Fix the value by touching [ENTER] button.
▶Sound LEVEL: 0~10 (0: silent)

4. Operation

4.11 Setting the Repeat Count of End Alarm

Display	Button
Sound rPt___03	AT SET SPEED

1. Press [AT SET SPEED] for more than 2seconds.
▶'Sound rPt' appears on the display window.

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

3. Fix the value by touching [ENTER] button.
▶The number of finishing sound: 0~99 (0: silent, 99: 99 times)

4. Operation

4.12 Emergency Lid Open

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

⚠️ · Wait for the rotor to stop completely before activating the emergency open.
· After opening the lid manually, it is recommended to wait until normal electricity comes back.

1. Find the emergency lid-lock release hole in the front body of the device and take out the white rubber closure

2. Insert the emergency lid open tool into the hole and revolve it counter clockwise until the lid is released.
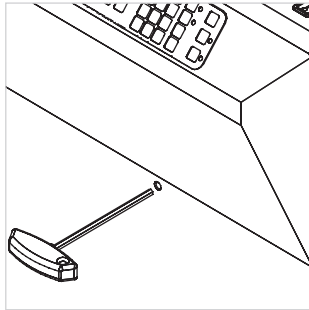
5. Maintenance

5.1 Maintenance

[Outer part of the device]
1. Clean the outside of the device 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 device. The scratches can cause corrosion on the surface of the device. If any rust appears, clean it with neutral detergents and keep dry.

[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.

[Shaft]
1. Always make special attention to clean the motor shaft to avoid any imbalance problem due to the contaminants.
2. After using the device, take out the rotor from the shaft, and clean the shaft with dry soft cloth to keep dry.

[Rotor]
1. If any parts are contaminated with samples, clean the rotor with soft wet cloth and keep the rotor dry.
2. Be careful not to make scratches inside or on the surface of rotors. Any small scratches can cause corrosion of the rotor and big damage to the device.
3. If you do not use the device, keep the rotor separately from the motor shaft and stand it upside down.

[Transportaion]
1. If you need to move or ship the device, be cautious to protect the motor shaft from any physical impact or turbulence.
2. Do not mount a rotor in any cases of movement. Fill inside the chamber with proper materials to keep the motor shaft on place and not to be influenced by physical pressure.

5. Maintenance

5.2 Care Instructions for Refrigerated device

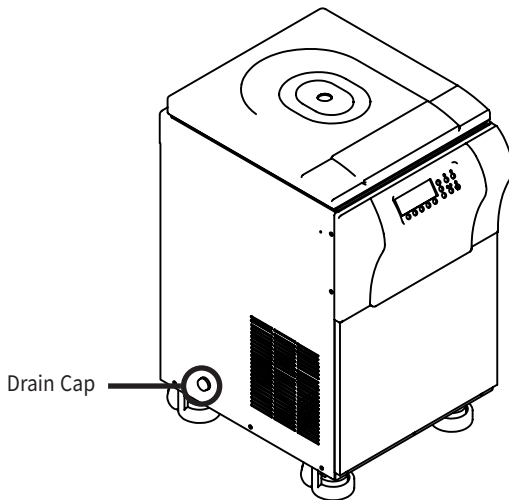**[Open the lid after centrifugation]**
1. Wipe up the moisture in the chamber with a soft cloth.

2. Leave the centrifuge lid open after centrifugation.

[Remove the condensation water]
1. There is a drain cap on the leftside of the device.
Remove the drain cap and empty condensation water regularly.

[Remove dust]
1. Remove any dust from the ventilation slits regularly.

Drain Cap

6. Trouble Shooting

6.1 Check list

Symptom	Check List
Power failure	Connect the AC Power cord and make sure that the line is completely connected between the device and power outlet. Check the power switch is turned on.
Can't be started	If the lid is not closed completely, the device 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, open the lid with emergency lid open tool manually for safety of sample.
Can't close the lid	Remove the dirt at the lid latch and then close the lid completely again. If the lid seems not being closed by mechanical reason, please contact our service team.
Noise and vibration during running	If the device is installed on the unstable floor, please install again on the solid flat floor horizontally.
	If the rotor is not coupled appropriately, disassemble the rotor and then check the appearance of rotor. If you find the damage of rotor, immediately discard it.
	Check balances of samples in the rotor. and load the same weight of samples symmetrically.

6. Trouble Shooting

6.2 Error codes

Error codes	Possible causes	Actions
E1	RPM Sensor	- Shut off the power supply, and then, turn on the power switch again to check the device. - If the error code shows continuously although you try to operate again, please contact us.
E2	Lid	- If the lid opens during the device running or is troubled in lid sensor, this message is appeared
E3	Motor Overheating	- 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 device. - If the error code shows continuously, please contact us.
E4	Low Voltage	- 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). - Use AVR to provide proper power.
E5	High Voltage	- 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.
E6	Over Speed	- If the device 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 device.
E7	Software	- If the installed software has bugs, this message is appeared. - Tuning the firmware (Download)
E8	Imbalance	- Check weight-balances of samples
E9	Inner temperature over or Inner temperature sensor error	- If the function of rotor recognition is failed, this message is appeared. - This message will be cleared by coupling an appropriate rotor. - If the error code shows continuously, please call Hanil tech support or place of purchase.
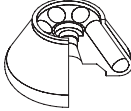
6. Trouble Shooting

6.2 Error codes

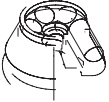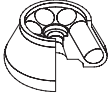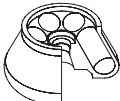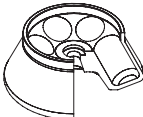| Error codes	Possible causes	Actions
E11	Chamber Temp error	- If the device is not reached to setting temperature within an hour, this message is appeared. - No user action. Please call Hanil tech support or place of purchase.
E12	Temp. Sensor Error	- If there is a faulty in the temperature sensing of chamber or over heated, this message is appeared. - No user action. Please call Hanil tech support or place of purchase.
E15	Motor Temp. Sensor	- If the motor temperature sensor can't recognize, this message is appeared. - No user action. Please call Hanil tech support or place of purchase.
E16	Comp. Temp. Sensor	- If the temperature of compressor is over heated up, this message is appeared. - No user action. Please call Hanil tech support or place of purchase.
E17	Communi-cation error	- If insecure communication arises among Main-Display-I/O, this message is appeared. - No user action. Please call Hanil tech support or place of purchase.
E20-27	Lid Lock	- If the sensors or cables of the lid lock system do not normally work, this message is appeared. - Please call Hanil tech support or place of purchase.

7. Rotors and Accessories

Fixed Angle Rotors

Rotor		Tube Capacity Bottom Type	Required Adaptor	Bore Ø x L (mm) Radius (mm)	Max. RPM (rpm) Max. RCF (xg)
A2.0-36	Hole angle : ∠30° Max. Capacity : 36 x1.5/2.0 mL Size (ø x H) : ø240 x 64 Max. height for tube fit : 49 mm Incl. a coupling bolt lid	1.5/2.0 mL Micro-filter tube	-	11 x 37.5 115.7	15,000 29,104
		0.5 mL	TR0.5	8 x 37 111	15,000 27,922
		0.2 mL	TR0.2	6 x 21 100	15,000 25,155
A10-12	Hole angle : ∠36° Max. Capacity : 12 x 10 mL Size (ø x H) : ø179.9 x 82 Max. height for tube fit : 87.1 mm Incl. a coupling bolt lid	10 mL Round	-	16.3 x 74.5 85.1	17,000 27,496
A15-12	Hole angle : ∠30° Max. Capacity : 12 x 15 mL Size (ø x H) : ø222.7 x 106 mm Max. height for tube fit : 121 mm Incl. a coupling bolt lid	15 mL Round	-	17 x 96 106	17,000 34,249
A15c-12	Hole angle : ∠36° Max. Capacity : 12 x 15 mL conical Size (ø x H) : ø215 x 121 Max. height for tube fit : 123.2 mm Incl. a coupling bolt lid	15 mL Conical	-	17 X 115 99.4	15,000 25,004
A50-6	Hole angle : ∠30° Max. Capacity : 6 x 50 mL Size (ø x H) : ø200 x 109 mm Max. height for tube fit : 122.7mm Incl. a coupling bolt lid	50 mL Round	-	29 x 100 96.1	17,000 31,050
		15 mL Round	TR15(50)	17 x 94 89.9	17,000 29,047
		15 mL Conical	TR15c(50)	17 x 105 91	17,000 29,402

7. Rotors and Accessories

Fixed Angle Rotors for Supra Series (2)

Rotor		Tube Capacity Bottom Type	Required Adaptor	Bore Ø x L (mm) Radius (mm)	Max. RPM (rpm) Max. RCF (xg)
A50c-6	Hole angle : ∠23° Max. Capacity : 6 x 50 mL conical Size (ø x H) : ø205.7 x 119 mm Max. height for tube fit : 118.1 mm Incl. a coupling bolt lid	50 mL Conical	-	30 x 108.6 91	15,000 22,891
A50-8	Hole angle : ∠30° Max. Capacity : 8 x 50 mL Size (ø x H) : ø213 x 110.7 mm Max. height for tube fit : 110.7 mm Incl. a coupling bolt lid	50 mL Round	-	29 x 100 98.9	15,000 24,878
		15 mL Round	TR15(50)	17 x 94 92.8	15,000 23,344
		15 mL Conical	TR15c(50)	17 x 105 93.9	15,000 23,621
A85-6	Hole angle : ∠25° Max. Capacity : 6 x 85 mL Size (ø x H) : ø209.1 x 112 mm Max. height for tube fit : 115.4 mm Incl. a coupling bolt lid	85 mL Round	-	38.3 x 95 97.6	15,000 24,551
		50 mL Round	TR50(85)	29 x 95 92.9	15,000 23,369
		50 mL Conical	TR50c(85)	29.5 x 100 93	15,000 23,394
		15 mL Round	TR15(85)	17 x 94 89	15,000 22,388
		15 mL Conical	TR15c(85)	17 x 100 89.2	15,000 22,438
A250-6	Hole angle : ∠25° Max. Capacity : 6 x 250 mL Size (ø x H) : ø295.6 x 147.8 mm Max. height for tube fit : 132 mm Incl. a coupling bolt lid	250 mL Flat	-	62 x 103 138.3	10,000 15,462

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