LABOGENE
Scandinavian by Design

INSTRUCTION MANUAL

Multi-Purpose, High Speed Centrifuge

ScanSpeed
Model 1248R/1580R

Cat. No. : 701329

CE

LaboGene A/S
Bjarkesvej 5
DK-3450 Allerød
Denmark

Phone No. +45 39 40 25 66
Fax No. +45 39 95 25 66

Mail info@labogene.com
Internet www.labogene.com

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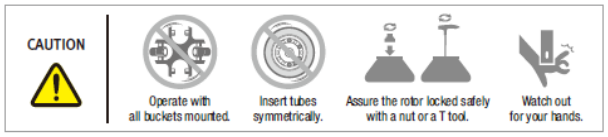
1 MEANINGS OF SYMBOLS & SAFETY PRECAUTIONS

1.1 Meanings of Symbols

1.1.1 Symbols on the device

Symbol	Meaning	Symbol	Meaning
	Attention and warning.		Attention and warning for electric shock
	Attention and warning for correct way of sample balancing in the rotor. Attention and warning for rotor coupling. Attention and warning for door opening and closing		

1.1.2 Symbols in this document

Symbol	Meaning	Symbol	Meaning
	This symbol refers to safety relevant warnings and indicates possible dangerous outcomes.	☞	Note. This symbol refers to the important reminder.

1.2 Safety Precautions

Before using the instrument, please read this operation manual to ensure correct usage. Incorrect handling of the instrument could possibly result in personal injury or physical damage on the instrument or its accessories.

1. ALWAYS locate the instrument on a flat, rigid and stable table capable of withstanding the weight of the instrument and its spinning operation.

2. ALWAYS make a safety zone of 30 cm around the centrifuge to indicate that neither hazardous materials nor persons should be permitted within the area during operation.

   ✓ ALWAYS position the instrument with enough space on each side of instrument to ensure proper air circulation.

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3. ALWAYS install the instrument within a temperature and humidity controlled environment. (Permissible ambient temperature: +5°C ~ +35 °C, Relative humidity: ≤ 85%)

4. Before connecting the power, check the rated voltage.

5. Should not use unapproved rotors and accessories.

   ✓ Only use rotors from Gyrozen Co., Ltd. with appropriate centrifugal tubes and suitable adaptors to embrace sample containers tightly enough inside rotors.

6. Before operating the instrument, check if the rotor and the rotor lid are securely fastened.

   ✓ Should operate the instrument with a rotor properly installed and secured to the motor shaft.

7. Mount the rotor on the motor shaft properly, check it with spinning manually.

8. Do not stop the rotor by touching with hand during the instrument is running.

9. Emergency door open should be performed only when spinning is completely stopped.

10. Should not exceed the rated speed or specific gravity. Samples whose density is greater than 1.2g/ml must have reduced maximum rotational speed to avoid rotor failure.

11. The sample content should not exceed 80% of total capacity of a tube. Otherwise, it would cause spillage of sample fluid and even the tube breakage.

12. ALWAYS load the tubes symmetrically with evenly weighted samples to avoid rotor imbalance. If necessary, use the water blank to counterbalance the unpaired sample.

13. The operation speed should not exceed the highest value of the individual guaranteed g-forces of each the centrifuge, rotor, bucket or adaptors and sample container, especially the guaranteed g-force of sample container should not be neglected.

14. The rotors should be cleaned and kept dry after every use for longer life and safety.

15. ALWAYS disconnect the power supply prior to maintenance care and service to avoid electrical shock.

16. ALWAYS use proven disinfection procedures after centrifuging biohazardous materials.

17. Should not centrifuge flammable, toxic, radioactive, explosive, or corrosive materials.

18. When it is necessary to use toxic or radioactive materials or pathogenic micro-organisms which belong to the Risk Group II of WHO: “Laboratory Bio- safety Manual,” should follow national regulations.

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- ✓ Do not place dangerous materials within 30 cm distance around the instrument, and that is also recommended by IEC 61010-2-020.
- ✓ Use the emergency door open function only when the door button on the control panel is du mb under the condition of complete stop of rotor running.
- ✓ Never try to open or move the instrument if it is not completely stopped.
- ✓ If the power input is more than +/- 10% of the recommended voltage or fluctuates frequentl y, it may cause malfunction of the instrument and often result serious damage.
- ✓ Install the instrument at the place without any kind of corrosive gases.

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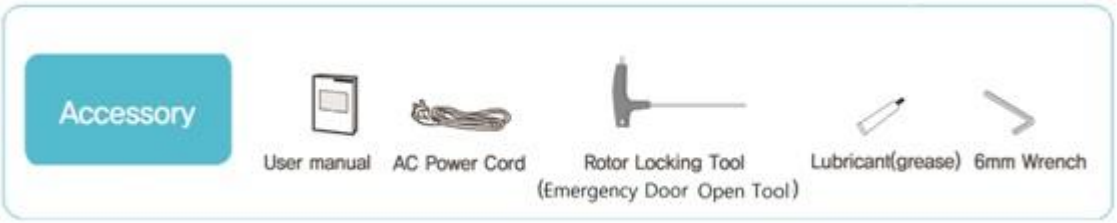
2 PRODUCT DESCRIPTION & TECHNICAL SPECIFICATIONS

2.1 Product Description

1 Door
2 Power Socket
3 Display & Control Panel
4 Power Switch
5 Manual Door Opening Hole



2.2 Technical Specifications

Max. RPM/RCF	Fixed angle	12,000 rpm / 16,582 xg	15,000 rpm / 21,910 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 (℃)		-20 ~ +40	
Fast Cool button		Yes	
Time control		Timed < 10 hr or continuous	
RPM/RCF conversion		Yes	
Noise level (dB)		≤60	

Acc/Dec	9/10 steps	
Program memory	100	
Rotor Identification	Automation	
Imbalance cutout	Yes	
Display	Blue LCD	
Safety lid lock	Yes	
Lid drop protection	Yes	
Radius correction	Yes	
Power supply(V/Hz)	220/50~60 (110V optional)	
Power requirement(KVA)	2.5	
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.	SS-1248R	SS-1580R

☞ This instrument has following functions for safety.

1. Automatic rotor identification function.
2. Automatic detection and alarms for imbalance, excess speed and heating.
3. Automatic door lock function.

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 bottom 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 it up on the flat table.
3. To disassemble the Motor Protecting Devices, use the additionally supplied 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 Door Release

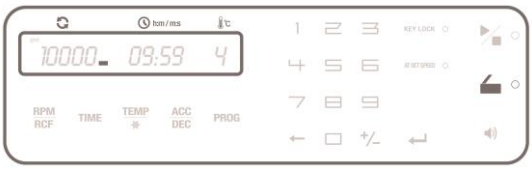
Action

4.1.1 Power On/Off

1. After connecting the AC Power cord at the power socket on the right back of the instrument, turn on the Earth Leakage Breaker Switch.
   - ➢ Check the proper power.

2. Turn on the instrument by pressing a 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.

4.1.2 Door Release



1. For opening the door, touch the [DOOR] button.
   - ➢ Should touch the [DOOR] button When the door is closed (Door LED shows off)
   - ➢ Close the door until hearing clank shut.
   - ➢ When the door is opened, the door LED turns on.

☞
- ✓ The door is not opened while the instrument is running.
- ✓ If the door is opened, the instrument could not be operated even with pressing the ‘Start’ button.
- ✓ For operational safety, this instrument has the automatic rotor recognition function.
- ✓ When you supply the power, “Rotor Scan…” will be appeared. If the rotor is absent, the “Error 9” will be appeared. This message will be cleared after rotor coupling and running.
- ✓ The door is not automatically opened after finishing operation to keep the sample at proper temperature.
- ✓ Power Failure: If there is any power failure during operation, door is not opened with ‘Door’ button. Door can be opened only when the operation is completely stopped and the power is on again. If you want to open the door at the power failure, please refer to ‘5-9. Emergency Door Open’.

4.2 Rotor Coupling and Disassembling

Action

1. Before coupling a rotor, clean the motor shaft and chamber with soft dry towel.

4.2.1 Swing-Out Rotor

2. Mount a proper rotor into the motor shaft.
3. Grasp the rotor with one hand, and place Rotor Locking Tool  at the center hole of the rotor.
   - To assemble the rotor: Rotate the Rotor Locking Tool clockwise until tightly assembled.
   - To disassemble the rotor: Rotate the Rotor Locking Tool counterclockwise.

4. Hang the appropriate buckets into the rotor.
   - Load the identical bucket at each wing for safety. (Do not le ave a vacant wing without bucket. All wings should hold ide ntical bucket.)
   - Remove dirt and dust around hooks of rotor and hanging part of bucket.
5. Spin the rotor manually to check if bucket swinging is free enough and ever. If they do not swing freely, apply the Lubricant (grease) to the linking area.

4.2.2 Fixed Angle Rotor

2. Mount a proper rotor into the motor shaft.
   Grasp the rotor with one hand, and place the Rotor Locking Tool at the center hole of the rotor.
   - To assemble the rotor: Rotate the Rotor Locking Tool clockwise until tightly assembled.
   - To disassemble the rotor: Rotate Rotor Locking Tool counterclockwise.

3. To close of the rotor lid, rotate the rotor lid nut clockwise.
   - For opening lid: rotate the rotor lid nut 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.

☞ For operational safety, this instrument has the automatic rotor recognition function.

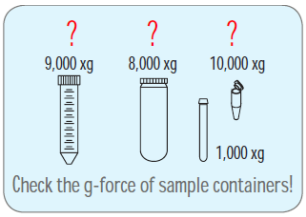
4.3 Positioning of Sample Tubes

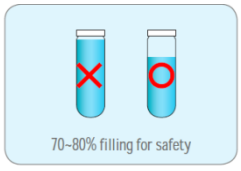
Action

1. Before loading sample tubes, check the water drop or dirt in the rotor hole or inner adaptor.
   - ➢ If there is a water drop or dirt in the rotor hole or inner adaptor, remove it with soft dry cloth.

2. Tubes should be placed in the rotor with same amount of samples at symmetrical positions.
   - ➢ Only use appropriate centrifugal tubes and do not exceed the speed beyond the tube's max g-force.
   - ➢ For safety, fill the sample for 70~80% in the tubes.

Correct Way of Sample Balancing and Tube Usage





✓ If the number of samples is not in pair, please load the control tubes at each symmetrical pos ition. Otherwise, it results noise and vibration, which eventually damage the instrument

☞ 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.

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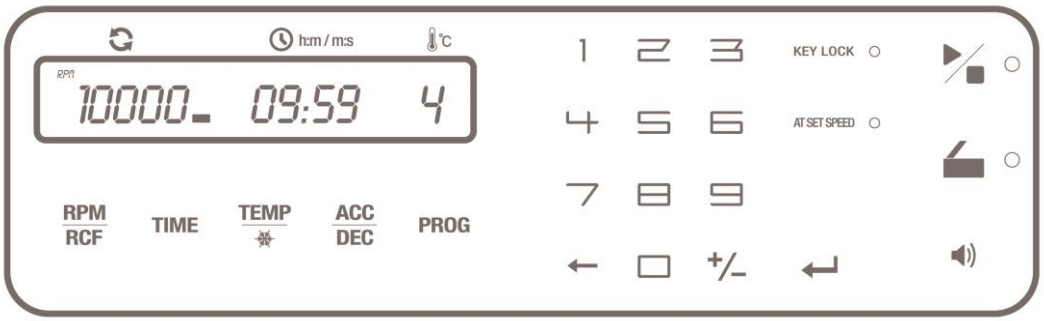
5 OPERATION

5.1 Key Functions of Control Panel

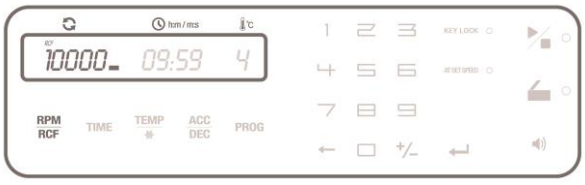


□ RPM/RCF	For automatic conversion of RPM/RCF and to set the speed
□ TIME	Use to set time, available range up to 9 hour 59 min (00:00: continuous)
□ Temp	Use to set temperature (-20°C ~ 40°C) Use to reach rapid refrigeration up to the setting temperature. (touch for more than 2 seconds.)
□ ACC/DEC	Use 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
□ Enter	Use for completion of data setting
□ Start/Stop	Use to start and stop operation
□ Door	Use to open instrument lid
□ Sound	Use to set the number of sound and volume

5.2 Setting the RPM/RCF Value

Action

5.2.1 Setting the RPM Value

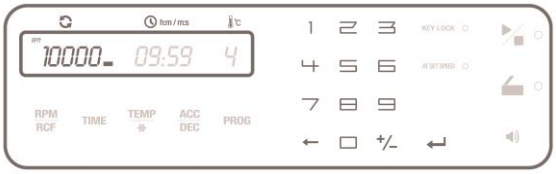


▶ Speed setting unit: 10 rpm/ 1xg

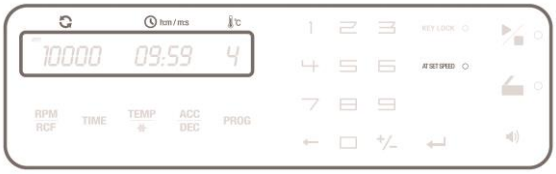
1. Touch the [RPM/ RCF] button once.

- RPM MODE is generated with touching a [RPM/ RCF] button once.
- RCF MODE is generated with touching the [RPM/ RCF] button twice.
- RPM/ RCF LED is flickering at the display window.

2. Touch the number buttons to change input value.
   - If you do not touch the number button 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

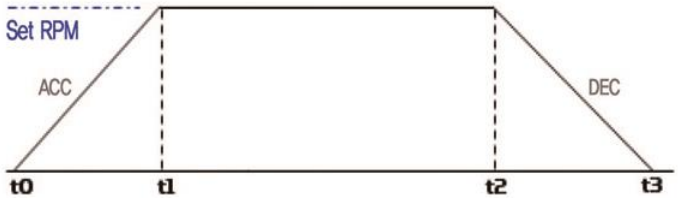
Action

5.3.1 Setting the AT SET SPEED mode

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

AT SET SPEED Mode

For exact time control, this instrument 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.



*[AT SET SPEED] lamp turns on: From t1 to t2
*[AT SET SPEED] lamp turns off: From t0 to t2

5.3.2 Setting the 'MIN/ HOUR' Value

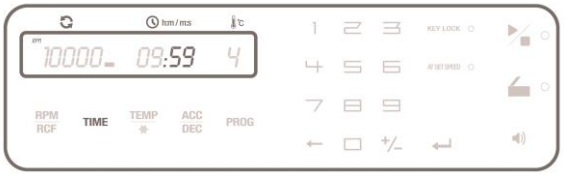
▶ Speed setting unit: 1hr. / 1 min.

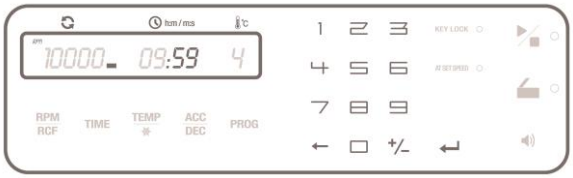
Action

✓ 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.



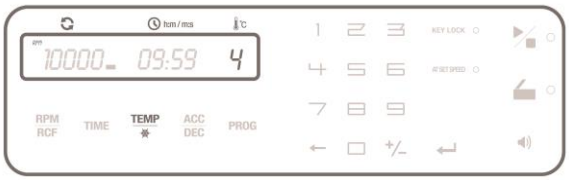


5.4 Setting Temperature and Fast Cool

Action

5.4.1 Setting Temperature

- ▶ Temperature can be set from -20℃ to 40℃
- ▶ Temp setting unit: 1 ℃



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

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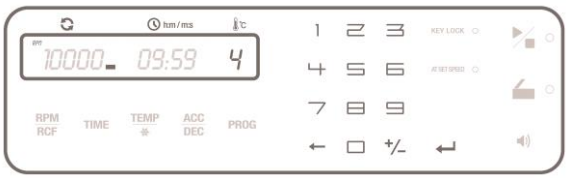
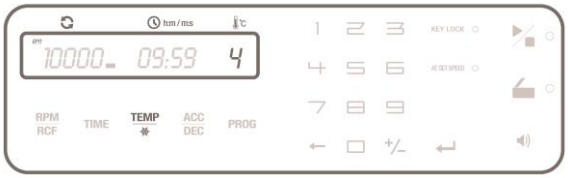


5.4.2 Fast Cool



1. Setting the temperature. (Please refer to 5-4-1. Setting Temperature)
2. After installation of the rotor and closing the door of instrument, touch 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 (1,000 rpm).
   - ➢ The passed time is showed on the display window.

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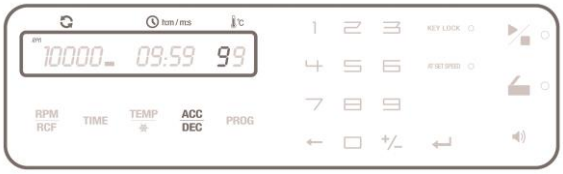
☞
- ✓ If you'd like to load your sample tubes before pressing the [Fast Cool] button, please check if the sample is safe during spinning at 1,000 rpm.
- ✓ Before starting Fast Cooling, please check the rotor coupling and symmetry of sample tubes.

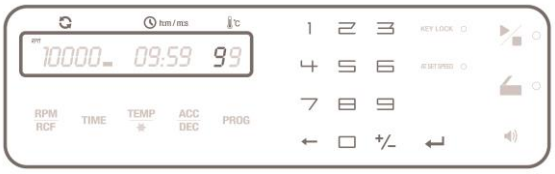
5.5 Acceleration / Deceleration

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

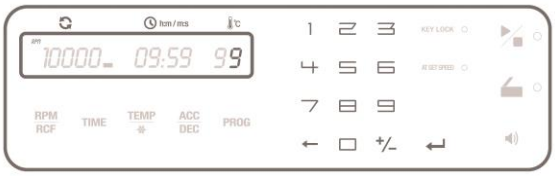
Action



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. Fix the ACC level by touching [Enter] button.
4. Touch the number buttons to change input DEC value.
   - ➢ Input the desired level of DEC from 0 to 9. (Level 0: Natural deceleration / Level 9: The fastest deceleration)

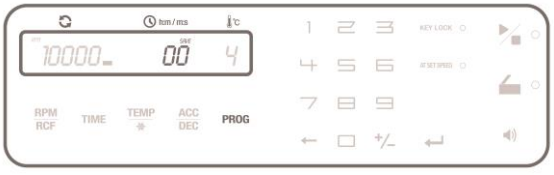


   - ➢ If you do not touch the number button for 15 seconds, the setting mode is cleared.
   - ➢ If wrong number is entered, touch [←] button and change the value again.
5. Fix the DEC level by touching [Enter] button.

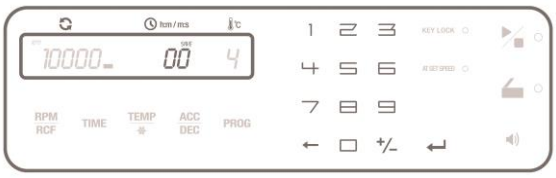
5.6 Program Saving & Recalling

Action

5.6.1 Program Saving



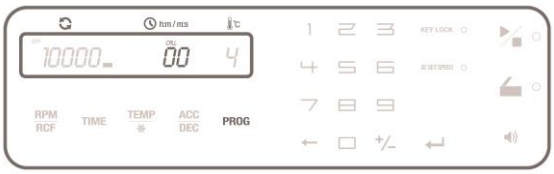
1. Set parameters. (Refer to 5-2 ~ 5-5)
2. Touch the [PROG] button twice.
   - ➢ 'SAVE' is turned on the display window.



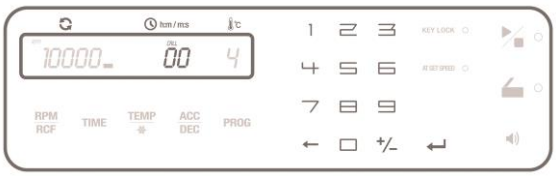
3. Touch the number buttons to change input Program number.
   - ➢ If you do not touch the number button for 15 seconds, the setting mode is cleared.
   - ➢ Save up to 100 programs. (Program numbers from 00 to 99).
   - ➢ If wrong number is entered, touch [←] button and change the value again.

4. 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.

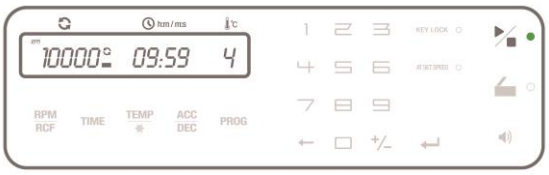


2. Touch the number buttons to select program number you want to recall and then touch the [Enter] button.
   - ➢ If you do not touch the number button for 15 seconds, the setting mode is cleared.
   - ➢ If wrong number is entered, touch [←] button and change the value again.

5.7 Start/Stop

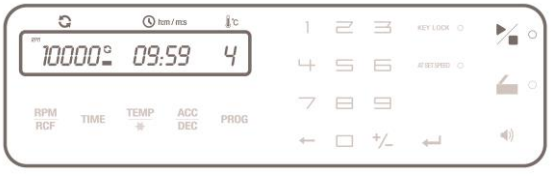
Action

5.7.1 Start



1. After setting RPM/RCF and Time, touch [Start/Stop] butt on.
   - ➢ During running, a 'Start LED' is turned on.
   - ➢ The instrument is running only when the door is closed.
   - ➢ When you touch the [Enter] button during operation, display window shows the saved setting parameter s

5.7.2 Stop



1. In case of touching the [Start/Stop] button, the operation

is stopped.

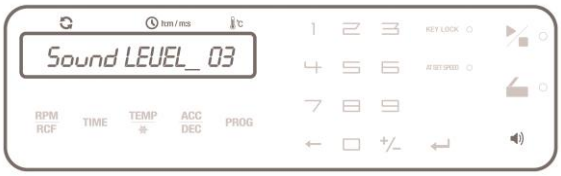
- When you touch the [Start/Stop] button twice, the operation is stopped with DEC 9.

5.8 Setting the Number of Sound and Volume

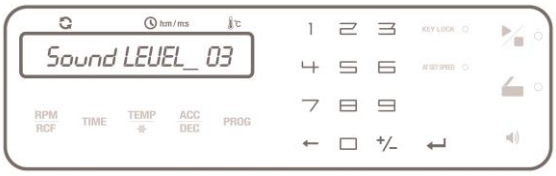
The number of finishing sound and its volume can be controlled in the user mode.

Action

5.8.1 Setting the Volume of Finishing Sound



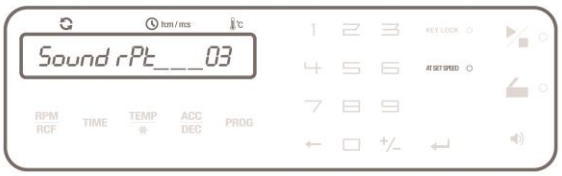
1. Touch [Sound] button.
   - ‘Sound LEVEL_03’ appears on the displa y window.



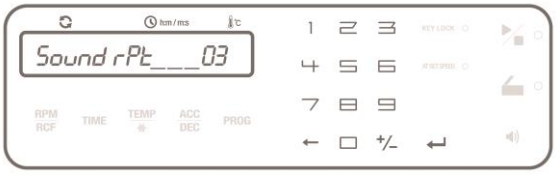
2. Touch the number buttons to change the value for the number of sound.

3. Fix the value by touching [Enter] button.
   - Volume: 0~10 steps (0: silent)

5.8.2 Setting the Number of Finishing Sound



1. Touch [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 number of sound.

3. Fix the value by touching [Enter] button.
   - The number of finishing sound: 0~100 (0: silent, 100: 100 times)

5.9 Emergency Door Open

For emergency door opening, you can use the Emergency Door Open Tool when the instrument is completely stopped. The door can be unlocked manually with the Emergency Door Open Tool through the emergency door opening hole.

Action

1. Find the emergency door open hole in the front body of the instrument and take out the white rubber closure.
2. Insert the Emergency Door Open Tool into the hole and revolve it counter clockwise until the door 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 door manually, it is recommended to wait until normal electricity comes back.

6 MAINTENANCE

6.1 Outer part of Instrument

1. Clean the outside of 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 s urface of the instrument.

✓ 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.

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6.3 Shaft

1. Always make special attention to clean the motor shaft to avoid any imbalance problem due to the contaminant s.
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. 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 instrument.
3. If you do not use the instrument, keep the rotor separately from the motor shaft and stand it upside down.

6.5 Transportation of Instrument

1. If you need to move or ship the instrument, be cautious to protect the motor shaft from any physical impact or tu rbulence.
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 Door Release)
Don't run	If the door is not closed completely, the instrument can't run. Check the Door LED on the display window and close the door completely.
Can't open the door	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 door with emergency door open tool manually for safety of sample. (Please refer to 5-9. Emergency Door Open)
Can't close the door	Remove the dirt at the door latch and then close the door completely again. If the door seems not being closed by mechanical reason, please contact our service team.
Noise and vibration	Please check the balanced status of both the table and the instrument.

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during running	Please re-check the coupling status of the following three matches to minimize the noise 1. the balanced way of coupling of the rotor into the motor shaft 2. the completeness of fixing of the Rotor Locking Nut on the rotor 3. the matching status of Rotor Lid with the rotor (Please refer to 4-2. Rotor Coupling and Disassembling)
	Check balances of samples in the rotor. (Please refer to 4-3. Positioning of Sample Tubes) and load the same weight of samples symmetrically.

7.2 Error Code

If the instrument shows the error code with beeping sound, press 'STOP' button to stop the beeping sound and press 'Enter' button to release of the error status and make the instrument go to the default setting again.

Error	Possible Causes	Actions
Error 1	RPM Sensor	- 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 us.
Error 2	Door	- If the door opens during the instrument running or is troubled in door sensor, this message is appeared. -Remove the dirt at the door latch and then close the door completely again. Check the Door LED on the display window. If the error code shows continuously, please call a Field Service Engineer.
Error 3	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 instrument. - If the error code shows continuously, please contact us.
Error 4	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.
Error 5	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.
Error 6	Over Speed	- 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	Software	- If the installed software has bugs, this message is appeared.

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		- Tuning the firmware (Download)*
Error 8	Imbalance	- Check weight-balances of samples (Please refer to 4-3. Positioning of Sample Tubes) and then turn off and on the instrument for checking.
Error 9	Rotor ID or RPM Sensor	- If the function of rotor recognition is failed, this message is appeared. - This message will be cleared by coupling an appropriate rotor (Please refer to 4-2. Rotor Coupling and Disassembling.) - If the error code shows continuously, please call a Field Service Engineer.
Error 11	Chamber Temp. Error	- If the instrument is not reached to setting temperature within an hour, this message is appeared. - No user action. Please call a Field Service Engineer.
Error 12	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 a Field Service Engineer.
Error 15	Motor Temp. Sensor	- If the motor temperature sensor can't recognize, this message is appeared. - No user action. Please call a Field Service Engineer.
Error 16	Comp. Temp. Sensor	- If the temperature of compressor is over heated up, this message is appeared. - No user action. Please call a Field Service Engineer.

* Any wire disconnection or tuning of the instrument must be performed only by a service engineer who is authorized by GYROZEN Co., Ltd.

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8 DECLARATION OF CONFORMITY

Declaration of conformity

We declare under our responsibility, that the following product:

Model: ScanSpeed 1248R Refrigerated Multi-purpose Centrifuge

to which this declaration relates is in conformity with the following standard(s), directives or other normative document(s):

In compliance with:

EN 61010-1 - Safety requirements for electrical equipment for measurement, control and laboratory use - General requirements

EN 61010-2-020 - Safety requirements for electrical equipment, control and laboratory use - Particular requirements for laboratory centrifuges

EN 61000-6-1 - Electromagnetic compatibility - Generic immunity/emission standard

EN ISO 11201 – Acoustics – Noise emitted by machinery and equipment

Following the provisions of:

2006/42/EC - Machinery Directive, as amended

2006/95/EC - Low Voltage Directive, as amended

2004/108/EC - EMC Directive, as amended

2011/65/EU - RoHS Directive

2012/19/EU - WEEE Directive

Allerød, November 2018

Rasmus Sørensen
QA Manager
LaboGene A/S, Bjarkesvej 5, 3450 Allerød, Denmark

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Scandinavian by Design

Declaration of conformity

We declare under our responsibility, that the following product:

Model: ScanSpeed 1580R Multi-purpose Refrigerated High Speed Centrifuge

to which this declaration relates is in conformity with the following standard(s), directives or other normative document(s):

In compliance with:

EN 61010-1 - Safety requirements for electrical equipment for measurement, control and laboratory use - General requirements

EN 61010-2-020 - Safety requirements for electrical equipment, control and laboratory use - Particular requirements for laboratory centrifuges

EN 61000-6-1 - Electromagnetic compatibility - Generic immunity/emission standard

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QA Manager
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