

Multi-purpose/ Large Capacity, High Speed Centrifuge

1736R/1096R

User' s Manual



Manufacturer: Baygene Company Limited

4th Floor, Area B, Building 1, No. 505 ZiYue Road, Minhang District, Shanghai

Tel:(021)-6728-5083 Fax:(021)-6420-5380

Let Professionals Serve Professionals!

GENESPEED®



THE BEST FUNCTIONAL QUALITY

- ☑ Manufactured and tested to IEC standards, stable spinning operation within +/-2% variation
- ☑ Steady and soft deceleration with dynamic brake technology
- ☑ Unique internal fan for effective temperature control
- ☑ High-capacity, strong compressor ensures fast cooling of chamber and samples
- ☑ Fast cooling function to 4°C in 5 minutes for fast start up of cooled samples
- ☑ Automatic rotor identification
- ☑ Automatic RPM/RCF conversion



SAFETY and ROBUSTNESS

- ☑ Sturdy structured, two or three layered lid for noise-minimized and safe operation
- ☑ Safety lid lock scheme for safe and reliable work environment
- ☑ Lid lid protector protecting the operator and samples
- ☑ Automatic rotor identification for safe operation
- ☑ Automatic detection and warning for imbalance, excess speed and over-heating
- ☑ Emergency lid-lock release for power blackout or sudden stoppage
- ☑ The eco-friendly compressor-off function on when lid is open
- ☑ The aerosol tight buckets and rotors to prevent contamination
- ☑ Autoclavable and corrosion-free rotors

Wide range of modern centrifuges for a wide variety of laboratory applications



CONVENIENCE IN OPERATION

- ✓ Soft touch button/screen with intuitive controls
- ✓ Highly legible blue and white LCD display
- ✓ Time control functions of pulse, timed and continuous
- ✓ Automatic RPM/RCF conversion
- ✓ Easy to check actual rotation through the viewing port in the lid
- ✓ Program memory up to 100 (or 10) programs
- ✓ Automatic rotor identification
- ✓ Automatic lid release at the completion of spinning
- ✓ A large assortment of rotors, buckets and adaptors for diverse applications



EASY CUSTOMIZATION

- ✓ Any rotors, sample containers and adaptors can be customized upon specified requirement
- ✓ High flexibility of structural & functional modifications



CERTIFICATES AND REGISTRATIONS

- ✓ Accredited with ISO 9001, ISO 13485, and KGMP
- ✓ Comply with CE conformity

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1. Meanings of Symbols & Safety Precautions

1-1. Meanings of Symbols

1-1-1. Symbols on the instrument

Symbol	Meaning	Symbol	Meaning
	Attention and warning.		Attention and warning for electric shock
		<p>Attention and warning for correct way of sample balancing in the rotor.</p> <p>Attention and warning for rotor coupling.</p> <p>Attention and warning for lid opening and closing</p>	

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 floor 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.
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 Baygene Company Limited 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 lid 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 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 Biosafety Manual," should follow national regulations.



- ✓ 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 lid open function only when the lid button on the control panel is dumb under the condition of complete stop of rotor running.
- ✓ Never try to open or move the instrument if it is not completely stopped.

Temp. range (°C)	-20 ~ +40	-10 ~ +40
FAST cool button	Yes	
Time control	Pulse, timed < 10 hr or continuous	
Time counting modes	Selectable, at set speed or from starting	
RPM/RCF conversion	Yes	
Noise level (dB)	≤ 56	
ACC/DEC	9/10 steps	
Program memory	100	
Parameters on display window	RPM (RCF), Oper Status Lid Open/Close, Hr : Min, Temp, ACC, DEC	
Display	Blue LCD	
Automatic rotor Identification	Yes	
Imbalance cut-off	Yes	
Safety lid lock	Yes	
Lid drop protection	Yes	
Motorized lid open & close	Yes	
Power supply(V/Hz)	220/50~60 (110V optional)	
Power requirement	2,500VA	3KVA
Dimension(W x D x H, mm)	473 x 600 x 840	643 x 762 x 850
Weight without rotor (kg)	110	180
CE mark	Yes	Yes
Cat. No.	GS-1736R	GS-1096R

 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 lid lock function.

3. Preinstallation Requirements.

3-1. Environmental Requirement

1. Install the instrument on the flat and rigid floor. If you place the centrifuge on the slopping area, the motor shaft might be distorted by the rotor weight and centrifugal force.
2. Install the instrument about 30cm away from the wall for the air circulation. It is also recommended to install the instrument at the dustless place as much as possible.
3. Install the instrument at the place with appropriate temperature and humidity. It has to be maintained at the proper temperature & humidity. (Permissible ambient temperature: +5°C – +35 °C, Relative humidity: 30% ~ 85%)
4. Install the instrument at the place without any kinds of corrosive gases.

3-2. Electricity Requirement

1. Check the proper voltage of your instrument and connect to adequate power outlet.
2. If the power input is more than +/- 10% of the recommended voltage or fluctuates frequently, it may cause malfunction of the instrument and often result serious damage.

3-3. Unpacking

1. Untie the plastic banding over the paper box and get rid of box from the instrument main body.
2. Unwrap the vinyl coat surrounding the main body.
3. Place the instrument on a proper place by moving instrument's wheel.
4. Removal of Safety Padding

4. Installation

4-1. Balance Adjustment

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

Action

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

1. Place the Bubble Leveler on top of the instrument.
Try to locate all bubbles in the center of the Bubble Leveler with rotating the red gear which is in caster of the instrument.
2. Adjust the height of four – wheel, which is at the bottom of the instrument with rotating the red gear (which is in caster of the instrument) for the first balance adjustment. (For the final balance adjds



4-2. Power On/Off and Lid Release

Action

4-2-1. 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 a power switch on the right 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.



4-2-2. Lid Release

1. For opening the lid, touch 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.

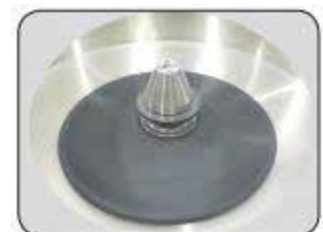


- ✓ The lid is not opened while the instrument is running.
- ✓ If the lid is opened, the instrument could not be operated even with pressing the 'Start' button.
- ✓ For operational safety, this instrument has the automatic rotor recognition function.
- ✓ When you supply the power, "Rotor Scan..." will be appeared. If the rotor is absent, the "Error 9" will be appeared. This message will be cleared after rotor coupling and running.
- ✓ The lid is not automatically opened after finishing operation to keep the sample at proper temperature.
- ✓ Power Failure: If there is any power failure during operation, lid is not opened with [LID] button. Lid can be opened only when the operation is completely stopped and the power is on again. If you want to open the lid at the power failure, please refer to '51. Emergency Lid Open'.

4-3. Rotor Coupling and Disassembling

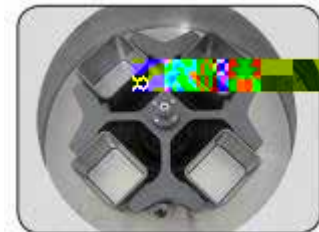
Action

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



4-3-1. 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 leave a vacant wing without bucket. All wings should hold identical bucket.)
 - Remove dirt and water drop 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.

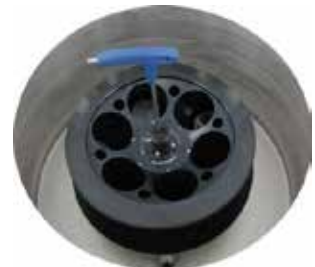


4-3-2. Fixed Angle Rotor

2. Mount a proper rotor into the motor shaft.

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

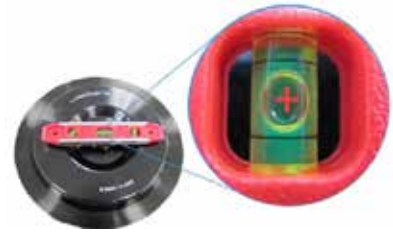


When you run a fixed angle rotor, make sure that the rotor lid is tightly closed. If you don't close the rotor lid completely, it will be crushed.

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

4-4. Balance Adjustment – Final

1. Mount the rotor and place the Bubble Leveler on the middle of the top of a rotor.
 - Confirm that air bubbles of all three windows of the Bubble Leveler are within the black lines.
2. To adjust the balance status, rotate the red colored ring at the wheel caster clockwise or counterclockwise until the device is well balanced.



4-5. Positioning of Sample Tubes

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

? ? ?

9,000 xg 8,000 xg 10,000 xg

1,000 xg

Check the g-force of sample containers!

✓ If the number of samples is not in pair, please load the control tubes at each symmetrical position. 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.

5. Operation

5-1. Key Functions of Control Panel

- | | |
|---------------------------------------|--|
| <input type="checkbox"/> RPM/RCF | For automatic conversion of RPM/RCF and to set the speed |
| <input type="checkbox"/> TIME | Use to set time, available range up to 9 hour 59 min (00:00: continuous) |
| <input type="checkbox"/> Temp | Use to set temperature (-20°C ~ 40°C for 1736R/ -10°C ~ 40°C for 1096R)
Use to reach rapid refrigeration up to the setting temperature. (touch for more than 2 seconds for Fast Cool'.) |
| <input type="checkbox"/> 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. |
| <input type="checkbox"/> PROG | Use to save a set of setting values or recall the saved program number |
| <input type="checkbox"/> KEY LOCK | Use for key lock mode |
| <input type="checkbox"/> AT SET SPEED | Use to count the run time once the actual run speed reaches to the set speed value |
| <input type="checkbox"/> Pulse | Use for quick runs |
| <input type="checkbox"/> Enter | Use for completion of data setting |
| <input type="checkbox"/> Start/Stop | Use to start and stop operation |
| <input type="checkbox"/> Lid | Use to open instrument lid |
| <input type="checkbox"/> Sound | Use to set the number of sound and volume |

5-2. Setting the RPM/RCF Value

Action

5-2-1. Setting the RPM/RCF Value

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 [X] button and change the value again

5-3. Setting the Time Value Action

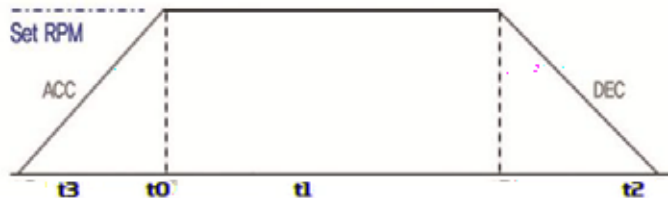
5-3-1. Setting the AT SET SPEED mode



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

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 [X] 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 [X] 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

- 1736R: Temperature can be set from -20°C to 40°C
 - 1096R: Temperature can be set from -10°C to 40°C
1. Touch the [TEMP] button. Default or latest temperature value blinks on the display window.
 2. Touch the number buttons to change 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 [X] button and change the value again.
 3. Touch the [Enter] button to complete setting.



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 lid 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 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.





- ✓ 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 [X] 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 [X] 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.

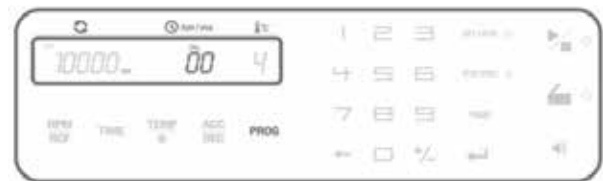


- 'SAVE' is turned on the display window.
3. Touch the number buttons to change input Program number.
 - If you do not touch the number button for 15 seconds, the setting mode is cleared.
 - Save up to 100 programs. (Program numbers from 00 to 99).
 - If wrong number is entered, touch [X] button and 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 [X] 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] button.
 - During running, a Start LED is turned on.
 - The instrument is running only when the lid is closed.
 - When you touch the [Enter] button during operation, display window shows the saved setting parameters



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 Key Lock Mode

Action

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.



5-9. Repeat Account and Sound Pitch of End Alarm

Repeat account and sound pitch of the end alarm can be selected.

Action

5-9-1. Setting the Sound Pitch of End Alarm

1. Touch [SOUND] button.
 - 'Sound LEVEL_03' appears on the display window.
2. Touch the number buttons to change the value for the pitch of sound.
3. Fix the value by touching [ENTER] button.
 - Sound LEVEL: 0~10 (0: silent)



5-8-2. Setting the Repeat Count of End Alarm

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



5-10. Pulse

It is for quick and short spin down.

Action

1. If you touch [PULSE] button and release at the point you want to stop, the centrifuge decelerates immediately.
When the operation is completely stopped, lid is automatically opened.

5-11. Emergency Lid Open

For emergency lid opening, you can use the Emergency Lid-Lock Release Tool when the instrument is completely stopped.

The lid can be unlocked manually with the Emergency Lid-Lock Release Tool when the instrument is completely stopped.





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.

6-3. Shaft

1. Always make special attention to clean the motor shaft to avoid any imbalance problem due to the contaminants.
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 rot



Noise and vibration during running	If the instrument 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. (Please refer to 4-3. Rotor Coupling and Disassembling)
	Check balances of samples in the rotor. (Please refer to 4-5. 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 [START/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 error	- Shut off the power supply, and then, turn on it again.

			<p>problems in the overload of motor and the output of motor.</p> <ul style="list-style-type: none"> - Shut off the power supply, and then, turn on the power switch again to check the instrument.
Error 7	Software		<ul style="list-style-type: none"> - If the installed software has bugs, this message is appeared. - Tuning the firmware (Download)*
Error 8	Imbalance		<ul style="list-style-type: none"> - Check weight-balances of samples (Please refer to 4-5. Positioning of Sample Tubes) and then turn off and on the instrument for checking.
Error 9	Rotor ID or RPM Sensor		<ul style="list-style-type: none"> - 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 4-3. Rotor Coupling and Disassembling.) - If the error code shows continuously, please call GENESPEED® Field Service Engineer.
Error 11	Chamber Error	Temp.	<ul style="list-style-type: none"> - If the instrument is not reached to setting temperature within an hour, this message is appeared. - No user action. Please call GENESPEED® Field Service Engineer.
Error 12	Temp. Sensor Error		<ul style="list-style-type: none"> - If there is a faulty in the temperature sensing of chamber or over heated, this message is appeared. - No user action. Please call GENESPEED® Field Service Engineer.
Error 15	Motor Sensor	Temp.	<ul style="list-style-type: none"> - If the motor temperature sensor can't recognize, this message is appeared. - No user action. Please call GENESPEED® Field Service Engineer.
Error 16	Comp. Sensor	Temp.	<ul style="list-style-type: none"> - If the temperature of compressor is over heated up, this message is appeared. - No user action. Please call GENESPEED® Field Service Engineer.
Error 17	Communications Error		<ul style="list-style-type: none"> - If insecure communication arises among Main-Display-I/O, this message is appeared. - No user action. Please call GENESPEED® Field Service Engineer.
Error 20-27	Lid Lock		<ul style="list-style-type: none"> - If the sensors or cables of the lid lock system do not normally work, this message is appeared. - Please contact a Service Engineer of your local GENESPEED®' s partner.

* Any wire disconnection or tuning of the instrument must be performed only by a service engineer who is authorized by Baygene Company Limited

** GENESPEED® is a registered trademark of Baygene Company Limited. All product specification and claims are subject to change without notice.

