Blue*Line*
Instruments for Electrophoresis

INSTRUCTION MANUAL

BlueSpin Mini

(Cat. No. BS-MINI)

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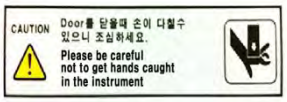
Vers. 04/13

1 Meanings of Symbols & Safety Precautions

1.1 Symbols on the device

Symbol	Meaning	Symbol	Meaning
	Indicate a hole for manual door opening in case of emergency		Attention and warning for electric shock
	Attention and warning for rotor coupling.		Attention and warning for door opening and closing

1.2 Safety Precautions

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

- ALWAYS locate the instrument on a flat, rigid and stable table capable of withstanding the weight of the instrument and its spinning operation.
- 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.
- ALWAYS install the instrument within a temperature and humidity controlled environment. (Permissible ambient temperature: +5 °C ~ +35 °C, Relative humidity: ≤ 85 %)
- Before connecting the power, check the rated voltage.
- Unapproved rotors and associated accessories should not be used.
- Before operating the instrument, check if the rotor and the rotor lid are securely fastened.
- The instrument should be operated with a rotor properly installed and secured to the motor shaft.
- Mount the rotor on the motor shaft properly, check it with spinning manually.
- Do not stop the rotor by touching with hand during the instrument is running.
- Emergency door open should be performed only when spinning is completely stopped.

- The rated speed or specific gravity should not be exceeded. Samples whose density is greater than 1.2 g/ml must have reduced maximum rotational speed to avoid rotor failure.
- 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.
- ALWAYS load the tubes symmetrically with evenly weighted samples to avoid rotor imbalance. If necessary, use the water blank to counterbalance the unpaired sample.
- 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.
- The rotors should be cleaned and kept dry after every use for longer life and safety.
- ALWAYS disconnect the power supply prior to maintenance care and service to avoid electrical shock.
- ALWAYS use proven disinfection procedures after centrifuging biohazardous materials.
- Flammable, toxic, radioactive, explosive, or corrosive materials should not be centrifuged.
- 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.

Attention

- **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 dumb 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 frequently, it may cause malfunction of the instrument and often result in serious damage.**
- **Install the instrument at a place without any kinds of corrosive gases.**

2 Packing List & Technical Specifications

2.1 Packing List

- Microcentrifuge
- Fixed Angle rotor (BS-MRM)
- Locking nut
- Rotor lid
- 12 of 0.2 ml & 0.5 ml adaptors
- Power cord
- Manual

2.2 Technical Specifications

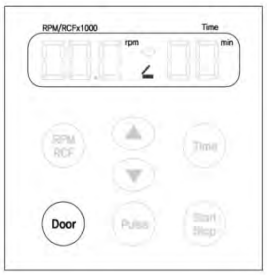
Max. RPM / RCF	13,500 rpm / 12,300 xg	6,000 rpm / 1,850 xg
Max. capacity	12 x 2.0 ml tubes	4 x 8-tube PCR strips
Time control	Pulse or timed ≤ 30 min	
RPM / RCF conversion	Yes	
Noise level	≤ 56 dB	
Acc / Dec	≤ 12 / < 16 s	
Display	Blue LCD	
Automatic door release at completion	Yes	
Power supply	220 V / 50~60 Hz	
Power requirement	110 VA	
Dimension (W x D x H)	208 mm x 245 mm x 145 mm	
Weight without rotor	4.4 kg	

3 Installation

1. Connect the AC Power cord to the power socket on the back of the instrument.

2. Turn on the instrument by pressing the switch on the back of the instrument.

3. For opening the door, press the [DOOR] button.



4. The door is automatically opened after completion of spinning operation with beeping sound.

5. When you close the door, close it until hearing a clank shut.

- 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.
- Power Failure: If there is any power failure during the 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 chapter “Emergency Door Open”.

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

7. Mount a proper rotor into the motor shaft.

8. Place the Rotor Locking Nut at the center hole of the rotor.

To assemble the rotor: Rotate the Rotor Locking Nut clockwise until tightly assembled.
To disassemble the rotor: Rotate the Rotor Locking Nut counterclockwise.

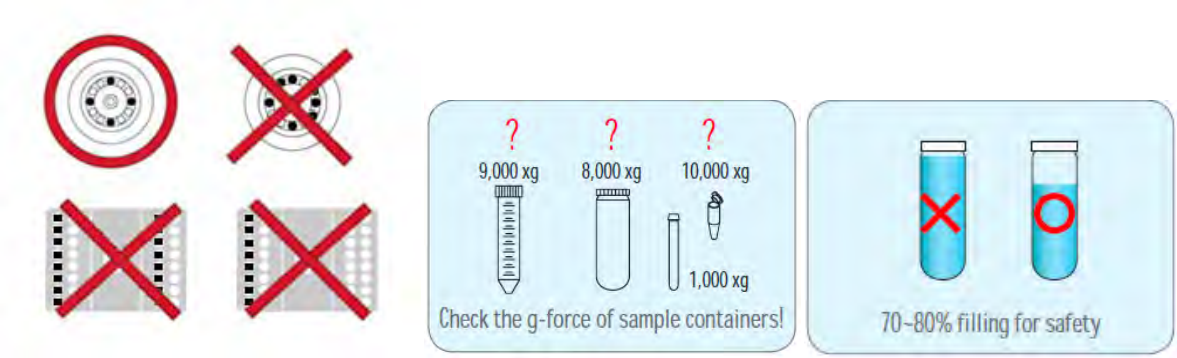
9. After loading sample tubes, close the rotor lid until hearing a clank shut. When you open the lid, lift the nut.

When the PCR rotor is coupled, please do not speed over 6,000 rpm / 2,400 rcf.

10. Positioning of sample tubes:

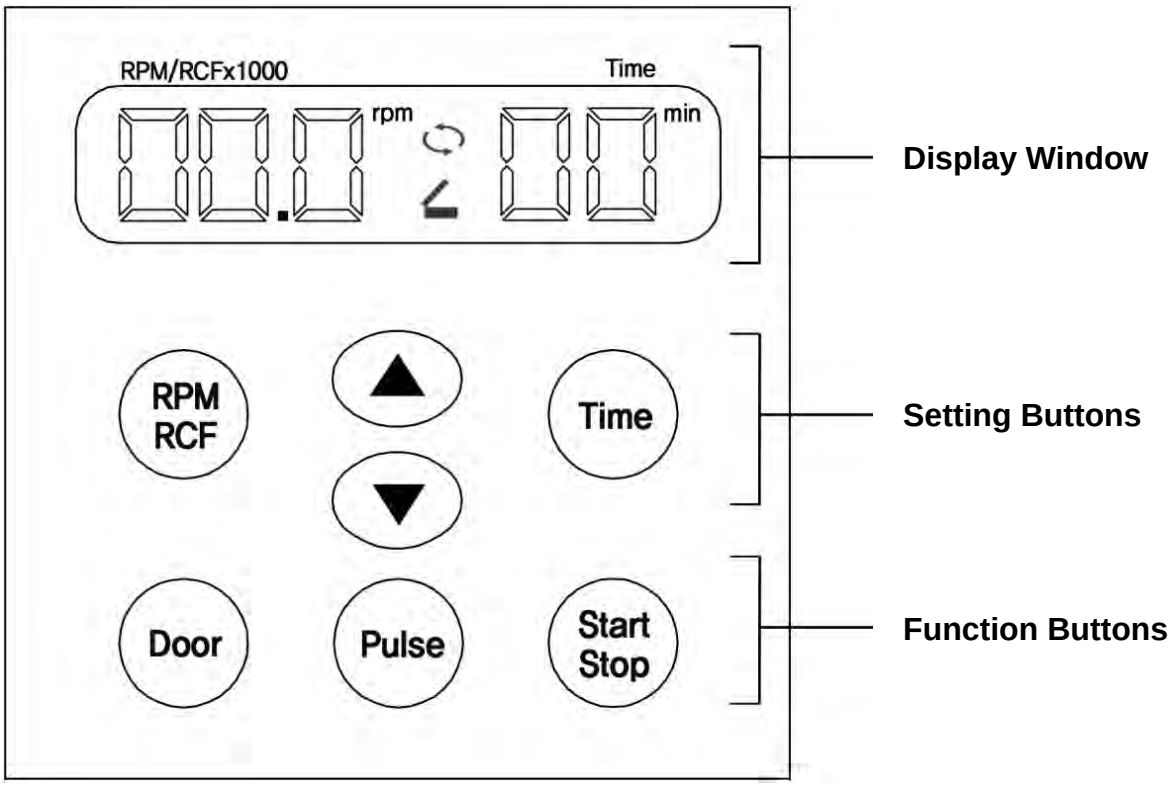
- Before loading sample tubes, check for water drops or dirt in the rotor hole or inner adaptor.
- If there is a water drop or dirt in the rotor hole or inner adaptor, remove it with a soft dry cloth.
- Tubes should be placed in the rotor with same amount of volume at symmetrical positions.
- Only use 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.
- If the number of samples is not in pair, please load the control tubes at each symmetrical position. Otherwise, it results in noise and vibration, and eventually damages the instrument.

Correct Ways of Sample Balancing & Tube usage:



4 Operation

4.1 Control panel



Display Window

- Shows speed, time (displayed as “min”), status of running, the status of door opening or closing and RPM / RCF Mode (displayed as rpm or rcf).
- While running, ↻ is flickering.
- ◢ appears when the Door is opened and ▬ appears when the Door is closed.

Setting Buttons

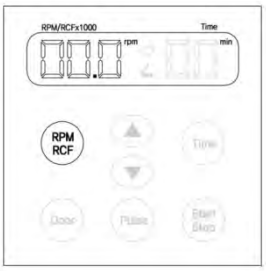
- When setting up the RPM / RCF and Time, you can put the set value with up (▲) and down (▼) button.

Function Buttons

- Door: For opening instrument door
- Pulse: For quick spin down
- Start / Stop: Commend start and stop operation

4.2 Setting RPM / RCF

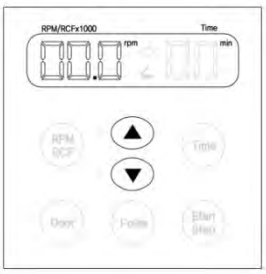
4.2.1 Setting RPM



1. RPM MODE is generated by pressing the [RPM / RCF] button once.

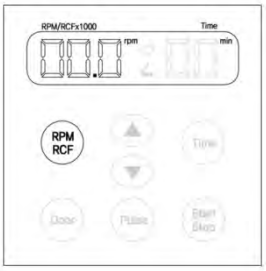
   RPM LED is flickering on the display window.

2. Press the [▲▼] buttons to change input value.



   RPM setting unit: 0.1 unit (0.1 = 100 rpm)
   After 5 seconds from pressing the input value, the setting value is saved.
   If you want to check the input value, press [RPM / RCF] button.
   If you do not press the [▲▼] button for 5 seconds, the setting mode is cleared.

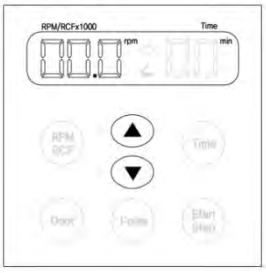
4.2.2 Setting RCF



1. RCF MODE is generated by pressing the [RPM / RCF] button twice.

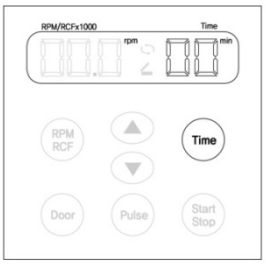
   RCF LED is flickering on the display window.

2. Press the [▲▼] buttons to change input value.



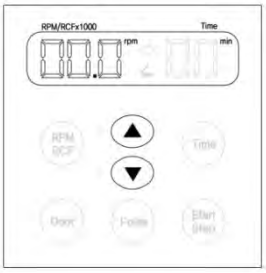
   RCF setting unit: 0.1 unit (0.1 = 100 rcf)
   After 5 seconds from pressing the input value, the setting value is saved.
   If you want to check the input value, press [RPM / RCF] button.
   If you do not press the [▲▼] button for 5 seconds, the setting mode is cleared.

4.3 Setting Time



1. Press the [TIME] button once.

   min LED is flickering.



2. Press the [▲▼] buttons to change input value (in 1 min steps).

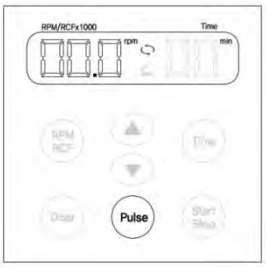
   After 5 seconds from pressing the input value, the setting value is saved.
   If you do not press the [▲▼] button for 5 seconds, the setting mode is cleared.

4.4 Start / Stop

1. After setting RPM / RCF and Time, press [Start / Stop] button.

   The running starts only when the door is closed.
   In case of pressing the [Start / Stop] button while running, the running is stopped.

4.5 Pulse



1. If you press [Pulse] button and release at the point you want to stop, the centrifuge decelerates immediately.

   When the running is stopped, the door is opened automatically with beeping sound.

4.6 Emergency Door Open

1. After pulling the instrument forward about 10 cm, find the “Emergency Door Open Hole” at the bottom of the instrument.
2. Insert spikes (a car key, scissors and etc.) 2 ~ 3 cm into the “Emergency Door Open” hole and pull the spikes at the opposite direction of the arrow.

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.

5 Maintenance

5.1 Outer part of Instrument

- 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.
- Do not use any volatile chemicals such as alcohol and benzene, etc.
- Be careful not to make scratches on the surface of the instrument. The scratches can cause corrosion on the surface of the instrument.
- If any rust appears, clean it with neutral detergents and keep dry.

5.2 Chamber

- Keep dry inside the chamber after every use.
- If the chamber is contaminated, dip the cloth in neutral detergent and clean contaminated area.

5.3 Shaft

- Always make special attention to clean the motor shaft to avoid any imbalance problem due to the contaminants.
- After using the instrument, take out the rotor from the shaft, and clean the shaft with dry soft cloth to keep dry.

5.4 Rotor

- If any parts are contaminated with samples, clean the rotor with soft wet cloth and keep the rotor dry.
- 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.
- If you do not use the instrument, keep the rotor separately from the motor shaft and stand it upside down.

5.5 Transportation of Instrument

- If you need to move or ship the instrument, be cautious to protect the motor shaft from any physical impact or turbulence.
- 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.

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 instrument and power outlet. Check the power switch is turned on.
Can’t be started	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 spikes for safety of sample.
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 your distributor.
Noise and vibration during running	Please check the balanced status of both the table and the instrument.
	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
	Check balances of samples in the rotor. Load the same weight of samples symmetrically.

6.2 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 or Error 9	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 your distributor.
Error 2	Door	• The door is not closed completely. • Remove the dirt at the door latch and then close the door completely again. Check the Door LED on the display window. If it is not solved in shortly, open the door with emergency door tool manually for safety of sample.
Error 3	Motor Overheating	• The motor is overheated. • 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 your distributor.
Error 4	Low Voltage	• 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.
Error5	High Voltage	• 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	• The instrument is spun with over speed, due to 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	• The installed software has bugs. • Tuning the firmware (Download)
Error 8	Imbalance	• Check weight-balances of samples. Turn off and on the instrument for checking.

7 Rotors and Accessories

Product	Cat. No.
Fixed Angle Microtube Rotor with plastic lid for 12 microtubes	BS-MRM
Angle Rotor PCR-tube Rotor for 4-rows of PCR strip tubes	BS-MRP
0.2 ml Adaptor of microtube rotors	BS-A02
0.5 ml Adaptor of microtube rotors	BS-A05

EC-Declaration of Conformity

We hereby certify that the following described machine in it´s conception, construction and form is in accordance with all the relevant essential health and safety requirements of the EC EMC Directive 2004/108/EC (21st May 2007) and the EC Low Voltage Directive 2006/95/EC (12th December 2006) is adopting these directives.

This declaration is no longer valid if the machine is modified without our consent.

Authorized representative:

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Description of the machine:
Function: Centrifuge
Type/modell : BlueSpin Cryo

The agreement with further valid guidelines/regulations following for the product is explained:

- EN 61010-1:2001: Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements
- EN 61010-2-020:2006: Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-020: Particular requirements for laboratory centrifuges
- EN 61326-1:2006: Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
- EN 55011:2007: Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement

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