Instruction Manual

BeadBlaster 24R
D2400-R
Refrigerated Homogenizer

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Foreword

Thank you for purchasing a BeadBlaster 2R4 Homogenizer. This manual contains instructions for the proper operation and care of this instrument. Please read it carefully before operation and keep it available for future use.

Prior to initial operation:

Please check the instrument and the accessories against the packing list when you first open the shipping carton. Report any damage, discrepancy, or missing items to the supplier immediately.

Version 1, December 2019

Safety Warnings and Guidelines

1. Important operation information:

Read this manual carefully before attempting to operate the instrument.

Read this manual prior to powering up the instrument. Pay special attention to the guidelines and directions below and be familiar with all safety warnings and guidelines.

2. Safety:

The operation, maintenance and repair of the instrument should comply with the basic guidelines and safety warnings below. Noncompliance may interfere with the useable life of the instrument and safety protection and may void the warranty.

Use this product indoors. Do not operate in a damp or wet environment.

Before using the instrument, read the manual carefully. The instrument is designed for use in laboratory environments and must be operated by skilled personnel with the appropriate training.

Do not attempt to open the casing or repair the instrument. Disassembly will void the warranty. If there is a service issue with the instrument, please contact Benchmark.

Before operation, check to see that the voltage rating on the instrument matches your local voltage. The rated electrical load of the outlet should not be lower than that of the instrument's demand. If the power cord is damaged, it should be replaced. Do not place the power cord where it will have objects placed on it or where it will be walked on. When unplugging the instrument, do not pull the plug out of the socket by the cord.

Install the instrument in a cool dry location free from dust, direct sunlight or strong lights. The instrument should be placed away from corrosive gasses, strong magnetic fields, and heat sources. Allow at least 4 inches on all sides of the instrument for proper air circulation. Be sure that the air vent at the back of the instrument is not blocked. If using two instruments, they should be placed at least 3 feet apart.

The power switch is located on the rear of the instrument. After use, the power to the instrument should be turned off. If the instrument will not be used for a long period of time, it should also be unplugged and covered with a cloth or plastic to keep it free of dust.

If samples are processed for an extended time period, many cycles or without a pause between cycles, thermal breakdown of the sample tube may occur. Be sure to follow manufacturers guidelines for lysing kits and tubes.

The instrument should be unplugged immediately and the supplier contacted in the event of:

- Liquid leaking into the instrument
- Smoke or fire
- Abnormal operation: such as abnormal sound or smell.
- Instrument dropping or outer housing damaged.
- Instrument function changes

3. Maintenance

The tube holder should be cleaned with a cloth dampened with a small amount of alcohol. The outside of the unit can be cleaned with a camp cloth or mild detergent if required.

Always disconnect power to the unit before any cleaning procedure. Do not apply cleaning solutions directly to the tube holder or chamber. Do not use corrosive agents while cleaning. Do not submerge the instrument.

Contents

Chapter 1 Introduction

BeadBlaster 24R is a homogenizer for biological samples. It features high speed, three-dimensional motion and has a capacity for 24 samples.

Features:

- Can break and crack most of biological samples (animal and plant tissue, soils, yeast, spores, microorganisms, etc.)
- Process 24 samples in a minimal amount of time.
- On board memory for 50 programmed runs
- Run stops automatically if the cover is opened.
- The refrigerated chamber helps to keep samples cool and aids in avoiding degradation of samples due to heat build up.

Chapter 2 Specifications

1. Normal operating conditions

Ambient temperature: 10℃~ 30℃

The relative humidity: ≤70%

Power: AC 100V-120V/200V-240V 50-60Hz

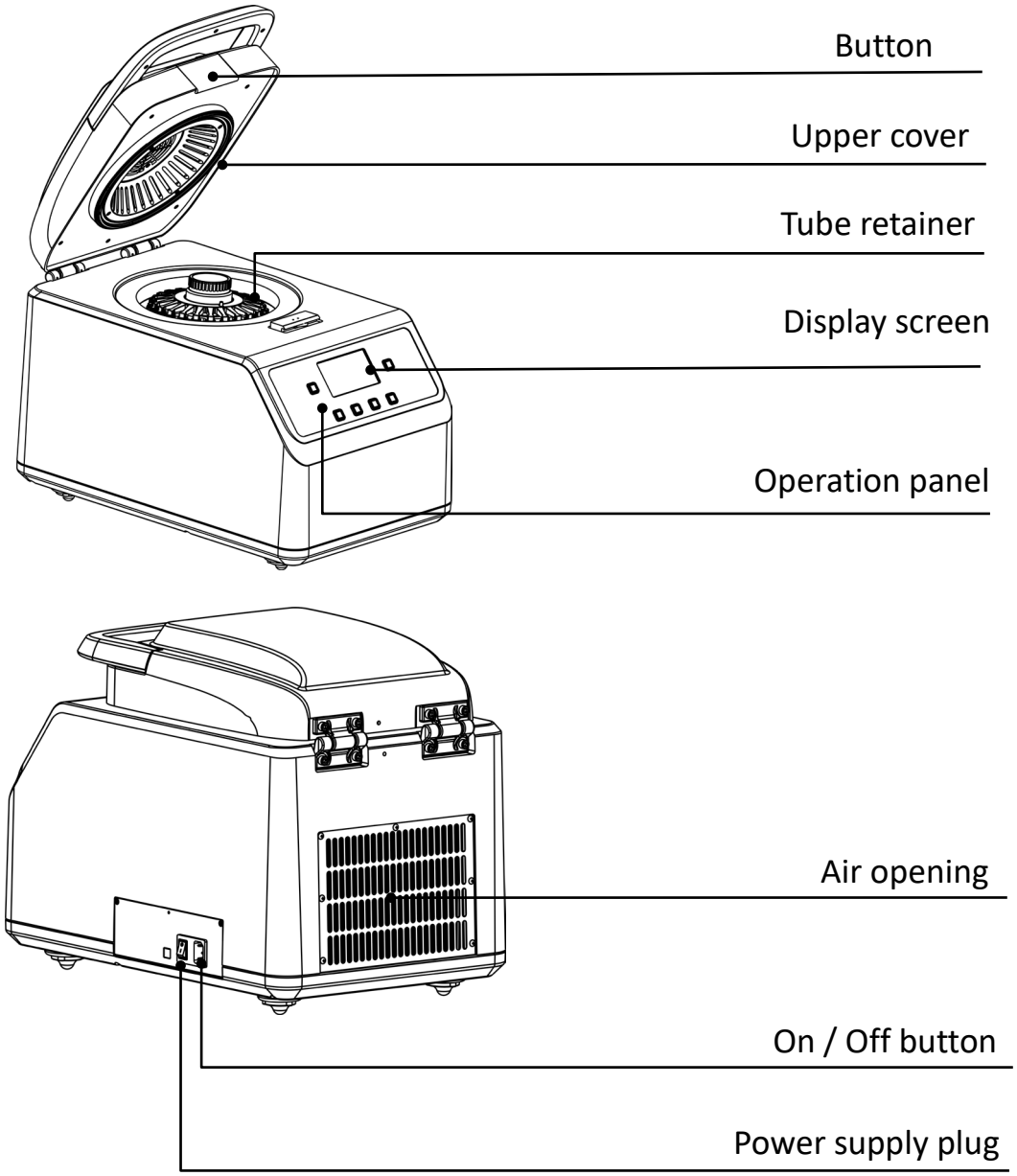
2. The basic parameters and characteristics

Type / Parameter	Bioprep-24R
Power Supply	100V-120V/200V-240V 50-60Hz
Ambient temperature	10℃-30℃
Temperature range	-10℃-40℃
From RT to 0℃	<30 min
Temperature uniformity	≤±2℃
Sample Size	24 X 2ml tubes/12 x 5ml tubes
Speed	4.00m/s~7.00m/s, 0.05m/s increments
Cycle duration	1s~ 1min30s, Increased by step 1s.
Pause	1s~ 2min, Increased by step 1s.
Number of Cycles	10
Programs	50
Acceleration time	<4s
Deceleration time	<4s
Data Output	USB
Noise	<65 db
Power	1000W
Weight (kg)	40.0kg
Dimension(WXDXH)	330mm×252mm×410mm

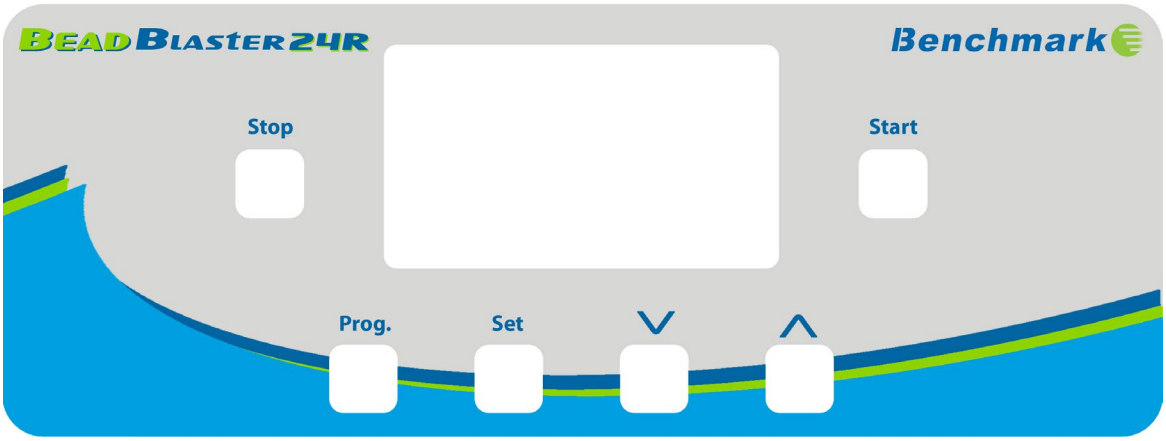
Chapter 3 Basic Instructions

This chapter focuses on the structure, operation keys, and display of the instrument, as well as preparatory work before starting. Please read this chapter before initial operation.

1. Structure overview



2. Operation panel



Prog. Use with ▲/▼ to select the desired program.

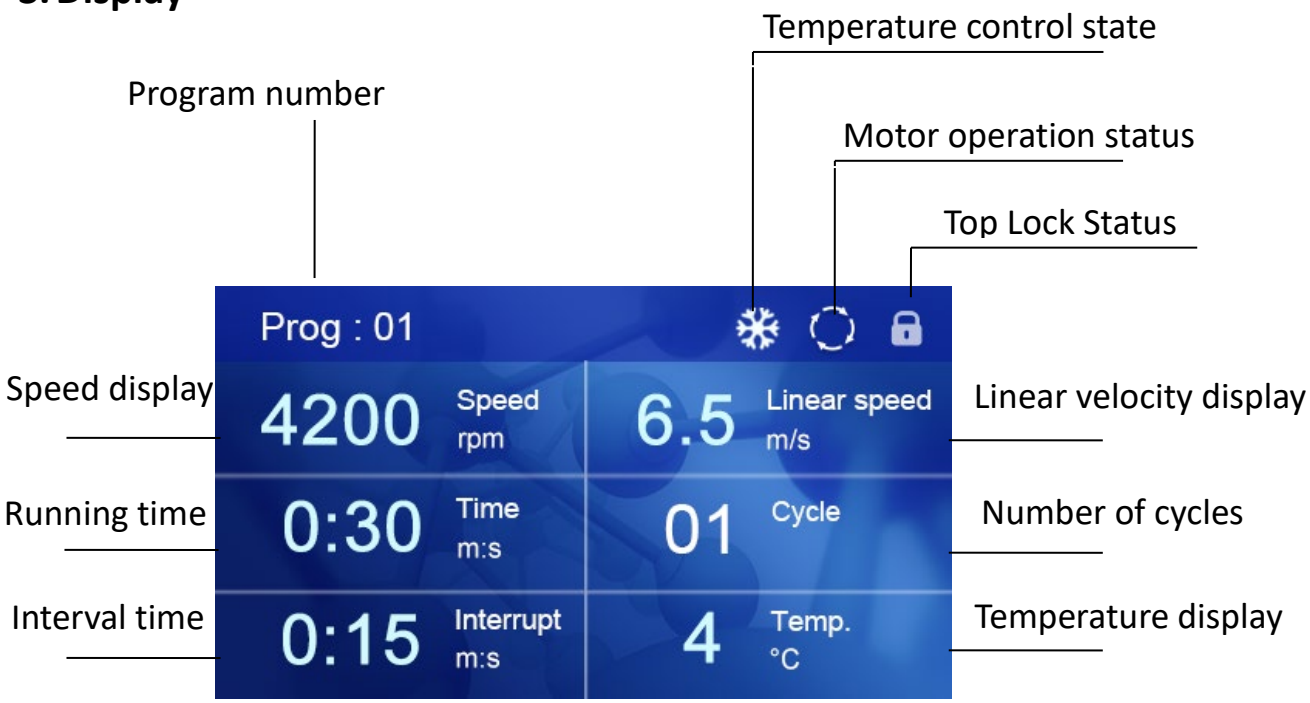
Set Set speed, run time, interval time, pause time for current program.

▲/▼ Modify Parameters.

Run Run program

Stop Stop program

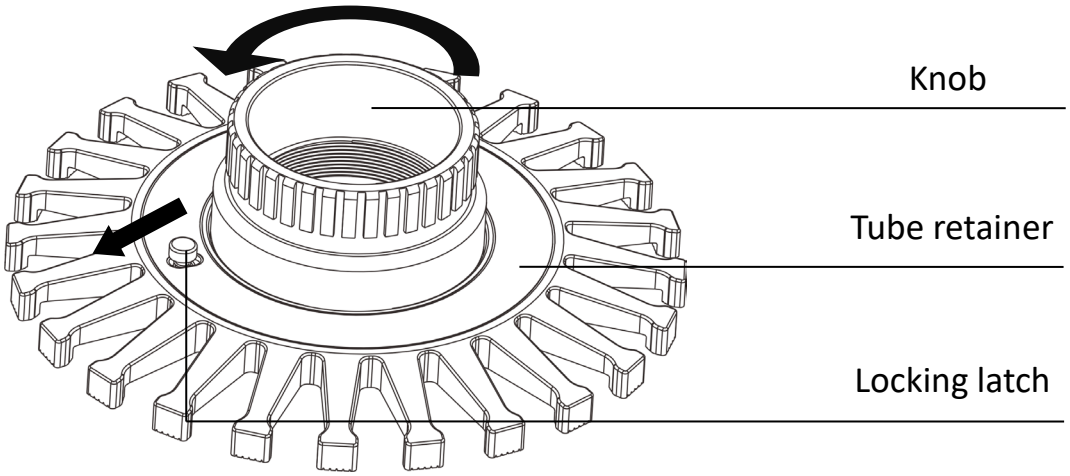
3. Display



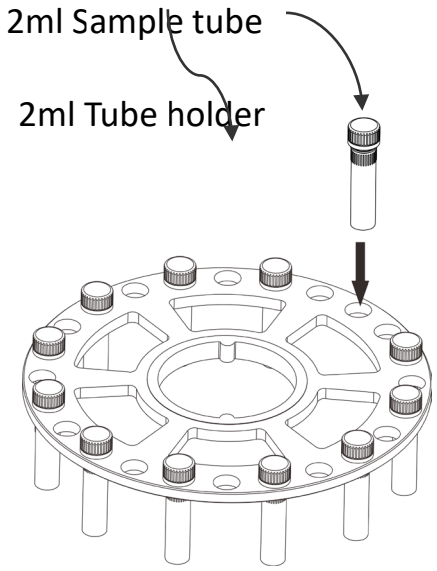
Chapter 4 Operation Guide

1. Loading lysing kits

1.1 Disengage the locking latch, turn the knob counter-clockwise and remove the tube retainer.

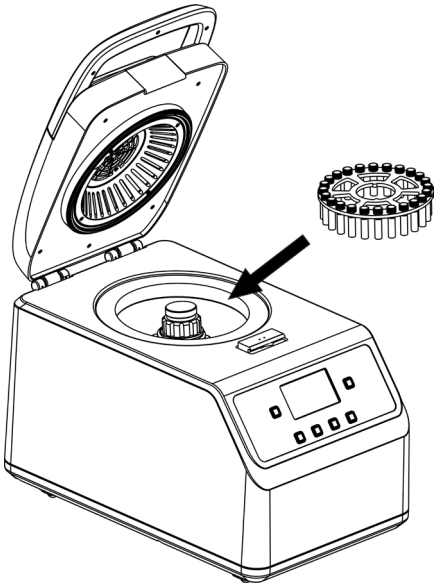


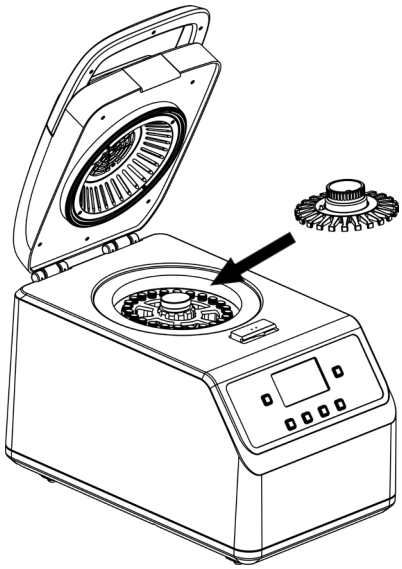
1.2 The tube holder maybe be filled in or out of the instrument. To remove, simply lift off the shaft. Place the tubes into the tube holder and press down until seated. If less than 24 tubes are used, they should be evenly distributed in the tube holder. If removed, the tube holder can then be replaced, making sure the two bumps on the holder line up with the indentations on the shaft.

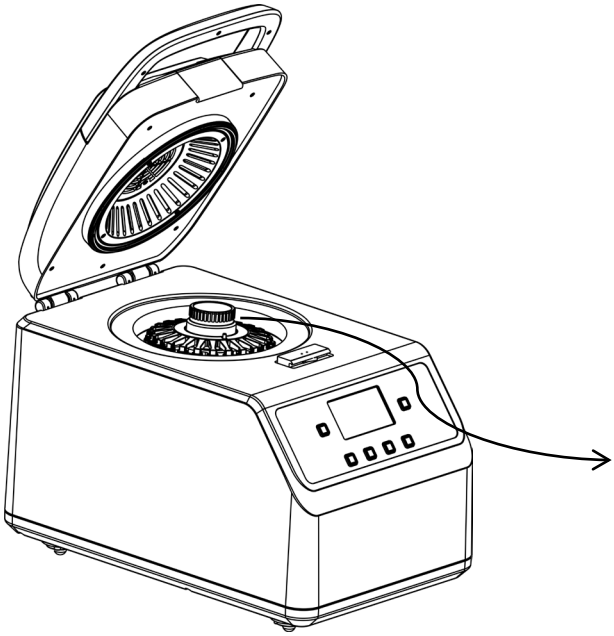


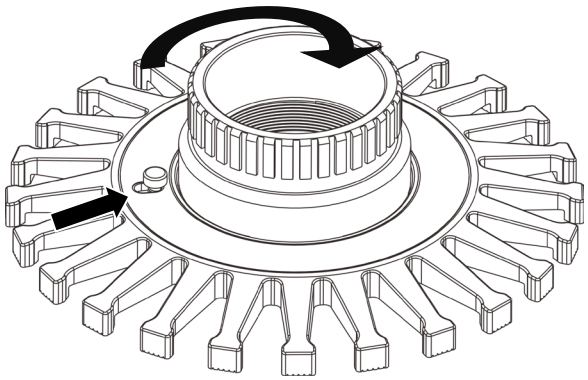
1.3 Place the tube retainer on top of the tube holder. Tighten the kiob clockwise and push the locking latch inwards. A click will indicate that the latch is in place. If the latch cannot be pushed inwards, turn the knob 2 degrees and try again.

Note: The locking latch must be pushed in "LOCK" place.





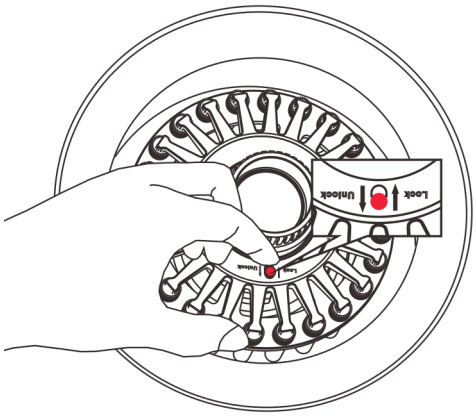




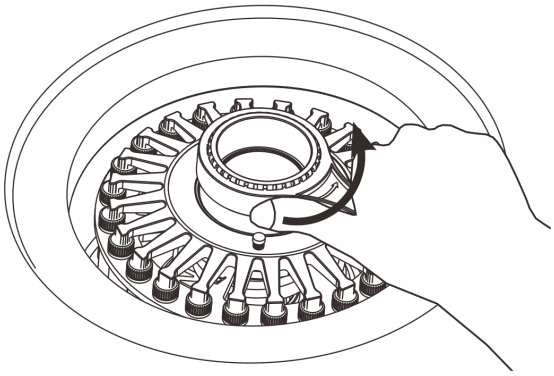
Tighten the knob clockwise, and pull the locking latch inwards to lock the tube retainer in place

1.4 Close the cover and engage the cover latch. Operation can then begin.
DO NOT ATTEMPT TO OPERATE THE UNIT WHITHOUT THE TUBE RETAINER LOCKED IN PACE!

1.5 In the process of use, if the tube pressure plate is too tight to unscrew, you can use the pressure plate wrench



Move the lock lever outward to unlock the tube retainer. If the lock lever cannot be moved outwardly, please turn the knob for 2 degrees and turn the lock lever again.



Place the wrench onto the knob and loosen the knob counterclockwise.

2. Program selection

Hold down the Prog. key, and then press "▲" or "▼" to select pre-defined 1-50 programs.

3. Program setting

Press “Set” key once, SPEED in display flashes, then press “▲”or“▼”, to set the speed.

Press “Set” key again, LINEAR SPEED in display flashes, then press “▲”or“▼”, to set the speed.

Press “Set” key again, TIME in display flashes, then press “▲” or “▼”, to set the run time.

Press “Set” key once more, CYCLE in display flashes, then press “▲” or “▼”, to set the cycle.

Press “Set” key again, INTERRUPT in display flashes, then press “▲” or “▼”, to set the pause time.

Press “Set” key once more, TEMP in display flashes, then press “▲” or “▼”, to set the temperature.

Values will automatically be saved after 3 seconds without activity.

Operating Ranges for Parameter Adjustments

Speed	Run number	Run Time(S)	Pause (S)	Rest time between 2 consecutive runs
4.0m/s-4.5m/s	1 to 10	5 to 90	5 to 120	2 to 5min
4.6m/s-4.9m/s	1 to 3	5 to 90	5 to 120	2 to 5min
5.0m/s-5.9m/s	1 to 3	5 to 60	5 to 120	5 min
6.0m/s-7.0m/s	1 to 3	5 to 30	30 to 120	5 min

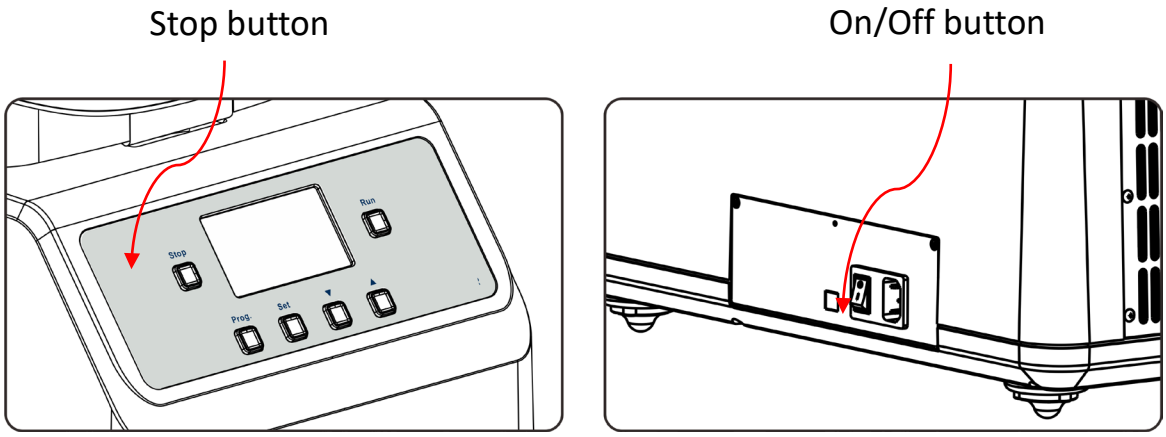
4. Running and ending program

Press “Run” to start operation.

Press “Stop”, end operation

Note: If there is abnormal noise during the operation, press “Stop” at

once to stop running, or turn off the On/Off button on the back of the instrument..



5. Grinding bead selection

D1032-01	0.1mm zirconium	Bacterial lysis (gram+/-), small yeasts
D1032-05	0.5mm zirconium	Yeast, algae, spores
D1032-10	1.0mm zirconium	Larger yeasts, algae, fungi
D1032-15	1.5mm zirconium	Soft tissues, liver, brain, adipose, spleen
D1032-30	3.0mm zirconium	Tougher tissues, heart, muscle, leaves
D1032-SK	Starter kit, 10 of each above	See above
D1032-0105	0.1/0.5mm zirconium mixed	Bacterial lysis, yeast, algae, spores
D1032-60	1x6mm zirconium satellite	Dry grinding hard samples, seeds, bone, hair
D1032-RF-60	As above, reinforced tube	Dry grinding hard samples, seeds, bone, hair

D1031-01	0.1mm silica/glass	Bacterial lysis (gram +/-)
D1031-05	0.5mm silica/glass	Yeast, algae spores
D1031-10	1.0mm silica/glass	Larger yeasts, algae, fungi
D1033-28	2.8mm stainless steel	Hard samples, insects, tough plants
D1033-30G	Garnet shards, 1x6mm zirconium	Skin, highly fibrous samples
D1034-MX	0.1, 4mm glass, 1.5mm zirconium	Feces, environmental samples

Prefilled 2ml tubes supplied in packs of 50. Loose beads and empty tube also available. Ask for details.

It is important to select the proper size and material of beads for the most efficient homogenization.

6. Sample preparation

Tips for setting up and homogenizing samples:

1. Start with everything cold – samples, beads, buffer. Do not freeze the bead tubes. Polypropylene is brittle when frozen and can crack from the impact of the beads. If tubes are frozen with samples in them, allow to come to at least 4º before homogenizing.

2. Do not overload the tubes. For the most efficient homogenization, keep the total volume of beads, buffer and samples to ½ the total volume of the tube or less. When possible to pick the size and shape of the sample, remember that a long thin piece will homogenize more efficiently than a short square one.

3. Process at maximum speed in bursts of 20-30 seconds with a 30 second rest in between. After 2 cycles, check the sample. If there are still large pieces left, continue processing in short bursts until completely homogenized. When working with samples that contain a large amount of collagen or extra cellular matrix, there may be some small particles that do not completely homogenize. This is normal - proteins and nucleic acids will have been released from the cells. What is left is the collagen and ECM.

4. After processing, spin the tubes briefly to bring the beads and debris to the bottom and pipette off the lysate for downstream processing.

7. Restore factory settings

Press the button “prog” and turn unit on at the same time. A beep will indicate completion.

Default parameters of factory program.

① Speed : 3650 rpm
② Linear speed : 6.00m/s
③ Time: 0:30 m:s
④ Cycle: 3
⑤ Interrupt: 0:30 m:s
⑥ Temp: 4℃

Chapter 5 Troubleshooting Guide

Problems and actions

No	Common problem	Possible cause	Action(s)
1	No display on the screen	No power on the main power plug	Check power supply and plugged properly
		On/Off button broken	Change button
		Faulty fuse	Change fuse (5X20 250V 10A)
		Others	Contact suppliers
2	Instrument does not run	Motor temp above 65℃	Running recovered till temp drops to below 60℃
		Faulty Control board	Contact Benchmark
		Faulty Motor	
3	Abnormal noise	Faulty Bearing	Contact Benchmark
4	Keys don’t work	Plug connector loose	Contact Benchmark
		Faulty key board	Contact Benchmark
5	Display screen displays "E104" and alarms	Motor rotation blockage	Contact Benchmark
6	Display screen displays "E501" and alarms	During operation, the cover was opened accidentally	Close the cover
7	Display screen displays "E503" and alarms	Run button was pressed without lid closed.	Close the cover and press the “run”
8	Display screen displays "E101" and alarms	Motor over speed	Contact Benchmark
9	Display screen displays "E109" and alarms	Motor over temperature	Wait motor temperature falls below 60℃, resume operation
			High ambient temperature, transfer unit to to 10C~30C environment for use

10	Display screen displays "E502" and alarms	Damaged Micro Switch	Contact Benchmark
11	Display screen displays "E011" and alarms	Chamber overheating	Wait chamber temperature falls below 45℃, resume operation
			High ambient temperature, transfer to 10C~30C ambient temperature to use
12	Display screen displays "E015" and alarms	Chamber open circuit	Contact Benchmark
13	Display screen displays "E016" and alarms	Chamber short circuit	Contact Benchmark
14	Display screen displays "E021" and alarms	High pressure tube overheating	Wait high pressure tube temperature falls below 80℃, resume operation
			High ambient temperature, transfer the site to 10C~30C environment for use
15	Display screen displays "E025" and alarms	High pressure tube open circuit	Contact Benchmark
16	Display screen displays "E026" and alarms	High pressure tube short circuit	Contact Benchmark
17	Display screen displays "E027" and alarms	Motor Sensor open circuit	Contact Benchmark
18	Display screen displays "E028" and alarms	Motor Sensor short circuit	Contact Benchmark

For questions, please contact Benchmark Scientific:

Email: info@benchmarkscientific.com Phone 908 769-5555