



BENCHTOP SHAKING INCUBATOR

BSBT-1701 BSBT-1702 BSBT-1703 BSBT-1704

INDEX

1. Working principle	2
2. Performance description	3
3. Scope of application	4
4. Definition of terms	4
5. Instruction for Safety	5
5.1 Danger	5
5.2 Warning	5
5.3 Caution	6
6. Notes	7
6.1 Use environment requirements	7
7. Product Introduce	8
7.1 Specifications	9
8. Operation instructions	14
8.1 Main interface description	14
8.2 Run operation	15
8.3 Programs Editing	16
8.4 Program cycle setting	17
8.5 Fix Mode setting	19
8.6. Use of optional "independent temperature limit controller"	21
9. Cleaning and maintenance	22
10. Troubleshooting	23
11. Packing List	24

1. Working principle

The constant temperature shaking incubator is an advanced constant temperature culture equipment that combines the functions of the oscillator and the incubator. It mainly realizes two parameters of temperature and speed control, achieving scientific and reasonable oscillation culture purposes. Creatively utilizing the principle of single-axis drive technology to provide a light and reliable speed, the medium is always oscillating. The heating wire is used to heat the rear part of the box, and the airflow in the box is continuously circulated through the cross-flow fan to maintain a constant temperature in the entire box. The heating power of the electric heating tube is controlled by the PID controller, and the high-precision temperature sensor is used to ensure accurate and stable temperature inside the box.

2. Performance description

Humanized design

- It integrates the incubator and the oscillator into one, and it occupies a small area.
- Patented design, transparent large window design, wide viewing angle, dynamic mastering of training results.
- With reserved test holes, the external temperature can be measured in real time by an external sensor (optional).
- The inner body of the box is made of stainless steel, which has strong anti-corrosion ability and is easy to clean.
- Low heat dissipation DC brushless motor, large starting torque, wide speed regulation, maintenance-free, break through the defects that the existing domestic shaker could not run continuously for a long time.

Security function Technical characteristics

- Protection of equipment: The second set of temperature limit alarm system conforms to international standards. When the heating is out of control or exceeds the maximum limit temperature, the heating is automatically cut off, and the sound and light alarm is used to remind the operator; the equipment is safely operated without accidents;
- Protection of key components: Critical electrical components are equipped with over-current, over-temperature, overload and other safety protection to prevent accidental equipment;
- Protection of samples:
 1. When the door is opened, the breeze circulation, heating, and oscillation speed are automatically stopped, and there is no disadvantage of temperature overshoot;
 2. When the temperature inside the box is higher or lower than the set temperature, the alarm starts to cut off the heater, and the sound and light reminds the operator;It can protect the sample from normal test without accidents;
- Provide fault information: When the device fails, the display will display a fault message to ensure that the fault information is clear at a glance.

3. Scope of application

The temperature control range of the constant temperature shaking incubator is RT+5~65°C. The speed range is shown in Table 1. It integrates the functions of the incubator and the oscillator, provides precise temperature control, realizes shock culture, and meets the suspension culture of bacteria and microorganisms. The demand is an ideal instrument for cell culture, fermentation, biochemical water quality analysis, plant cultivation, breeding and other experiments.

4. Definition of terms

1. Temperature range: refers to the precise and stable temperature range that can be provided and used in the box;
2. Temperature fluctuation: refers to the range in which the central temperature point in the tank fluctuates at different times, and "±" indicates the range of upward and downward fluctuations;
3. Speed: The speed of rotation per minute, expressed in rpm, ie rpm.

5. Instruction for Safety

5.1 Danger



The improper use of this unit may cause property damage and / or personnel injury.

1. This product must be earthed reliably and kept far away from electromagnetic interference source (Zero line or neutral line should never be used as earth wire).
2. Please ensure the voltage and frequency of the power supply is compatible with the incubator power requirements prior to use.
3. The product should be connected to a separate power outlet and both the plug and outlet are earthed properly.
4. It is not allowed to pull off or insert the power plug wantonly without turning off the power switch while the product is in operation.
5. It is not permissible to lengthen or shorten the power line at random.
6. No repairs may be done without permission and the equipment must be maintained by an electrician entrusted by our company.

5.2 Warning

Caution (It may cause serious loss in property or injuries and deaths)

1. Operation shall be done only after the directions for use are read and understood fully.
2. SUS 304 container is not acid-resistant, anti-corrosive measures should be adopted and acidic medium should never be used in the incubator.
3. The power line should never be drawn directly when pulling off the plug.
4. In one of the following cases, the power plug must be pulled off:
 - Replacement of fuse.

- Under inspection and repair when the product fails.
- Suspension from use for a long time.
- In movement.

5. When the equipment works on the bench, a crowning barrier should be built at the edge to avoid shifting of the oscillating box due to long-time work and falling from the bench, to cause serious loss in product or property injury and deaths.

5.3 Caution

Otherwise its service life may be affected, resulting in its inability to work regularly.

1. The product shall be mounted on a solid and firm plane, keeping it horizontal.
2. Some space shall be left around the product.
3. The product must be put into use under given working conditions.
4. Never open/close the box door with a force, otherwise the door will fall away and the product injured causing casualties.
5. In case of suspension from use for long, the product should be dehumidified regularly to avoid damage to relevant devices.

6. Notes

6.1 Use environment requirements

1. Indoor use;
2. Ambient temperature: 15 ° C ~ 35 ° C,
Relative humidity is not more than 85%;
3. Power supply: 220V 50HZ
4. Atmospheric pressure: (86 ~ 106) KPa;
5. The altitude is not higher than 2000 meters;
6. There is no strong vibration source and strong electromagnetic field around;
7. It should be placed on a stable, horizontal and sturdy surface (floor) without direct sunlight. The working environment is free of serious dust and no corrosive gas.
8. As shown in the figure 1, there should be a space gap of no less than 10cm around the product (front, back, left, and right); a space gap of not less than 50cm should be left.

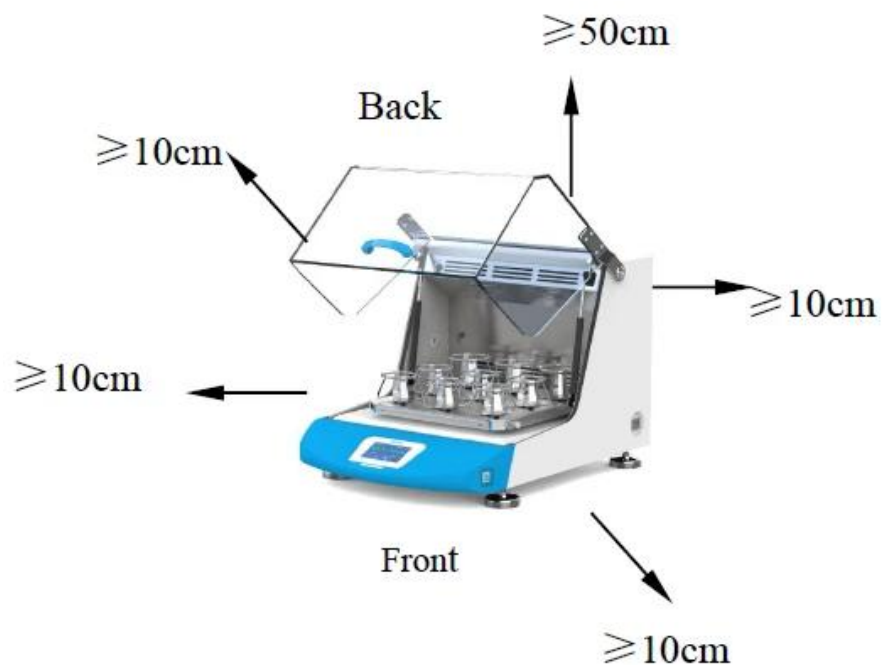


Figure 1

7. Product Introduce



Figure 2

1. cover
2. Glass cover hinge
3. Air flow channel
4. Pneumatic support rod
5. Replaceable fixture (see configuration table)
6. Independent temperature limit controller
7. Controller
8. Power switch

9. Adjustable foot

7.1 Specifications

Specification	BSBT-1701	BSBT-1702	BSBT-1703	BSBT-1704
Temperature Range	Amb +5°C~65°C			4°C~65°C
Temperature Resolution	0.1°C	0.1°C	0.1°C	
Shaking Speed Range	40~250rpm	40~300rpm	40~300rpm	
Speed adjustment accuracy	±1rpm	±1rpm	±1rpm	
Max. load	1.5KG	4KG	6KG	
Amplitude	20mm	20mm	20mm	
Timing Range	1-99H59min	1-99H59min	1-99H59min	
Internal height	220mm	270mm	320mm	
Platform Size(mm)	250*250	350*350	450*450	
Exterior Dimension (mm)	390*370*590	490*450*690	590*550*790	
N/W	32Kg	42Kg	52Kg	75Kg
Electrical Requirement	AC220V 50Hz	AC220V 50Hz	AC220V 50Hz	
Power Consumption	450W	650W	1000W	1300W
Note: If you need to customize the fixture, the number of physical specifications is subject to customer requirements.				

Table 1

Specification	BSBT-1705	BSBT-1706	BSBT-1707	BSBT-1708
Temperature Range	Amb +5°C~65°C			4°C~65°C
Temperature Resolution	0.1°C	0.1°C	0.1°C	
Shaking Speed Range	40~500rpm	40~500rpm	40~500rpm	
Speed adjustment accuracy	±1rpm	±1rpm	±1rpm	
Max. load	1.5KG	4KG	6KG	
Amplitude	4mm	5mm	5mm	
Timing Range	1-99H59min	1-99H59min	1-99H59min	
Internal height	220mm	270mm	320mm	
Platform Size(mm)	250*250	350*350	450*450	
Exterior Dimension (mm)	390*370*590	490*450*690	590*550*790	
N/W	32Kg	42Kg	52Kg	75Kg

Electrical Requirement	AC220V 50Hz			
Power Consumption	450W	650W	1000W	1300W
Note: If you need to customize the fixture, the number of physical specifications is subject to customer requirements.				

Table 2

Optional fixture classification:



Figure 3

Conical flask clamp fixing plate (standard configuration)

(Need to be equipped with flask clamp or test tube rack)

Features:

The conical flask clamp fixing plate is used for mounting and fixing the conical flask, test tube rack or other jig.

Accessory number: sample book

Size (mm):

250*250

350*350

450*450

Note: The factory configuration conical flask clamp is configured in 250mL.

The number that can be placed

Flask clamp capacity	BSBT-1701	BSBT-1702	BSBT-1703	Configuration
50ml	16	36	49	
100ml	9	23	36	
250ml	8	13	18	Standard
500ml	4	8	16	
1000ml	-	4	9	
2000ml	-	-	4	

Table 3



Figure 4

Universal spring clip (Optional)

Features:

Multi-function spring clip, a variety of test tubes, Erlenmeyer flasks and other shaped vessels can be placed.

Order No.: See sample book

Size (mm): 250*250

350*350

450*450



Figure 5

Rod universal fixture

Features:

The rod universal fixture is suitable for all types of containers, and the variable pinch roller allows for universal adjustment of the container. Suitable for all sizes of flat bottom flasks.

(including accessories: basic bracket, clamping roller, fastening screw, anti-slip mat),

Order No.: See sample book

Size (mm):

250*250 (3 Clamping rollers)

350*350 (4 Clamping rollers)

450*450 (5 Clamping rollers)



Figure 6

Flat plate universal fixture (Optional)

Features: Flat plate universal fixture is used in the viscosity range of low-smooth shaking operations, such as cell culture, culture dishes, culture media in culture flasks and culture dishes, and containers with low center of gravity. (Includes accessories: non-slip mat)

Order No.: See sample book

Size (mm):

250*250

350*350

450*450



Figure 7

Petri dish tray (Optional)

Features: The Petri dish tray is composed of an aluminum plate and a black elastic rope, and can fix the culture bottle or the shaped bottle body.

Order No : See sample book

Size (mm):

250*250

350*350

450*450



Figure 8

Test tube rack (Optional)

Features: Made of stainless steel for easy placement and removal of test tubes. The test tube rack is designed to strongly shake and fix small tubes, test tubes, cuvettes, centrifuge tubes, and the like.

Order No.: See sample book

Size (mm): See sample book



Figure 9

Beaker clip (Optional)

Features: Different tubes can be sorted and mixed on the same platform, and different sizes of glassware can be mixed. The specifications of the flask holder can be selected. The beaker clip is made of stainless steel and can hold the conical flask and the cylindrical bottle.

Order No.: See sample book

Specification(ml):(customizable)

50 mL

100 mL

250 mL

500 mL

1000 mL

2000 mL

8. Operation instructions

8.1 Main interface description

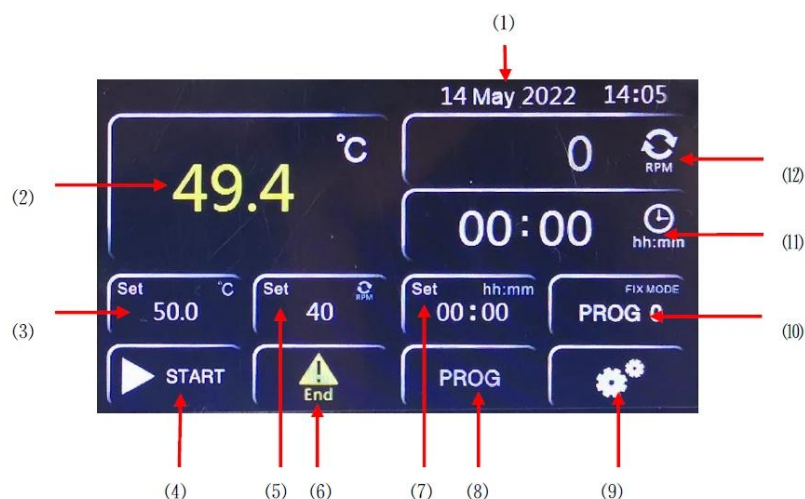


Figure 10

1. System time display area: display of the current system time.
2. measured Temperature
3. set temperature, the set temperature can be modified by clicking in the fixed value state.
4. START/STOP : START is displayed when stopping, STOP is displayed when running, click to switch the running stop state.
5. Set speed : the current set speed is displayed, and the set speed can be modified by clicking on it when the value is fixed.
6. Status zone: display   when normal operation or appointment is on, display  when stopping, display  when alarm is on, display  when temperature is self-adjusting, flashing, when the buzzer sounds, click to change the zone to muffle the sound.
7. Setting time area: the current setting time is displayed, and the setting time can be modified by clicking when the value is fixed.
8. Program content editing
9. parameter setting: click on it to enter the setting menu interface, which allows access to the parameter layer.
10. PROG select: displaying the running group as 0 when the value is fixed, displaying the program working group and the number of current running segments when the program is in progress, click to modify the current running group.
11. TIME zone: display of running time.
12. current speed: displays the measured RPM.

8.2 Run operation

1. Ensure that the controller is in a stop "END" state.
2. Operating steps, as follows



Figure 11

8.3 Programs Editing

1. Ensure that the controller is in a stop "END" state.
2. Operating steps, as follows



Figure 12



Temperature setting



Speed setting



Timer setting

8.4 Program cycle setting



Figure 13

Cycle: the number of cycles of the program, 0 means infinite cycles, other numbers, cycle the corresponding number of times, such as 1, the program only runs 1 time, then the device stops.

Delay: Appointment start time setting, after setting the time here, return to the main interface, click on the run button, that is, start timing, after the time is up, the device will run automatically.

Note .

1. There are 8 groups of programs, with 8 steps each.
2. Key point: After the program content has been edited, if there are extra steps you don't need , please set the time of next step as 0, it means the end of the program, otherwise the controller will execute all steps.

ESC	SET PROG								1	OK
Step	1	2	3	4	5	6	7	8		
	31.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0		
	40	40	40	40	40	40	40	40		
 min	2	2	2	2	2	2	2	2		

Figure 14

8.5 Fix Mode setting

1. When PROG =0.
2. Operating steps, as follows



Figure 15

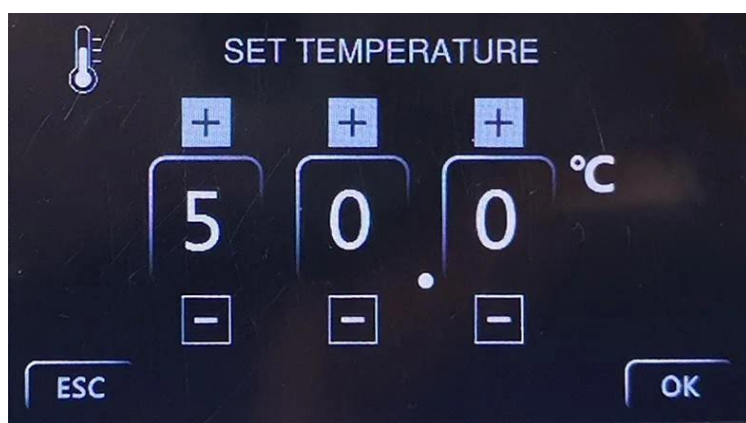


Figure 16

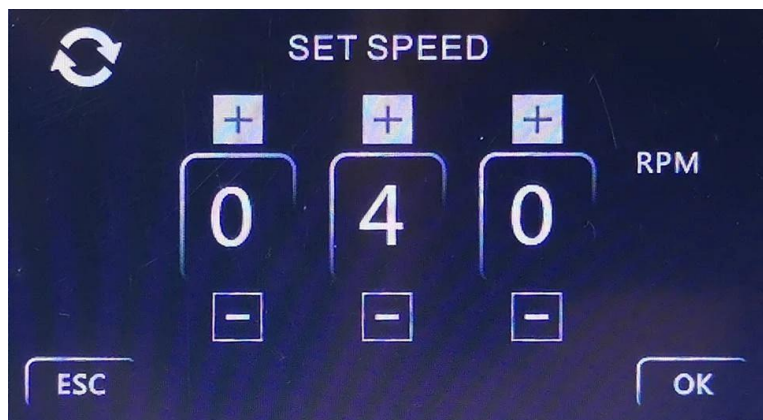


Figure 17

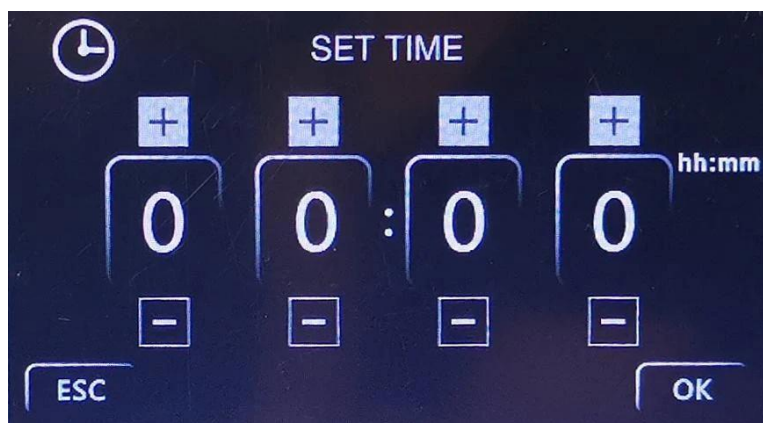


Figure 18

8.6. Use of optional "independent temperature limit controller"

The over temperature protector is an independent protection system. When the temperature of the temperature controller is out of control, when the temperature in the working chamber reaches the temperature limit setting of the over temperature dial, the over temperature protector will automatically cut off the heating and sound an alarm.

(as shown on the figure 19) When the working room temperature is lower than the temperature limit °C After the set value, the protection system is eliminated and the instrument resumes work. Loop this way until troubleshooting

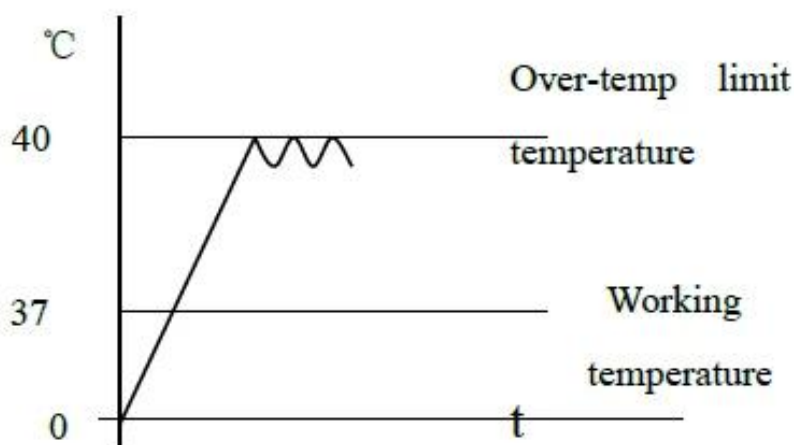


Figure 19

The specific operation is as follows:

8.1.6.1 The temperature limit setting should be greater than or equal to $(SV+AL) + (3\sim5)^{\circ}\text{C}$ using the over-temperature setting dial on the panel, +, - button to set the required temperature limit temperature.

Example: $SV=57^{\circ}\text{C}$, $AL=3$ Should be set at 60°C



Setting button

Figure 20

9. Cleaning and maintenance

Product moisture treatment

1. After each use, dry the surface of the cabinet with a dry cloth to prevent rust.
2. When the product is not used for a long time (more than one month), it should be energized regularly. The machine runs at 50r/min for 5 hours to prevent moisture and rust. After the end, the power cord should be unplugged.
3. If the product is placed for a period of time or intermittently for more than half a year, the tray should be pushed by hand to see if it can be rotated and then used for power-on;
4. In addition to parameters such as speed and time, other relevant parameters should be modified by our company's service center or adjusted by professionals;
5. When the equipment is placed on the platform, the table edge must be provided with a raised barrier to prevent the oscillation box from being displaced after long-term operation and a drop phenomenon.

10. Troubleshooting

Item	Problem	Problem reason	Solution
1	No power supply when start	Power outlet no power or poor contact.	Inspection, repair.
		The power line is broken.	Replace.
		Power switch is not open or break down.	Open (closed) switch or replace it
		Fuse is blown or Fuse is not installed.	Install the appropriate fuse, check the cause of the fuse burning, after boot repair.
2	The machine doesn't work when turns on	Control power is not open; Running key is not pressed.	Operate according the user manual.
		Controller or the motor and other components bad is broken	Replace.
3	The screen shows " "	Sensor Pt100 is broken	Repair, check when Pt100=0 °C is 100Ω, Each increase of 1 °C increase of about 0.3Ω.
4	The temperature doesn't rise up; The temperature stop rising after a period of time.	Setting temperature is below the ambient temperature.	Reset
		Check the timing setting.	Reset enough time or setting the time as 0.
		The controller has no voltage output.	Controller is broken, replace or repair.
		Both side of heating pipe has voltage	Heating pipes fall off or breakdown
		Door switch failure	Adjust the position of the hasp or replace the broken switch

5	The actual temperature shows error/	Accuracy goes wrong	Zero and full degree correction and require professional debugging is required
6	It has Static error or large overshoot	The parameter is set unreasonable.	Set temperature value $<(RT+5)^{\circ}\text{C}$ or need professional debugging and modifying P,I,D data.
7	Temperature is out of control.	The heater is broken	Replace.
		The controller is broken	Replace.
		Fan does not run; the actual temperature is low in working chamber.	Repair, replace.

8	Big Noise (Including the cooling fan)	The product placement is not stable, The screw of fasten Fan pallet fan is loosen.	Repair.
9	Oscillation does not work or out of control	The optical chopper is broken or cable poor contact	Replace the optical chopper and repair
		Dashboard is broken	Replace dashboard
		Motor does not turn.	Motor overload or breaks down, the door switch is not touching well. Need repairing or replacing.
		Door switch is broken.	Adjust the position of the hasp or replace the broken switch.
10	Rotation is not up	The mechanical transmission section has stuck phenomenon.	Hand Test.
		Small starting torque	Modify the relevant parameters need professional debugging

Table 4

11. Packing List

No.	Type	Name	Unit	Qty	Remarks
1	Equipment	Orbital Shaker		1	Determine the model according to the order number
2	Document	Operating instructions		1	
3	Document	Packing list		1	
4	Spare part	Power cable		1	
5	Spare part	Fuse		2	

Table 5



Biolab Scientific Ltd.

Trillium Executive Center, East Tower, 675 Cochrane Dr, Markham, Ontario L3R 0B8, Canada
Email: info@biolabscientific.com | Website: www.biolabscientific.com