A Geno Technology, Inc. (USA) brand name

Incubating Shaker

Cat. No. BT917

1-800-628-7730 ♦ 1-314-991-6034 ♦ info@BTLabSystems.com

Thanks for choosing BT Lab Systems' BT917 Incubating Shaker. This operation manual describes the function and operation of the instrument. In order to use the instrument properly, please read this manual carefully.

IMPORTANT SAFETY INFORMATION

Users should understand how to use the instrument properly before operating it. Please read this operation manual carefully before using the instrument.

The operation, maintenance and repair of the instrument should comply with the basic guidelines and warning below. Ignoring these instructions will affect the life of the Instrument and safety precautions.

- This product is an indoor Instrument.
- These units are designed for laboratory use by persons knowledgeable in safe laboratory practices.
- The operator should never open or repair the instrument. Opening or repairing the instrument will void the guarantee and can cause accidents.
- The power plug should safeguard against an electric shock. The 3-pin plug supplied with the instrument should be matched with a suitable grounded socket.
- The temperature of the metal block will be very high during the normal operation. This will produce scalding or boiling liquid. Do not touch any part of the body to the instrument to avoid scalding.
- Close the test tube lid before putting the tube into the block. Liquids may spill out in the block or onto the device if the tube lid is opened, which will damage the block or the device.
- Make sure the outlet voltage complies with the voltage required. Make sure there is nothing else plugged into the same outlet. Hold the plug when pulling out the power line. Do not plug the cord in where it is a tripping hazard.
- The instrument should be used in an area with low temperature, little dust, no water, no sunshine or hard light and with good air circulation. Do not use where there is corrosive gas or a strong magnetic field. Keep far away from central heating, camp stove and other hot sources. Do not put the instrument in a wet and dusty area. The vent on the instrument is designed for aeration. Do not wall up or cover the vent. The distance between each device should be more than 100cm when there is more than one instrument.
- The main switch is on the rear of the device. Turn to "I" to power on the device, and Turn to "O" to power off the device. Power off when not in use. If the instrument will not be used for a long period, unplug, and cover with a piece of cloth to protect it from dust.
- In case of the following, unplug the instrument at once and contact BT Lab Systems.
    - The instrument comes into contact with liquid
    - The instrument gets soaked or burned
    - The instrument emits an abnormal sound or smell
    - The instrument is dropped or the outer shell damaged
    - The instrument functions abnormally.

MAINTENANCE

The well in the block should be cleaned with a cloth dampened by alcohol to assure good heat conduction between the block and the test tube. If there are smudges on the instrument, clean it with a dry cloth.

Power off when cleaning the instrument. Do not drop the cleaning fluid in the well. Do not corrosive cleaning fluid.

INTRODUCTION

The Incubating Shaker is designed with fast mixing speed and integrates 3 functions of mixing, shaking and incubating. Combined with intelligent operation, it can mix not only various tubes, PCR plates, deep-well plates, micro plates and other laboratory supplies, but also has the function of vortexing and heating all kinds of tubes.

KEY FEATURES

- Perfect radius with adjustable mixing speed.
- Programmable. Efficient shaking and temperature control.
- Microprocessor controlled incubator. Good temperature control. Accurate control of the shaking speed.
- Timing function. Time range is from 0 to 100 hours.
- Can use various blocks, convenient replacement.
- Built-in temperature calibration function and short mixing function.
- DC brushless motor drive, long life and maintenance free.
- Multiple safety protection functions. Conforms to CE safety standards, safe and reliable.

NORMAL OPERATING CONDITIONS

Ambient Temperature: 5°C ~30°C
Relative Humidity: ≤70%
Power: 110V~ 3A

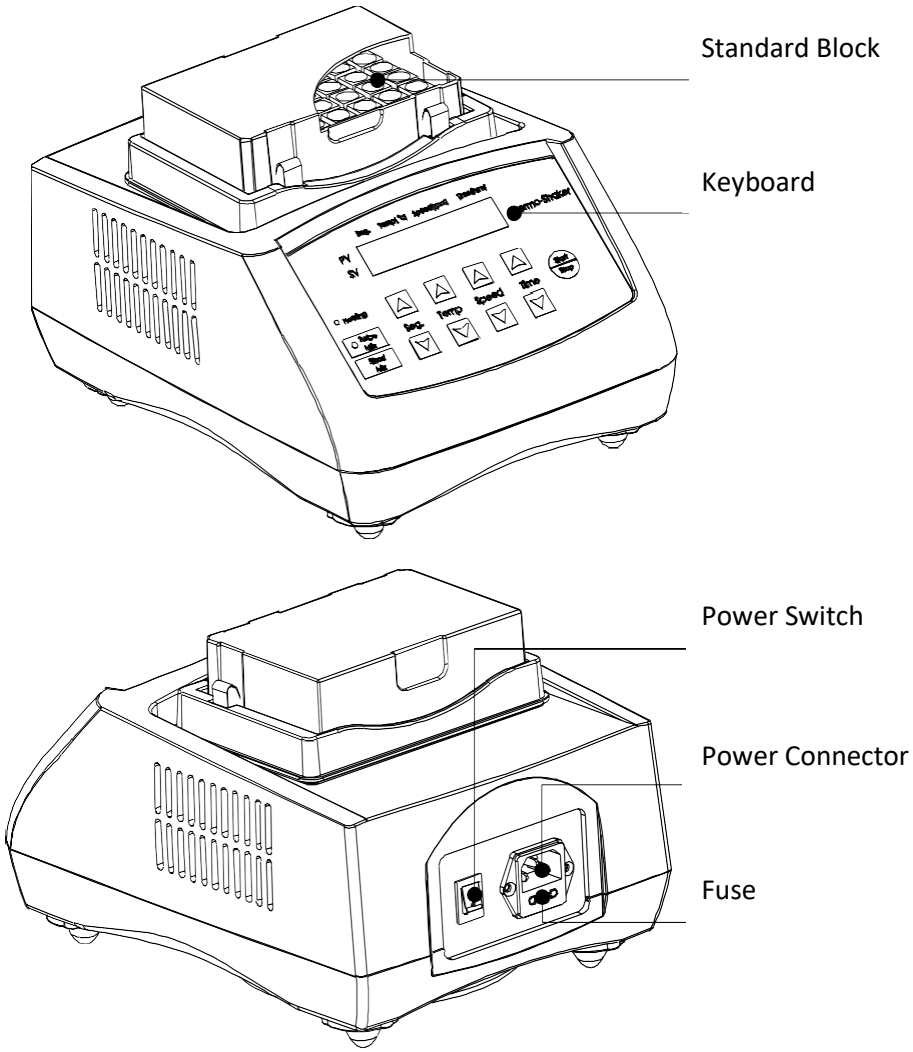
TECHNICAL SPECIFICATIONS

Mixing Rate: 300 ~ 2000rpm; 300 ~ 1600rpm
Orbit: 3mm
Temperature Setting Range: 5~100°C
Temperature Controlling Range: R.T.+ 5°C ~ 100°C
Timing Range: 1min ~ 99h59min
Temperature Accuracy: ≤ ± 0.5°C
Display Accuracy: 0.1°C
Heating Time: ≤20min (20°C to 100°C)
Tube Stand: A: PCR96x0.2ml B: 24x0.5ml C: 24x1.5/2.0ml
Heating Part: HEATER
Dimension (D x W x H): 270×190×170 mm
Net Weight: 6.8kg

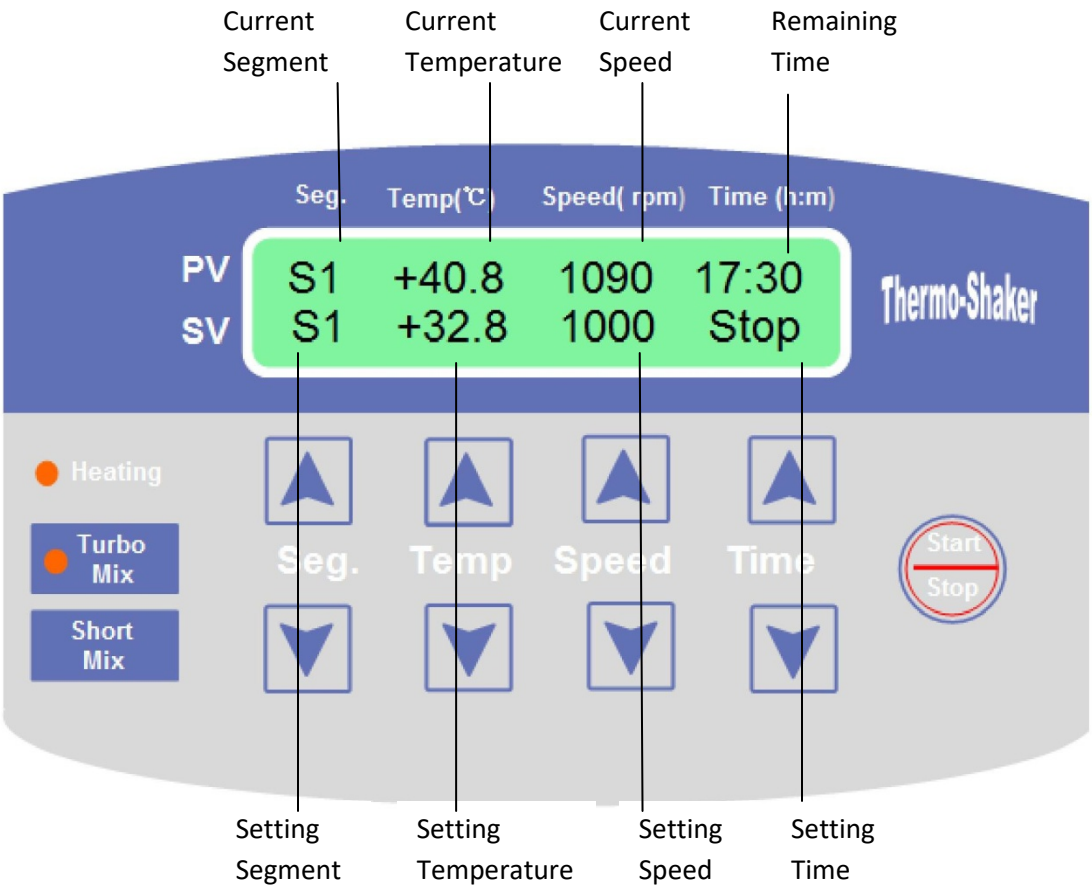
INTRODUCTION

This section mainly describes the instrument's mechanical structure, the keyboard and functions of each key. Please learn this chapter well before the instrument is operated for the first time.

EQUIPMENT OVERVIEW



KEYBOARD AND DISPLAY PANEL



KEY FUNCTION

SEG “UP” and “DOWN” arrow	Key for selecting procedure segment. Five segments can be selected (S1, S2, S3, S4, S5).
TEMP“UP” and “DOWN” arrow	Key for setting temperature. Press “UP” or “DOWN” arrow to set the target temperature. Holding “UP” or “DOWN” arrow can quickly set the temperature. Hold the “DOWN” arrow key until it displays “OFF” on the LCD to shut the temperature function off.
SPEED“UP” and “DOWN” arrow	Key for setting speed. Press “UP” or “DOWN” arrow to set the target speed. Hold “UP” or “DOWN” arrow to quickly set speed. Continuously press “DOWN” arrow key until it displays ”OFF” on the LCD to shut off the shaking function. Speed setting unit is 1rpm.
TIME“UP” and “DOWN” arrow	Key for setting time. Press “UP” or “DOWN” arrow to set the target time. Hold “UP” or “DOWN” arrow to quickly set time. Hold “DOWN” arrow key until it displays ”OFF” on the

	LCD to shut off the timing function.
SHORT MIX	Key for short mix. The device mixes at the frequency visible in the display for as long as the “Short Mix” key is held down. The time is counted in seconds until 999s has expired.
START/STOP	Key to start or stop. Press Start/Stop key to start or stop the program. Briefly press to start the program. Holding the key will stop the program.
TURBO MIX	Key for Turbo Mix. When Turbo Mix key is pressed the indicator light on the side goes on and off while the speed changes from highest setting of 2000rpm and 1600rpm When the setting speed is at 2000rpm, the light is on. When the setting speed is at 1600rpm, the light is off.
HEATING	The indicator light flickers when the instrument is heating or cooling. The indicator light stays on when it reaches the temperature.

Setting Single Temperature, Speed and Timing

1. When powered on the instrument enters into the initial program with a beep.
2. After 6 seconds, the LCD displays the program. “S1 is the segment run in last operation. “30.0” indicates current temperature of the block. “37.0” is setting temperature, “1000” is setting speed, “10:00” is setting time in last operation. Temperature unit is ° C. speed unit is rpm, Time unit is hour:minute.

S1	30.0	0	00:00
S1	37.0	1000	10.00

3. Press “UP” or “DOWN” arrow of Temp. The temperature setting value will increase or decrease.

   Press “UP” or “DOWN” arrow of Speed or Time to set shaking speed or time.

   Hold “UP” or “DOWN” arrow to quickly increase or decrease the value.

   Instrument confirms and autosaves the setting value.

   After setting the program S1, press “Start/Stop” to run S1. When the program is finished, an alarm will beep five times. Shaking will be stopped. Temperature is kept at the setting value.

   NOTICE: Pressing “UP” or “DOWN” arrow of Temp will autostart the instrument to the setting temperature. If not pressing “UP” or “DOWN” arrow, press “Start/Stop” to start operation.

4. Press “UP” or “DOWN” arrow of Seg. to select Segment. Set the segment’s values according to 3 above. A total of five segments can be set for operation.

How to Shut off the Temperature, Speed and Timing Function

1. Press "UP" or "DOWN" arrow of Seg. to select one segment from S1, S2, S3, S4, S5.
2. Press "DOWN" arrow of Temp. until it displays "OFF" on the LCD to shut off the thermo function. Similarly, press "DOWN" arrow of Speed or Time to shut off the shaking or timing function.

NOTICE:

1. Shut off timing function, The LCD displays ∞. The program is ongoing.
2. When the instrument displays "CON" it is in operation.

Short Mix

Hold "Short Mix", the instrument starts to shake, release "Short Mix", shaking stops. In the short mix mode, (example:) LCD displays "600RPM" which is the shaking speed. "023S" is the time, which means the instrument already operated 23 seconds. The time is counted in seconds until 999 seconds has expired.

NOTICE:
The maximum short mix speed can be set in the current segment.

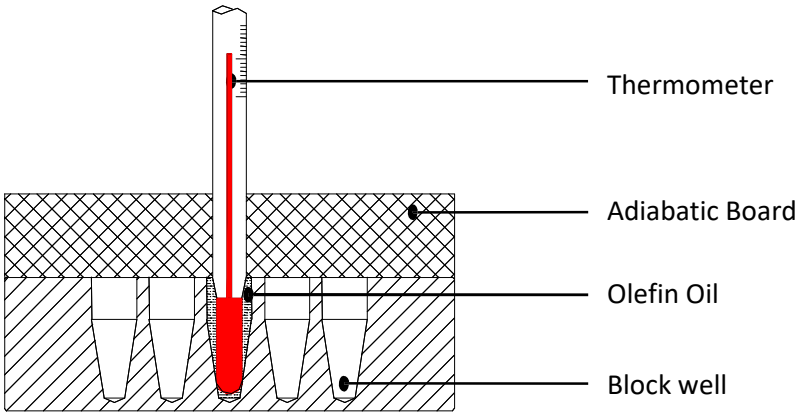
Temperature Calibration

The temperature of the instrument has been adjusted before it is sold. If there is deviation between the actual temperature and the displayed temperature, you can do as follows to calibrate it.

NOTICE:
The instrument uses two temperature adjustments to ensure its accuracy. It is linearly adjusted on 40 ° C, and 100 ° C. The temperature accuracy will be within ±0.5 ° C after the double temperature adjustment. Both the circumstances and the block temperature should be lower than 35 ° C when calibrated.

Adjustment Methods

1. Start up the instrument, it enters waiting interface. Make sure the current temperature in display is below 35 ° C. If the temperature is higher than 35 ° C, please wait until it down below 35 ° C.
2. Inject olefin oil into one of the cone-shaped wells. Put a thermometer into this well (the precision of the thermometer should be 0.1. The temperature ball should be immerged into the cone-shaped well). Heat insulation material is needed on the block to separate it from the oil.



NOTICE: To ensure the calibration precision, read the actual temperature value after the temperature reaches calibration points for at least 20 minutes.

3. Press the "UP" arrow and "DOWN" arrow of Seg. simultaneously when the instrument is not operating. On the display the practical temperature is behind "P:". The program auto controls the temperature to 40 ° C. The sign "*" flickers. The value behind "AdjTemP" is the calibration temp. When temperature achieves 40 ° C, "ADJ" and "*" flicker together, the value behind "P:" is still the practical temperature.
4. Wait for 20 minutes, the actual temperature of thermometer is (example)38.8 ° C. Press "UP" or "DOWN" arrow of Temp. to change the value behind "AdjTemP" to 38.8. Press "Start/Stop" to confirm.

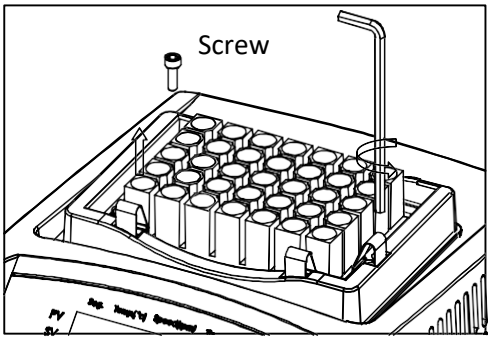
   The program saves the value. The temperature rises to 100 ° C automatically. The sign "*" flickers.
5. When practical temperature reaches 100 ° C, "ADJ" and "*" flicker together.
6. Wait for 20 minutes, the actual temperature of the thermometer is (example) 98 ° C. Press "UP" or "DOWN" arrow of Temp. to change the value behind "AdjTemP" to 98.0. Press "Start/Stop" to confirm
7. Program turns to interface for operation. After temperature calibration, the temperature display is the same as the practical temperature of block.

NOTICE:
1) During temperature calibration, press "UP" or "DOWN" arrow of Seg. simultaneously to cancel the calibration. The system keeps the former calibration.

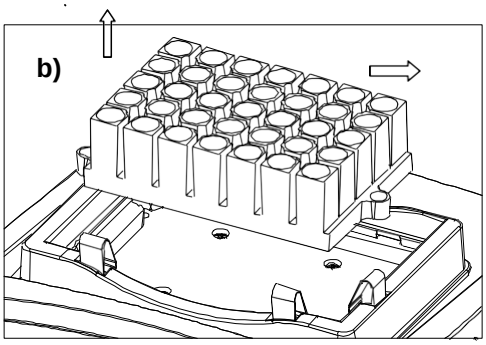
2) Do not simultaneously press "UP" or "DOWN" arrow of Seg. unless calibration is needed.

Block Replacement

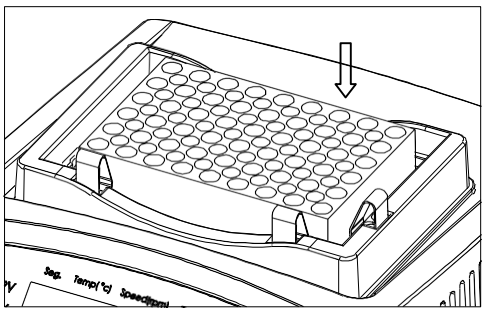
1. Open the cover and pull out the three screws which fix the block to the heating board with the screwdriver.



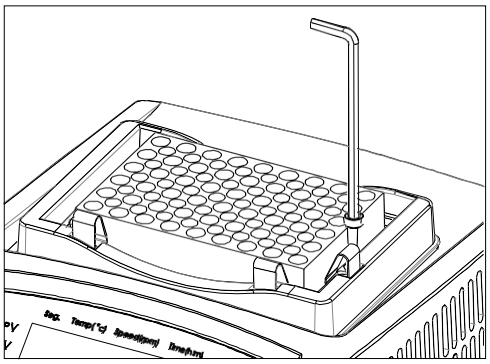
2. Take out the screws, pull out the block from the main instrument.



3. Take another block, lay it on the heating board. The block installment holes should line up with the holes in the main instrument.

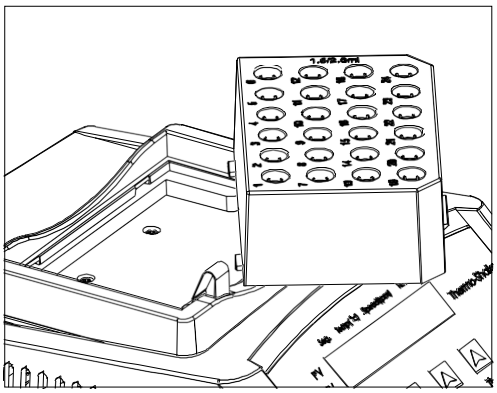


4. Put the screws into the installment holes. Attach the block on the heating board of the instrument with the screwdriver.

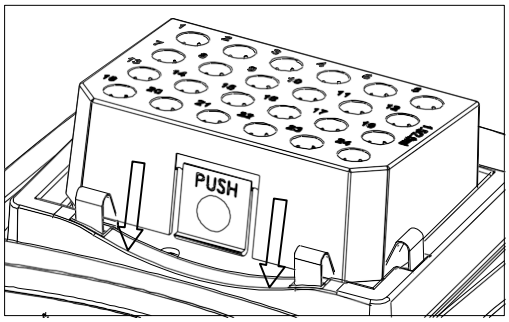


Attaching Tube Stand

1. Remove the block according to Block Replacement above. Push the two bulges at rear of the stand to corresponding hollows of the base frame.

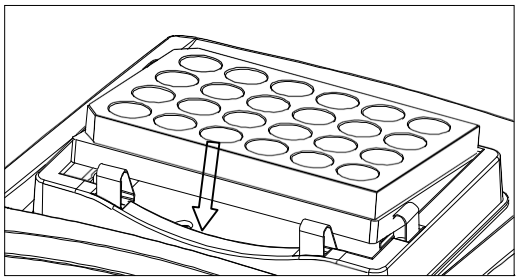


2. Push and press the front part of the stand until the “PUSH” button locks in the base frame.



Attaching Plates

Press one long side of the plate into the base frame. Press another side until the spring locks the plate. Make sure the plate is fastened.



TROUBLE SHOOTING

Issue	Possible Causes	Solution
No signals on the display when power on.	No power	Check the power
	Broken fuse	Contact BT Lab Systems
	Broken switch	Contact BT Lab Systems
	Other	Contact BT Lab Systems
The actual and displayed temperatures are much different.	Broken sensor	Contact BT Lab Systems
"OPEN" in the temperature display with a beep alarm.	Temperature sensor is broken or ambient temperature is below 0°C	Contact BT Lab Systems
"SHORT" in the temperature display with a beep alarm.	Temperature sensor is broken or ambient temperature is below 0°C	Contact BT Lab Systems
No heating	Broken sensor	Contact BT Lab Systems
Button does not work	Broken button	Contact BT Lab Systems

TECHNICAL SUPPORT

BT Lab Systems offers technical support for all of its products. If you have any questions about the product's use or, operation, please contact BT Lab Systems at the following:

E-Mail: info@BTLabSystems.com