LABSTAC

OPERATION MANUAL

Thermo Shaker Incubato

MIX37-25A & MIX37-25
SHA71-1600

PREFACE

Thanks for choosing thermo shaker incubator. This operation manual describes function and operation of the instrument. In order to use the instrument properly, please read this manual carefully before operating the Instrument.

Opening Check

Please check the instrument and appendix with the packing list when you first open the packing case. If anything does not match with the packing list, please contact with the vendor or the producer.

Safety Warnings and Guidelines

1. Important Operation Information of The Security

Users should have an entire conception of how to use the instrument properly before operating it. Please read this operation manual carefully before using the instrument.

It is forbidden operating before read the operation manual. Read the guidelines and directions below and carry out the countermeasure according to them.

2. Security:

To operation, maintenance and repair the instrument, please comply with the basic guidelines and the remarked warnings below. Otherwise, the instrument will suffer effect on the scheduled working life and also on the protection provided.

This product is a normal and an indoor using instrument.

Before operation, read the manual carefully. These units are designed for using in the laboratory environments by who're knowledgeable in safe laboratory practices.

The operator should not open or repair the instrument by himself. Otherwise, the instrument will lose the qualification of repair guarantee or cause accidents. The company will repair the instrument based on warranty description.

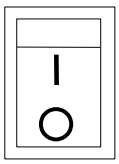
A.C. power's grounding should be reliable to safeguard against an electric shock. The 3-pin plug supplied with thermo-shaker's power cable is a safety device that should be matched with a suitable grounded socket.

The temperature of metal block will be very high during the normal operation. There will be scald or boiling of the liquid. It is strictly prohibited any part of the body touching the instrument from scald.

Close the test tube lid before put 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 voltage is complying with the voltage required. Make sure the rated electrical outlet load no lower than the demand. Power line should be replaced with the same type if it any damage. Make sure there is nothing on the power line. Hold the jack when pull out the power line. Do not pull the power line. Do not put the power line in ambulatory place.

The instrument should be put in the place where of low temperature, little dust, no water, no sunshine or hard light, and of good aeration, no corrosively gas or strong disturbing magnetic field, and far away from central heating, camp stove and other hot resource. Do not put the instrument in wet and dusty place. 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.



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 operation finished. If long period do not use the instrument, pull off the connector plug, cover a cloth on the instrument to prevent from dust.

Pull the connector plug from the jack at once in the following case, and contact the vendor.

- There is some liquid flowing into the instrument;
- Drenched or fire burned;
- Abnormal operation: such as abnormal sound or smell;
- Instrument dropping or outer shell damaged;
- The function has obviously changed.

3. The maintenance of Instrument

The well in the block should be cleaned by the cloth stained with alcohol to assure good heat translation between the block and the test tube and no pollution. If there are smutches on the instrument, clean them with cloth.

Power off when cleaning the instrument.
Do not drop the clean fluid in the well when cleaning.
Corrosive clean fluid is strongly prohibited.

Index

01. Introduction

The Thermo Shaker Incubator is an ideal instrument for intensive mixing of samples in the regulated temperature conditions.
Shaking and thermo modes (heating or cooling) can be used both simultaneously and independently as well as time setting. It is a shaker while it is a thermostat. The main body of the mixing block can be used with different kinds of blocks. The instrument is applicable for DNA analysis, extraction of lipids and other cell components, DNA library creation, PCR amplification, pre-denaturation in electrophoresis, serum solidification, etc.

Features:
1. Optimized 2D mixing control, over 3mm mixing orbit.
2. LCD display. Easy to set and use.
3. Accurately control and display time, temperature and speed.
4. Overheating protection device.
5. Temperature can be calibrated to meet user's needs.
6. Low noise and stable working.
7. Conforms to CE safety standard
8. Customized blocks are available to satisfy experimental requirement.
9. Can be used for micro test tubes, PCR plates, deep-well plates and MTPs
10. Gentle, reliable mixing with long-life brushless motor

02. Specifications

1. The normal operating condition
   Ambient temperature: 5°C ~30°C
   The relative humidity: <70%
   Power supply: 100-230V～ 1.5A 50-60Hz

2. The basic parameters and specifications

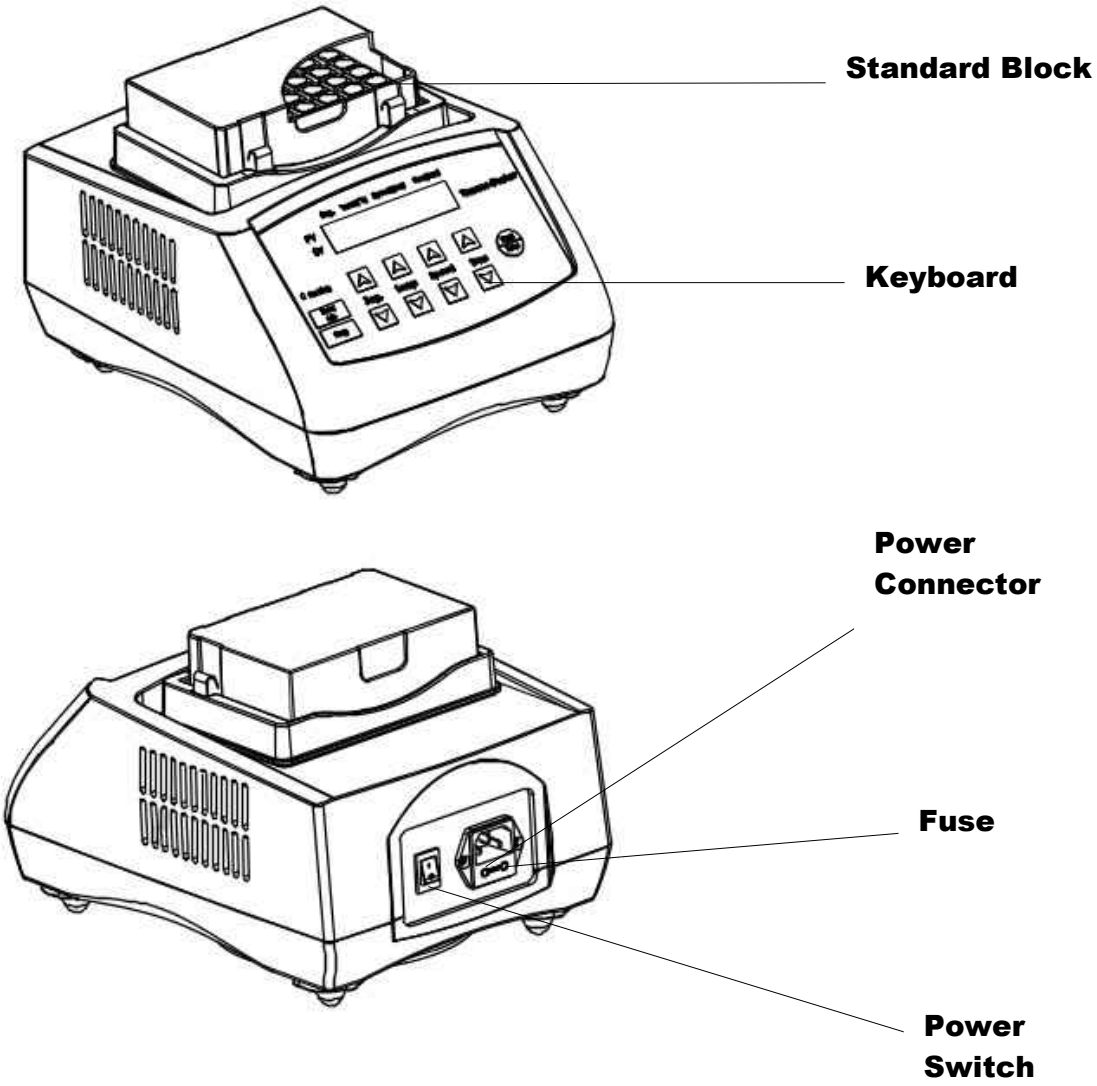
Model Parameter	SHA74-1500
Mixing rate	200~1500 rpm
Orbit	2mm
Temperature setting range	0C~100C
Temperature control range	0C~100C@ Room temp. <20 °C 4C~100C@Room temp.<25C 10C~100C@ Room temp.<30C
Timing range	1min ~ 99h59min
Accuracy of the temperature	<0.5C
Temperature stability	@100C:± 0.5C
Heating time	From 25 C TO 100C ^15min (The ambient temperature is 20°C~30C)
Cooling time	^20min (ET^20C:20C~0C) ^20min (ET^25C:RT~4C) <20min (ET^30C:RT~10C)

Standard Block	A-BLOCK: 96x0.2 ml F-BLOCK:24x <012mm tube B-BLOCK: 54 x 0.5ml G-BLOCK:12x15ml Falcon C-BLOCK: 35 x 1.5ml H-BLOCK: 6x50ml Falcon D-BLOCK: 35 x 2.0ml E-BLOCK: 20 x 1.5ml + 15 x 0.5ml
Fuse	250V 3.0A 05x20
Dimension (mm)	300(D)x225(W)x195(H)
Net weight (kg)	8.5

03. Preparations

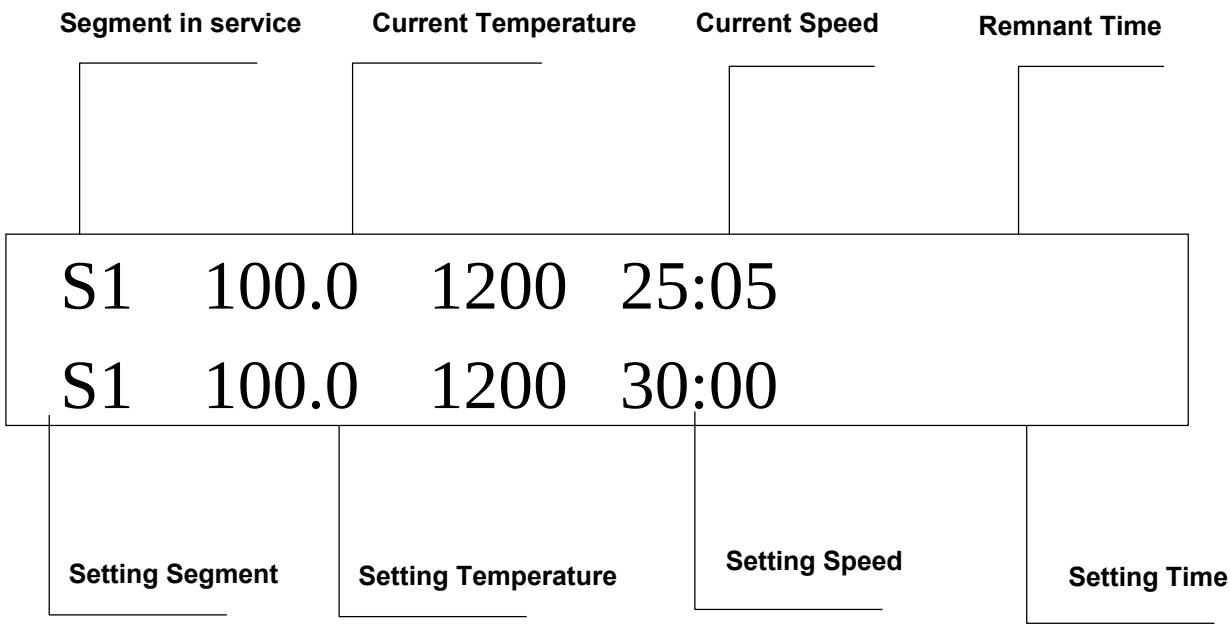
This chapter mainly describes the instrument's mechanical structure, the keyboard and functions of each key, as well as preparations before power on. Please learn this chapter well before the Thermo Shaker to be operated the first time.

1. Structure Description



2. Keyboard and Display panel

Display Panel:



3. Key Functions

Seg. ▲ ▼	Key for selecting procedure segment. Five segments can be selected (S1, S2, S3, S4, S5).
Temp. ▲ ▼	Key for setting temperature. Press ▲ or ▼ to set the target temperature. Press ▲ or ▼ continuously can quickly set temperature conveniently with x10 speed. Continuously press ▼ till it displays “OFF” on the LCD, shut the thermo function.
Speed ▲ ▼	Key for setting speed. Press ▲ or ▼ to set the target speed. Press ▲ or ▼ continuously can quickly set speed conveniently with x10 speed. Continuously press ▼ till it displays “OFF” on the LCD to shut off the shaking function. Speed setting unit is 1rpm.
Time ▲ ▼	Key for setting timing. Press ▲ or ▼ to set target timing value. Press ▲ or ▼ continuously can quickly set timing conveniently with x10 speed. Continuously press ▼ till it displays “OFF” on the LCD to shut off the timing function.
Prog.	Key for programming. Press “PROG” to select segment. Default starting segment is S1. The instrument can implement 4 programs as S1-S2, S1-S2-S3, S1-S2-S3-S4, S1-S2-S3-S4-S5.
Short Mix	Press to shake, release to stop key. The device shakes at the speed of current selected segment.
Start/Stop	Key for start or stop. Press Start/Stop key to start or stop the program. To stop the program in operation need to keep pressing the start/stop key for around 2 seconds.
Heating	The indicator light is flickered when heating or cooling. The indicator stays light on when keeps the reaching temperature.

04. Operation Guide

1. Setting Single Temperature, Speed and Timing

a) The instrument enters into the initial program as the chart on the right with a beep when power on.

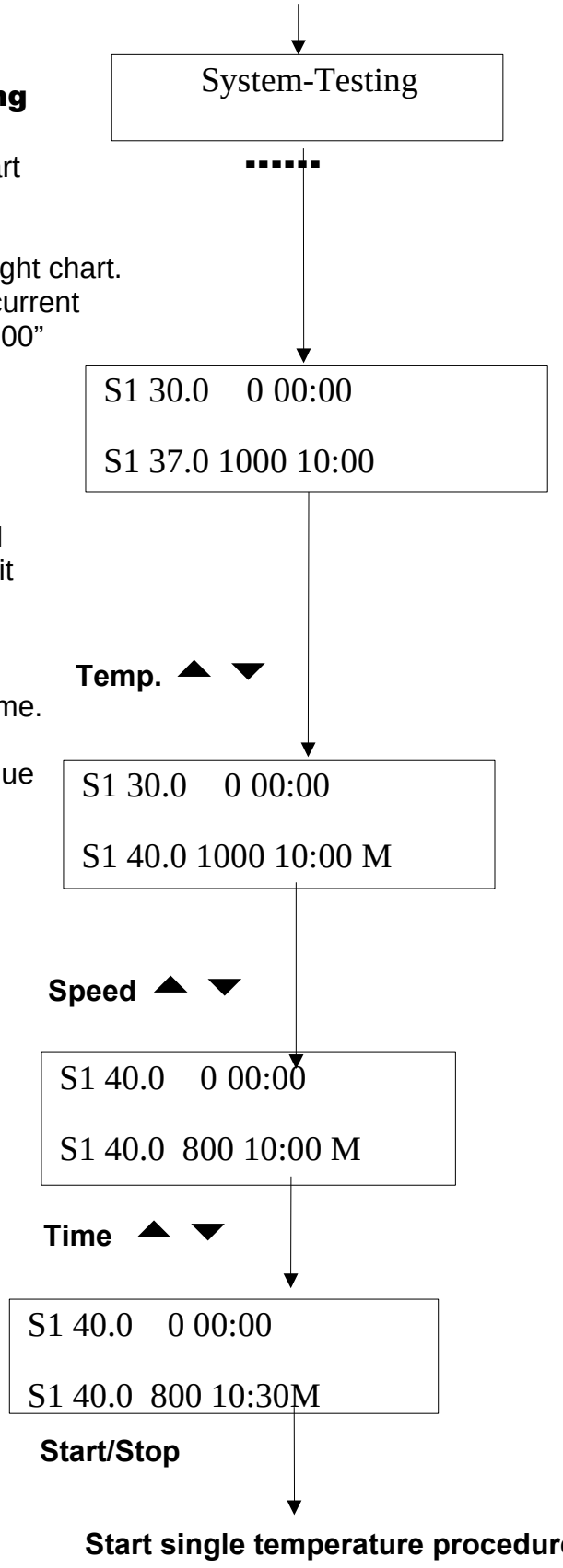
b) After 6 seconds, the LCD display program, e.g. as the right chart. “S1” is the segment run in last operation. “30.0” indicates current temperature of the block. “37.0” is setting temperature, “1000” is setting speed, “10:00” is setting time in last operation. Temperature unit is °C, speed unit is rpm, and time unit is hour:minute.

c) Press ▲ or ▼ of Temp, the temperature setting value will increase or decrease from decimal digit, unit digit, tens digit to hundreds digit.

Press ▲ or ▼ of Speed or Time to set shaking speed or time.

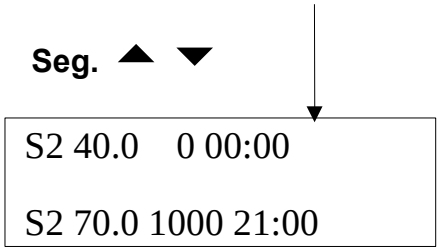
Continuously press ▲ or ▼ to increase or decrease the value from unit to tens digit, to hundreds digit quickly.

Instrument confirms and autosave the setting value.
After finishing setting program S1,
press “Start/Stop” to run S1.
When program finished, it will alarm a beep five times.
Shaking will be stopped while temperature kept at the setting value.



NOTICE: Press or of Temp will autostart the instrument to the setting temperature. If no pressing or , have to press "Start/Stop" to start operation.

d) Press ▲ or ▼ of Seg. to select Segment.
Set the segment's values according to
c). Total five segments can be set for operation.



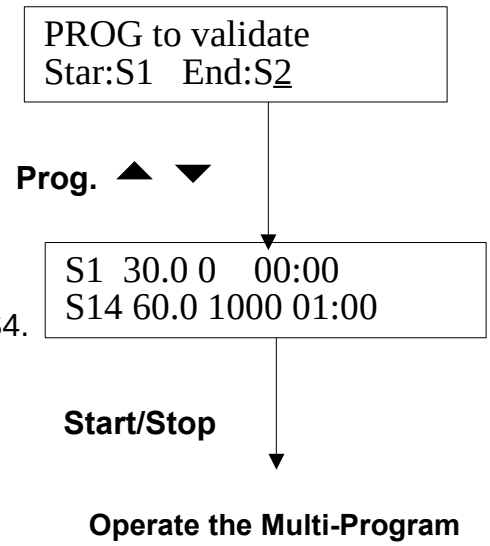
2. How to Set Multi-program Connecting

a) Press "Prog." to connect segment S1, S2, S3, S4, S5 to operate as S1-S2, S1-S2-S3, S1-S2-S3-S4, S1-S2-S3-S4-S5.

NOTICE: Multi-program start from S1.

b) E.g., to connect programs S1-S2-S3-S4.
Press "Prog.", LCD display as the right chart.
"S1" is the starting segment which could not be changed.
"S2" is the ending segment. Press of Seg. till it shows "S4".
Then press "Prog." to confirm the value. "S1" changes to "S14" as the right chart. Multi-program set is S1-S2-S3-S4.

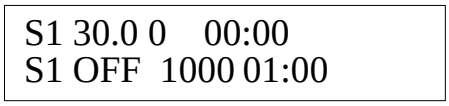
c) Press "Start/Stop" to operate the multi-program S1-S2-S3-S4.



NOTICE: After fix the segment, press "Start/Stop" to operate the multi-program.

3. How to Shut off the Temperature, Speed and Timing Function

a) Press ▲ or ▼ of Seg. to select one segment from S1, S2, S3, S4, S5.
b) Press ▼ of Temp. till it displays "OFF" on the LCD to shut off the thermo function. Similarly, press ▼ of Speed or Time to shut off the shaking or timing function.



NOTICE:

1) Shut off timing function, the timing time is ∞. "CON" displayed on the LCD in this case.

2) In multi-program operating, if timing function is shut off in one segment, program will operate at that segment continuously. Keep press "Start/Stop" to stop the segment, operate after re-timing.

4. Short Mix

Keep press "Short Mix", the instrument starts to shake, release "Short Mix", shaking stops.

In the short mix mode, LCD displays as the right chart. "600RPM" is the shaking speed. "023S" is operated time, which means the instrument already operated 23 seconds. The time is counted in seconds, more than 999 seconds display 999S.

Short Mix is running
600RPM 023S

NOTICE:

1) The maximum short mix speed can be set according to requirement in the current segment.

2) After multi-program complete, the maximum short mix speed is the speed of segment S1.

5. Temperature Calibration

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

NOTICE:

1) The instrument has 3 calibration temperature points to ensure the veracity. It is linearly adjusted on 10 °C, 40 °C and 100 °C. The temperature accuracy will be within ±0.5°C after temperature calibration.

2) Both the environmental and the block temperature should be lower than 30°C when calibration.

Adjustment Methods:

a) Power on the instrument, it enters into waiting interface. Make sure the current temperature in display is below 30 ℃. If the temperature is higher than 30 ℃, please wait until it down below 30℃.

b) Inject olefin oil into one of block well, and then put a thermometer into this well (the precision of the thermometer should be 0.1 ℃ and the temperature ball should be absolutely immerged into the olefin oil in the block well). Adiabatic material is needed on the block to separate it from the circumstance. (refer to below Figure A)

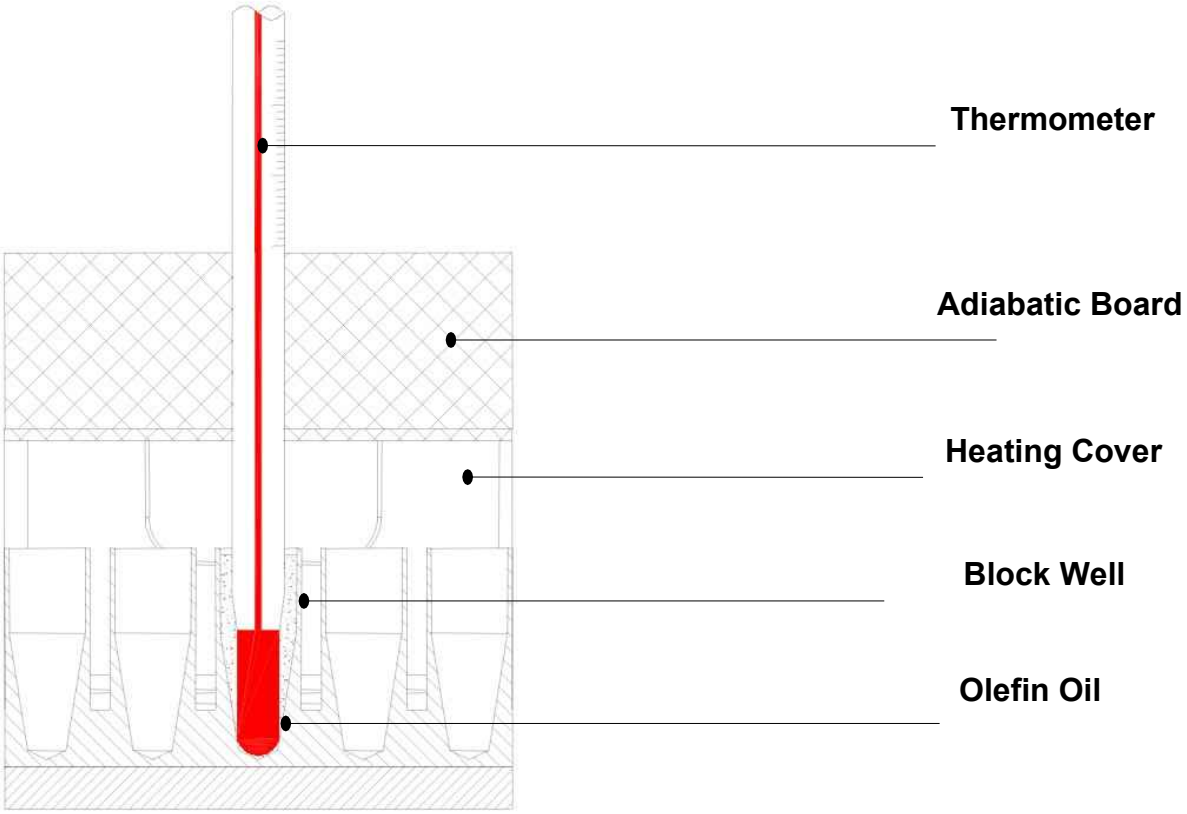
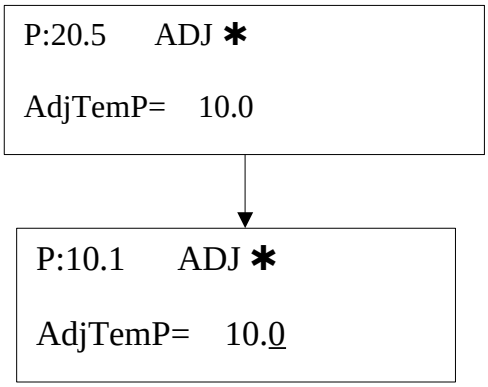


Figure A

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

c) Press ▲ and ▼ of Seg. simultaneously when the instrument is not operating. The program turns to interface as the right chart. Practical temperature is behind "P:" which shows 20.5, and the program auto control the temperature to 10℃. At the meantime, the sign"✱" flickers ceaselessly. The value behind "AdjTemP" is calibration temperature.



When temperature achieves 10°C, "ADJ" and "✱" flicker ceaselessly together, the value behind "P:" is still practical temperature.

d) Wait for 20 minutes, the actual temperature of thermometer is 9.8°C. Press ▲ or ▼ of Temp. to amend the value behind "AdjTemP" to 9.8. Press "Start/Stop" to confirm.

Program saves the value.
Temperature rises to 40°C automatically.
The sign "✱" flickers ceaselessly.

e) When practical temperature reaches 40°C, "ADJ" and "✱" flicker ceaselessly together.

f) Wait for 20 minutes, the actual temperature of thermometer is 38°C. Press or of Temp. to amend the value of "AdjTemP" to 38.0.
Press "Start/Stop" to confirm.

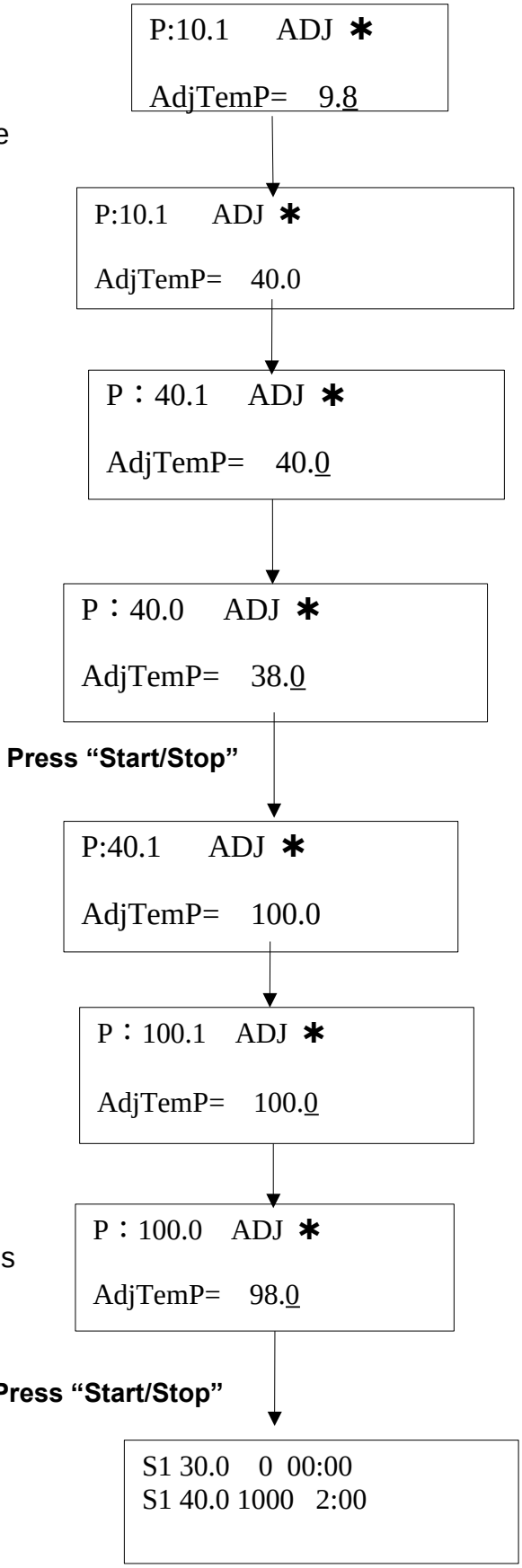
Program saves the value.
Temperature rises to 100°C automatically.
The sign "✱" flickers ceaselessly.

g) When practical temperature reaches 100°C, "ADJ" and "✱" flicker ceaselessly together.

h) Wait for 20 minutes, the actual temperature of thermometer is 98°C. Press or of
Temp. to amend the value behind "AdjTemP" to 98.0.
Press "Start/Stop" to confirm

i) Program turns to interface for operation as the right chart.

After temperature calibration, the temperature display is the same as the practical temperature of block.



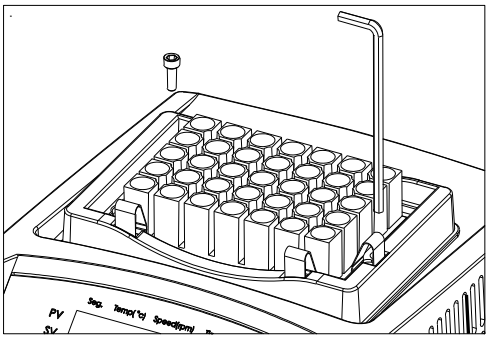
NOTICE:

1) During temperature calibration, press ▲ and ▼ of Seg. simultaneously to cancel the celibration. The system keeps the former calibration.

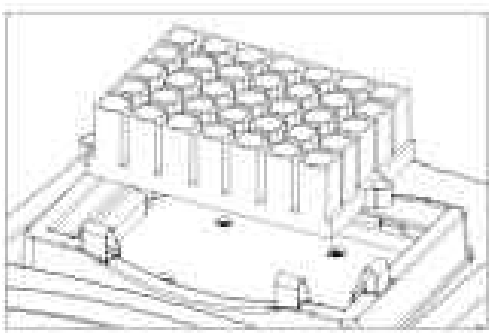
2) Do not simultaneously press ▲ and ▼ of Seg. unless calibrate is really needed.

6. Block Replacement

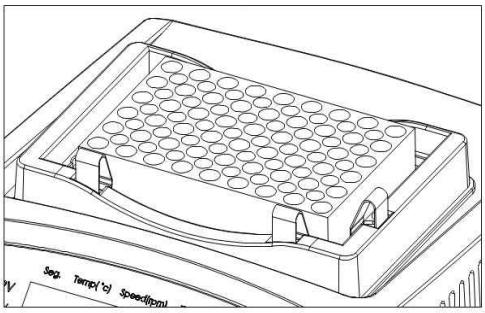
a) Open the cover and pull out the three screws which fix the block to the heating board with the screwdriver.



b) Take out the screws, put out the block from the main instrument.

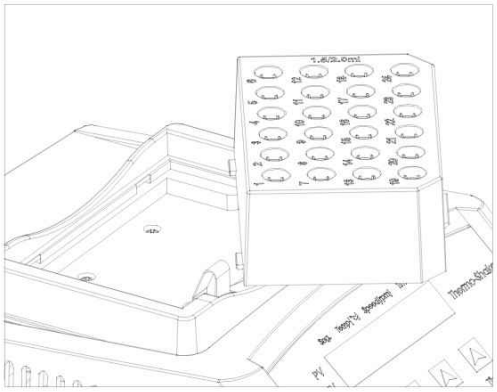


c) Take another block, steadily lay it aside on the heating board. The block installment holes should aim at the holes in main instrument.

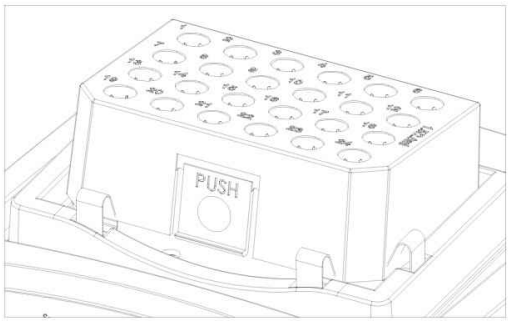


7. Tube Stand Fixing

a) Remove the block according to "Block Replacement" in above item 6 first. Push the two bulges at rear of the stand to corresponding hollows of the base frame. Refer to the right chart a).

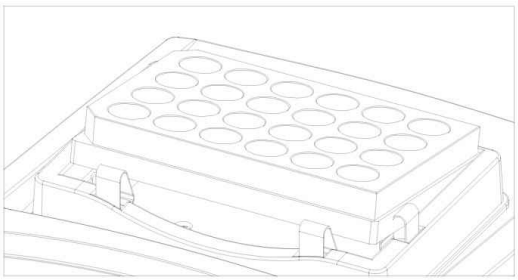


b) Push and press the front part of the stand till the "PUSH" trip locks in the base frame. Refer to the right chart b).



8. Plate fixing

Press one long side of the plate into the base frame. Press another side till the spring locks the plate as the arrowhead in the right chart c) indicates. Make sure the plate is fastened.



05. Failure analysis and troubleshooting

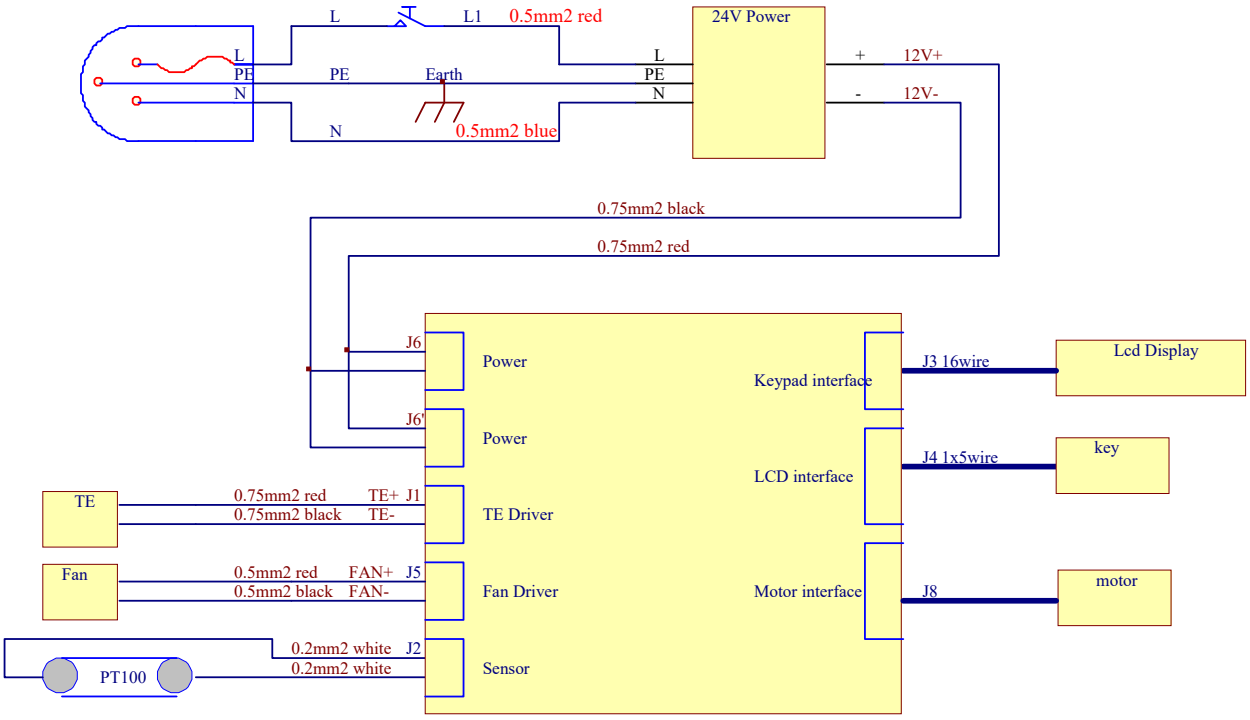
Failure analysis and processing procedures

No.	Phenomenon	Possible Causes	Processing Procedure
1	No signals on the display when it is powered on.	No power	Check the power
		Broken Fuse	Exchange fuse (250V 3AΦ 5x20)
		Broken switch	Exchange the switch
		Others	Contact to the seller
2	The actual and displayed temperatures are quite different.	Broken sensor	Contact to the seller
3	“OPEN” in the temperature display with the alarm of beep.	Temperature sensor is broken or the environmental temperature is below 0°C	Contact to the seller
4	“SHORT” in the temperature display with the alarm of beep.	Temperature sensor is broken or the environmental temperature is below 0°C	Contact to the seller
5	“ERR” in the temperature display with the alarm of beep.	Temperature sensor is broken or the environmental temperature is below 0°C	Contact to the seller
6	No hearing or cooling	Broken sensor or broken TE module	Contact to the seller

7	**Press invalid**	**Broken film switch**	**Contact with the seller**
8	**Very slow cooling or cooling temperature cannot reach the target in range.**	**Ambient temperature too high**	**Bring down ambient temperature**
		Broken fan	**Contact with the seller**
		Broken TE module	**Contact with the seller**
9	**“ERR” in the speed display continuously with alarm of beep.**	**Engine blocked**	**Contact with the seller**
10	**“ERR” in the speed display intermittently with alarm of beep.**	**Engine unstuck**	**Contact with the seller**

Appendix A：Wiring Diagram of SHA71-1600

（Below diagram is just for reference. It is subject to change without prior notice.）



LABSTAC

Email: contact@labstac.com
Website: www.labstac.com