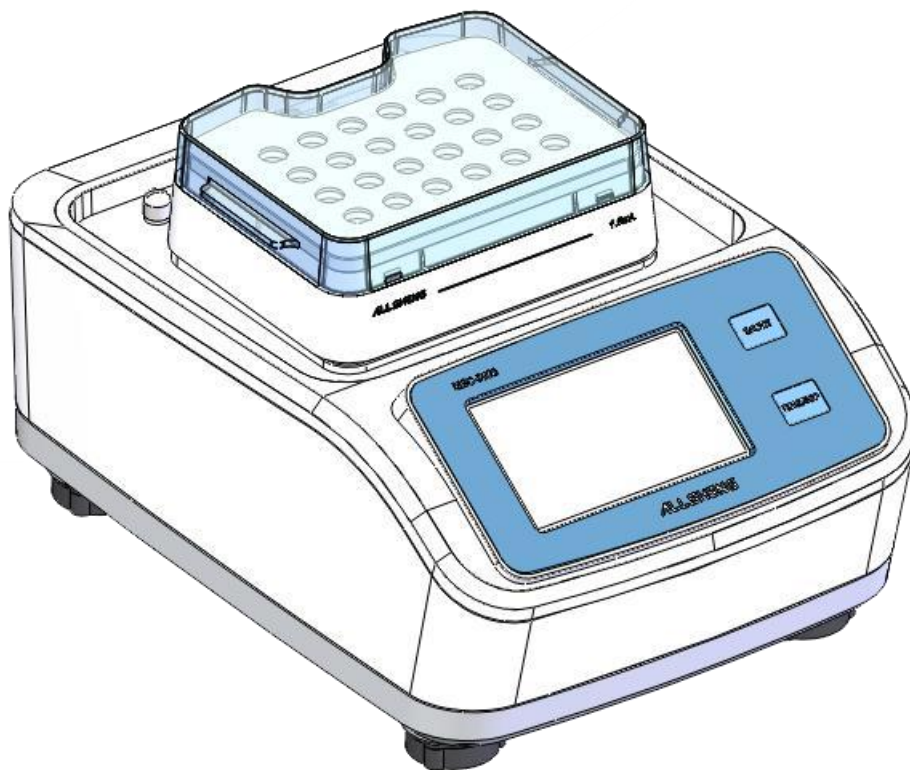

Operation Manual

V 1.3

MSC-3000

Thermo Shaker Incubator



Version modification Record:

Version No.	Date	Modification Description
V1.0	2020.12.01	➤ Initial Release
V1.1	2021.09.01	➤ Technical Parameter: Add the Maximum heating and cooling rate, and the Maximum speed
V1.2	2021.10.28	➤ Add touch warning, modify the screen shot of the calibration parameter interface
V1.3	2024.11.13	➤ Chapter 4.9 deleted

Foreword

Thank you for purchasing our Thermo Shaker Incubator. This manual includes the function and operating instruction, please read the manual entirely to ensure using the instrument correctly. Keep the user manual for future reference during the use of instrument.

Opening Check

Please check the instruments as well as all accessories with packing list when you first open the packaging. If you find any wrong or missing, please contact with distributor or manufacturer.



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Safety Warning and Guidelines

Users should have a comprehensive understanding on how to use this instrument before operate, do read this manual carefully.



It is forbidden to operate the instrument without reading this manual. Otherwise it may cause serious burn or shocked by electricity. Do read manual carefully and operate safely according to these guidelines.

1 Security

The operation, maintenance and repair of the instrument should comply with the basic guidelines and the remarked warning below. Or it will have effect on the scheduled using life of the instrument and the protection provided.



This instrument conforms to the standard GB9706.1-Class I - B type, and for indoor use only.



Please read this manual carefully before using the instrument, or it may cause injuries. Only knowledgeable person who have been trained for installing and using it is allowed to operate.



The operator is not allowed to disassemble or repair the instrument by himself. It may cause bodily harm and warranty will be voided. If repair work is needed, please contact with vendor or manufacturer.

The input wires must be reliable and earthed to prevent any electric shock accident. The instrument is equipped with three-pin grounding plug, and the 3rd pin is the grounding pin. Please use the matching grounded power socket.



Before powering on the device, please ensure that the voltage of power supply is consistent with the required voltage and rated load. Please make sure it is not lower than required.

If the power cord is damaged, replace it with a new power cord that has same specifications. Do not cover or put anything on the instrument or power wire when running. Wire should be well tucked and away from walking path in the lab. Insert and pull the power wire with gently when unplugging and make sure the plug completely inserted in the outlet when plugging back the instrument.



The temperature of metal block is high and the liquid might boil over during the operation. Please do not touch the block while it is hot because it may cause injuries or scalding.



The instrument should be placed in low-humidity, in clean environment away from dust, away from water and strong direct sunlight. The room space should be well ventilated and away from the heating, stove and any heat source. Others, the room space cannot be interfered by corrosive gas or in a strong magnetic field.

The holes in the instrument are designed for Ventilation to avoid overheat temperature. Please do not block or cover it. When several instruments are being used simultaneously, please keep a distance of at least 100 cm between the instruments.

CAUTION! Risk of crushing because of removable parts.



- Do not replace any consumables during the mixing process.
- Do not remove the block during the mixing process.
- Do not remove the ThermoLid or MabeB Lid during the mixing process.

Power off and pull out the power plug after each use. Cover the instrument when cold to avoid dust if the instrument is not used for a long-term.



Please pull out the power cord if any of the following conditions are present. Contact with vendor or manufacturer for solve:

-
- **There is some liquid flowing into the instrument;**
 - **Instrument get drenched by rain or water;**
 - **Abnormal working, especially abnormal smell and sound;**
 - **Instrument fell down or outer shell damaged;**
 - **Instrument is not functioning properly.**

3. Maintenance

Clean the wells regularly by a soft cloth with a little of anhydrous alcohol. Ensure the tube contact the wall of the well fully and good heat conduction, and avoid contamination.

If there is stain drop on the surface of instrument, please clean it with a soft cloth with cleansing sream.



Power off when cleaning the instrument.

Do not pour any liquid in the wells when cleaning it.

Do not clean the surface with corrosive cleaning argent.

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Chapter 1 Brief introduction

MSC-3000 Thermo Shaker Incubator combines incubation and shaking.

Timer will improve work efficiency. It is an ideal automated tool for processing samples that require incubation, catalyzed and mixing etc.

Features:

- 4.3 inch color LCD touchscreen for programming and monitoring. Very simple operations and easy to use.
- Power recovery function, the instrument can automatically go back to original settings when power is back on in case of a power interruption.
- Controlled by microprocessor, the instrument has an excellent linear temperature control and highly accurate rotation speed.
- Timing function, the incubator time can be set between 0~100 hours. The remaining running time will be displayed on the touchscreen and alarm will sound when finished.
- Variety of standard sample blocks to choose from, and blocks can be recognized automatically; it's easy to exchange the blocks without any tools. Customized blocks are also available.
- Equipped with over-heating protection device for higher reliability.
- Temperature calibrating function.
- With short mixing by inching function.
- Driven by DC brushless motor, long-life and maintenance-free.
- With import and export function for testing program.

Chapter 2 Characteristics

1. Basic parameters

Parameter	Specification
Ambient temperature	5°C ~ 30°C
Relative humidity	≤70%
Power source	100-240V 50-60Hz
Input power	200w
Fuse protector	125V 2.5A $\Phi 5 \times 20$
Mixing orbit (Horizontal rotary)	3mm
Mixing frequency	100~3000rpm
Display	4.3 inch capacitance touch display screen
Programs number	50
External interface	USB for associated to program, printer 7Pin socket for hot lid
Dimension: (DxWxH)	318mmx154mmx220mm
Weight	10kg

2. Temperature parameters

Parameter	Specification
Temperature range	0°C~105°C
Timing range	1s~99h59min59s

Temperature control accuracy	$\pm 0.5^{\circ}\text{C}$
Temperature uniformity	$\pm 0.5^{\circ}\text{C}$ (@30-50°C)
Heating time	$\leq 15\text{min}$, 25°C~100°C (Ambient temperature 20°C~30°C)
Cooling time	$\leq 20\text{min}$ (Ambient temperature $\leq 20^{\circ}\text{C}$: 20°C~0°C)
	$\leq 20\text{min}$ (Ambient temperature $\leq 25^{\circ}\text{C}$: RT~4°C)
	$\leq 20\text{min}$ (Ambient temperature $\leq 30^{\circ}\text{C}$: RT~10°C)
Heating rate	Max*; 3°C/min; 2°C/min; 1°C/min; 0.1°C/min
Cooling rate	Max*; 1°C/min; 0.5°C/min; 0.1°C/min

* Max.heating rate:9 °C/min(RT~100°C , @MateB 1.5mL)

Max.cooling rate:4 °C/min(100°C~RT, @MateB 1.5mL)

3. Blocks parameters

Model no.	Sample capacity	Max rotate speed	Optional spare
MateB 0.5mL	24 x0.5 mL tube	2000rpm	ThermoLid/MabeB Lid*
MateB 1.5mL	24 x 1.5 mL tube	2000rpm	ThermoLid/MabeB Lid
MateB 2.0mL	24 x 2.0mL tube	2000rpm	ThermoLid/MabeB Lid
MateB 0.5mL+1.5mL	15 x 0.5mL+	2000rpm	ThermoLid/MabeB Lid

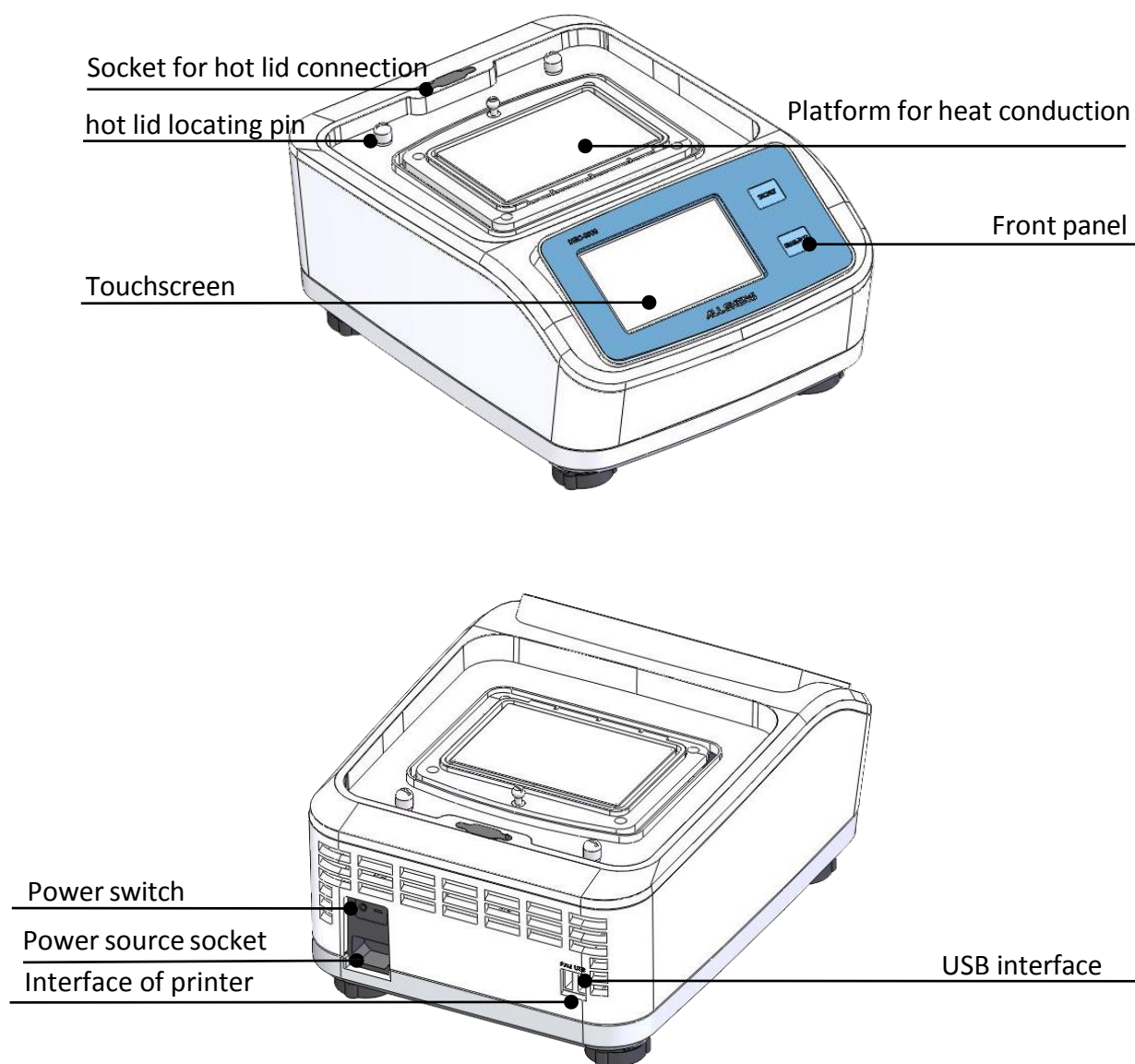
	20 ×1.5mL tube		
MateB 5.0mL	8 × 5 mL tube	1000rpm	ThermoLid
MateB 12mm	24 × ϕ 12 mm tube	2000rpm	-
MateB Cryo	24 x 1.5ml/2.0m Cryogenic Vials	2000rpm	-
MateB 15mL	8 × 15 mL tube	1000rpm	-
MateB 50mL	4 × 50 mL tube	1000rpm	-
MateB Plate-1	96x0.2mL micro plate	3000rpm	ThermoLid/MabeB Lid
MateB Plate-2	96x2mL deep well plate	1000rpm	-
MateB PCR 96	96x0.2mL PCR plate	2000rpm	ThermoLid/MabeB Lid
MateB PCR 384	384 PCR plate	3000rpm	ThermoLid/MabeB Lid
MateB DWP 500	96/500 μ L deep well plate	1600rpm	ThermoLid/MabeB Lid
MateB DWP 1000	96/1,000 μ L deep well plate	1600rpm	ThermoLid/MabeB Lid

*** *The max rotating speed should be 2000rpm when using ThermoLid
or MabeB Lid.**

Chapter 3 Basic operation instruction

The main structure, touchscreen operation and the preparing job before power on the instrument will be introduced in this chapter. Please learn about this chapter very well before start on.

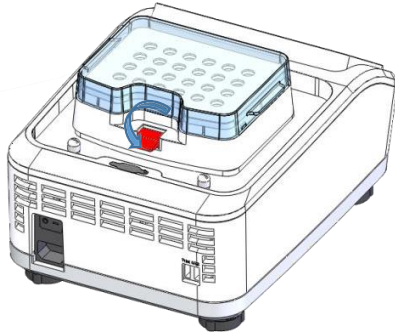
1. Structure



2. Illustration for block changing

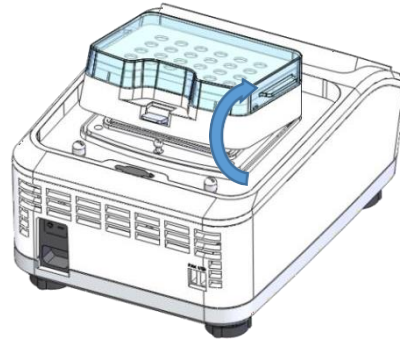
a) Pull down the eccentric wheel handle to a horizontal position

a)



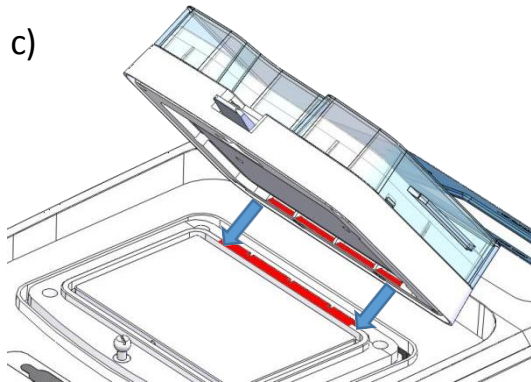
b) Turn up the block then take out it.

b)



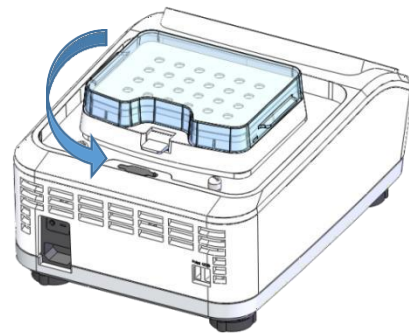
c) Take another type block to fix into the buckle of platform

c)



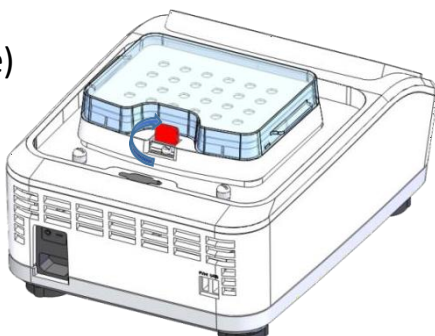
d) Press the block to make it is fit with the heating platform smoothly.

d)



e) Pull up the eccentric wheel handle to a vertical position.

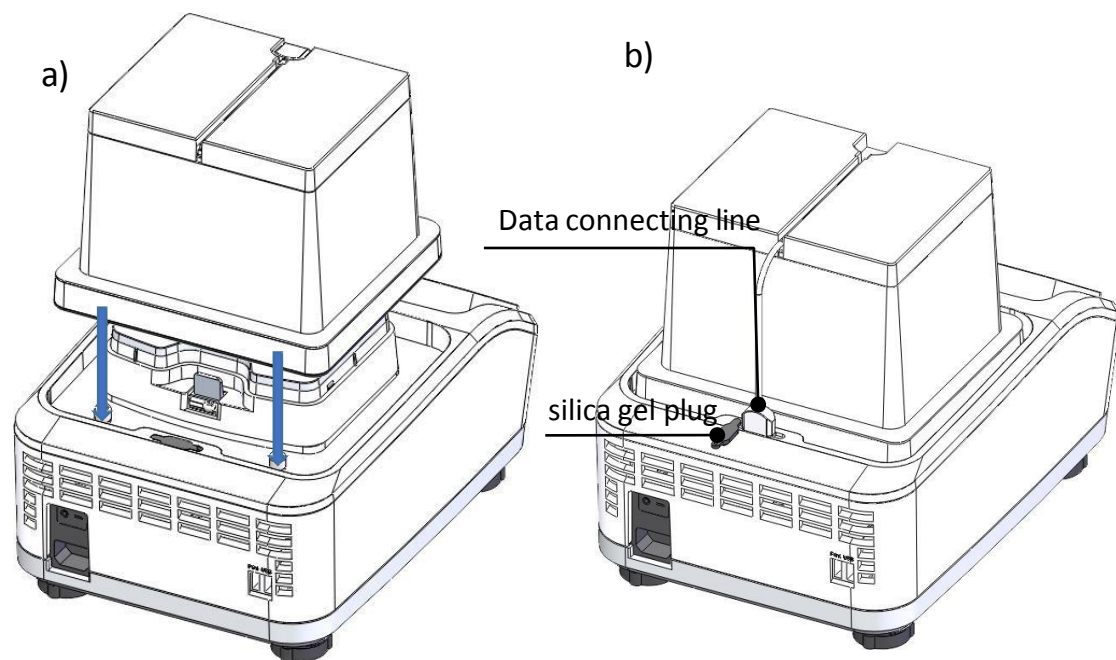
e)



Attentions : please ensure there is no any junk between the heating platform and block before installing the block!!!

3. Illustration for installing the hot lid

- a) Put the hot lid over the instrument, ensure the hot lid locating pin is pointing the locating hole of the hot lid, then fix the hot lid down to make it fit with instrument.
- b) Take out the silica gel plug in the instrument; insert the data locating pin is pointing the connecting line into the socket which is used to connecting with hot lid.

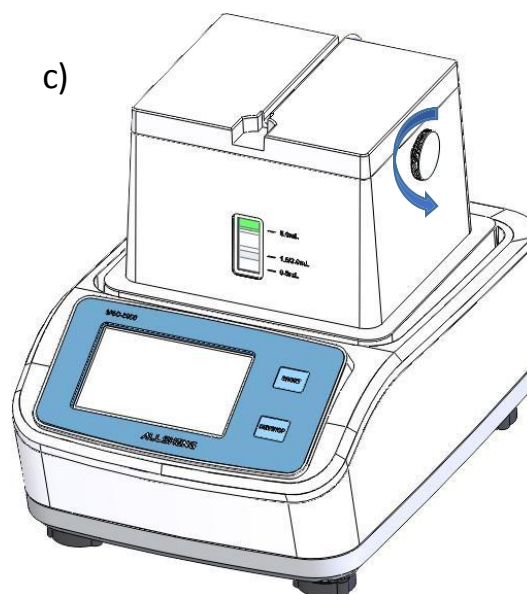


c) Rotating the knob on the left side of hot lid to get down the heating plate into to a suitable position.

The hot lid will go down when knob rotated by counterclockwise direction and go up by clockwise direction.

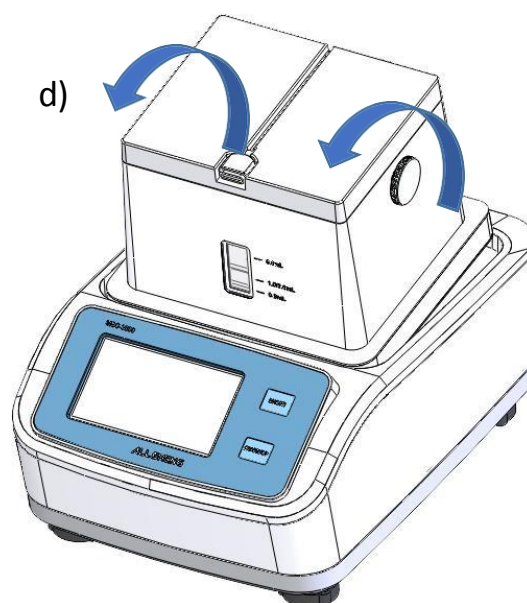
Attentions: Please ensure the heating plate of hot lid do not touch with block when the instrument mixing function is on.

Attentions : When start hot lid function, the block should be not with clear lid!!!



d) Remove the hot lid:

Disconnect the data connecting line, and turn over the hot lid forward toward, take out the hot lid after out of locating pin.



Chapter 4 Software operation

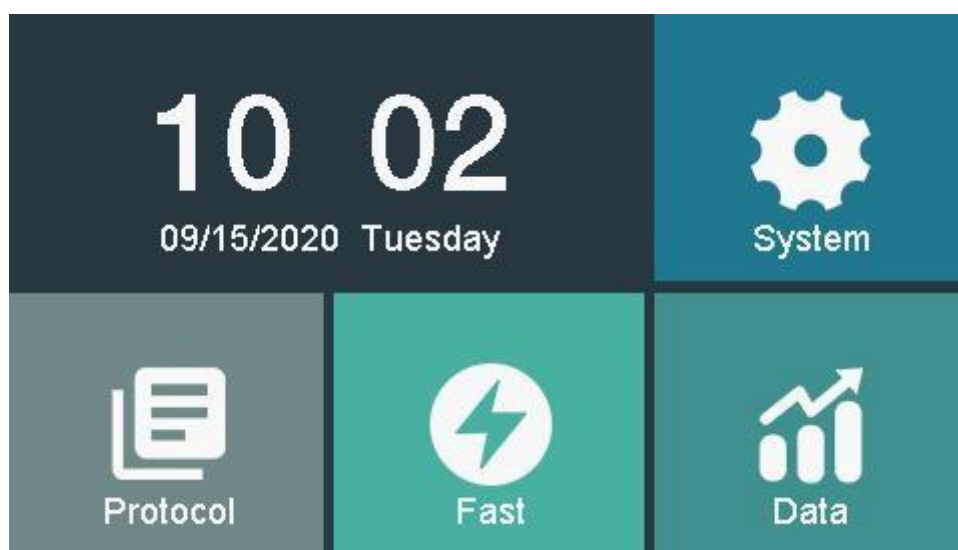
1. Power on self-test

Connect power source and turn on the switch on the back of instrument, the start-up image appear as below. If self-test failed, the error alarm interface prompts.



2. The main interface

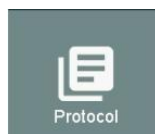
After self-test finished, the main interface display.



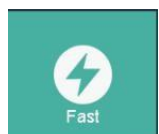
The icon on the main interface as below:



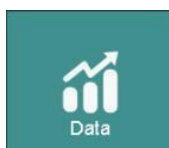
System setting



Program



Fast program



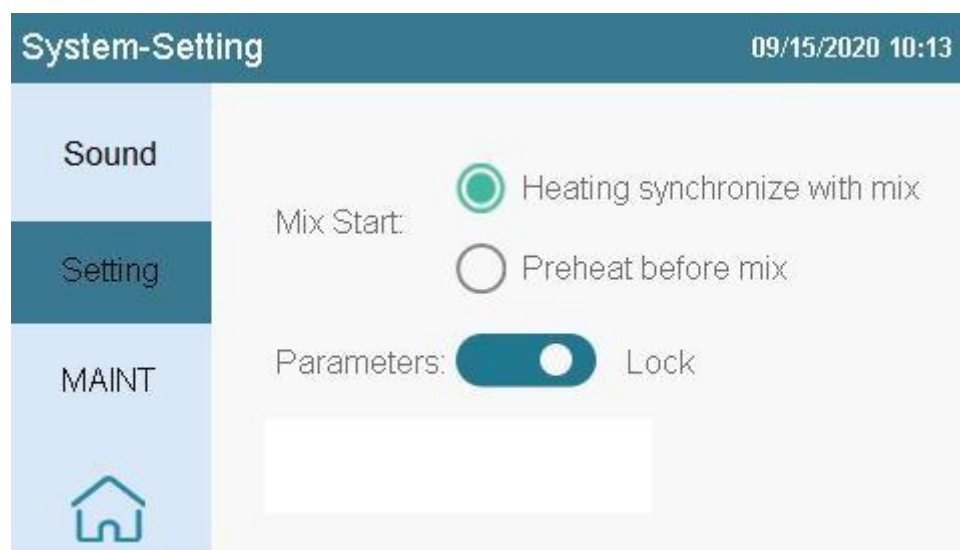
Review the history data

Curve

3. System interface

Click the "system" icon on the main interface then into the "System Setting", here is available to set the parameter, voice, language and time as well as data translating, factory data reset, program upgrade etc.

Different pages can be switched by sliding the scroll bar on left side.



Back to main interface

3.1 Parameter setting

Mix Start point:

Heating synchronize with mix: temperature-control function and

mixing function will run simultaneously after the fast program is starting.

Mix after preheat: After fast program starting, the Temperature-control function starts first; the mixing function will start after it reaches to preset temperature.

Operating parameters:

When it is locked, the parameters cannot be changed on the fast program interface;

When it is unlocked, the parameters can be changed on the fast program's running; and the instrument will run according to the updated parameters.

3.2 Sound setting

Open or close the buzzer. If open the buzzer, "Beep" sound alarm when instrument power on and program finished.



3.3 Data transfer

Users can import or export the program through the USB socket.



3.3.1 Protocol import



3.3.2 Protocol export



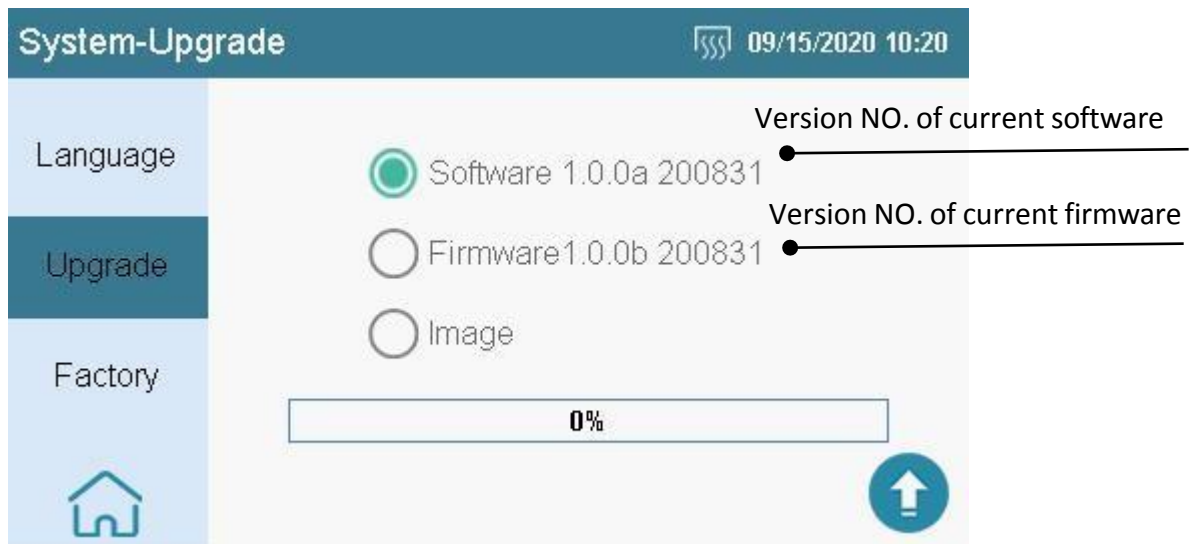
3.4 Factory setting

All the protocols will be deleted and all the parameters should be reset after restoring the factory settings.



3.5 Upgrade

User can upgrade the software, firmware and image through the USB flash disk.



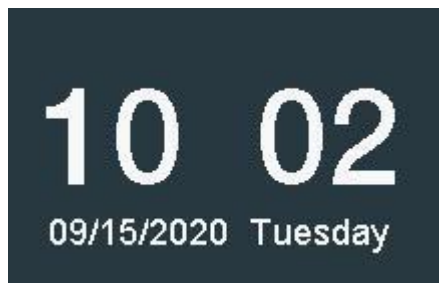
3.6 Language setting

Chinese and English language can be chosen through the System-Language interface.



3.7 Time setting

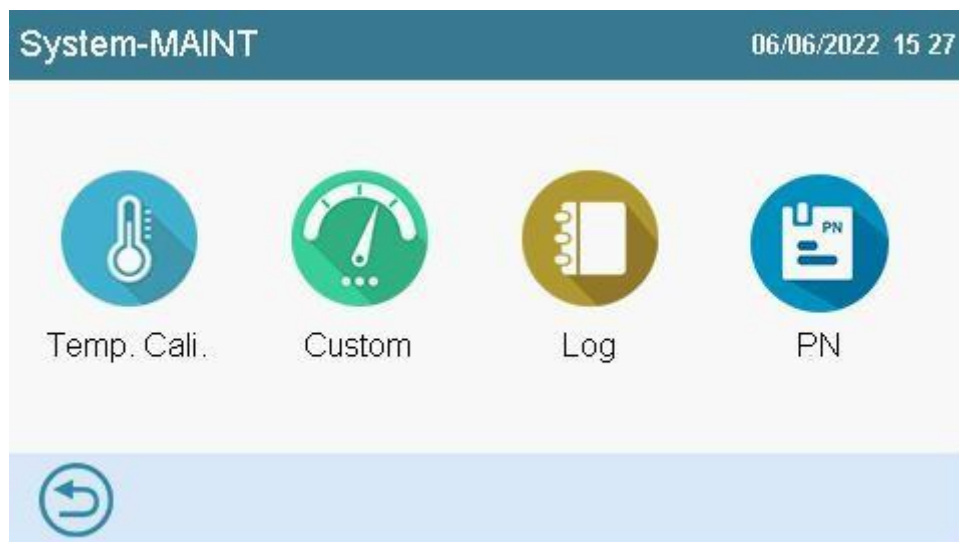
Display date and time is available to change through the System-Time interface.



Click the time on main interface also is able to enter time set interface.

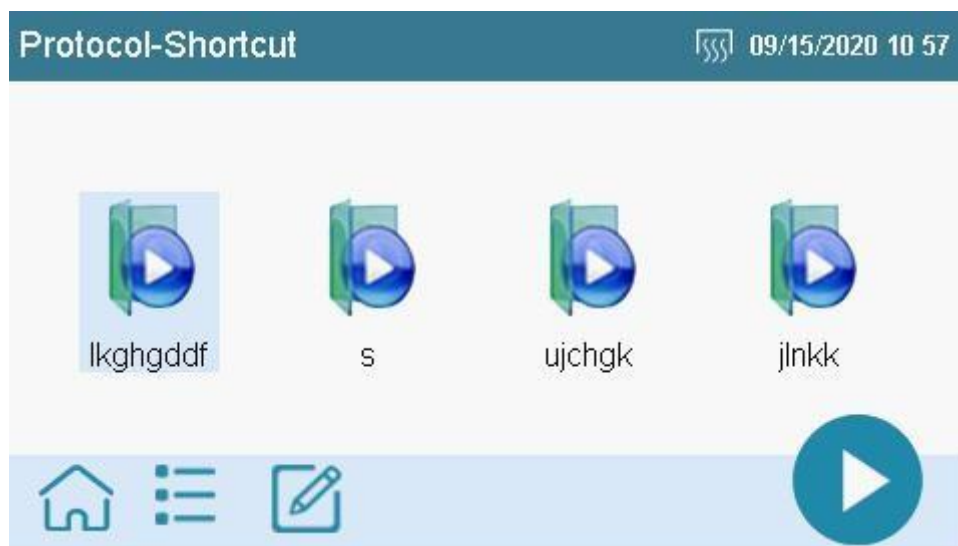
3.8 MAINT

Input the password to enter System-MAINT interface.



4. Protocol-Shortcut interface

Click the protocol icon to enter Protocol-Shortcut interface, user can create, edit or run the protocol here.



The function of each icon in Protocol-Shortcut as below:



Shortcut Protocol (The icon will be highlight after be chosen)



Back to the main interface



Enter protocol list interface




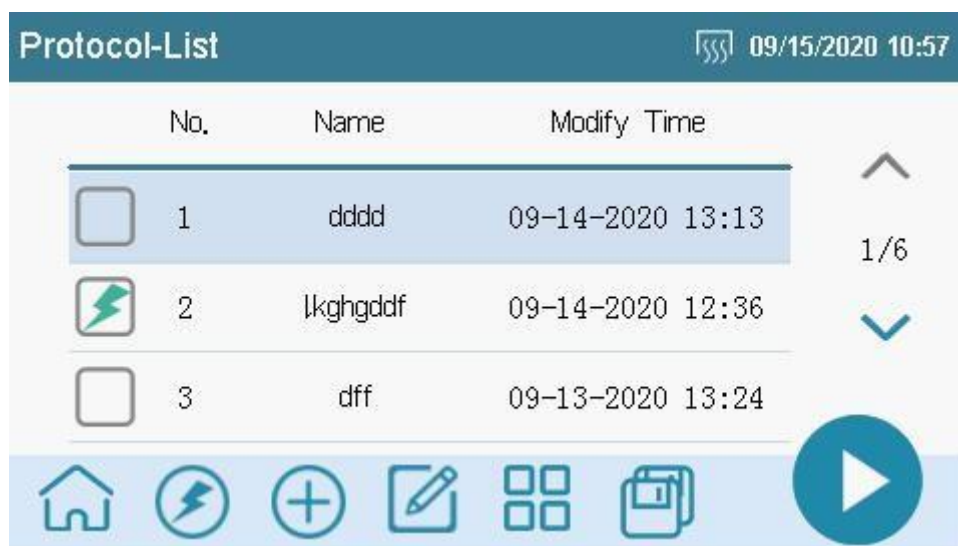
Enter protocol setting interface



Running the Shortcut Protocol chosen

4.1 Protocol list interface

Click icon  enter the protocol list interface to create, delete, edit or run the protocol there.



The function of each icon in protocol list interface is as below:



Set shortcut protocol

(Selected shortcut protocol is shown as the icon above, 4 shortcuts protocols can be select at most)



Back to main interface



Enter shortcut protocol interface



Create a new protocol



Edit selected protocol



Enter protocol manage interface



Save selected protocol as



Run selected protocol




Page up (turn gray when to Top)



Page down (Turn gray when to bottom)

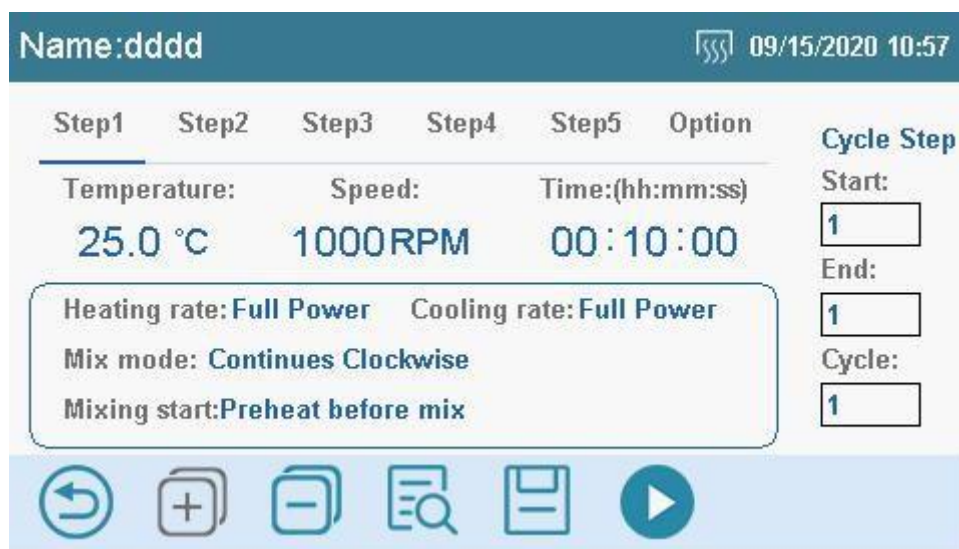
4.2 Create a new protocol

4.2.1 Create protocol's name

Click icon  on protocol list interface to create a new protocol. At most 8 letters or numbers can be input for protocol name, letters are case sensitive. A prompt pop up when a new protocol name is same as existing protocol name. Fifty protocols can be saved at most.

4.2.2 Protocol edit interface

Input protocol's name and press "Enter" into protocol edit interface.



Each functions of protocol interface is as below:



Step: Click one of the steps to display the relevant parameter.

Option: Click the icon to display the relevant parameters.



Keep temp.: Block will maintain the setting temperature after all steps are finished, default is 5.0°C. The function opens after ticking the box.

Hot lid temp. is over block temp.: Temperature on hot lid is 5.0°C higher than the installed block (User can reset the temperature value, range is 0.0~20.0 °C, default is 5.0 °C); the function turn on after tick the box. (This function is not available if the block temperature is under 20°C).

Parameter setting: The parameters can be edited directly by clicking it.

Temperature: Temperature range is 0~105 °C. If the temperature setting as "-", it means the temperature is not controlled.

Rotating speed; the rotating speed range is 0~3000rpm.

(Note: the actual rotating speed will be limited by different blocks.)

Time: Time range is 00:00:01~99:59:59.

If time set as "—:—:—", means no timing.

Advanced parameters setting: Display advanced parameters, click it to

enter advanced parameters setting interface.

Rate:**Temperature mode:**

Full Power: Default setting. Heating and cooling at its max rate.

User-defined: Heating rate can be set as: 3.0°C/min, 2.0°C/min, 1.0°C/min, 0.1°C/min;

Cooling rate can be set as: 1.0°C/min, 0.5°C/min, 0.1°C/min.

The screenshot displays the software interface for the MSC-3000 Thermo Shaker Incubator. At the top, a dark blue header bar contains the following information: "Name: demo", "MateB 24*1.5mL", a temperature icon showing "27.1°C", and a date/time stamp "03/26/2021 16:14". Below the header, there are three columns: "Rate", "Mixing Mode", and "Mix Start". Under "Rate", there are three rows of radio button options: "Temp Mode:" with "Full Power" (unselected) and "Custom" (selected); "Heating rate:" with "3.0 °C/min" (selected), "2.0 °C/min" (unselected), "1.0 °C/min" (unselected), and "0.1 °C/min" (unselected); and "Cooling rate:" with "1.0 °C/min" (selected), "0.5 °C/min" (unselected), and "0.1 °C/min" (unselected). At the bottom of the interface, there is a light blue bar with a circular arrow icon.


Mixing mode:

Mix direction: There are three directions: Clockwise, Anticlockwise and Clockwise & Anticlockwise. Default is clockwise.

Mix method: There are two mix methods: continues mixing and intermittent mixing. If choose intermittent mixing, continuous mixing time and the intermittent time can be set.

Remark: If choose Clockwise & Anticlockwise in "mix direction", then only intermittent mixing can be selected. Default is continues mixing.

Name:demo			MateB 24*1.5mL 27.1°C 03/26/2021 16:14		
Rate	Mix Mode	Mix Start			
Mix direction:	<input checked="" type="radio"/> Clockwise	<input type="radio"/> Anticlockwise			
	<input type="radio"/> Clockwise&Anticlockwise				
Mix method:	<input checked="" type="radio"/> Continues	<input type="radio"/> Intermittent			




Mix start point:

Heating synchronize with mix: Temperature-control function and mixing function will run simultaneously after the fast program is starting.

Mix after preheat: After fast program starting, the temperature-control function run firstly, the mixing function will run after it reaches to preset temperature.

Name:demo			MateB 24*1.5mL 27.1°C 03/26/2021 16:14		
Rate	Mix Mode	Mix Start			
	<input type="radio"/> Heating synchronize with mix				
	<input checked="" type="radio"/> Preheat before mix				



Cycle step:

Start: Start the cycle steps;

End: Stop the cycle steps;

Cycle: Cycle times;

Illustration: Cycle start from step1, and end in step3, cycle is repeat twice.

The actual running step is:







step1→step2→step3→step1→step2→step3→step4→step5

The screenshot displays the software interface for a protocol named 'demo'. At the top, it shows 'MateB 24*1.5mL' and a temperature of '27.1°C' with a date and time of '03/26/2021 16:14'. Below this is a table of steps:


Step1	Step2	Step3	Step4	Step5	Option
Temperature:	Speed:	Time:(hh:mm:ss)			Cycle Step
25.0 °C	1000 RPM	00:10:00			Start: 1
Heating rate: Full Power Cooling rate: Full Power					End: 3
Mix mode: Continues Clockwise					Cycle: 2
Mixing start: Preheat before mix					

At the bottom of the interface, there is a row of six icons: a circular arrow (back), a plus sign in a square (add), a minus sign in a square (delete), a magnifying glass (preview), a document icon (save), and a play button (run).

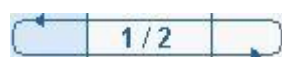
Press icon: the function for each icon is as below:

-  Back to the protocol list, prompt whether save or not after click.
-  Increase steps, the max steps number is five.
-  Delete the current steps, prompt pop up after click.
-  Preview: Click it to enter the protocol preview interface.
-  Save protocol and recall saved protocol anytime
-  Run the current protocol.

Protocol preview interface:

Click icon  to enter protocol preview interface, user can check the thumbnail image and detail parameters in this interface.

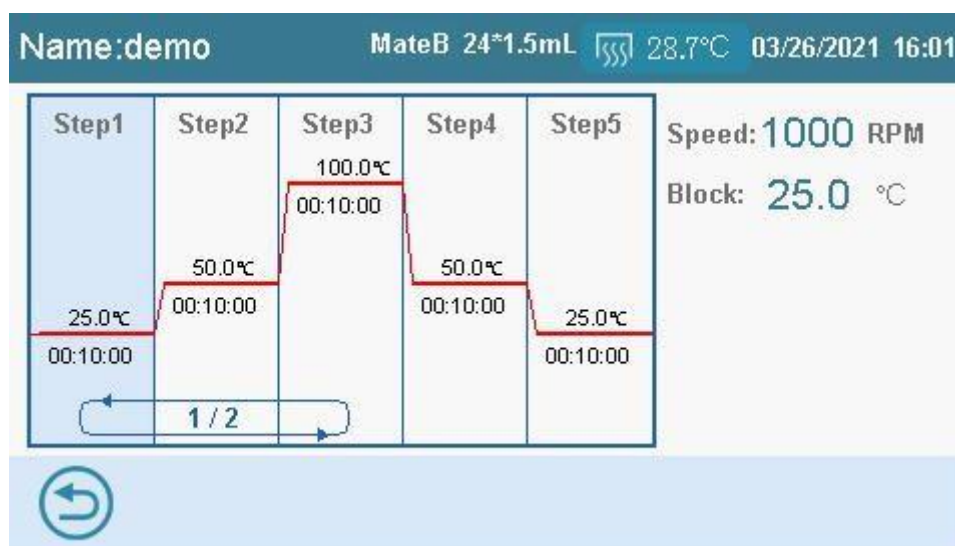
The icon will be highlight after clicking the step, and the detailed parameters of the step will display in the right side status bar.



This icon means cycle; the area crossing means the step range of the cycle. As figure below, the starting point of this cycle is step1, ending point is steps3; 1/2 means total cycle is twice and current is the first cycle.



Back to the protocol edit interface:

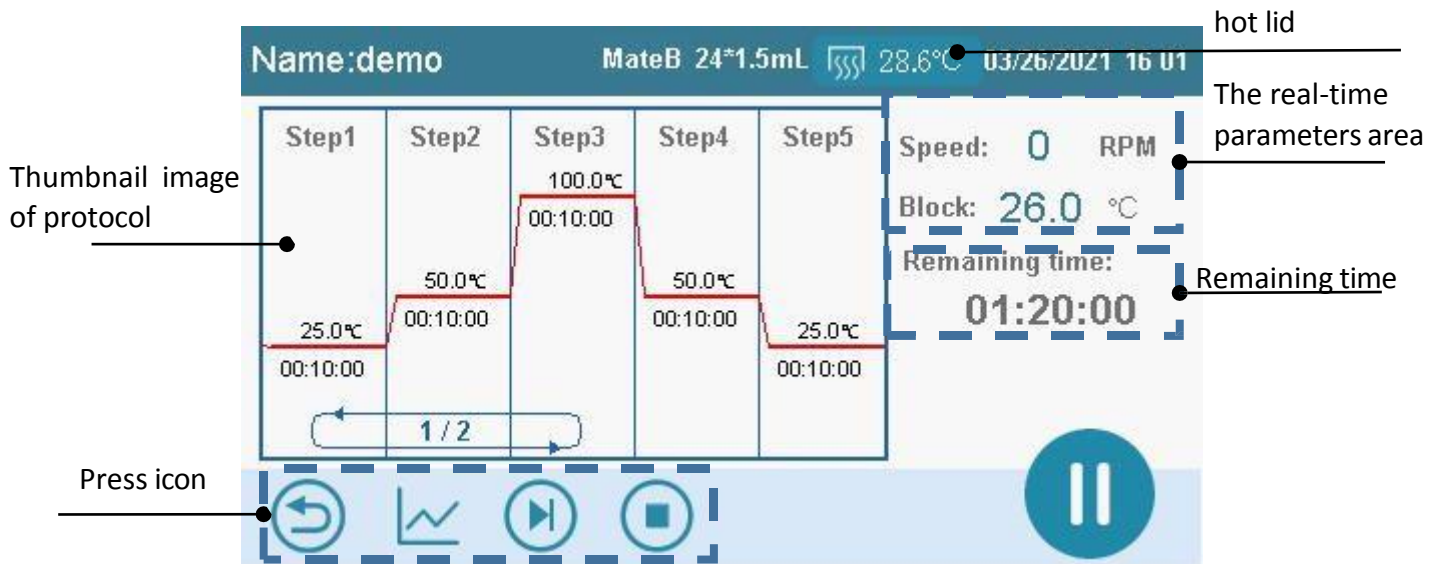


5. Protocol running interface

5.1 Introduce for running interface

Take the "dddd" protocol mentioned above as example, after clicking

icon , enter running interface.



Thumbnail image of protocol : Include the temperature, time, starting point, ending point and cycle times of each steps; the step on running will display as highlight. It’s available to modify the parameters on running process when click the step.

Press icon: the function for each icon as below:



Back to the protocol list; prompt whether to stop the protocol on keep it running.



Skip over the current step and enter next step; in special, if the current step is on the cycle step, it will enter the next step of this cycle.

For example, when running the step3 of “dddd” protocol, if it is on first cycle, it will skip step3 and enter the second cycle to running step1. When all the steps finished, skip icon will change to return icon.



Enter temperature curve interface to see the running curve for

current protocol.



Stop icon: Prompt whether stop the protocol on running.



Pause: The protocol will pause when click it and will recovery running after click it again.

Icon of hot lid:



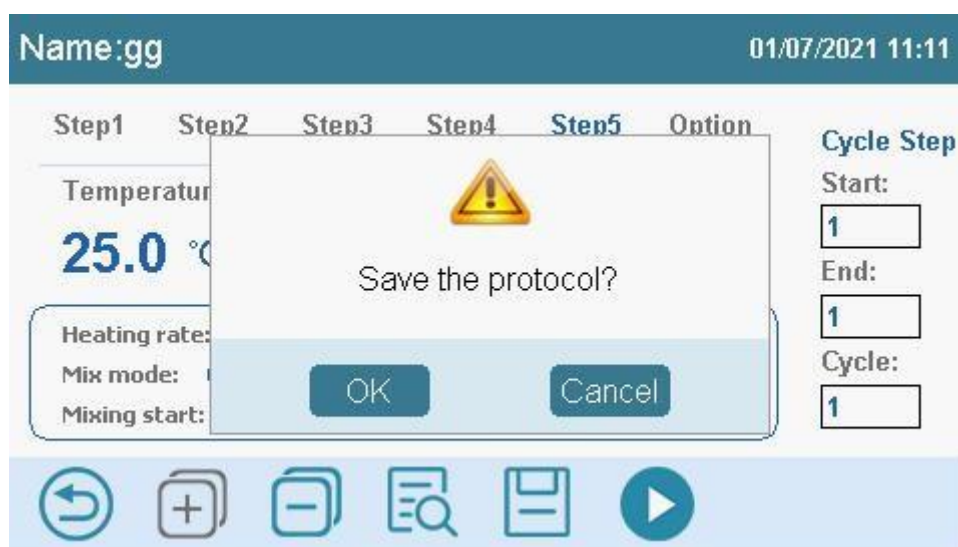
After connecting the hot lid, this icon will show on status bar and will disappear after disconnecting.

Real-time parameters: Display rotating speed, the real-time temperature of block.


Remaining time: Display the remaining time of current protocol (not include heating or cooling time).

5.2 Protocol edit interface

Click step in the protocol running interface enter the protocol edit interface, parameter is able to modify during running.



The protocol edit interface on running is generally same as the interface mentioned in 4.2.2. But it is not allowed to add or reduce steps.

After modifying the parameters, click icon  and prompt whether to save the protocol. After confirm, the remaining steps will be run according to the modified protocol.

5.3 Running curve interface


Click icon  to enter the running curve interface on the protocol running interface.



Diagram: Including ordinate temperature, range is -10~110 °C, the baseline 50°C marked in red; abscissa time, range is 0~25 min, page will be turned after over 25min; the red curve represents the temperature trend of hot lid and the green curve represents the temperature trend of block.

Status: Include the real-time temperature of hot lid (red curve) and block (green curve), current cycle times, baseline temperature

Number (not allowed to change).



Click this icon to back to protocol running interface



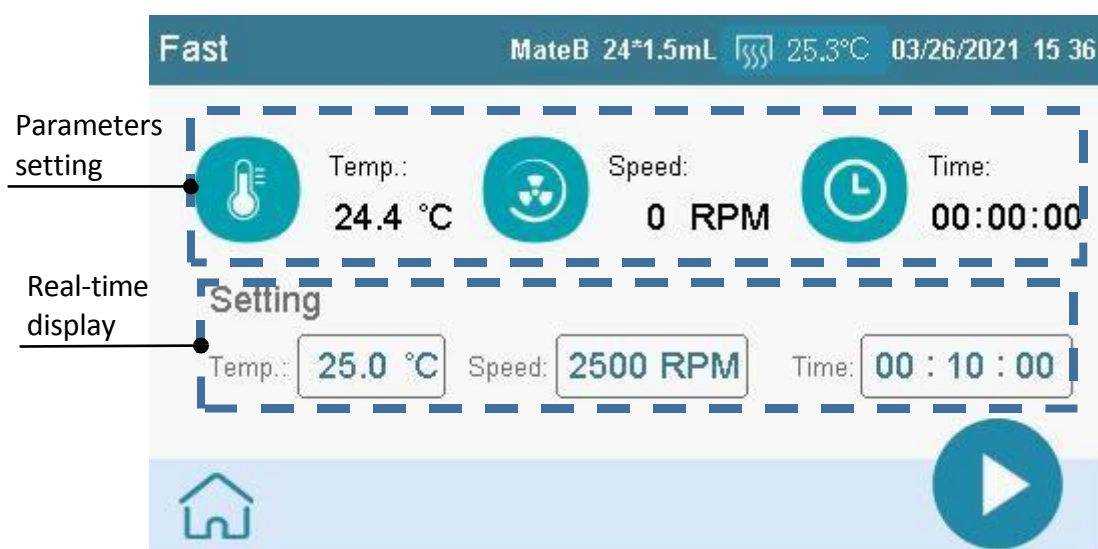
Turn page left side(it will get gray after arrived top)



Turn page right side(it will get gray after arrived bottom)

6. Fast interface

Click the "Fast" icon on the main interface to enter the "Fast" running interface.



Parameters setting:


Temperature: The temperature range is 0~105 ° C. If the temperature is set as "-", it means there is no control to the temperature.

Rotating speed: The rotating speed range is 0~3000rpm.

(Attention: The actual rotating speed would be limited by different blocks.

Time: The time range is 00:00:01~99:59:59. When it is set as "—:—:—", it means no timing.

Real-time display: Display the real-time temperature, rotating speed and the remaining time.

 28.6°C Icon of hot lid, hot lid temp can be set after click the icon.



Back to main interface



Run the protocol according to the current parameter after click the running icon, the interface as below



If the icon get gray, unable to back the main interface during running process



Click this icon to enter the temperature curve interface to see the current running temperature curve. (Temperature running interface can be reference the 5.3 running curve interface)



Stop: Prompt whether stop the running protocol after click this icon.



Pause: Pause the running protocol, click again to resume.

7. Data interface

Click the data icon on main interface to enter the data interface; it can store 1000 data at most.

No.	Name	Run Time
1	dddd	09-15-2020 11:04
2	dddd	09-15-2020 11:03
3	dddd	09-14-2020 13:12

Data list : the data is list by descending order according to the running time, selected data shows as highlight.

The function of other icons is as below:



Back to main interface



Search function; filter the data by time range



Data management, click to enter the data management interface



Check the data, click to enter the data check interface




Turn page upward. (It will turn gray after arriving at the top)




Turn page downward. (It will turn gray after arriving at the bottom)

7.1 Data manage interface

Click icon  to enter the data manage interface.

Data-Management				09/15/2020 11:20
<input type="checkbox"/>	No.	Name	Run Time	
<input type="checkbox"/>	1	dddd	09-15-2020 11:04	^
<input type="checkbox"/>	2	dddd	09-15-2020 11:03	1/59
<input type="checkbox"/>	3	dddd	09-14-2020 13:12	v

The function for each icon of data manage interface is as below:



Selection box: Shown as ticked after click it



Return: Back to the data interface




Delete: Delete the selected data



Data export: Export data into USB flash disk

7.2 Data review interface

Click icon  in the data interface to enter the data review interface, the user is able to check the real-time temperature curve during running


process intuitively.





Diagram: User is able to see the real-time temperature curve during the running process intuitively.


Data area: Display the temperature of hot lid and block of blue line's location, as well as the time. User can check the real-time data of different point in the diagram area. In special, the basic line is able to be changed to make it more convenient for check the data curve. (Default basic line is 50°C).

Key icon: The function for each icon is as below:

 Return: back to the data interface

 zoom out the abscissa

 Zoom in the abscissa

 Zoom out the ordinate



Zoom in the ordinate



Ordinate self-adaption

8. Front panel

MSC-3000 Thermo Shaker Incubator realizes the man-machine interaction through touchscreen, only have two physical keys as below:



Short mixing: Press this key constantly, then the instrument will mixing by the max rotating speed of current installed block, and it will stop mixing once release this key.



Run/Stop: Protocol will run or pause/run after press this key Shortly and if press it for longer time (1 second), the protocol will stop Running.

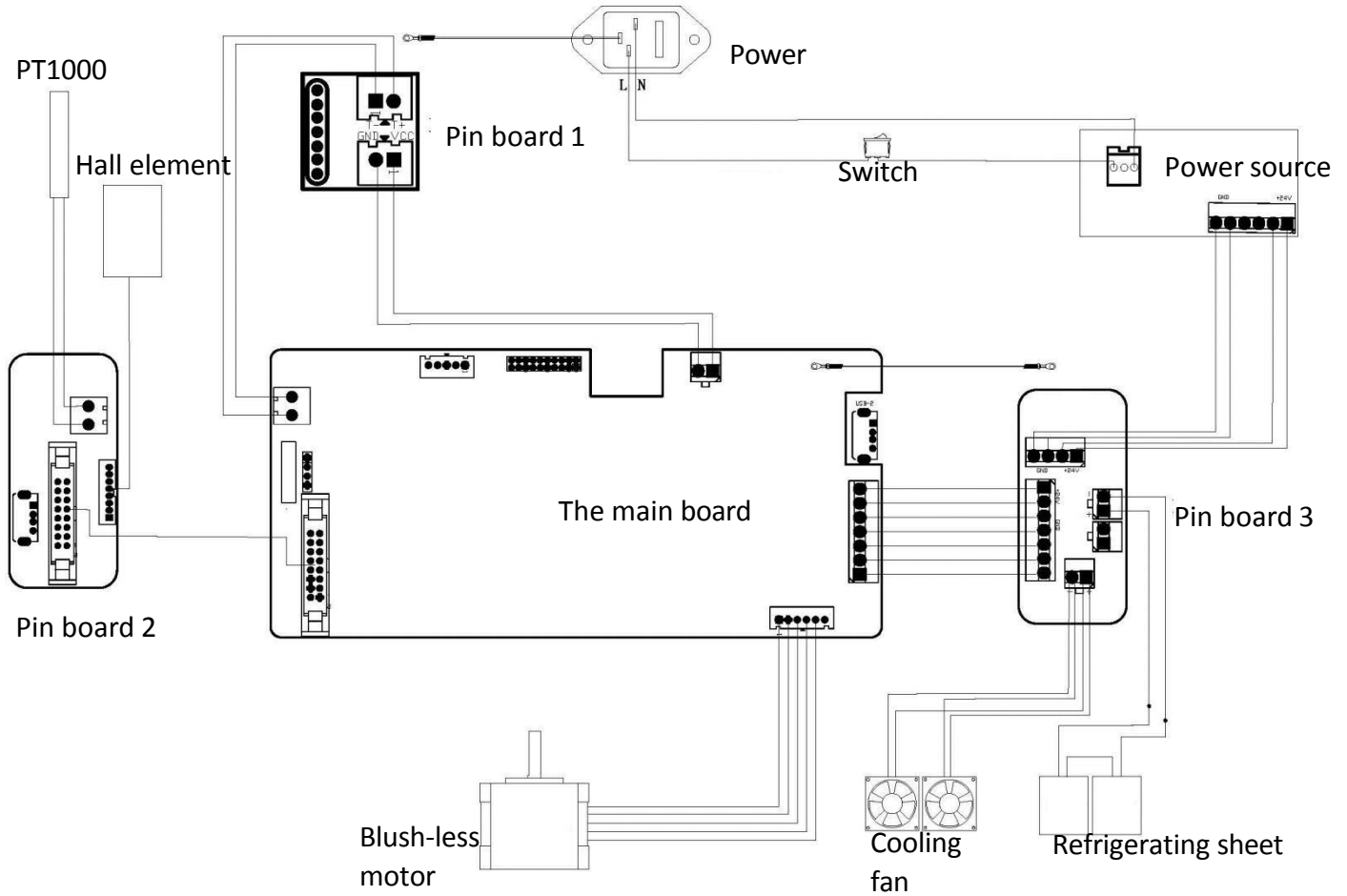
Chapter 5 Troubleshooting

No.	Description	Reasons	Solution
1	Display screen not light after turn on the power switch	Power source is not connected	Check the power source and Connect it.
		Fuse is burned	Replace the fuse (250V 2.5A ϕ 5x20)
		Switch is bad	Replace the switch
		Other reasons	Contact the distributor or manufacturer
2	Display temperature is different with the actual temperature.	Temperature sensor is bad or block is not fixed properly.	Contact the distributor or manufacturer
3	Module is nether Heating nor cooling	DC power is bad	Contact the distributor or manufacturer
		TE refrigeration sheet is bad	
4	Keyboard not work	Front panel is broken	Contact the distributor or manufacturer
5	Cooling speed is very slow or it cannot reach to the lowest	Ambient temperature is too high	Low the ambient temperature

		Block is not fixed properly	Check if the block is installed properly
		Fan is bad	Contact the distributor or manufacturer
		refrigeration sheet is bad	
6	Prompt motor is stuck	Motor is stuck	Contact the distributor or manufacturer
7	Prompt E101-motor's rotating is over speed	Motor lose control	Contact the distributor or manufacturer
8	Prompt there is no block	No block find	Check if the block is installed properly
9	Block crash to the instrument when mixing	Block is not installed properly	Check if the block is installed properly
10	Prompt E011-block_temp_over	Temperature sensor lose control	Contact the distributor or manufacturer
11	Prompt E015-E015-block_temp_open	Temperature sensor is open circuit	Contact the distributor or manufacturer
12	Prompt E016-block_temp_close	Temperature sensor is short circuit	Contact the distributor or manufacturer

13	Prompt E021-hot_temp_over	Temperature senor of hot lid lose control	Contact the distributor or manufacturer
14	Prompt E025-hot_temp_open	Temperature senor of hot lid is open circuit	Check if the connecting line of hot lid is connected properly. Contact the distributor or manufacturer
15	Prompt E026-hot_temp_close	Temperature senor of hot lid is short circuit	Check if the connecting plug of hot lid is short circuit and contact the distributor or manufacturer
16	Prompt E702-RTC error	The hardware is damaged	Contact the distributor or manufacturer
17	Prompt E708-Nand flash error		
18	Prompting E709-SPI flash error		
19	Prompting E801-uart_err	Signal interference	Power off and restart Contact the distributor or manufacturer

Appendix : MSC-3000 Wiring diagram



Memo