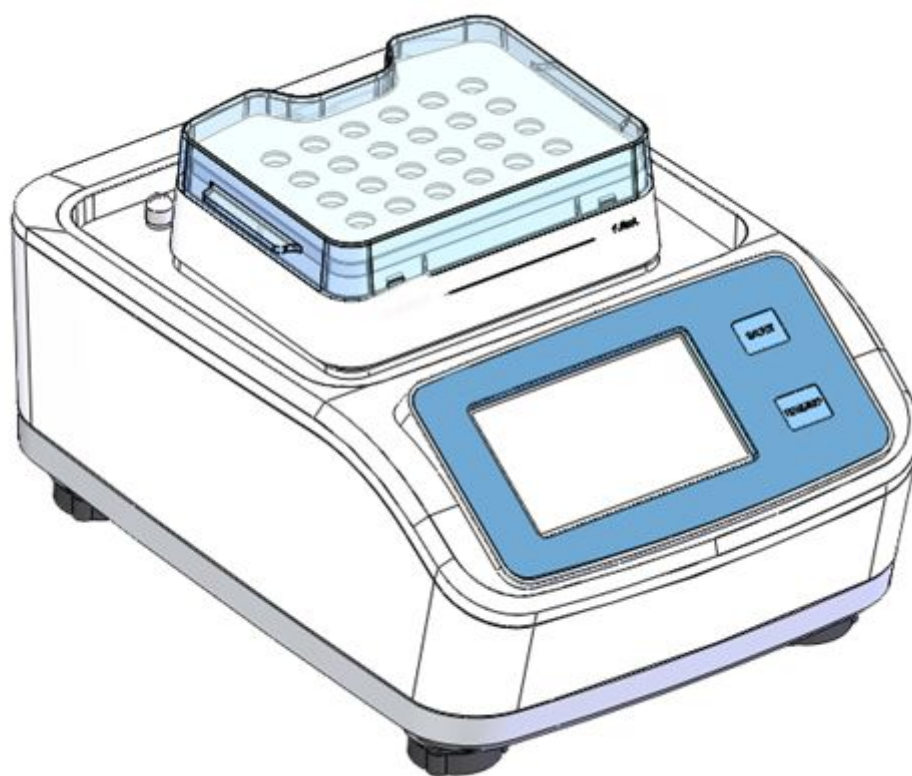

Operation Manual

V 1.0

MultiTherm™ Touch Heating/Cooling Vortexer



Benchmark
Scientific 

Thank you for your purchase of the Benchmark MultiTherm Touch Heating/Cooling Vortex Mixer. Please read this manual carefully before use as it contains important safety information. Keep the manual for future reference.

Please check that all accessories ordered are included with the instrument along with the appropriate power cord. If any items are missing contact Benchmark Scientific or your local Benchmark dealer. If the package has been damaged in transit, please retain the packaging and contact the carrier.

Benchmark Scientific

PO Box 709, Edison NJ 08818 USA

Tel: 908-769-5555

Fax: 732-313-7007

Website: www.benchmarkscientific.com

Email: info@benchmarkscientific.com

Important Safety Considerations and Guidelines



Read this manual carefully. Serious burns or electrical shock can occur from improper operation. Please adhere to all safety guidelines in this manual.

1 Security

Operation, maintenance, and repair of the instrument should comply with the basic guidelines and remarks that follow. Failure to do so may affect the useable life of the instrument and the protection provided.



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



Do not attempt to disassemble, modify, or repair the instrument. Doing so may cause injury and may void the warranty. Please contact the manufacturer for repair.



The instrument is equipped with a three-pin grounded plug. Please be sure that your power source is grounded – do not attempt to bypass the grounding pin.



Ensure that the local voltage matches the voltage of the unit and that the rated load of the power outlet is not lower than that required by the instrument.



Do not use the instrument if the power cord is damaged. Do not place equipment or other objects on the power cord. Insert the power cord gently by and ensure that the plug is completely inserted into the outlet.



During and after operation, the metal block may be very hot. Do not touch the block as injury may result.



The instrument should be placed on a sturdy bench, in a clear, dry area away from water, strong, direct sunlight and heat sources. Keep away from corrosive gas and strong magnetic fields. The vents in the instrument are designed for ventilation and to prevent overheating. Do not block or cover the vents. Leave sufficient distance between the instrument and any walls or other equipment for air to circulate. When multiple instruments are placed next to each other, 100cm of space should be left between them.

CAUTION! Risk of crushing from movable 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**



Turn off power to the unit after operation is finished. If the unit will be left idle for a long people of time, unplug and cover with a soft cloth.



Disconnect power immediately if any of the below occur:

- Liquid has entered the instrument
- Instrument is wet from rain or water
- Abnormal smell or sound
- Instrument is dropped or housing is damaged
- The function has obviously changed.

2 Maintenance

Clean the block wells regularly with a cotton swab dipped in alcohol.

Wipe down the housing with a clean, soft cloth.

Power off when cleaning the instrument



Do not pour any liquid into the wells or submerge the instrument or blocks.

Do not use corrosive agents to clean the instrument or blocks.

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Chapter 1 Brief introduction

The MultiTherm Touch combines incubation, vortexing and timed operation. It is ideal for a variety of application in a wide array of sample containers.

Features:

- 4.3 inch color LCD touchscreen
- Power recovery function (retains original settings after power failure)
- Microprocessor control
- Wide variety of sample block formats. Blocks are automatically recognized by the system. Block exchange is simple and requires no tools.
- Equipped with over-heating protection
- Temperature calibrating function.
- Short mix function.
- Long life, maintenance-free brushless DC motor
- Import/Export function for programs, Export function for data

Chapter 2 Characteristics

1. Basic specifications

Parameter	Specification
Ambient operating temp.	5°C - 30°C
Relative humidity	≤70%
Power source	100-240V 50-60Hz
Input power	200w
Fuse	125V 2.5A $\Phi 5 \times 20$
Mixing orbit	3mm
Display	4.3 inch capacitance touch display screen
Programs memory	50
External interface	USB : for program saving and transfer, printer 7 Pin socket : hot lid
Dimension (DxWxH)	318mmx154mmx220mm
Weight	10kg

2. Temperature specifications

Parameter	Specification
Temp control range	0°C-105°C (Ambient minus 20°C to 105°C)
Timer	1s-99h59min59s
Temperature 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 20°C-30°C)
Cooling time	$\leq 20\text{min}$ (Ambient $\leq 20^{\circ}\text{C}$, 20°C-0°C) $\leq 20\text{min}$ (Ambient $\leq 25^{\circ}\text{C}$, RT-4°C) $\leq 20\text{min}$ (Ambient $\leq 30^{\circ}\text{C}$: RT-10°C)
Ramp rate – heating	Max; 3°C/min; 2°C/min; 1°C/min; 0.1°C/min
Ramp rate – cooling	Max; 1°C/min; 0.5°C/min; 0.1°C/min

3. Available blocks

Catalog no.	Sample capacity	Max speed	Lid Options**
H5100-05	24 × 0.5 mL tube	2000rpm	Heated/Std
H5100-15	35 × 1.5 mL tube	2000rpm	Heated/Std
H5100-20	35 × 2.0mL tube	2000rpm	Heated/Std

H5100-CMB	15 x 0.5mL+ 20 x 1.5mL tube	2000rpm	Heated/Std
H5100-5MT	8 x 5 mL tube	1000rpm	Heated
H5100-12	24 x ϕ 12 mm	2000rpm	-
H5100-2CR	24 x 1.5ml/2.0m Cryogenic Vials	2000rpm	-
H5100-150	8 x 15 mL tube	1000rpm	-
H5100-500	4 x 50 mL tube	1000rpm	-
H5100-MP	1 microplate	3000rpm*	Heated/Std
H5100-2DMMP	2ml plate	1000rpm	-
H5100-02	PCR plate or 96x0.2mL tubes	2000rpm	Heated/Std
H5100-384	384 well plate	3000rpm*	Heated/Std
H5100-5DWMP	500 μ L plate	1600rpm	Heated/Std
H5100-1DWMP	1000 μ L deep well plate	1600rpm	Heated/Std

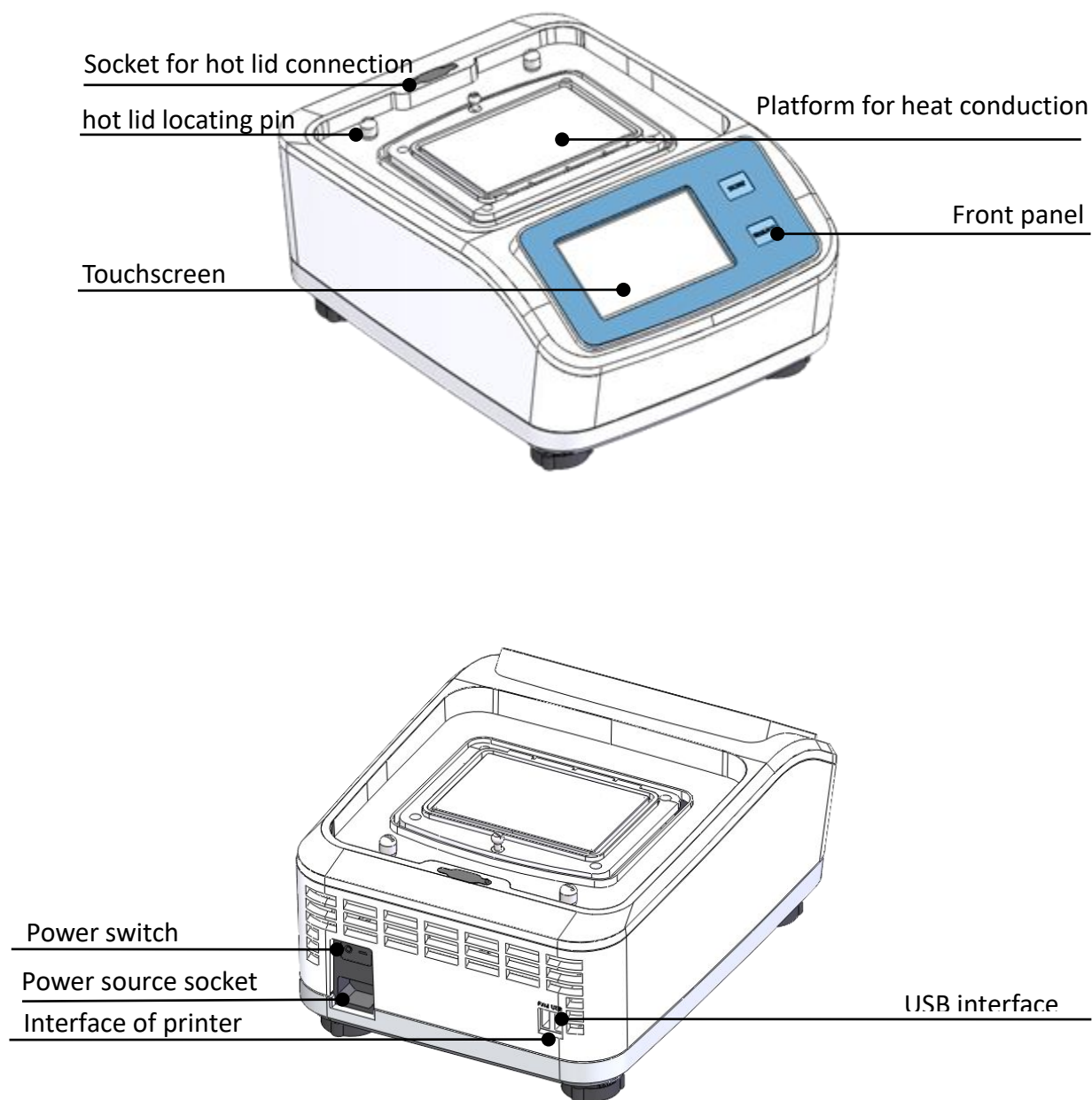
***The max speed should be 2000rpm when using hot lid or standard lid**

****Standard lid supplied with block. Hot lid purchased separately.**

Chapter 3 Basic Operation

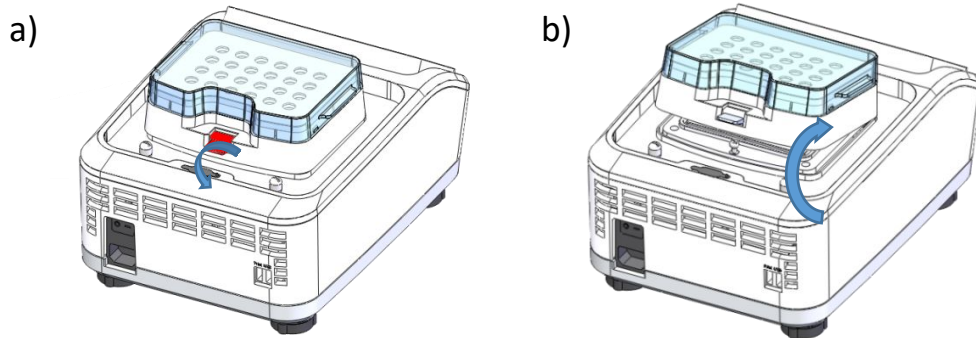
1. Structure

Below are the relevant parts of the MultiTherm Touch without the block in place:

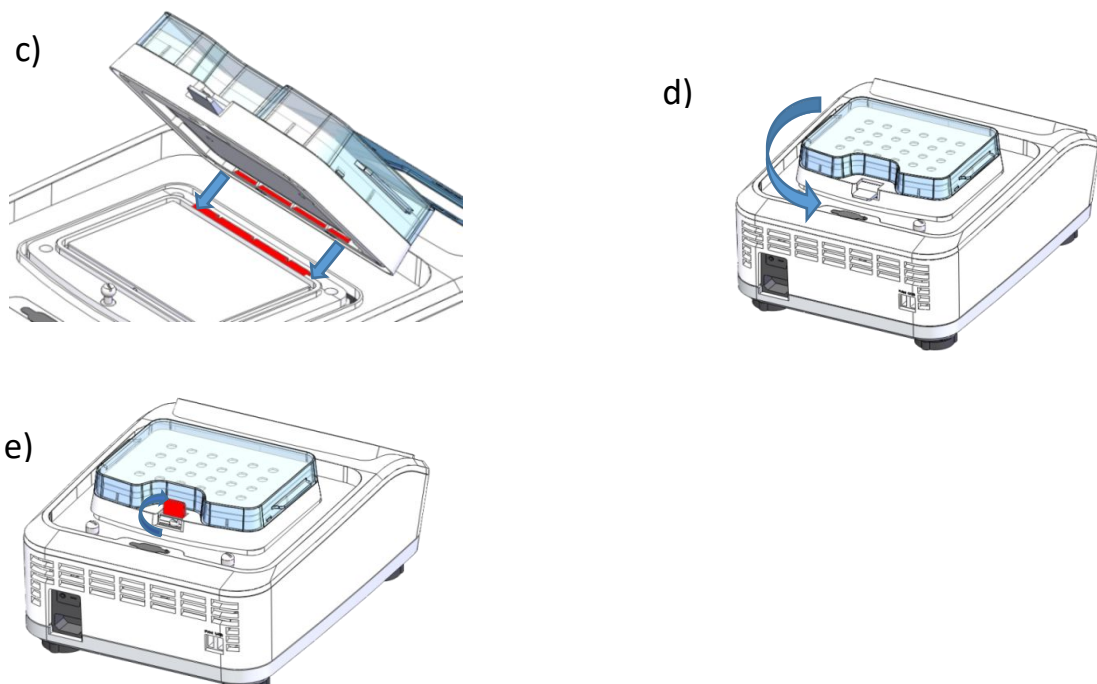


2. Changing the block

To remove the block, turn the tab on the back of the block so that it is in a horizontal position (a). Lift the back of the block up from the chassis and then upward away from the instrument (b).

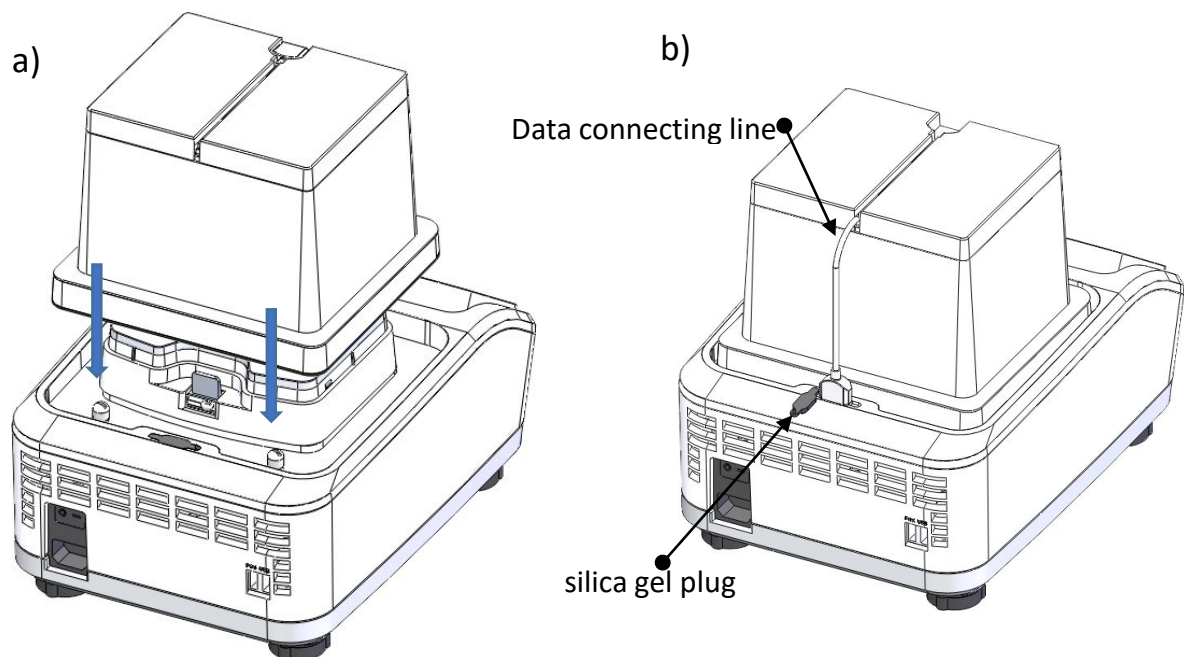


To replace the block, be sure that the tab on the back of the block is in a horizontal position. Match the front of the block to the chassis as shown below (c). Lower the block onto the chassis and the alignment pin (d). Turn the tab up to a vertical position (e). Note: Be sure there is nothing between the block and the heating surface.



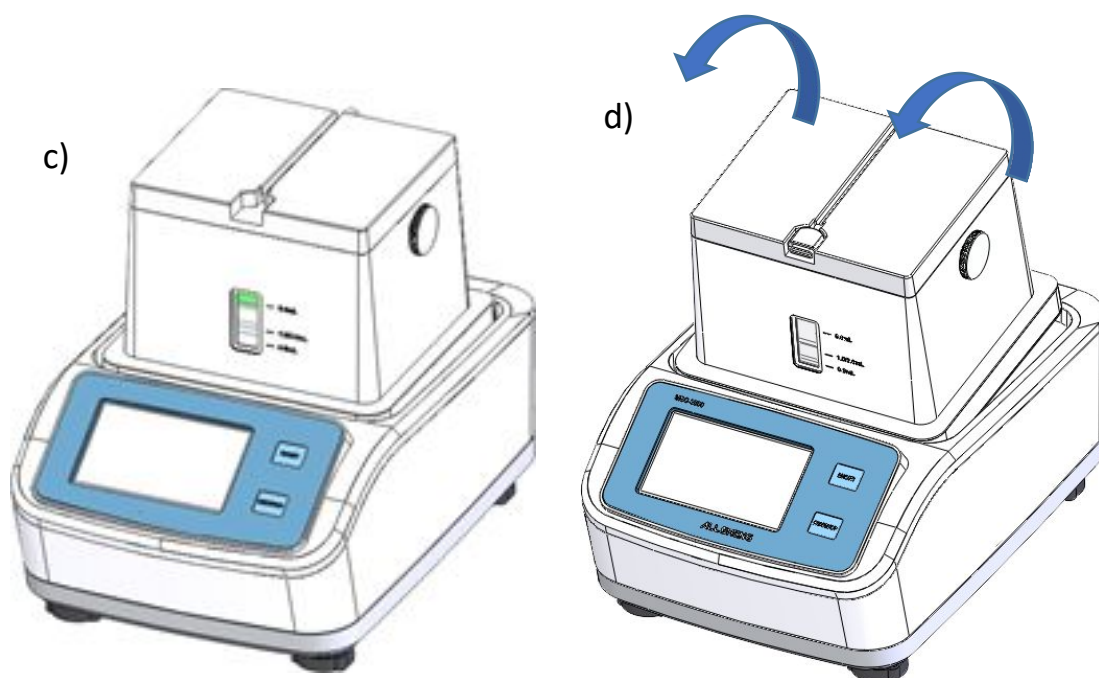
3. Installing the optional hot lid

Place the hot lid over the unit with the block installed. See figure (a) below for the proper orientation. Ensure that the locating pins mate with the holes in the hot lid (a). Press down into place. Remove the silica plug covering the hot lid connecting port (b) and insert the line from the lid into the socket.



Before use, the platen in the heated lid must be lowered to the specific height required by the consumable. Rotate the knob on the left side of the lid counter clockwise to lower the platen and clockwise to raise it. The position of the platen will be show through the window on the front of the lid (c).

Note: The heating plate should not be in contact with the block when shaking. Do not operate the heated lid function with the clear lid in place.



To remove the hot lid: disconnect the data connecting line and lift the hot lid forward (d) until the locating pins disconnect from the lid. It can then be lifted up and away from the unit.

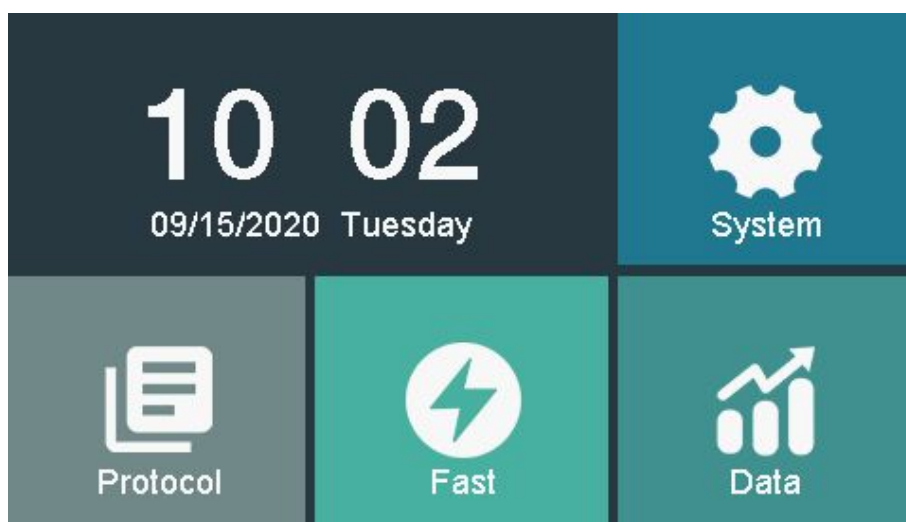
Chapter 4 Software operation

1. Power on self-test

Connect power source and turn on the switch on the back of instrument, the start-up image will appear while the unit performs a self test.

2. The main interface

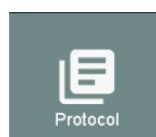
After self-test is finished, the main interface will display.



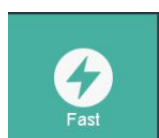
The icons on the main interface are as below:



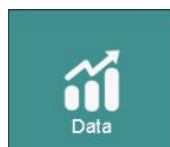
System setting



Program



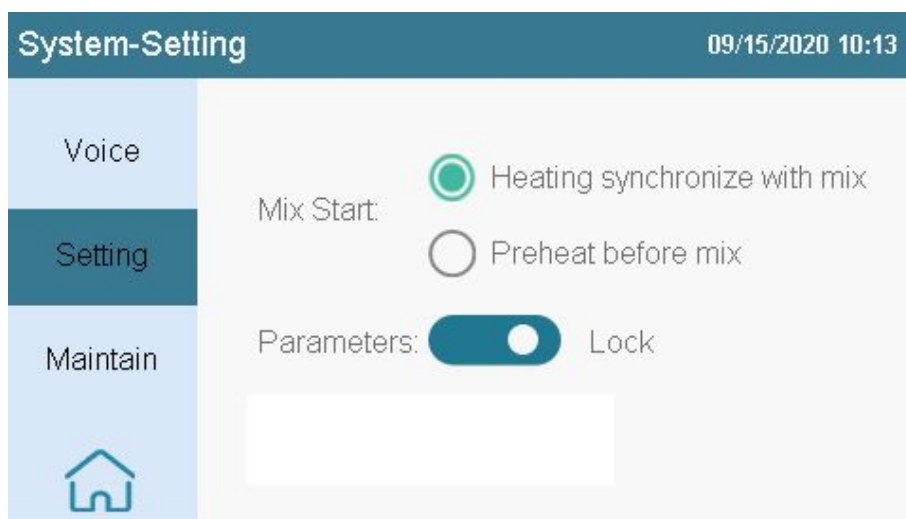
Fast program



Review data curves

3. System interface

Click the "system" icon on the main interface. The "System Setting" menu will appear. Use the scroll bar on the left side to see the options.



Touching the home icon will return to the main interface.

3.1 Setting

Mix Start:

Heating synchronize with mix: Heating/cooling and shaking will start as soon as the fast program is started.

Mix after preheat: After the fast program is started, the block will heat/cool to the set temperature and then the shaking will start

Lock: This function locks and unlocks the parameters for the fast program. When it is unlocked, the parameters can be changed and the fast program will run with the updated parameters. Parameters cannot be changed in the fast program interface when this is locked.

3.2 Voice setting

The tones that sound when the unit is first turned on and when a program is finished can be turned off and on. Open means the tones are on and closed means they are off.

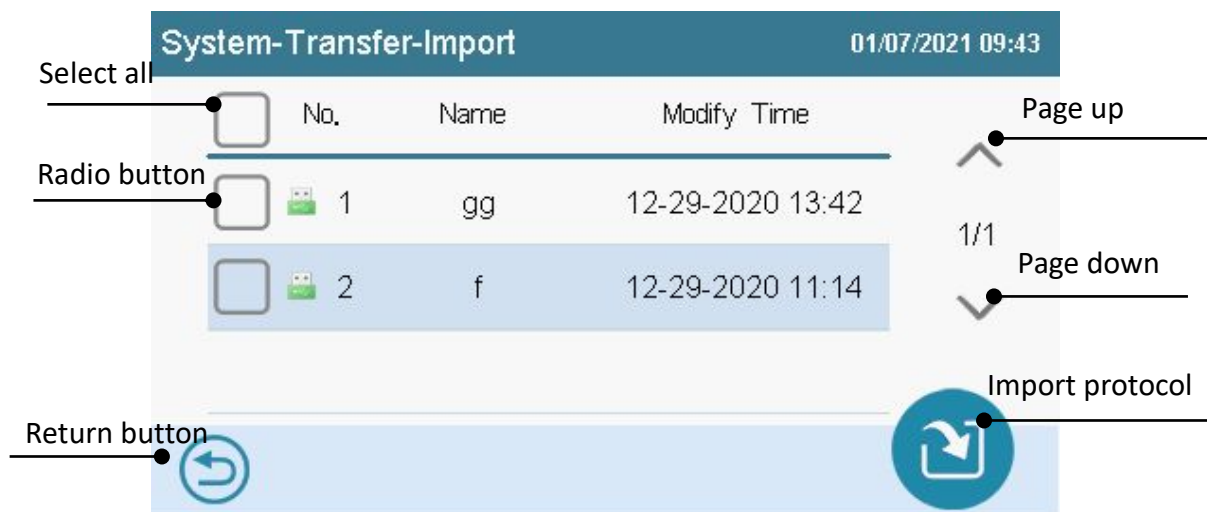


3.3 Data transfer

Users can import or export programs through the USB socket.



3.3.1 Protocol import



3.3.2 Protocol export



3.4 Factory setting

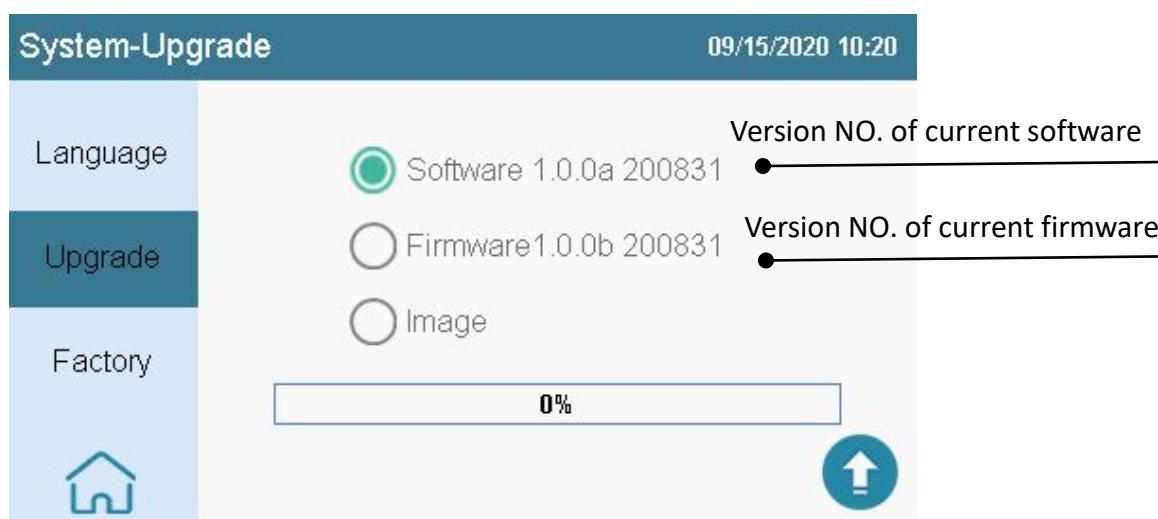
All protocols will be deleted and parameters reset if this setting is chosen.

This cannot be undone.



3.5 Upgrade

When available, users can upgrade the software and firmware through the USB.



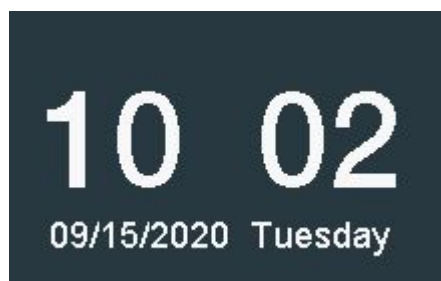
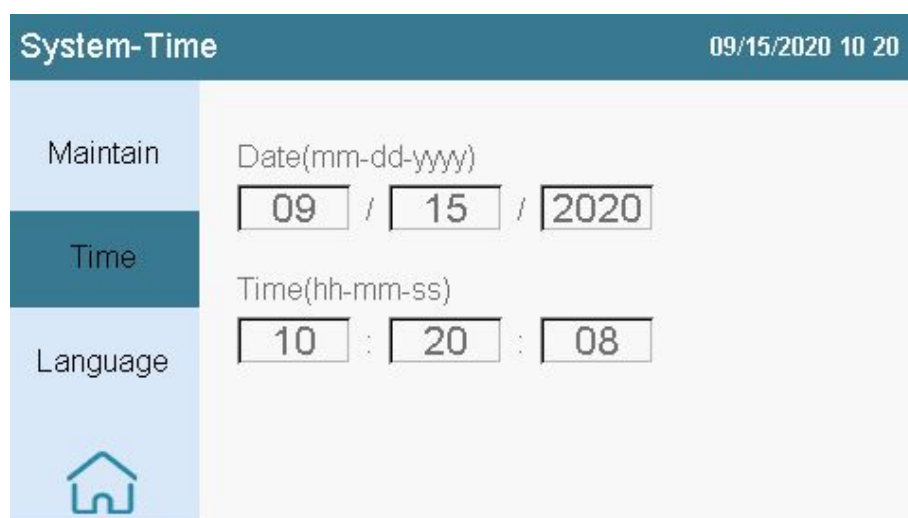
3.6 Language

Chinese or English can be chosen as the system language.



3.7 Time

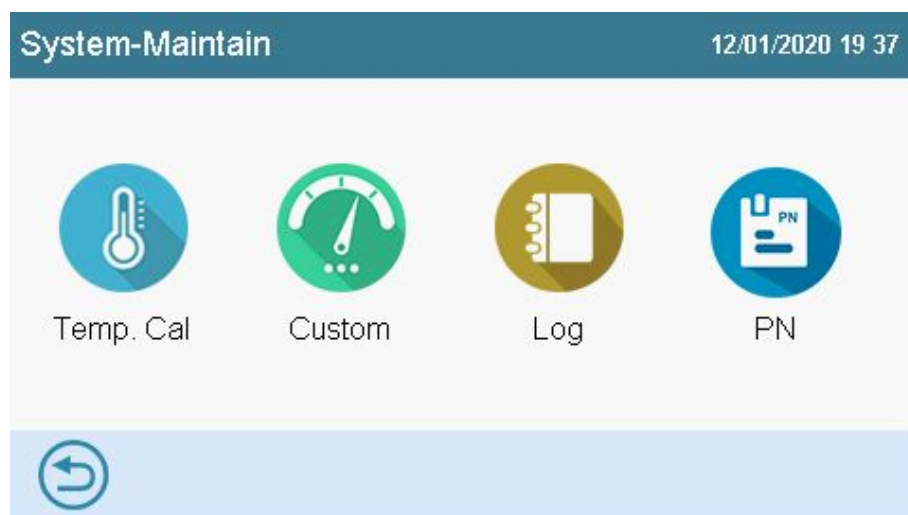
Display date and time can be changed here.



They can also be changed by touching the tile on the main interface.

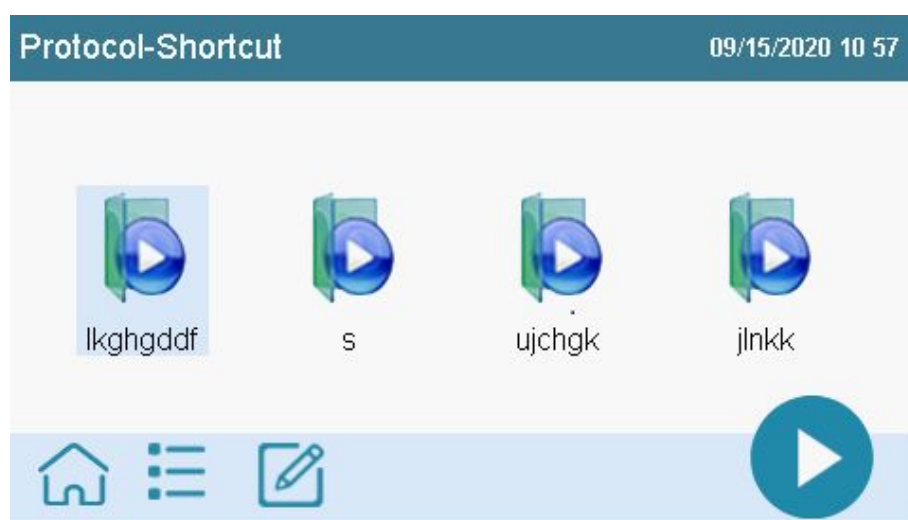
3.8 Maintenance

Input the password to enter System-Maintain interface.



4. Protocol-Shortcut interface

Touch the protocol icon to enter Protocol-Shortcut interface. Users can create, edit and run protocols here.



The function of each icon in Protocol-Shortcut follows:



Shortcut Protocol (the icon will be highlighted after be chosen)



Back to the main interface



Enter protocol list interface



Enter protocol setting interface



Run the Shortcut Protocol chosen

4.1 Protocol list interface

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

Protocol-List				09/15/2020 10:57
	No.	Name	Modify Time	
☐	1	dddd	09-14-2020 13:13	1/6
	2	lkghgddf	09-14-2020 12:36	
☐	3	dff	09-13-2020 13:24	



The function of each icon in protocol list interface follows:



Set shortcut protocol (up to 4 shortcuts can be chosen).



Back to main interface



Shortcut protocol interface



Protocol management



Edit selected protocol



Run selected protocol



Save selected protocol as



Page down (turns gray at bottom)



Page up (turns gray at top)



Create new protocol

4.2 Create new protocol

4.2.1 Create protocol's name

Click icon  on protocol list interface to create a new protocol and give it a name. The name can be a maximum of 8 letters or numbers and letters are case sensitive. The unit has an on-board memory for 50 protocols

4.2.2 Protocol edit interface

Input protocol's name and press "Enter". The protocol interface will appear as follows:

Name: dddd		09/15/2020 10:57				
Step1	Step2	Step3	Step4	Step5	Option	Cycle Step
Temperature:		Speed:		Time:(hh:mm:ss)		Start:
25.0 °C		1000RPM		00:10:00		1
Heating rate: Full Power		Cooling rate: Full Power				End:
Mix mode: Continues Clockwise						1
Mixing start: Preheat before mix						Cycle:
						1

Each function of the protocol interface is as below :

Name: dddd		H5100-CMB		21.5°C		09/15/2020 10:57	
Steps	Step1	Step2	Step3	Step4	Step5	Option	Option
Parameter setting	Temperature:		Speed:		Time:(hh:mm:ss)		Cycle Step
	25.0 °C		1000RPM		00:10:00		Start:
							1
Advanced parameters setting	Heating rate: Full Power		Cooling rate: Full Power				End:
	Mix mode: Continues Clockwise						1
	Mixing start: Preheat before mix						Cycle:
							1
Touch icons							

Step : Touch the step to display the parameters for that particular stop

Option : Touch the icon to display the available settable options, as follows.

Keep temp.: This is the temperature that the block will hold at after all steps in the protocol are finished. The default is 5°C. If the box is not checked, the heating/cooling function will turn off at the end of the program.

Name: dddd		H5100-CMB		21.5°C		09/15/2020 11:03	
Step1	Step2	Step3	Step4	Step5	Option	Cycle Step	
☐	Keep Temp:		5.0 °C			Start:	1
	(4.0~20.0°C)					End:	1
☐	Hot lid temp over block:		5.0 °C			Cycle:	1
	(0.0~20.0°C)						

Hot lid temp. over block: Default temperature of the hot lid is 5.0 °C higher than the block temperature (user can reset the temperature value, range is 4.0~20.0 °C, default is 5.0 °C). The function is only active if the box is checked. (This function is not available if the block temperature is under 20°C).

Parameter setting: The parameters can be edited by touching the screen over the parameter you wish to change.

Temperature: Settable temperature range is 0-105 °C. if “-” is entered, temperature is not controlled.

Speed : The speed range is 0-3000rpm. Note – the maximum speed is limited by different blocks. See the block table earlier in this manual for the maximum speeds.

Time: Time range is 00:00:01-99:59:59. Entering “-” for the time allows the unit to run continuously.

Advanced parameters setting: Touch this to enter the advanced parameter setting menu.

Rate:

Temperature mode:

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

Custom: The ramp rate of the heating can be slowed. Choose: 3.0°C/min, 2.0°C/min, 1.0°C/min, or 0.1°C/min. The ramp rate of the cooling can also be slowed: 1.0°C/min, 0.5°C/min, or 0.1°C/min.

The screenshot displays the 'Rate' settings menu in the MultiTherm Touch software. At the top, a status bar shows 'Name: dddd', 'H5100-CMB', a temperature of '21.5°C', and a timestamp of '09/15/2020 11:01'. Below this, the 'Rate' tab is selected, showing options for 'Temp Mode' (Full Power and Custom), 'Heating rate' (3.0 °C/min, 2.0 °C/min, 1.0 °C/min, and 0.1 °C/min), and 'Cooling rate' (1.0 °C/min, 0.5 °C/min, and 0.1 °C/min). The 'Custom' temperature mode is selected, and the heating rate is set to 3.0 °C/min. A blue bar at the bottom contains a circular arrow icon, likely for navigating back to the previous screen.

Mixing mode:

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

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

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

Name:dddd H5100-CMB 21.5°C 09/15/2020 11:12		
Rate	Mix Mode	Mix Start
Mix direction:	☒ Clockwise ☐ Anticlockwise	
	☐ Clockwise&Anticlockwise	
Mix method:	☒ Continues ☐ Intermittent	



Mix start point :

Heating synchronize with mix: Temperature-control function and mixing function will run simultaneously as soon as the program is started.

Mix after preheat: After the program run is started, the temperature-control function will heat the block to the set temperature and the mixing will start after the temperature is reached.

Name:dddd H5100-CMB 21.5°C 09/15/2020 11 12		
Rate	Mix Mode	Mix Start
	☐ Heating synchronize with mix	
	☒ Preheat before mix	



Cycle step:

Start: Where the cycling starts

End: Where the cycling stops

Cycle: Number of times the cycle is repeated.

The program shown on the screen below will run through steps 1, 2, 3 two times and then go to steps 4 and 5 (if they are programmed.)

Step 1→Step 2→Step 3→Step 1→Step 2→Step 3→Step 4→Step 5

Step1	Step2	Step3	Step4	Step5	Option	Cycle Step
Name: dddd H5100-CMB 21.5°C 09/15/2020 10:57						
Temperature:		Speed:		Time:(hh:mm:ss)		Start:
25.0 °C		1000RPM		00:10:00		1
Heating rate: Full Power Cooling rate: Full Power Mix mode: Continues Clockwise Mixing start: Preheat before mix						End:
						3
						Cycle:
						2








Icon: Touch the icons at the bottom of the page for the following



Back to the protocol list, will prompt whether save or not.



Add steps, the max steps number is five.



Delete the current step, prompt pop up to verify.



Preview: Enter the protocol preview interface.



Save protocol, prompt will pop up to verify.



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. (Refer to the image that follows.)

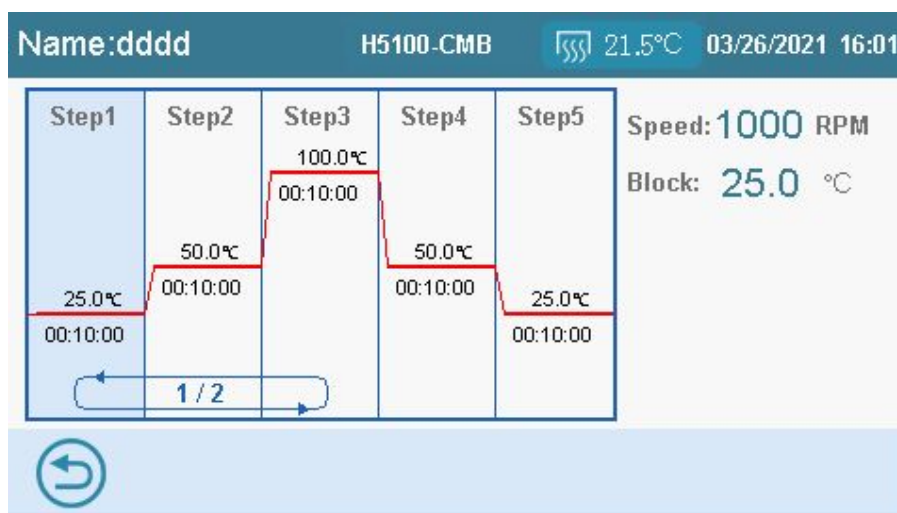
After touching and highlighting the step, the detailed parameters of the step will display in the right-side status bar.



This icon means cycle, the area included in the icon is included in the cycling. In the figure following, the starting point is step 1, ending point is step 3; 1/2 means total cycles are 2 and current running is the first cycle.



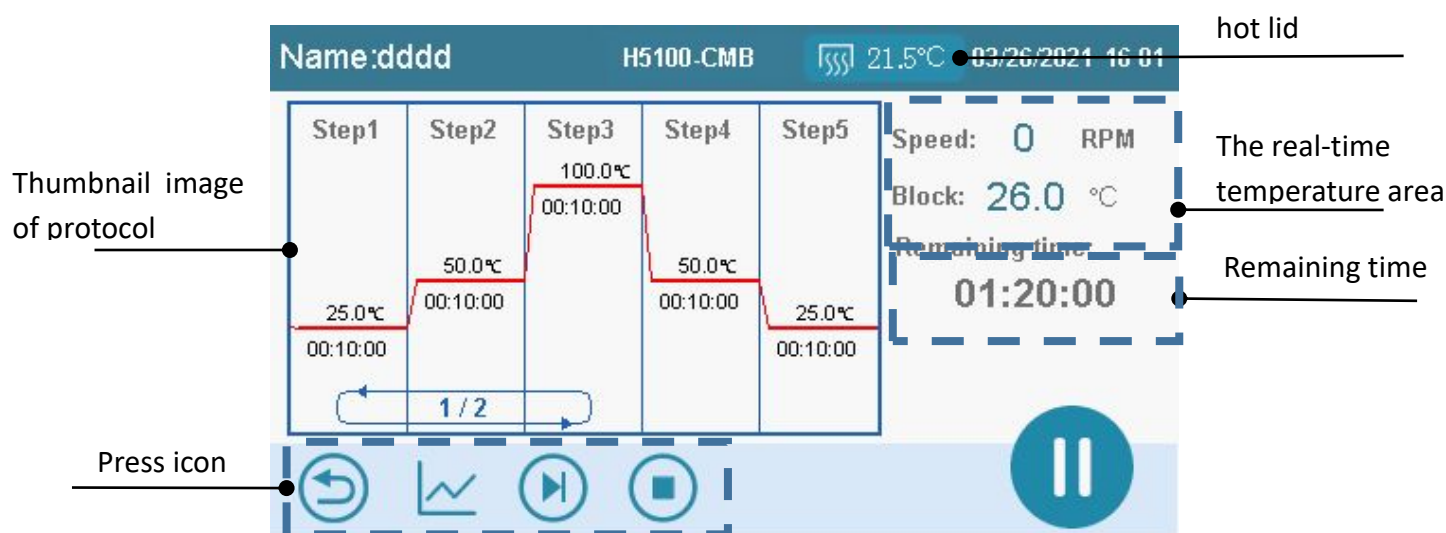
Back to the protocol edit interface



5. Protocol running interface

5.1 Introduction

Using protocol “dddd” above as an example, after touching icon  , enter running interface.



Thumbnail image of protocol : Includes temperature, time, starting point, ending point and cycle times of each step. The step currently running will display as highlighted. Parameters can be modified while running by clicking on the step.

Press icon: the function for each icon is below.



Back to the protocol list, Prompt whether stop the protocol on running.



Skip over the current step and start next step; if the current step is part of a cycle, the unit will enter the next step in the cycle. For example, when running the step 3 of “dddd” protocol during the first

cycle, if step 3 is skipped, the program will enter step 1 of the second cycle. When the program is finished, skip icon will change to return icon.



Enter temperature curve interface to see the running curve in process.



Stop icon: Prompt whether stop the protocol on running.



Pause: The protocol will pause when touched and will continue when touched again.

Hot lid icon:



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

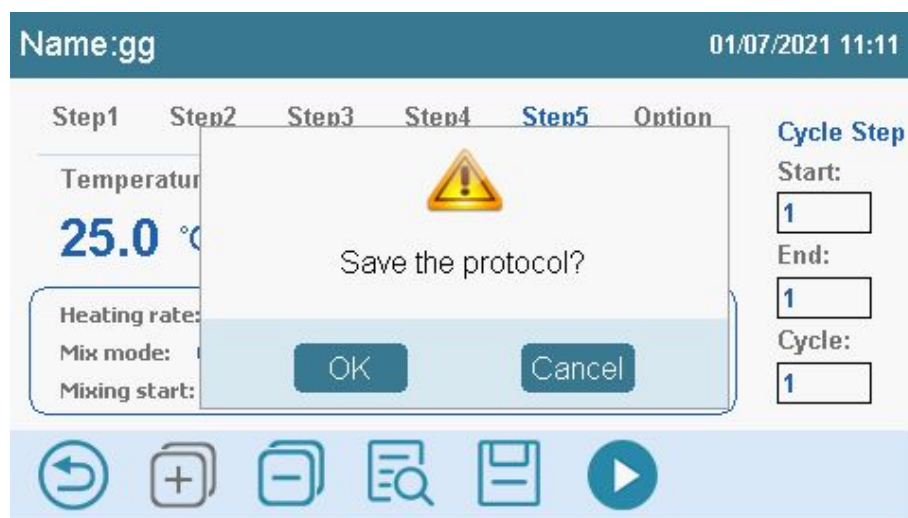
Advanced parameters: Display rotating speed, heating and cooling rate, mixing mode, and mixing starting point of current running step.

Real-time temperature: Displays the actual temperature of hot lid and block.

Remaining time: Display the remaining time in current protocol (this does not include heating and cooling time).

5.2 Protocol edit interface

Click step in the protocol running interface enter the protocol edit interface. Parameters may be modified while the program is running.



The protocol edit interface on running is generally same as the interface mentioned in 4.2.2. But steps cannot be added or deleted.

After modifying the parameters, click icon  and prompt whether to save the protocol will appear. After confirming the save, 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.

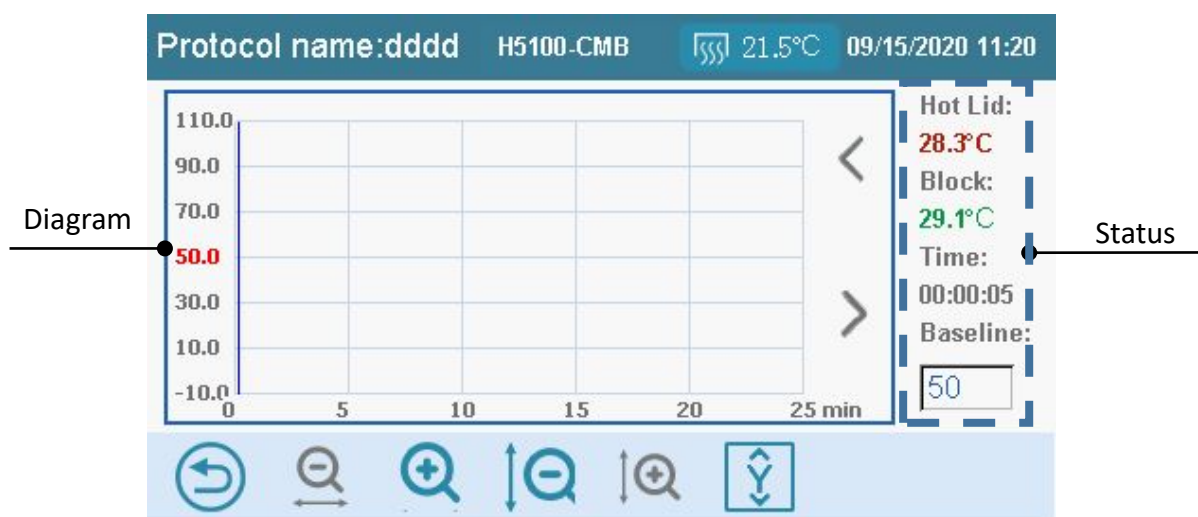


Diagram: The y-axis is temperature, range is -10~110 °C, the baseline 50°C marked in red. The x-axis is time, range is 0~25 min. The screen will turn a new page after 25min. The red curve represents the temperature trend of hot lid and the green curve represents the temperature trend of block.

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



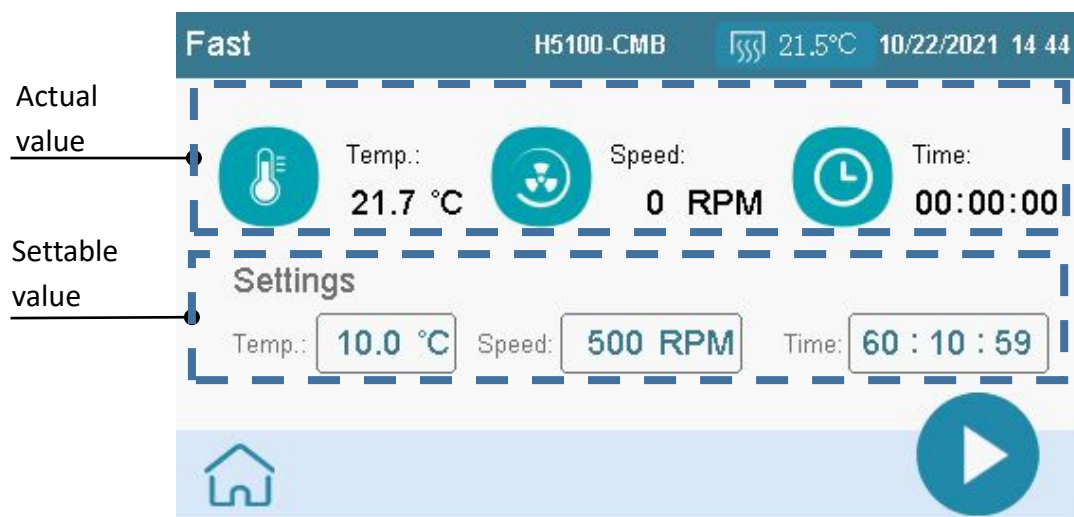
Turn page left side (it will get gray at the beginning)



Turn page right side (it will get gray at the end page)

6. Fast interface

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



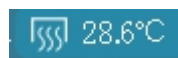
Parameters setting:

Temperature: The settable temperature range is 0-105 ° C. If the temperature is set as "-", temperature control is off.

Rotating speed: The rotating speed range is 0-3000rpm (max speed is limited for different blocks. See the block table for max speeds.)

Time: The settable time range is 00:00:01-99:59:59. When it is set as "—:—:—", the unit will run continuously until stopped.

Actual value: Displays the real-time temperature, rotating speed and the remaining time.



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

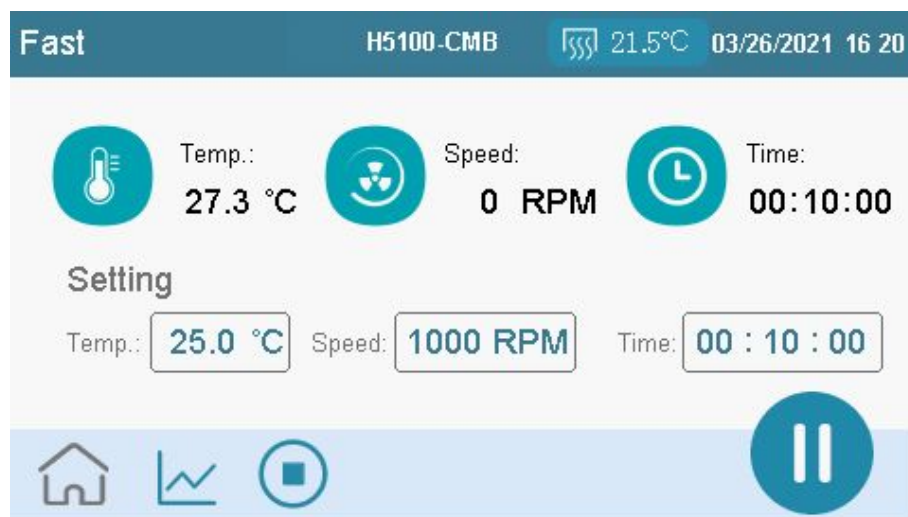


Back to main interface



Run the protocol according to the current parameter

After clicking the running icon, the menu below appears.



While the unit is running, this icon is gray and not available.



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



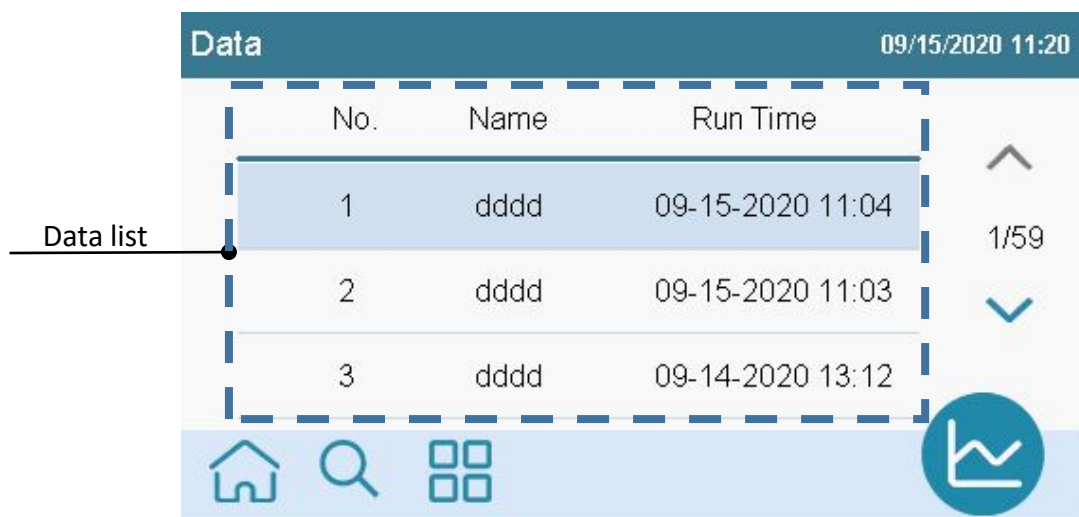
Stop: Stop operation – prompt will pop up to verify.



Pause: Pause the running protocol after touching. Touch again and operation will resume.

7. Data interface

Click the data icon on main interface to enter the data interface. Up to 1000 runs can be stored (depending on length of rung).



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 is sorted by run date and time, the most recent first. The selected data is highlighted;

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 at the beginning of the list)



Turn page downward (it will turn gray at the bottom of the list)

7.1 Data management interface

Click icon  to enter the data management interface.

Data-Management				09/15/2020 11:20
☐	No.	Name	Run Time	
☐	1	dddd	09-15-2020 11:04	1/59
☐	2	dddd	09-15-2020 11:03	
☐	3	dddd	09-14-2020 13:12	

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

☐ Selection box – touch the box to select the protocol. A check mark will appear in the box.

 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.



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

Data area: Display the temperature of hot lid and block of blue line's location, as well as the time. Drag the bright blue line to check the data at different times. The base line can be changed to make it easier to check the curve (default base line is 50°C).

Key icon: The function for each icons is below:



Return: back to the data interface



Zoom out the x-axis



Zoom in the x-axis



Zoom out the y-axis



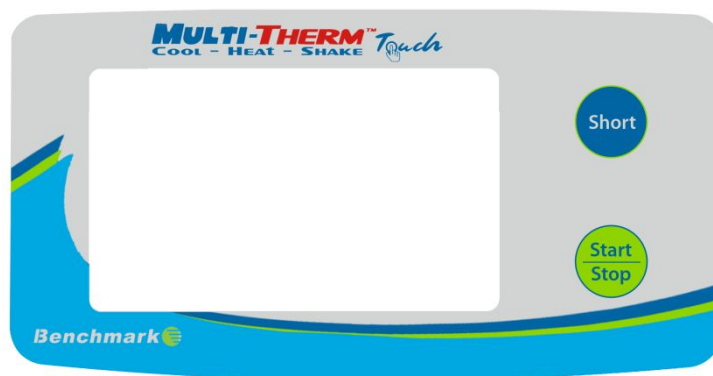
Zoom in y-axis



Best display as chosen by the unit

8. Front panel

The MultiTherm Touch utilizes a touch screen for most functions. There are only two physical keys, keys as below:



Short mixing: Press and hold this key for quick mixing at the maximum block speed. Releasing the key stops operation.



Run/Stop: Pressing this key while a protocol is running will pause the run. Pressing again will continue the run. Pressing this key for longer than 1 second will cancel operation of the currently running program.

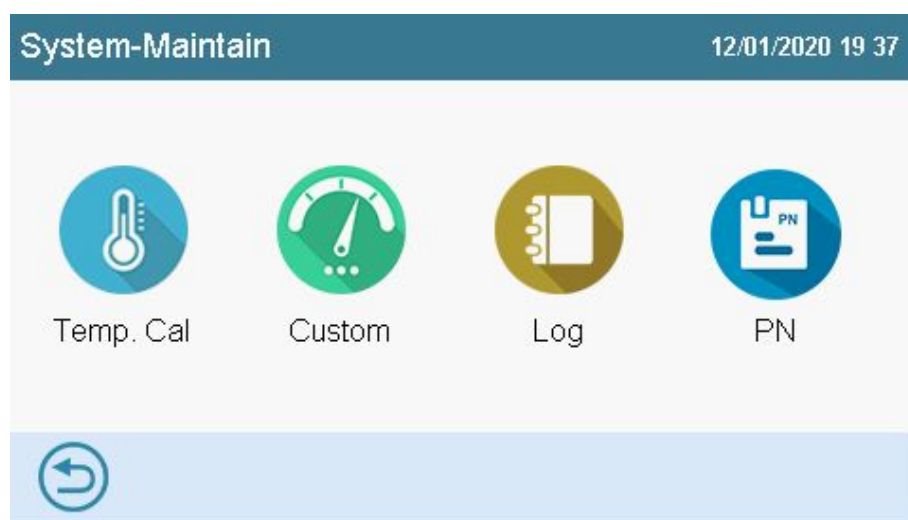
9. System maintenance

Slide the scroll bar on the left side of system interface, choose

"maintain", input the password to enter System-Maintain interface.

(Password is available from the manufacturer.)

(For the details please refer to chapter3.8)



Temp. Cal: Enter the temperature calibration interface



Custom: Enter the customized block interface



Log: Export log of system's running



PN: Check the PN number

9.1 Temperature calibration

The instrument has been factory calibrated. If the temperature is determined to deviate from the displayed temperature, the unit can be

recalibrated in the lab.

For ensuring the accuracy of temperature, the instrument is calibrated at three points (5°C, 40°C and 100°C) simultaneously by linear data, after the calibration, the system will ensure the accuracy of the other temperature points is $\leq \pm 0.5^\circ\text{C}$.

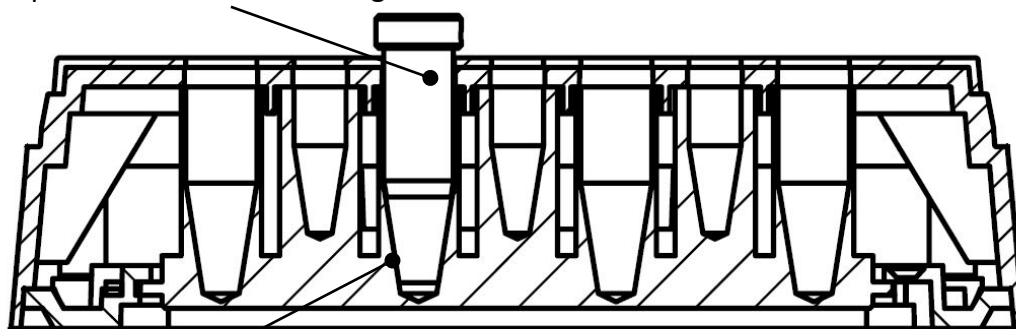
The ambient temperature and the block temperature should be lower than 25°C when calibrating the instrument.

Calibration method is as below:

A) Turn on the instrument and will see the main interface, then observe the actual temperature of block on the screen and make sure the temperature is lower than 25°C. If the temperature is higher than 25°C, please wait until it down to 25°C then continue as below.

B) Installed the block to be calibrated into the instrument, and put the temperature calibration tooling in the middle hole of block, ensure the temperature calibration tooling fits firmly in the tube hole as the image below:

Temperature calibration tooling



Tube hole

C) Click icon  in System-Maintain interface to enter the temperature calibration interface.

Maintain-Temp. Cali. 21.5°C 10/22/2021 14:44

Hot Lid Cali. Block Type: H5100-CMB **Parameter**

Constant Temp.: **5.0 °C** Used Time: **00:20:00** Block Temp.: **21.7 °C**

Block Temp.: °C **OK**

D) The type of block can be identified automatically by instrument, then click the icon  to run the temperature calibration protocol.

E) After temperature reaches 5 °C, allow it to stabilize for 20 minutes. Enter the temperature of the probe in the block temp box and click OK to confirm. The system will keep in this value and heat to 40 °C automatically.

F) After temperature arrives at 40 °C, let it stabilize for 20 minutes. Enter the temperature of the calibration tooling and confirm. The system will then heat to 100°C automatically.

G) After temperature reaches 100°C, allow to stabilize 20 minutes and enter the actual temperature of the calibration tool. Confirm the temperature and the calibration process will be finished

H) In special, the user can click **Parameter** to enter calibration parameter interface, as below,

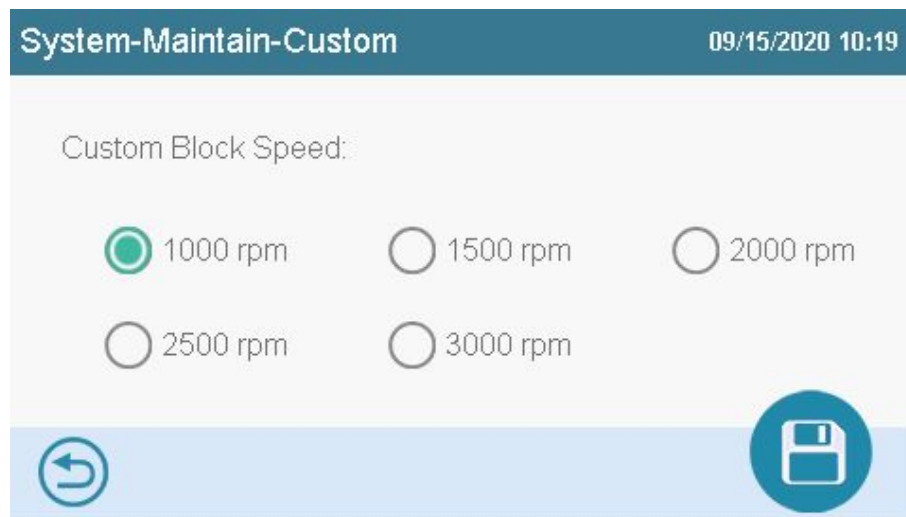
Maintain-Temp. Cali.					21.5°C 10/22/2021 14:44	
Block/Type	5.0°C	40.0°C	100.0°C	Speed	Temp. Cali	
H5100-02	5.2	38.0	98.2	2000	1/4	
H5100-384	5.1	40.0	98.0	3000		
H5100-05	5.1	40.0	100.0	2000		
H5100-CMB	5.0	40.0	100.0	2000		

The calibrating data for each block is available to review in calibration parameter interface.

Attention: It is not recommended to change the calibration unless an issue is detected. The unit is factory calibrated.

9.2 User-defined

Click icon  on System-Maintain interface to enter the user-defined interface.



Attention: User-defined interface is only available for custom blocks.

Chapter 5 Troubleshooting

No.	Description	Reasons	Solution
1	Display does not light when power is turned on	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 not Heating or cooling	DC power is bad	Contact the distributor or manufacturer
		TE refrigeration sheet is bad	
4	Keyboard not working	Front panel is broken	Contact the distributor or manufacturer

5	Cooling speed is very slow or it can not reach the lowest temperature.	Ambient temperature is too high	Lower 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 found	Check if the block is installed properly
9	Block bouncing when mixing	Block is not installed properly	Check if the block is installed properly
10	Prompt E011-block_temp_over	Temperature senor lost control	Contact the distributor or manufacturer

11	Prompt E015-E015-block_temp _open	Temperature senor is open circuit	Contact the distributor or manufacturer
12	Prompt E016-block_temp_close	Temperature senor 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	Contact the distributor or

17	Prompt E708-N and flash error		
18	Prompting E709-SPI flash error		
19	Prompting E801-uart_err	Signal interference	Power off and restart Contact the distributor or manufacturer