Operations Manual

INCU-SHAKER™ 20L/LR
STACKABLE SHAKING INCUBATOR

H3020 and H3022 (-E)

Benchmark Scientific

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1. General Information and Precautions

Safety Symbols:

1.1. Precautions related to the power cable

- Always allow at least 3cm between the power cable and the back wall to prevent the back wall from causing pressure on the power cable.
- Always use the electrical plug that was supplied with this instrument.
- Never touch the power cord with wet hands. (This can result in electric shock.)
- Never use a damaged power cord or power outlet.
- In the event of smoke or a burning smell, immediately remove the power cord from the outlet.

1.2. Precaution for use

- Do not attempt to disassemble this instrument. If service is required, please contact your local representative.
- Never operate a flammable spray near this instrument. (This can result in a fire hazard.)
- Always use caution when using flammable substances such as benzene, alcohol and LP gas. (Failure to do so can result in a fire hazard.)
- Prevent foreign substances from contacting the door seal. (The inflow of outside air can negatively impact the temperature in chamber.)
- Permissible ambient temperature range for transport: -10℃ to 60℃.
- **ALWAYS ensure that the instrument is connected to an outlet with specifications that match those of the serial number label**.
  (Over-voltage or under-voltage can damage the product and result in poor performance.)
- When installing the instrument, always allow a distance of at least 30cm from the back wall. Install the unit in the way that the power plug is easily accessible and can be easily pulled in case of danger.
- Install the instrument on a flat and stable surface, free from vibration and in a well-ventilated location. (If the surface is not level, it can cause excessive vibration during use.)

2. Feature & Specification

2.1 Features

- Magnetic induction drive & Brushless DC motor ensures low vibration and maintenance.
- BLDC motor does not interfere with temperature uniformity and provides exceptional stability and minimal noise
- User friendly, intuitive LCD touch panel
- Moisture resistant, epoxy-coated structure
- Automatic stop function on door opening, stops heating and platform shaking for safety and energy conservation
- Transparent window allows internal viewing without opening external door
- Compatible with MAGic Clamp™ universal magnetic platforms and accessories

2.2 Specification

1) Dimension (Exterior): 60(W) X 87(D) X 73(H) cm/ 23.6(W) X 34.3(D) X28.7(H) in.
(Internal): 51(W) X 50.5(D) X 57.7(H) cm / 20.1(W) X 19.9(D) X 22.7(H) in.
(Platform): 45(W) x 45(D) cm / 17.8(W) X 17.8(D) in.

2) Temperature range: H3020: Ambient +5℃ to 60℃

H3022: 4℃ to 60℃

3) Temperature accuracy: ±0.1℃ at 37℃

4) Temperature uniformity: ±1.0℃ at 37℃

5) Speed Range: 30~300 RPM

6) Shaking orbit: 19mm (3/4”)

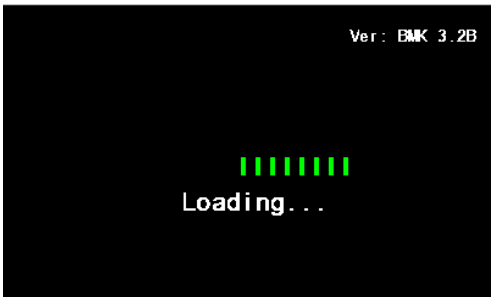
7) Circulation Fan: Convection Fan

9) Motor: Beltless DC Magnetic Induction Drive

10) Weight: H3020: 275.6lb / 125kg
H3022: 304.2lb / 138kg

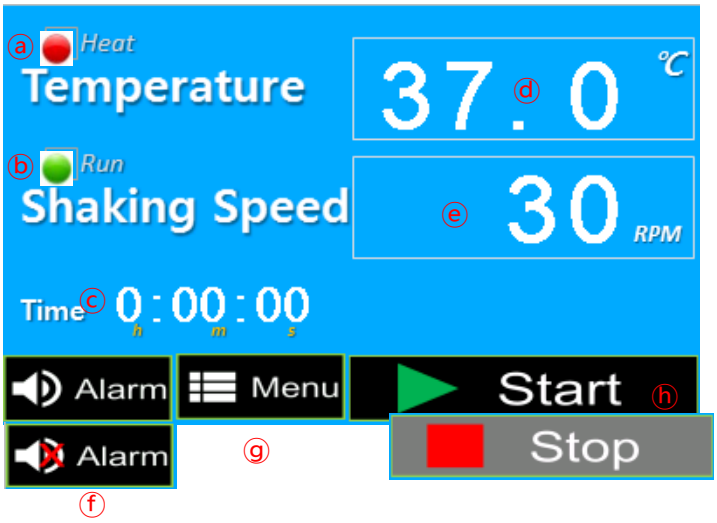
11) Electrical: 120V or 230V, 50/60Hz / H3022: 945kW(110V)

3. Operation



▶ Booting

1. Press the power switch into the ON position, the display illuminates and the booting screen is displayed for 2 seconds before showing the "Basic View" screen.
   NOTE: If the shaker has been powered off before the completion of a run, the unit will automatically power on to the previous settings.



▶Basic View Screen

ⓐ HEAT LED: indicates if the heater is activated

ⓑ RUN LED: indicates if the shaker is running.

ⓒ Time setting: Indicates the set or remaining time.
(To adjust, TOUCH the time value.)

ⓓ Temp setting: Displays the current temperature.
To set the desired temperature, TOUCH the temperature value.

ⓔ RPM setting: Displays the set or current RPM
To set the desired shaking speed, TOUCH the RPM value.

ⓕ Alarm ON/OFF: Alarm rings according to the condition
TOUCH to toggle the alarm on or off.

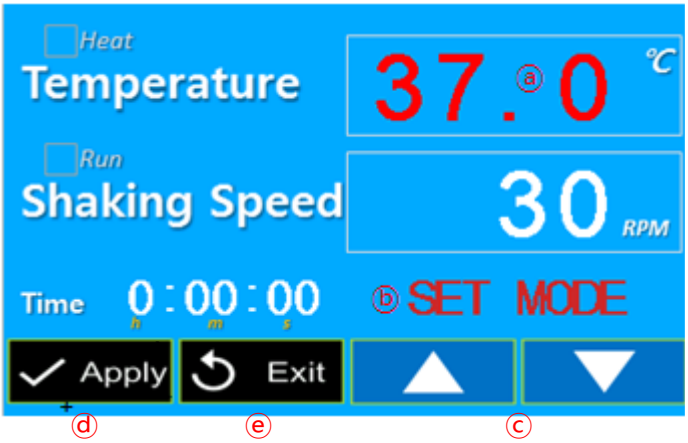
Alarm ON

Alarm OFF(mute)

ⓖ Menu: TOUCH to activate the main menu

ⓗ Shaker Start/Stop Button
TOUCH to Start or to stop the shaker.

ⓘShaker end: Indicates that time has expired and the shaker has stopped

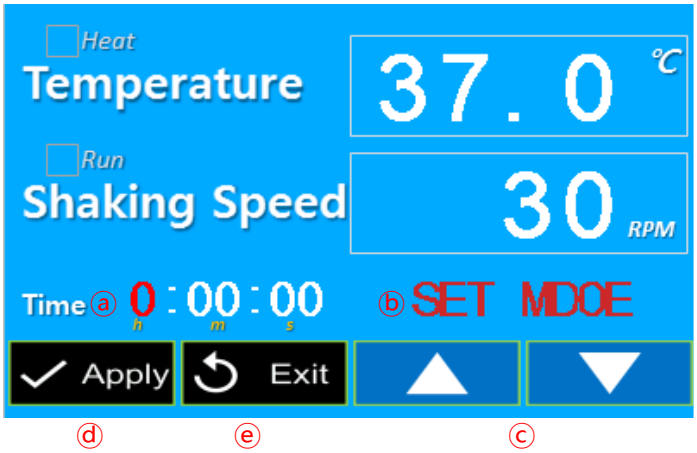


▷ Temperature Setting Change

ⓐ TOUCH the temperature value, The numbers become red.
ⓑ "SET MODE" is displayed. (flashes)
ⓒ Input the desired value by pressing UP(▲)/DOWN(▼) buttons
NOTE: Press and hold the buttons to increase or decrease the value quickly.
ⓓ Apply: To store the newly set value TOUCH Apply
(Or wait 5 seconds for the value to store automatically)
ⓔ Exit: If you press Exit after changing any values, the values are not saved and the screen returns to the previous screen.

▷RPM Setting Change

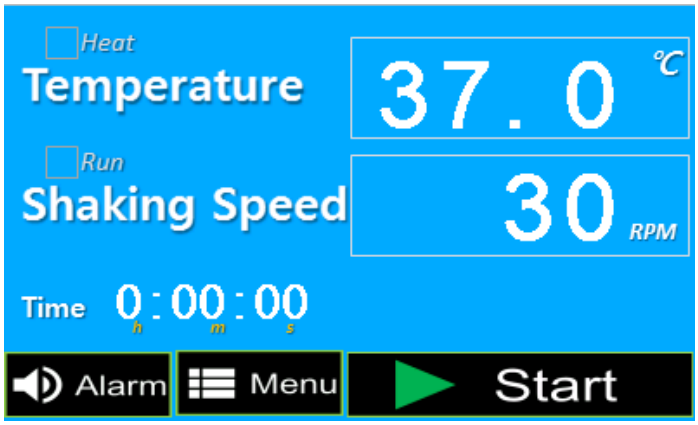
ⓐ TOUCH the RPM value, The numbers become red.
ⓑ "SET MODE" is displayed. (flashes)
ⓒ Input the desired value by pressing UP(▲)/DOWN(▼) buttons
NOTE: Press and hold the buttons to increase or decrease the value quickly.
ⓓ Apply: To store the newly set value TOUCH Apply
(Or wait 5 seconds for the value to store automatically)
ⓔ Exit: If you press Exit after changing any values, the values are not saved and the screen returns to the previous screen.



▷Time Setting Change

ⓐ TOUCH the time value, The numbers become red.
ⓑ "SET MODE" is displayed. (flashes)
ⓒ Input the desired value by pressing UP(▲)/DOWN(▼) buttons
NOTE: Press and hold the buttons to increase or decrease the value quickly.
ⓓ Apply: To store the newly set value TOUCH Apply
(Or wait 5 seconds for the value to store automatically)
ⓔ Exit: If you press Exit after changing any values, the values are not saved and the screen returns to the previous screen.

NOTE: The time cannot be adjusted during a run. To change the time during a run, you must TOUCH Stop. Change the time value and press Apply and Start.



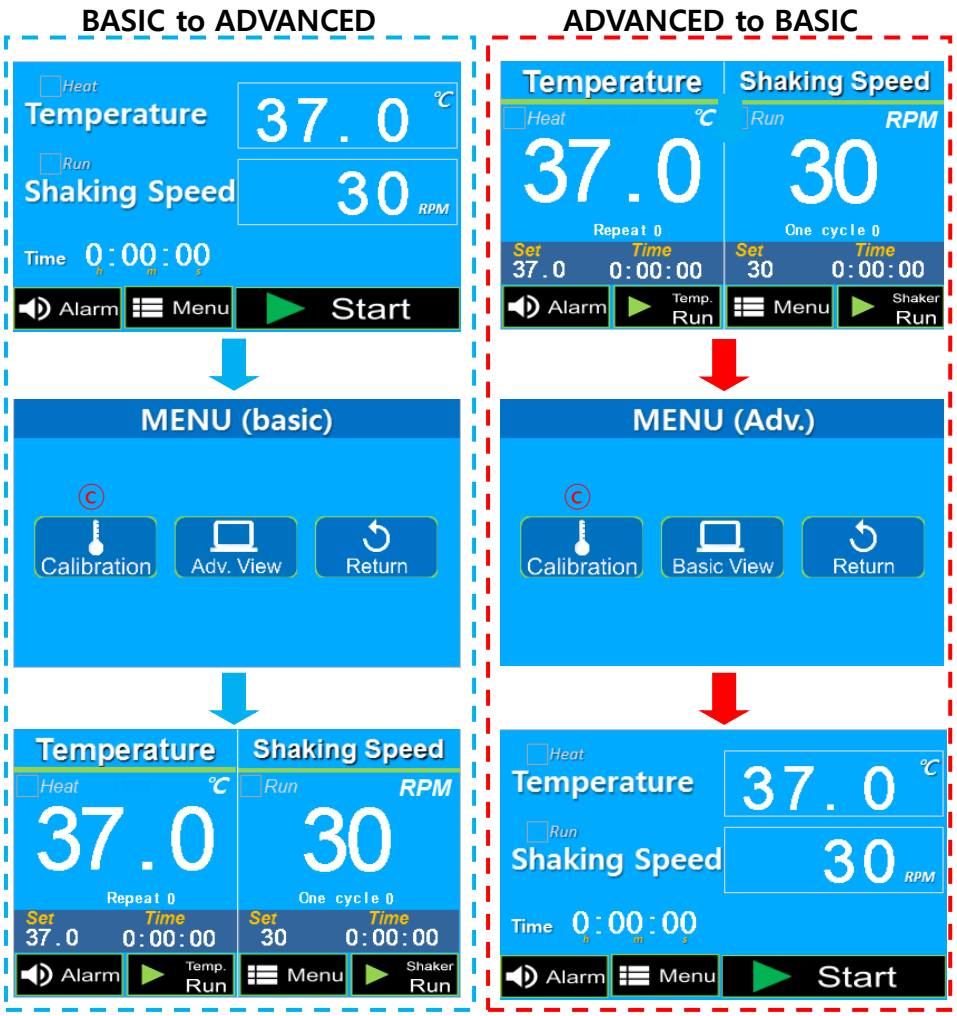
▷The End of Setting Time

ⓐ After the set time is over, time is displayed as 0:00:00.

ⓑ Shaker is stopped and the message "Shaker end" is displayed.

ⓒ Heating LED continuously runs until the STOP button is pressed to keep the set temperature.

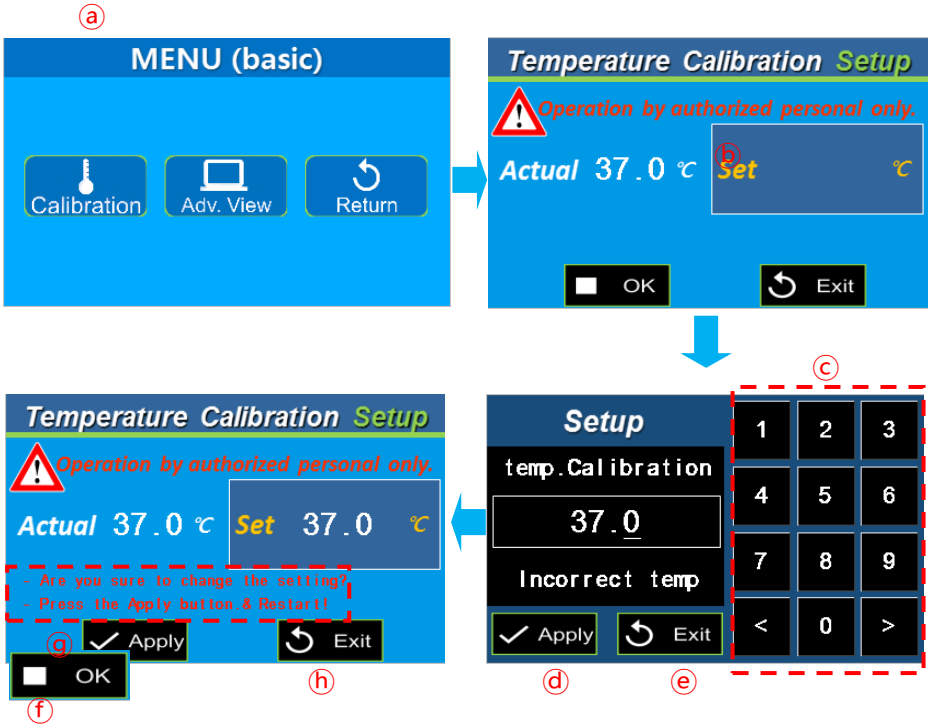
NOTE: The Heating is maintained even after the set time has expired to keep protecting samples at the set temperature. If you would like to stop the heating, TOUCH Stop.



▶ Advanced Mode

To switch from the standard BASIC view to the ADVANCED view the shaker and heater must be off. TOUCH "MENU" and choose the ADVANCED View.

NOTE: TO return to BASIC View,
TOUCH "MENU" And choose BASIC View.



▶Temperature Calibration

ⓐ To enter the calibration mode enter the menu and press Calibration .

ⓑ Press the rectangular "Set ℃" box.

ⓒ Input the calibrated (measured) value by using key pads and TOUCH Apply .

ⓓ Apply: When you TOUCH OK, the changed setting values are saved and the screen turns to the previous screen.

ⓔ If you press Exit button, the changed setting values are not saved and the screen turns to the previous screen.

ⓕ When you press Apply button, the message is displayed as the red rectangular part.

ⓖWhen you press APPLY button, the calibrated value is applied and the screen turns to the MENU.

ⓗ If you press Exit, the calibrated value is not saved and the screen turns to MENU.

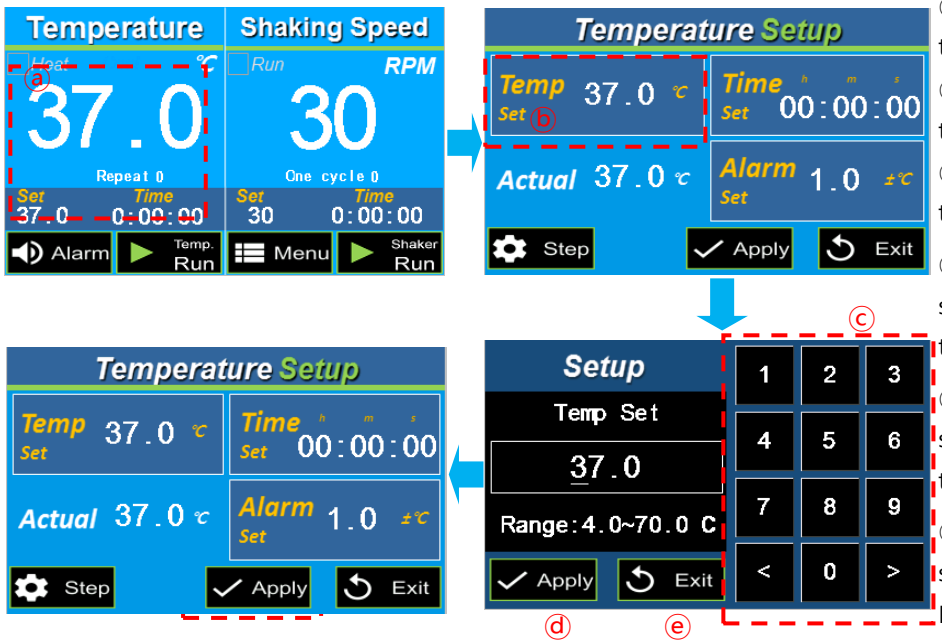
ⓘThe last calibrated value of set ℃ is continuously displayed until the power is turned off and on.

※Please measure the temperature of the inside of equipment by using a deliberate temperature measuring instrument before starting temperature calibration. At this moment, the temperature of the inside of equipment should be stabilized. If you measure with a sensor over 1 point, we recommend putting the average value on the calibrated one.

Temperature Setting (Advanced Screen)

Temperature Setting Change

Advanced



ⓐ TOUCH the temperature value, the screen turns to the temperature setting screen.

ⓑ TOUCH the "Temp Set" Value to adjust the set temperature.

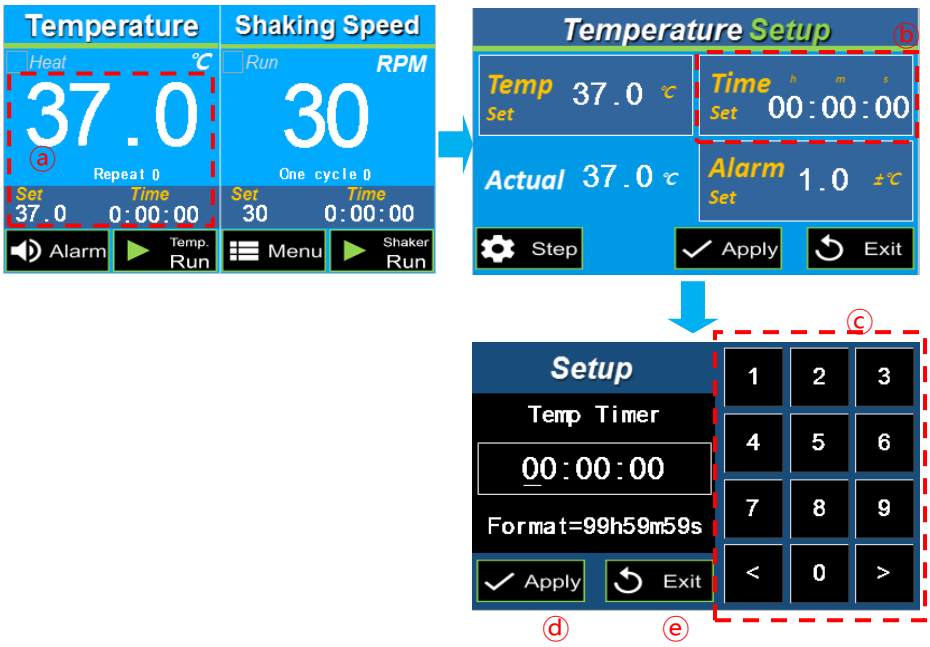
ⓒ Input the desired value by using the key pads in the setup screen.

ⓓ Apply: When you press Apply, the changed setting values are saved and the screen turns to the previous screen.

ⓔ Exit: If you press Exit, button, the changed setting values are not saved and the screen turns to the previous screen.

ⓕ Apply: You must press Apply to apply new setting.

NOTE: The temperature setting range of this instrument is 4~70℃. When selecting a value out of this range and pressing Apply, the message "Incorrect range" is displayed.



Adjusting the Time of the Temperature

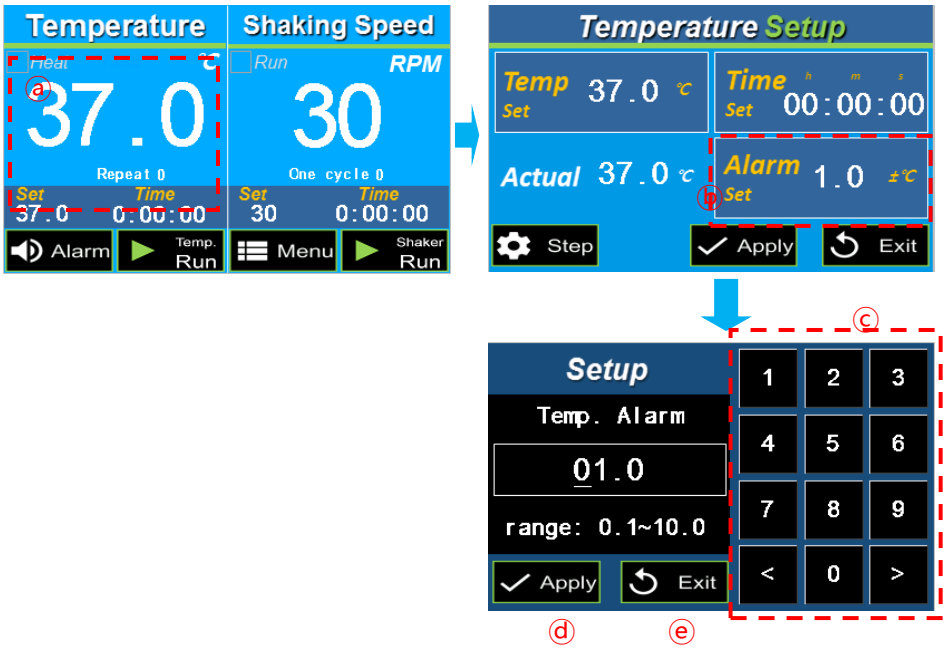
ⓐ TOUCH the temperature value, the screen turns to the temperature settings screen.

ⓑ TOUCH the "Time Set" value to adjust the set time of the heater.

ⓒ Input the desired value by using the key pads in the setup screen.

ⓓ Apply: When you press Apply, the changed setting values are saved and the screen turns to the previous screen.

ⓔ Exit: If you press Exit button, the changed setting values are not saved and the screen turns to the previous screen.



Adjusting the Alarm Setting

The alarm value is the difference between the set temperature and the measured (displayed) temperature. If the difference exceeds this value (once the temperature has been reached) the alarm will trigger.

ⓐ TOUCH the temperature value, the screen turns to the temperature settings screen.

ⓑ Touch the "Alarm Set" value to enter the alarm setup.

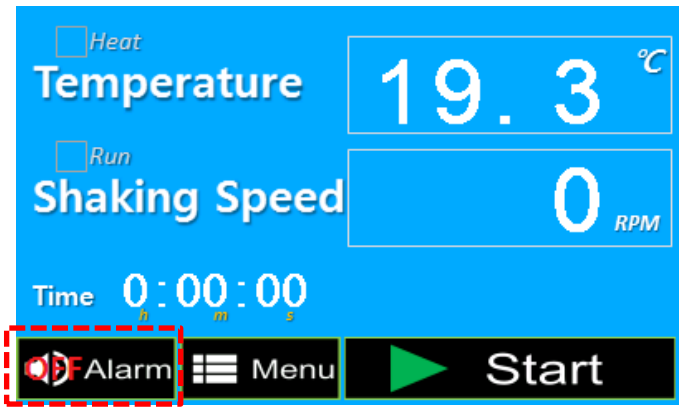
ⓒ Input the desired value by using the key pads In the setup screen.

ⓓ Apply: When you press Apply, the changed setting values are saved and the screen turns to the previous screen.

ⓔ Exit: If you press Exit button, the changed setting values are not saved and the screen turns to the previous screen.

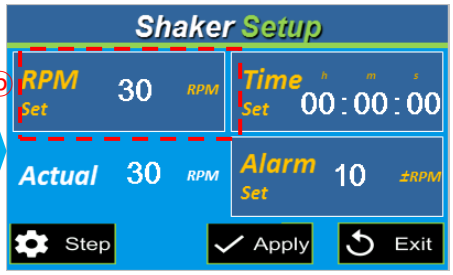
※ The alarm setting range is 0.1~10.0. When putting the value out of the range and pressing Apply, the message "Incorrect range" is displayed.

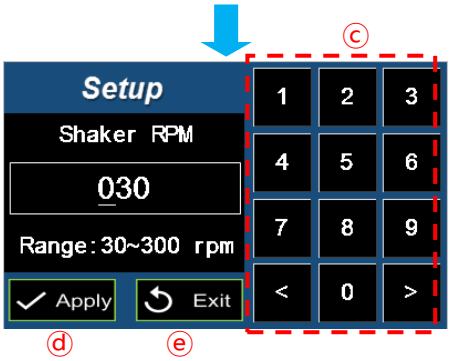
NOTE: With a set temperature of over 50°C, an alarm value of +2.0 is recommended.



▷ Alarm Off

The alarm can be deactivated in both the BASIC View and the ADVANCED View by TOUCHING the Alarm key.





▶ Shaker Setting (Advanced)

▷RPM Setting Change

ⓐ TOUCH the RMP Shaker value, the screen turns to the Shaker setting screen.

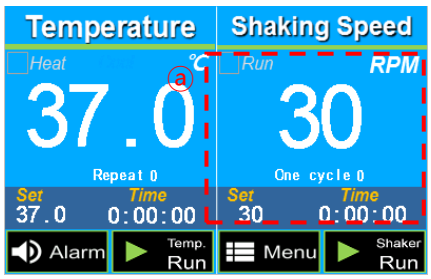
ⓑ TOUCH the "RPM Set" Value to adjust the set speed.

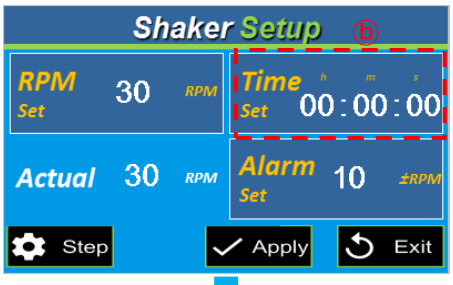
ⓒ Input the desired value by using the key pads in the setup screen.

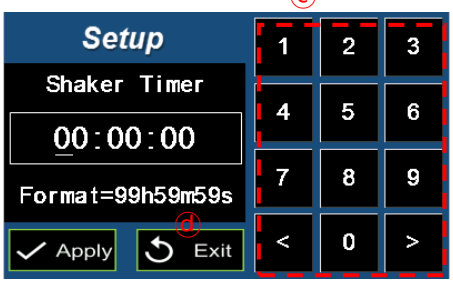
ⓓ Apply: When you press Apply, the changed setting values are saved and the screen turns to the previous screen.

ⓔ Exit: If you press Apply button, the changed setting values are not saved and the screen turns to the previous screen.

※ The RPM setting range is 30~300rpm. When entering a value out of this range and pressing Apply, the message "Incorrect range" is displayed.







▶ Shaker Setting (Advanced)

Adjusting the Shaking Time

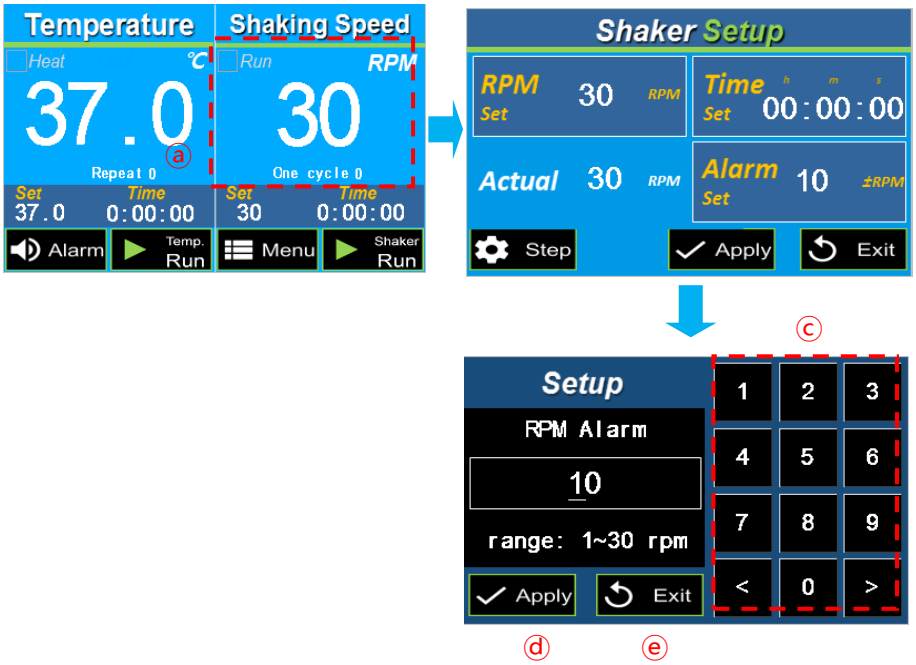
ⓐ TOUCH the RPM Shaker value, the screen turns to the Shaker setting screen.

ⓑ TOUCH the "Time Set" Value to adjust the set shaking time.

ⓒ Input the desired value by using the key pads in the setup screen.

ⓓ Apply: When you press Apply, the changed setting values are saved and the screen turns to the previous screen.

ⓔ Exit: If you press Apply button, the changed setting values are not saved and the screen turns to the previous screen.



▶ Shaker Setting (Advanced)

▷Alarm Setting Change

The alarm value is the difference between the set speed and the measured (displayed) speed. If the difference exceeds this value (once the temperature has been reached) the alarm will trigger.

ⓐ TOUCH the RPM shaker value, the screen turns to the Shaker setting screen.

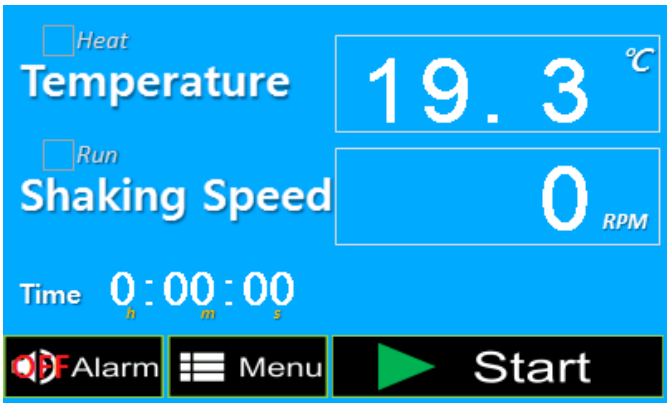
ⓑ TOUCH the "Alarm Set" Value to adjust the set speed.

ⓒ Input the desired value by using the key pads in the setup screen.

ⓓ Apply: When you press Apply, the changed setting values are saved and the screen turns to the previous screen.

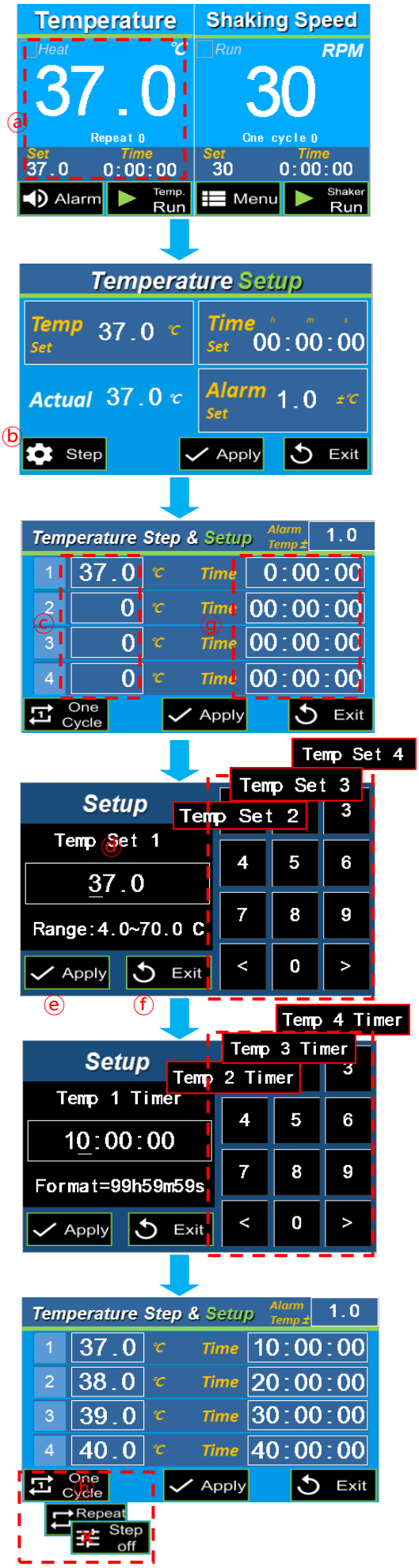
ⓔ Exit: If you press Apply button, the changed setting values are not saved and the screen turns to the previous screen.

※ The RPM setting range is 1~30rpm.
When selecting the value out of this range and Pressing Apply, the message "Incorrect range" is displayed.



▷ Alarm Off

The alarm can be deactivated in both the BASIC View and the ADVANCED View by TOUCHING the Alarm key.



▶Temperature Step Setting

▷Temp, Time Setting

ⓐ TOUCH the temperature value to enter the temperature setup screen.

ⓑ Select Step, the screen moves to the temperature step & setup screen

ⓒ You can select/link up to 4 desired temperatures.

Choose each of the 4 desired temperatures by pressing on the value.

(If less than 4 linked temperature is desire, leave the time and temperature values as "0" to skip.)

ⓓ Once a temperature value is selected, use the keypad in the setup screen to select the desired temperature.

ⓔ Apply: When you press Apply, the changed setting values are saved and the screen turns to the previous screen.

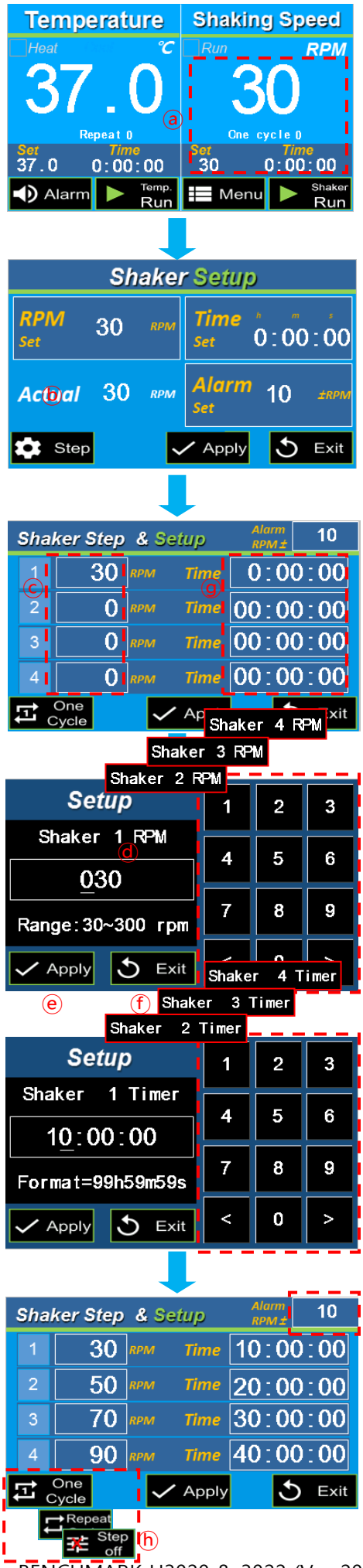
ⓕ Exit: If you press Exit button, the changed setting values are not saved and the screen turns to the previous screen.

ⓖ Once the desired temperatures have been chosen, adjust the time values by following the same steps.

ⓗ There are 3 modes available for Step Operation:

"One cycle", "Repeat Cycle", "Step off"

NOTE: Repeat cycle will result in continuous repeating of all programmed steps until the stop button is pressed.



▶Shaker Step Setting

▷RPM, Time Setting

ⓐ TOUCH the RPM Shaker value to enter the shaker setup screen.

ⓑ Select Step, the screen moves to the shaker step & setup screen.

ⓒ You can select/link up to 4 desired shaking speeds.
Choose each of the 4 desired speeds by pressing on the speed value.
(If less than 4 linked speeds are desire, leave the time and speed values as "0" to skip.)

ⓓ Once a RPM step is selected, use the keypad in the setup screen to select the desired RPM value.

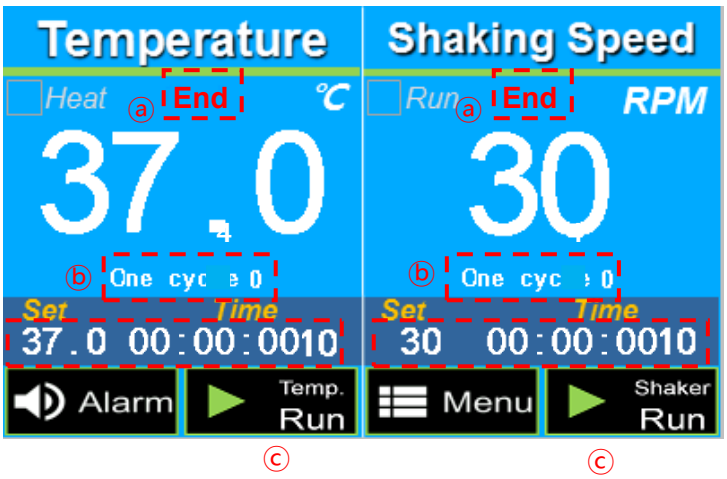
ⓔ Apply: When you press Apply, the changed setting values are saved and the screen turns to the previous screen.

ⓕ Exit: If you press Exit button, the changed setting values are not saved and the screen turns to the previous screen.

ⓖ Once the desired RPM speeds have been chosen, adjust the time values by following the same steps.

ⓗ There are 3 modes available for Step Operation:
"One cycle", "Repeat Cycle", "Step off"

NOTE: Repeat cycle will result in continuous repeating of all programmed steps until the stop button is pressed.



▶Step Cycle Ending Screen

ⓐ When the time for each step has expired, the "End" message is displayed.

ⓑ "Set" displays the setting value of 1st step. (Default value is displayed when Step Off) Time is displayed as 0.

ⓓ Temp. Run or Shaker Run is displayed as the instrument can be restarted at any time.

4. Additional Operating Instructions

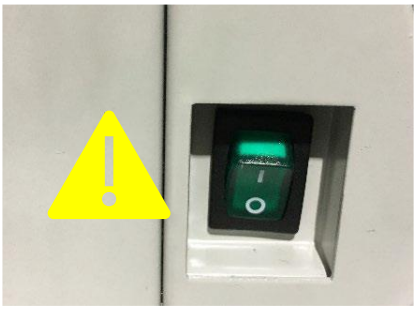
▶H3022(Cooling) Model Only:

▷ Cooling System ON Mode

If the instrument will be set to sub ambient temperatures, please turn on the "Cooling Switch" located on the front left side of the instrument.

DO NOT power on the "Cooling Switch", if the set temperature is more than 5°C above the room temperature. (※ Powering on this switch when the temperature is set +5 degrees above ambient may cause damage to the cooling system.)

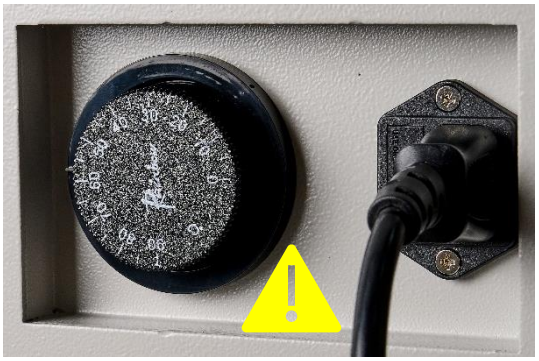
Compressor Switch (i.e. "Cooling Switch")



▶Over Temperature Protection:

The Incu-Shaker 20L Series includes an Over Temperature Safety Knob on the right side of the instrument. This safety feature results in an automatic shut-off once the measured temperature inside of the chamber has exceeded the set point of the knob. When the automatic shut-off has been activated, the SAFETY LED on the front panel will be illuminated. The default setting for this safety knob is 70°C. The value of this knob can easily be adjusted by the user, but please NOTE this safety knob should always be set at least 5°C higher than the programmed temperature on the digital display. If not, the incubator may be prevented from reaching the set temperature.

<Over Temperature Safety Knob>



<Safety LED on the front panel>

▶Platform Installation:

▷Microplate Platform and Spring Platform Installation:

The Incu-Shaker 20L(20LR) includes a flat non-stick platform for low-speed operation with many common vessels, including trays and dishes. For installation of any of the optional platforms the user must:

1) Unscrew the four plastic screws from the corners of the internal platform screws from the corners of the internal platform and remove the green rubber mat.
2) Clean any dirt or debris from the metal base-platform and apply the desired optional platform so that the four corner holes are aligned.
3) Screw in the four platform screws tightly by hand.

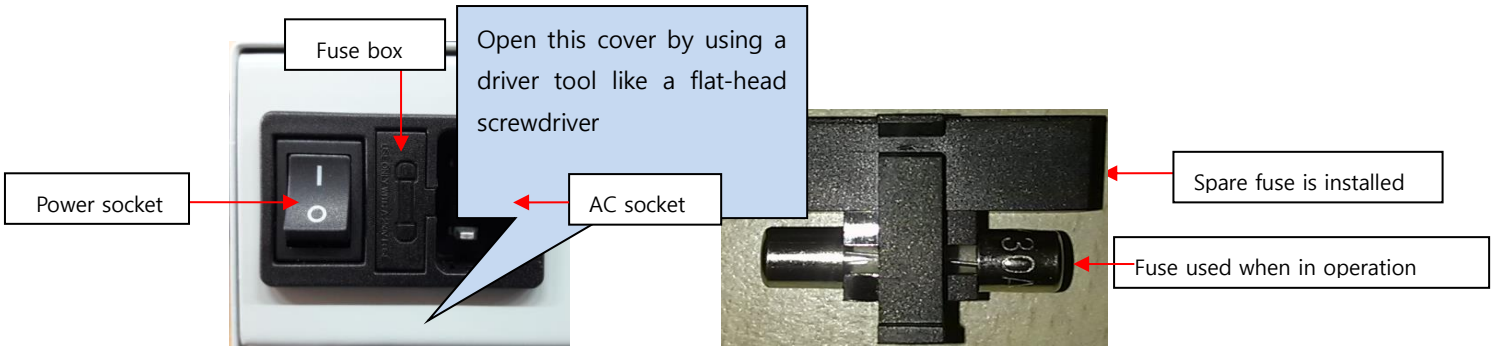
▷Magic Clamp Platform Installation:

If you have ordered the H1010-MR MAGic clamp platform as an accessory with your Incu-Shaker 20L(20LR), the platform may arrive installed on the shaker. If not, please follow the steps below for installation instructions.

1) Unscrew the four corner thumb screws from the four corners of the internal platform and remove the green rubber mat.
2) Clean any dirt or debris from the metal base platform and apply the MAGic Clamp platform so that the four corner holes are aligned.

3) Screw in the four platform screws tightly by hand.

5. Warning Messages & Fuse Replacement

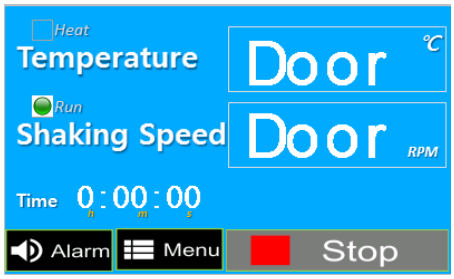


< AC POWER in the rear of equipment > **<Fuse in the fuse box >**

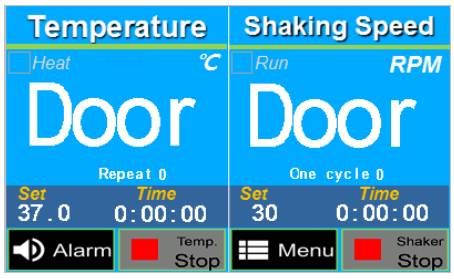
▶The fuse is stored in the fuse box of the integral power inlet on the backside of the instrument.

▶In the case you need to use the spare fuse, put a "ㄱ"-shaped tool, a flat-head screwdriver or tweezers in the "U"-shaped hole on the bottom of fuse box to open the cover, remove the installed fuse and replace it with the included spare.

Basic Screen



Advanced Screen

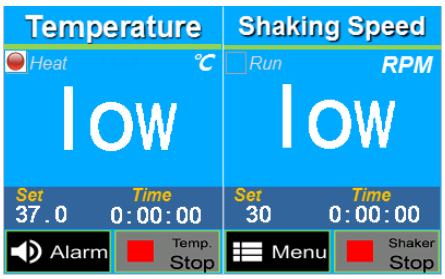


▶Event view

▷Door Open Message

When the door has been left open, the message "Door" is displayed on the basic and advanced screen.

NOTE: The heater and shaker are automatically stopped when the door is open.



▷Temperature/Shaker Alarm

The message "low" or "high" is displayed on the display when the measured value is deviating from the set value.

The message is only displayed when the difference exceeds the user programed value for the alarm.

NOTE: The message is cleared when the equipment maintains the values for 1 minute following the activation of the alarm.

Maintenance

The platform of the Incu-Shaker 20L(20LR) should be cleaned regularly with a soft cloth dampened with water or alcohol. (Always ensure that the machine has been powered down prior to cleaning.)

In the event of a spillage:

Power down the unit, remove the platform and dry the internal chamber with a soft cloth.

DO NOT attempt to operate the unit until the spillage had been properly dried.

Service and Contact

Service on the Incu-Shaker 20L(20LR) should only be performed by qualified service personnel. To request service or technical support, please contact Benchmark Scientific or your local benchmark Scientific representative.

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