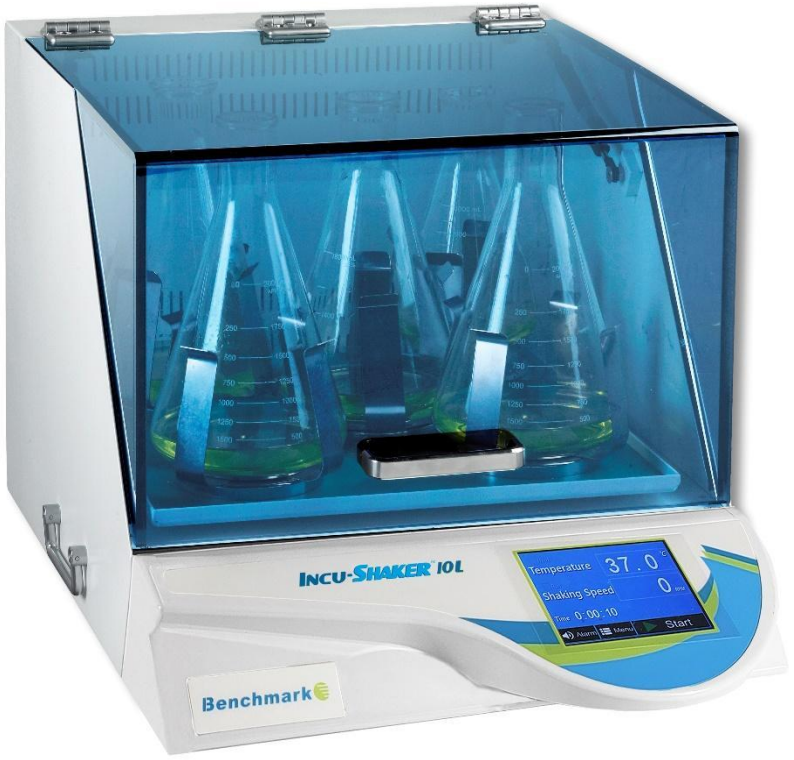
# Operations Manual

# INCU-SHAKER™ 10L

## Items:H2010 and H2012 (-E)




Benchmark Scientific

# 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 specifciations 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 an excessive vibration of the product.)

# 2. Feature & Specification

## 2.1 Features

- Magnetic induction drive & Brush less DC motor provides less vibration and maintenance.
- No interference with uniformity for cell culture by BLDC motor
- User friendly, intuitive LCD touch panel
- Moisture resistant structure by Epoxy – coated
- Automatic stop function Once LID opens, shaker automatically stops for safety and convenience
- Once-piece construction with acrylic cover
  Transparent acrylic cover allows internal viewing without disturbance
- Stable and Low Noise Shaking
  Blushless DC motor and beltless drive system for shaker minimizes noise and vibration
- Non-volatile memory for operation.
- Easy - Platform Installation

Very simple way to place holder or spring rack platform on the shaker.
And Optional accessories available for most common laboratory vessels

## 2.2 Specification

1) Dimension (Exterior H2010) : 51(W) X 65(D) X 47(H) cm/ 20(W) X 26(D) X19(H) in.
(Exterior H2012) : 51(W) X 79(D) X 56(H) cm / 20(W) x 31(D) x 22(H) in
(Internal H2010 & H2012): 49.5(W) X 49.5(D) X 28(H) cm / 19.5(W) X 19.5(D) X 11(H) in.
(Platform H2010): 23.5(W) x 29.2(D) cm / 9.5(W) X 11.5(D) in.
(Platform H2012): 45(W) x 45(D) cm / 17.8(W) x 17.8(D) in.
2) Temperature range : H2010: Ambient +5℃ to 60℃
H2012: Ambient -15℃ to 60℃
3) Temperature accuracy: ±0.1℃ at 37℃
4) Temperature uniformity: ±0.25%
5) Speed Range: 30~300 RPM
6) Shaking orbit: 19mm (3/4”)
7) Circulation Fan: Convection Fan
8) Timer: Digital -1 min. to 47hr 59mm. (1 min. increments)
9) Motor: Beltless DC Magnetic Induction Drive
10) Weight: H2010: 120lbs/51kg
H2012: 170 lbs/78kg
11) Electrical: 120V or 230V, 50~60Hz / 200W

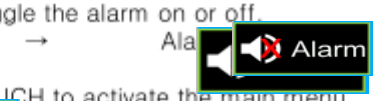
# 3. Operation

## ▶ Booting

- 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 → Ala




ⓖ Menu : TOUCH to activate the main menu
ⓗ Stop Button
TOUCH to start or to stop the shaker.



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

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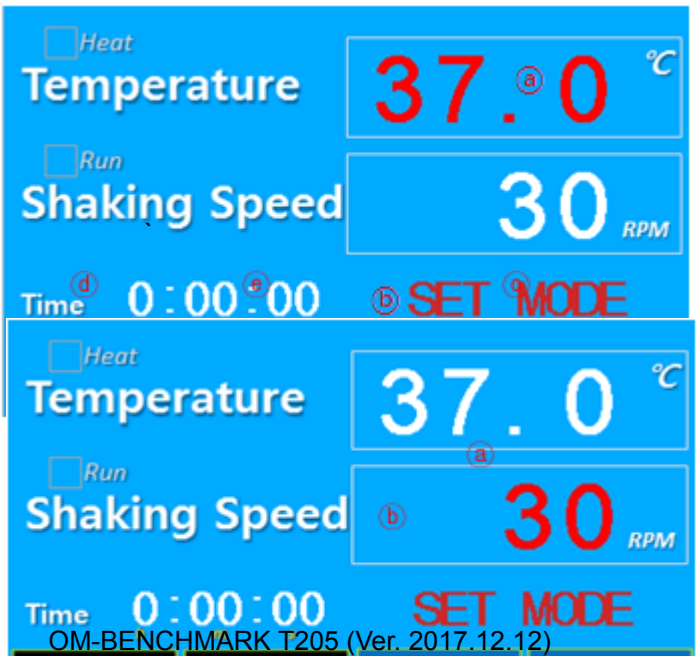
## ▷ Temperature setting change

ⓐ 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



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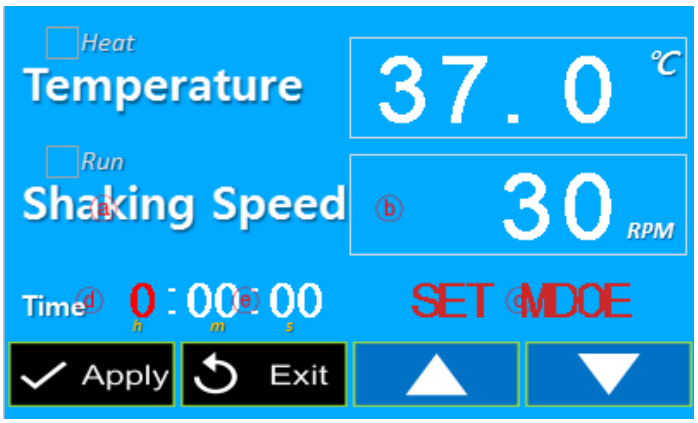
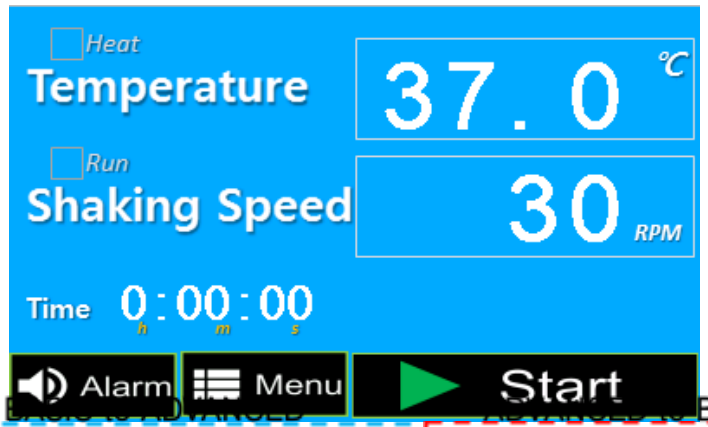



## ▷Time setting change

ⓐ 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 can not be adjusted during a run. To change the time during a run, you must TOUCH . Change the time value and press and.

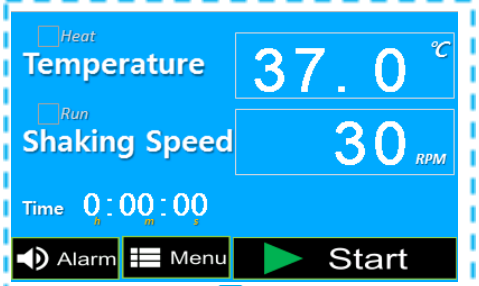



## ▷The end of setting time

ⓐ 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

BASIC

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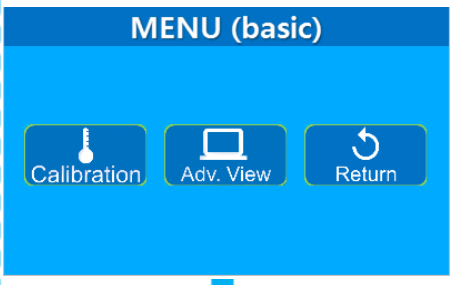




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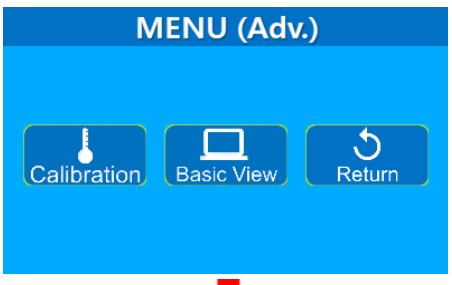
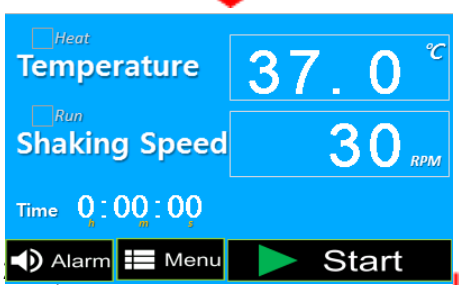
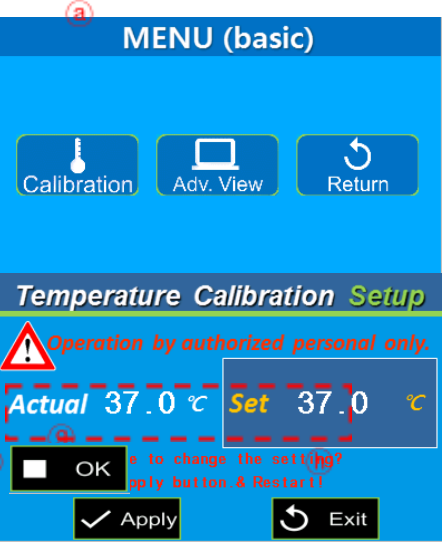
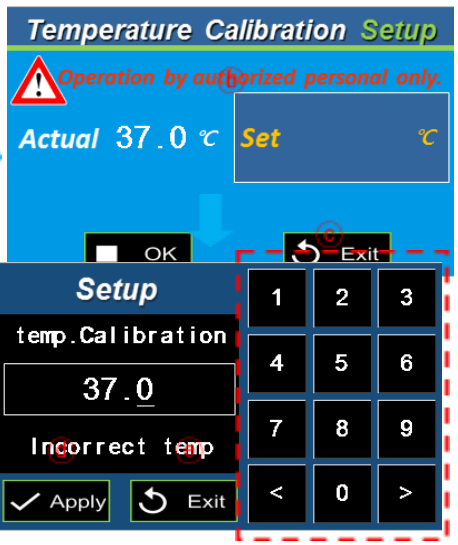



## ▶ Advanced Mode

To switch from the standard BASIC view to the ADVANCD 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.









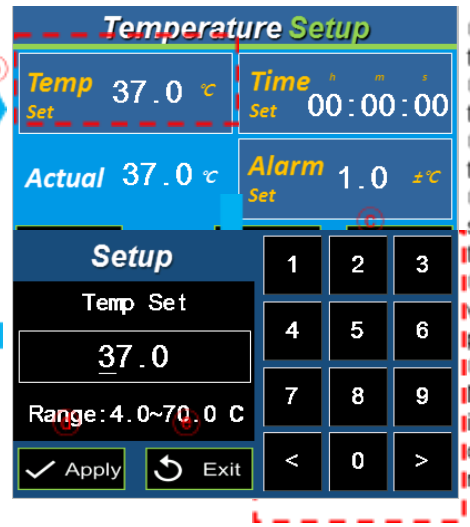

## ▶Tempearture calibration

ⓐ 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: When yo Apply , the changed setting values are saved a OK creen turns to the previous screen.
ⓔ If you press button, the changed setting values are n Exit and the screen turns to the previous screen.
ⓕ When you press button, the message is displayed as the Apply angular part
ⓖWhen you press APPLY button, the calibrated value is applied and the screen turns to the MENU
ⓗ If you press, 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 [illegible] and putting the average value and the calibrated one

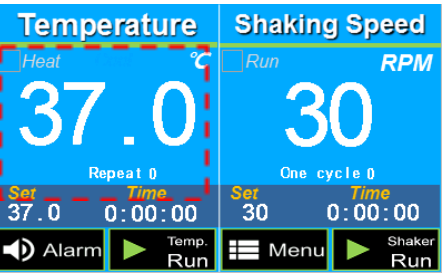
Exit

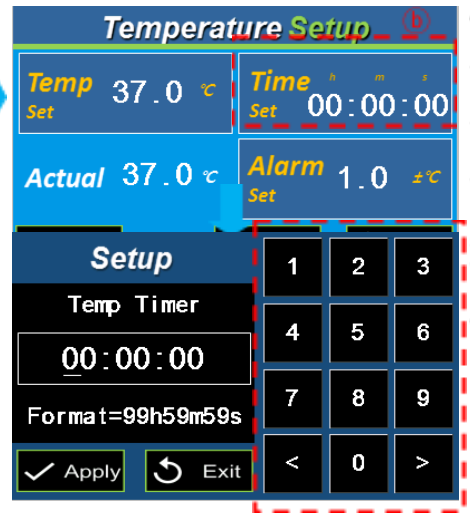




## Temperature setting (Advanced screen)

### Temperature setting change

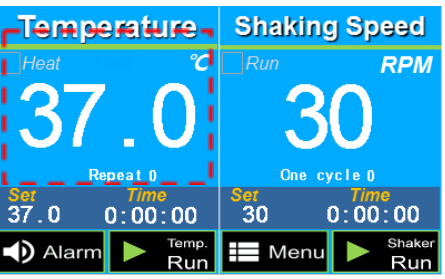
ⓐ TOUCH the temperature value, the screen turns to the temperature setting screen
ⓑ TOUCH the "Temp Set" Value to adjust the set temperature.
ⓒ Input the desired value by using the key pads in the setup screen
ⓓ Apply: When you press , the changed setting values are saved and the screen turns to the previous screen
ⓔ Exit: If you press , button, the changed setting values are not saved and the screen turns to the previous screen
ⓕ. Apply: You must press 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 , the message "Incorrect range" is displayed.

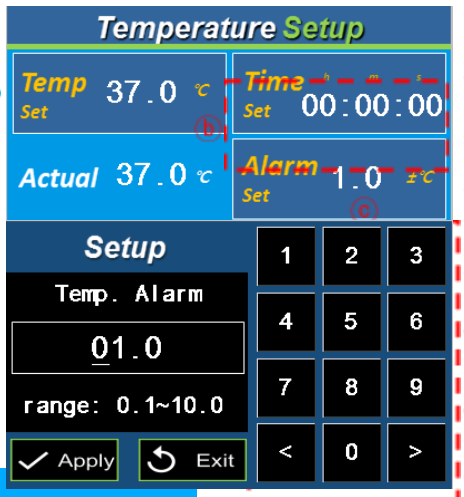



### Adjusting the Time of the Temperature

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

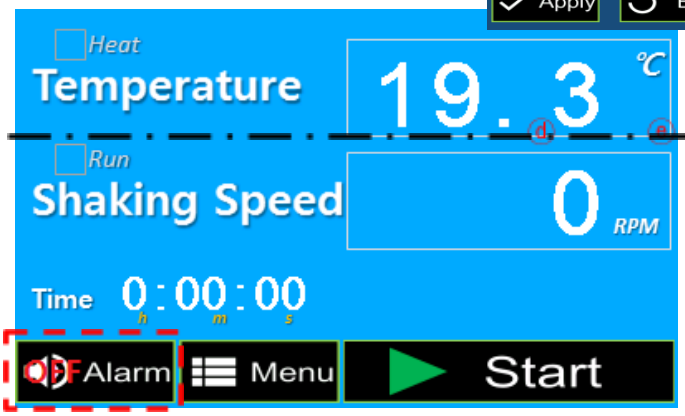



## Adjusting the Alarm setting

*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 , the changed setting values are saved and the screen turns to the previous screen
ⓔ Exit: If you press 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, the message "Incorrect range" is displayed.
**NOTE:** With a set temperature of over 50C, an alarm value of +2.0 is recommended




### ▷ Alarm Off

The alarm can be deactivate in both the BASIC View and the ADVANCED View by TOUCHING the key to toggle on or off.



## ▶ Shaker setting (Advanced)

### ▷ RPM setting change

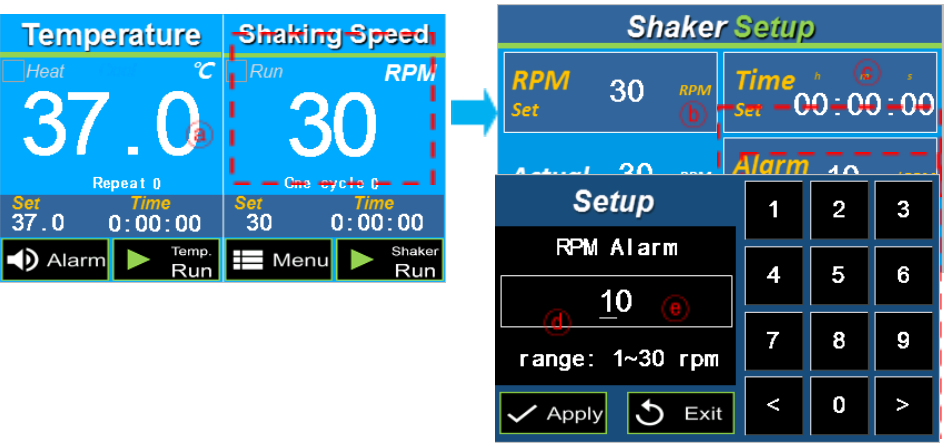
ⓐ TOUCH the RMP Shaker value, the screen turns to the Shaker setting screen
ⓑ TOUCH the "RPM Set" Value to adjust the set speed.
ⓒ Input the desired value by using the key pads in the setup screen
ⓓ Apply: When you press, the changed setting values are saved and the screen turns to the previous screen
ⓔ Exit: If you press 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 , 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 , the changed setting values are saved and the screen turns to the previous screen
ⓔ Exit: If you pressbutton, the changed setting

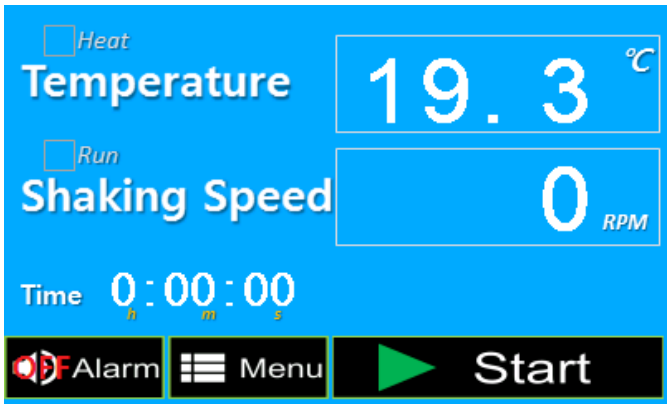



## ▶ Shaker setting (Advanced)

### ▷Alarm setting change

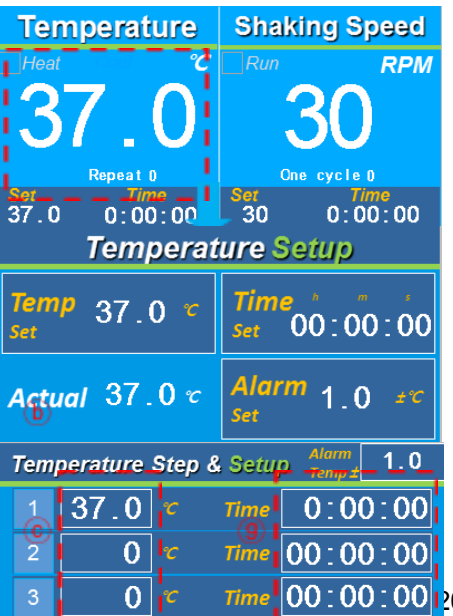
*The alarm value is the difference between the set speed and the measured (displayed) speed. If the difference exceeds this value (once the temperature has been reached) the alarm will trigger.*

ⓐ TOUCH the 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 , the changed setting values are saved and the screen turns to the previous screen
ⓔ Exit: If you press 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 , the message "Incorrect range" is displayed.




### ▷ Alarm Off

The alarm can be deactivate in both the BASIC View and the ADVANCED View by TOUCHING the key to toggle on/off.




## ▶Temperature step setting

### ▷Temp, time setting

ⓐ TOUCH the temperature value to enter the temperature setup screen.
ⓑ Select , 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 , the changed setting values are saved and the screen turns to the previous screen
ⓕ Exit: If you press 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.

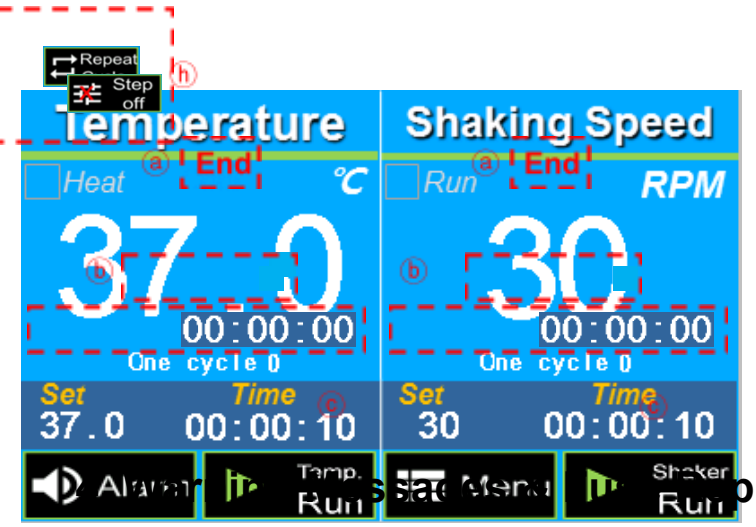
ⓗ There are 3 modes available for Step Operation : "One cycle", "Repeat Cycle", "Step off"
**NOTE:** Repeat cycle will result in continuo repeating of all programmed steps until the stop button is pressed.


## ▶ Shaker step setting

### ▷ RPM, time setting

ⓐ TOUCH the RPM Shaker value to enter the shaker setup screen.
ⓑ Select , 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 , the changed setting values are saved and the screen turns to the previous screen
ⓕ Exit: If you press 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 continue repeating of all programmed steps until the stop button is pressed.




▶Step Cycle Ending Screen

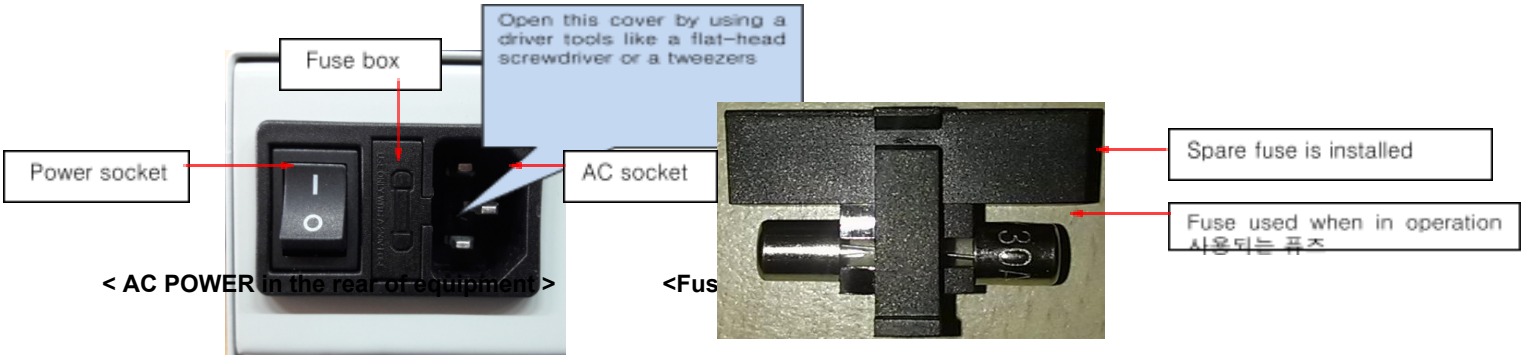
ⓐ When the time for each step has expired, the "End" message is displayed

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

Time is displayed as 0

ⓓ Temp. Run Shaker Run ayed as the instrument can be restarted at any time.

## Fuse Replacement

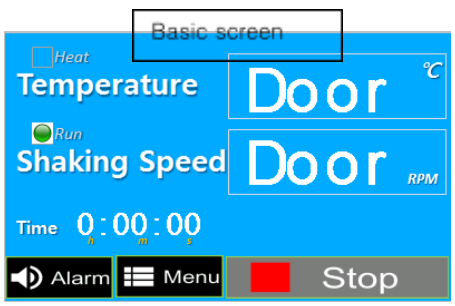


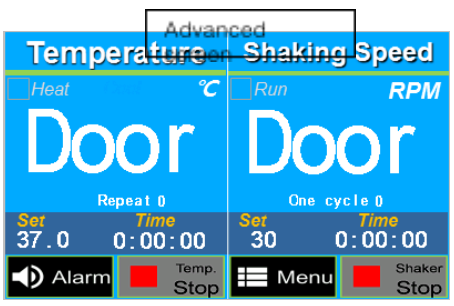

< AC POWER in the rear of equipment >

<Fus

▶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 a tweezers in the little U-shaped hole on the bottom of fuse box to open the cover, remove the installed fuse and replace it with the included spare.



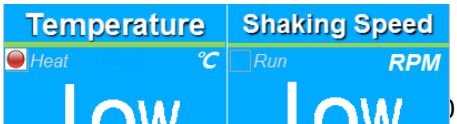




▶Event view

▷Door open message

When the door has been left open for opening the door, 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.

**Maintenance:**

**The platform of the Incu-Shaker 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 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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