

OPERATION MANUAL

SHAKING INCUBATOR

(Model : SI – 300/300R/600/600R)

Manual No. : 00HAA0001134(Rev.4)



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Jeio Tech, which focuses on the production and marketing of laboratory and scientific instruments, has produced these products with a state-of-the-art technology and new materials.

This operation manual describes the functions of the unit and key points that you have to keep in mind when you operate it.

Please be sure to read through this manual for an effective and utmost use of the unit before operating this instrument.

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1. Features

For efficient shaking, clock-wise and counter-clockwise turning can be selected. And this unit has a function to stop shaker on its own zero point which is suitable for cultivating of seeds which grew well on fixed state.

For this purpose, you can make the unit shake for a moment to mix culture-fluid and seeds, and stop for short period to cultivate. And it also has a function to stop shaker on its own zero point for partial picking or adding of culture-fluid by CNC equipment.

There are standard holder, holder plate and various optional accessories.

► Basic specification

1. Brushless DC motor(with function of feed back control and brake) and controller ensures speed adjusting from 10RPM to 300RPM and zero point stopping.
2. Largely sized fly wheel minimizes shaking vibration in high speed shaking.
3. Clock-wise, opposite direction turning, and keeping zero point that make the most condition suitable for cultivating can be selected to optimize cultivating condition by setting each time set.
4. Slim-type structure enables the unit to make lots of experiment at one time.
5. Various accessories for various containers.
6. Over Temp. Limit prevents the unit from overheating.
7. We are using safe-circuit to protect the unit from overheating and overloading.

2. Installation precaution

1. Be careful of carrying the unit because it is heavy.

You should use tools such as carrier or two persons should carry it.

2. Caution

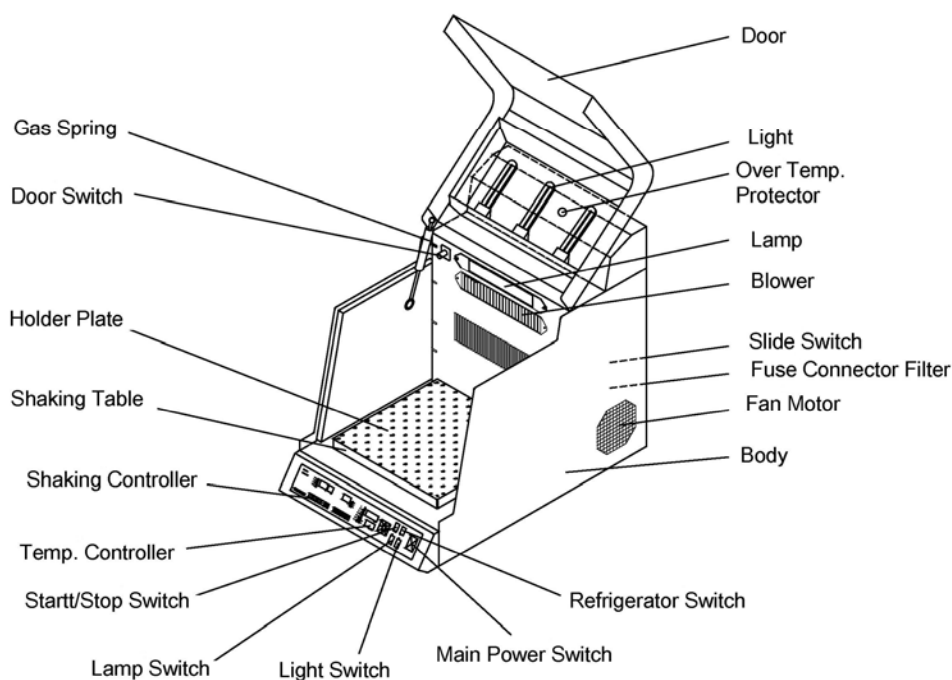


You should plug the power cord into a grounded socket during installation and operating of the unit.

3. The socket-outlet shall be installed near the equipment and shall be easily accessible.
4. You should check the electricity in accordance with the ID label.
5. Do not put the unit around equipment (for example: high-frequency welding machine, high-frequency sewing machine, SCR Controller with high capacity, etc) that generates strong high-frequency noise.
6. Keep the unit away from flammable substances.
7. Please, put the unit the place that is dry relatively and a little of diurnal range because moisture or big temperature gap could make the unit's life short.
(Below 80% of relative humidity.)
8. Keep the unit away from high heating resources like a heater or a stove.
(ambient temperature: 5°C~ 40°C)
9. Put the unit on the flat and rigid place.
10. Please, the unit is electric product. You must follow the general safe rules of electricity.

👉 Note : If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

3. Name of the parts and its operation



1. Body

2. Door

Its thickness is 5mm and is made of semi-transparent acrylic injection material.

3. Holder plate

4mm Tap on the plate to mount various sizes of Flask Holders.
Holes for setting Shaking table.

4. Shaking table

This is connected to an system to generate shaking motion.
One can set Holder plate or other accessories.

5. Shaking controller

One can set time and its clock and counter-clock shaking, pause function and other functions can be adjusted respectively.

6. Temp. controller

Micro Processor(CPU) which has an inspected S/W with Digital PID-Auto tuning function is mounted on the Temp. controller that has safety devices of the highest grade such as Temperature compensation function for PT-100Ω sensor and adjustable heating function.

7. Fuse connector filter

This is in Rear panel and is consisted of the built-in glass-fuse and noise filter.

8. Main power switch

This is for 'ON' and 'OFF' for the unit.

9. Start/Stop switch

This is for only operating Temp. controller.

① One must press 1 time this switch after Temperature and Time is set completely.

RUN LED is 'ON' if Temp. controller is in normal condition, but the LED is blink when the controller does not operate.

② One must press 1 time this switch in case Over Temp. Protector is disconnected.

③ Press this for 2 sec to stop Temp. controller operation.

10. Lamp switch

This is ON and OFF for Lamp.

11. Light switch

This is for ON and OFF for incubating-Light.

12. Refrigerator switch

This is for operating refrigerator. (Just for Model SI-300R/600R)

13. Over Temp. Protector

① This is a safety device which is consisted of an independent circuit. When the heater is overheated abnormally over the set temperature, this safety device will cut off the power supply automatically.

② In case TRIP happens, set the value higher by adjusting this switch and press START/STOP Switch just 1 time. Check the LED "ON" of Temp. controller.

14. Door switch

Shaking system, Blower, and Heater stop simultaneously when you open the Door. If you close the door, they re-operate again.

15. Slide switch.

In case power failure lasts over 3seconds, you can use this selective recovery switch to preserve (a) sample(s) by choosing either an auto-recovery or a forced- recovery of the unit.

If you select an auto-recovery, Temp. controller restarts automatically in case of power-failure over 3 seconds. If you select a forced-recovery, the unit does not work after power recovery. You must press Start/Stop switch



just 1 time to operate the unit.

16. Gas spring

This is a device to support the door.

17. Light

This is for incubating samples. (Option for Model SI-300R/600R)

18. Lamp

This is for seeing through the door inside.

19. Blower

This is a device that circulates air the door inside.

20. Fan motor

This device is to extract high temperature air that is caused by the refrigerator being operated outside the unit. (Just for Model SI-300R/600R)

4. How to operate Shaking Controller

4.1 Features

1) Self check up

Frequent self check shows error number if there are motor damages or circuit NFFID damages. User or technician can solve the problem easily by this function.

* See table of error message. (Page 14.)

2) Fixed point stopping

Brake function makes easy to use in automation system.

3) Clockwise and opposite direction rotation

Auto-reverse function. You can set the time of each direction.

4) Speed compensation

On rotating motor itself check and memorize the setting RPM. Therefore if there is external influence to motor speed, motor can keep setting RPM.

5) Auto control

For accurate speed control and fixed point control, it memorize regulated parameters.

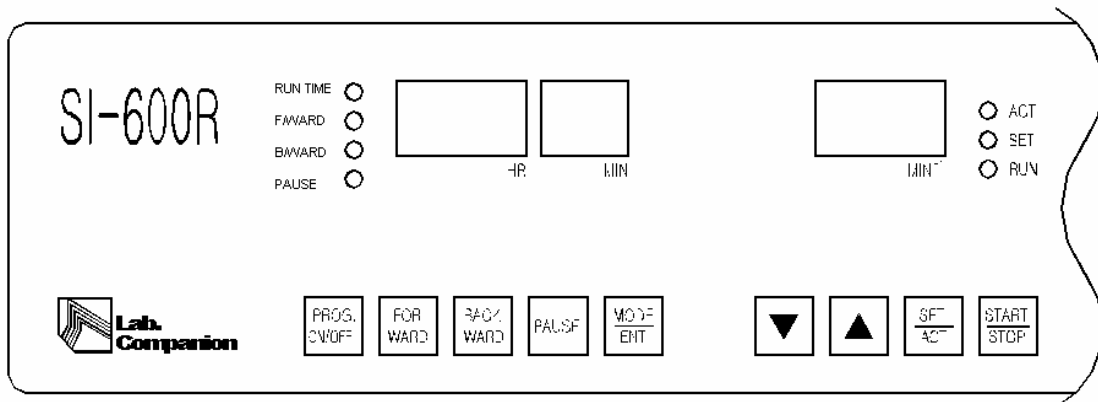
6) Wide range of RPM

Stable RPM from 10RPM to 300RPM.

7) Prompt acceleration and reduction of speed

Speed compensation and brake makes accurate and prompt acceleration and reduction with minimizing over-shoot and under-shoot.

4.2 Name and function



1) START/STOP key

You can start and stop the rotation with this key.

* You can not use this key when speed is reducing to stop.

2) SET/ACT key

You can check setting RPM and actual RPM, and when you put a new RPM value. On rotation by timer mode, push the key, and then it displays setting RPM for a couple of seconds, and then displays actual RPM with buzzer sound.

When machine is not rotate or not timer mode, push set/act key, and then you can change setting RPM with ▲/▼ key.

3), 4) ▲/▼ key

Increase or increase the value on RPM setting mode or timer setting mode. If you push the key for a short time, the value changes by 1, and if push long time, the value changes rapidly. Except total timer set mode, it changes by a unit of 10 seconds. Below decimal point means 10 seconds value.



5) PROG. ON/OFF key

Whenever you push the key, timer repeat on and off. Set run timer with mode/ent key and push forward key for setting direction of rotation or stopping. And then run timer LED is lightening and displays setting time.

* If forward or backward timer is not on, run timer is not operate even though you put on run timer and also motor is not rotate.) (999hours 59minutes)

6) FORWARD TIMER ON/OFF key

Whenever you push the key, timer repeat on and off. Set forward timer to forward time you want and push forward key, and then forward timer LED is lightening and also it displays setting time.(After a couple of second, total timer is displayed with buzzer sound.) (from 10seconds to 9minutes 50seconds)

7) BACKWARD TIMER ON/OFF key

Whenever you push the key, timer repeats on and off. Set backward timer to backward time you want and push backward key, and then backward timer LED is lightening and also it displays setting time.(After a couple of second, total timer is displayed with buzzer sound.) (From 10seconds to 9minutes 50seconds)

8) PAUSE TIMER ON/OFF key

Whenever you push the key, timer will be on and off. Set pause timer with mode/ent key, and then push pause key, and then pause timer LED is lightening. (After a couple of second, total timer is displayed with buzzer sound.) (from 1minute to 99minutes.)

9) MODE/ENT key

Key for timer setting. Push the key step by step, then it displays total timer-hour, minute, forward-timer minute/second, backward-timer minute/second, and pause-timer minute will blinking step by step. On blinking of the value you want, you can set the time with ▲/▼ key.

10) RUN TIMER LED

If you put on MODE/ENT key, it blinks. If run timer is operating or in run timer set mode, it is not blinks.

11) FORWARD TIMER LED

If you put on forward timer, it blinks. If forward timer is operating or in forward timer set mode, it is not blinks.

12) BACKWARD TIMER LED

If you put on backward timer, it blinks. If backward timer is operating or in backward timer set mode, it is not blinks.

13) PAUSE TIMER LED

If you put on pause timer, it blinks. If pause timer is operating or in pause timer set mode, it is not blinks.

14) Time display

It shows time of run timer. First three points shows hour value, and behind two points shows minute value. On pause timer displays, it means minute value.

15) RPM display

It shows actual RPM and setting RPM.

16) ACTUAL LED

On lightening, it shows actual RPM.

17) SET LED

On lightening, it shows setting RPM.

18) RUN LED

On lightening, it shows the machine is operating. When the speed reach setting value, it stops blinking.



4.3 RPM setting

- 1) You can push set/act key when the machine is not operating or the machine is operating not by timer mode.
- 2) Set RPM value with ▲/▼ key.
- 3) Push set/act key, and then RPM value is set with buzzer sound. And then it displays actual RPM with lightening of actual led.
- 4) After setting start operating with start/stop key.
- 5) You can change RPM by above mention from 1) to 3).
- 6) You can change RPM value from 10 to 300.

4.4 TIMER operation

- 1) If the machine is operating, stop the rotation with start/stop key.
 - * You can not set timer when the machine is operating.
- 2) Push mode/ent key, and then run timer LED and time value of time display are blinking. Push again mode/ent key, and then time value or minute value is blinking.
- 3) Choose a proper direction from forward, backward and pause.
Select one value within 4 timers, and set time value and minute value with ▲/▼ key.
- 4) Maximum time value is 999hours 59minutes by 1-minute value.
In the case of forward timer and backward timers you can set time value maximally to 9minutes 50seconds by 10 seconds. Below decimal point means 10 seconds unit. And pause timer can be set maximally 99 minutes by 1 minute.
- 5) After setting timer, push mode/ent key until you can hear buzzer sound.
With buzzer sound timer value is set.
- 6) After setting time, put on or off.
- 7) Push start/stop key, and then the machine is operating as you set.

8) If you want stop the timer on operating, push start/stop key.

* On timer operation, act/set key and start/stop key are available, but other keys are not available.

※ Caution

1. If you do not put on run timer, the machine does not operate.
2. Even though you put on run timer, if you do not put on forward or backward timer, timer does not operate.
3. The machine does not operate, if you put only run timer and pause timer.

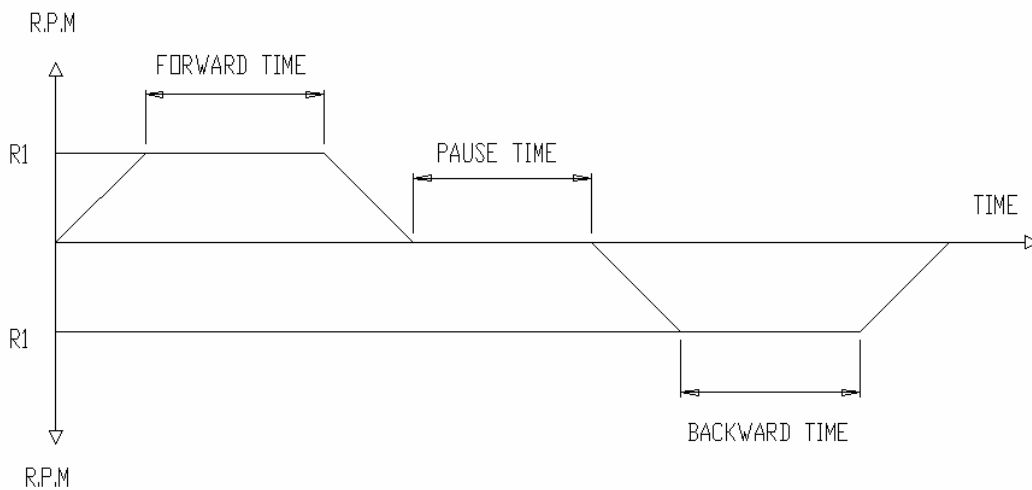


FIG 1. Total Timing

Turn on run timer and other timers, and then push start/stop key. And it starts shaking with buzzer sound. Shaking is completed as you set clock-wise, not clock-wise or fixed point stopping. When run timer displays 0 hours 0 minutes, the machine stops.

R1 = setting RPM



4.5 ERROR CODE

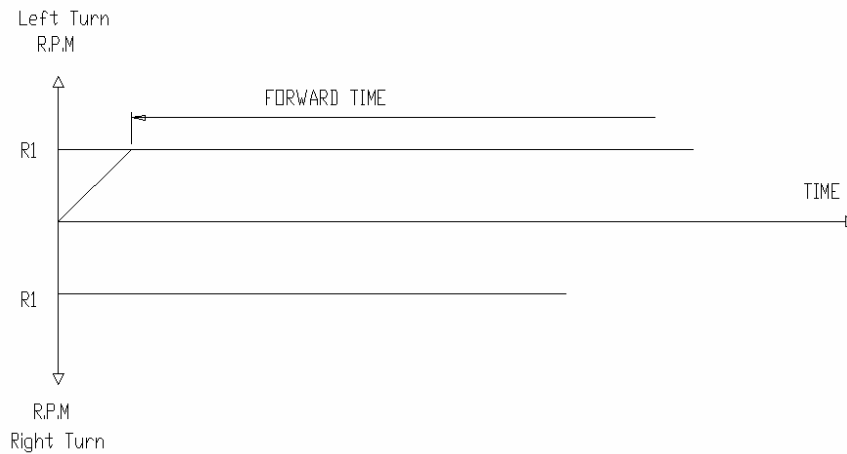
| NO | Error code | Description | Solution |
|----|------------|-----------------|--------------------------------------|
| 1 | Err. 01 | ROM error | Put off the power and turn on again. |
| 2 | Err. 02 | RAM error | |
| 3 | Err. 03 | CAL error | |
| 4 | Err. 04 | EEPROM error | |
| 5 | Err. 05 | Motor error | |
| 6 | Err. 06 | IR Sensor error | |
| 7 | Err. 07 | Power error | Push any key. |

1. If Err. 01,02,04 occur, please call for services.
 - ※ Caution: When you turn on the machine again, motor is operating to find speed value of 10RPM in the system. Therefore please wait until the motor completely stopped.
2. If Err. 03 occur, check EEPROM.
3. If Err. 05 occur, check circuits of motor damages, motor belt and sensor.
4. If Err. 06 occur, it may be circuits of sensor damages, check the circuit.
5. Err. 07 means power supply is down and on again, therefore stop the machine with start/stop key, and set again.

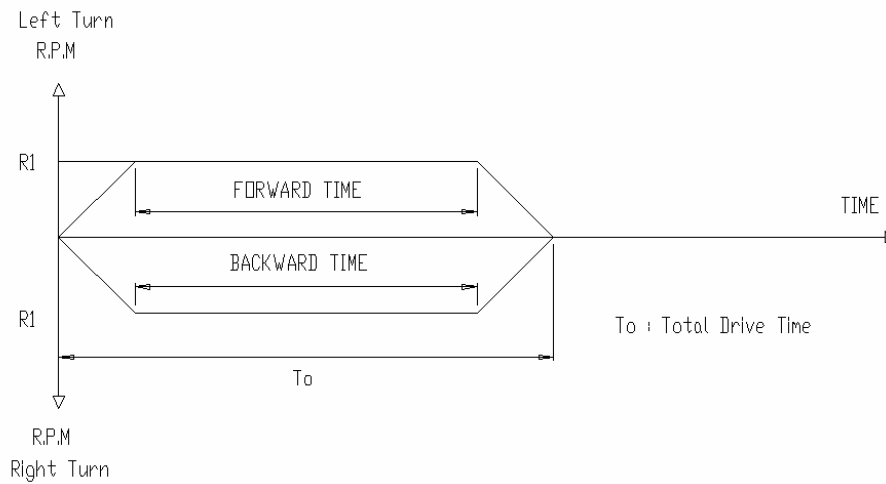
4.6 Handling and operation

5 modes can be used.

Mode 0) When you do not use timer

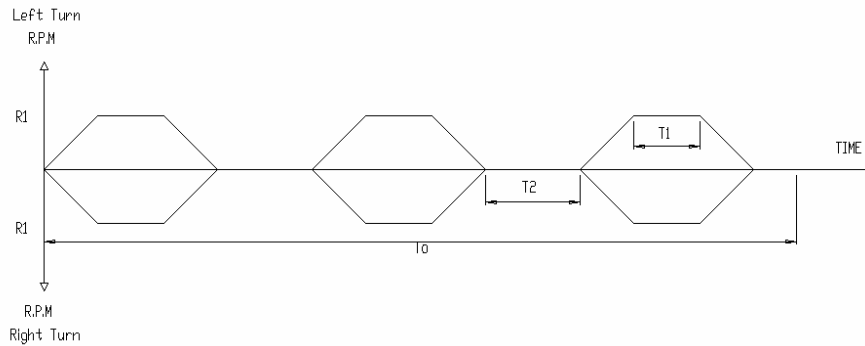


Mode 1) Using timer, one direction rotation in set time

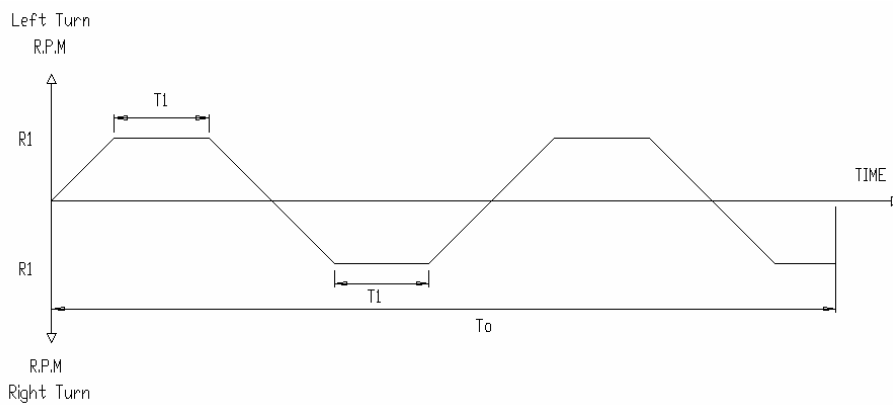




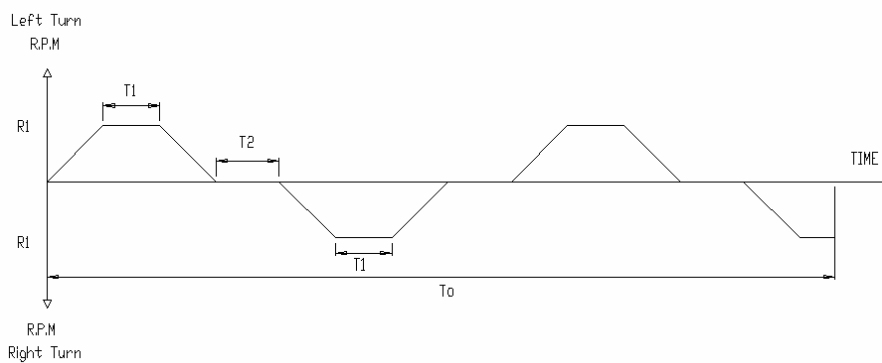
Mode 2) One direction rotation in fixed RPM and fixed time (t_1) and then keep stopping in fixed time(t_2), and repeat t_1 and t_2 . All these operation is done in fixed time (t_0)



Mode 3) Right turn and left turn by turns, fixed RPM in fixed time. And repeat in fixed time (t_0)



Mode 4) Right turn (t_1), keep stopping (t_2), left turn (t_1), keep stopping (t_2). These operations repeat by turns in fixed time (t_0)



Mode 1~4) #1 and #2 is the same with Mode 0.

※ Setting t0, t1, t2

(t0=Total run time, t1=rotation time right or left, t2=stop period)

Press

**PROG
ON/OFF**

RUN LED is 'ON' on the left side of the panel and 5 LEDs are 'ON' on the left side of Control pane, and initial number 000.01 displays at the same time.

(First 3 digits represent hours, following 2 digits represent minute. You can set time from 1 minute up to 999 h 59 min.)

< Setting TOTAL RUN TIME (t0)>

1. Press **MODE
ENT** key : The first 3 digits starts blink.
2. Set hour by adjusting ▲, ▼ key.

3. Press **MODE
ENT** again to set minute.
4. The following 2 digits are blink.
5. Set minute by adjusting ▲, ▼ key.

6. Press **MODE
ENT** key.
- ⇒ Setting TOTAL TIME is completed.

After all above no 1 through no 7. is done, FORWARD LED is 'ON' on the left side of the panel.

<Setting FORWARD TIME>

1. 2 digits (0.0) is blink on the display.
2. (you can set 10 sec up to 9 min 50 sec.)

3. After adjusting with ▲, ▼ key, press **MODE
ENT** key.
- ⇒ Setting FORWARD TIME is completed.

After FORWARD TIME is set, BACKWARD LED and 2 digits are blink respectively.

The process of Setting BACKWARD TIME is the same with Setting FORWARD TIME

<Setting PAUSE TIME>

1. After setting BACKWARD TIME, press **MODE
ENT** key.
2. Pause LED and 2 digits are blink respectively.
(You can set 1 min up to 99 min)

3. After adjusting with ▲, ▼ key, press **MODE
ENT** key.
- ⇒ Time setting is finished completely.



[MODE 1]

1. Right rotation Setting

- 1. Press

| |
|-----------------|
| PROG. ON/OFF |
|-----------------|

 Key.
- 2. Press

| |
|-------------|
| FOR WARD |
|-------------|

 Key.

3. Check RUN TIME LED and F/WARD LED are 'ON', and then press

| |
|-------|
| START |
|-------|

2. Left rotation Setting

- 1. Press

| |
|-----------------|
| PROG. ON/OFF |
|-----------------|

 key.
- 2. Press

| |
|-------------|
| FOR WARD |
|-------------|

 key.

3. Check RUN TIME LED and B/WARD LED are 'ON', and then press

| |
|-------|
| START |
|-------|

[MODE 2]

- 1. Press

| |
|----------------|
| PROG ON/OFF |
|----------------|

 key.
- 2. Select

| |
|-------------|
| FOR WARD |
|-------------|

 or

| |
|--------------|
| BACKW ARD |
|--------------|

 key.
- 3. Press

| |
|-------|
| PAUSE |
|-------|

 key.
- 4. Check RUN TIME, F/WARD or B/WARD, and PAUSE are 'ON'.
- 5. Press

| |
|-------|
| START |
|-------|

[MODE 3]

- 1. Press

| |
|----------------|
| PROG ON/OFF |
|----------------|

 ,

| |
|-------------|
| FOR WARD |
|-------------|

 and

| |
|--------------|
| BACK WARD |
|--------------|
- 2. Check RUN TIME, F/WARD, and B/WARD are 'ON'.
- 3. Press

| |
|-------|
| START |
|-------|

[MODE 4]

- 1. press

| |
|----------------|
| PROG ON/OFF |
|----------------|

 ,

| |
|-------------|
| FOR WARD |
|-------------|

 ,

| |
|--------------|
| BACK WARD |
|--------------|

 and

| |
|-------|
| PAUSE |
|-------|
- 2. Check RUN TIME, F/WARD, B/WARD, PAUSE are 'ON'
- 3. Press

| |
|-------|
| START |
|-------|

5. How to operate Temperature Controller

5.1 Features

This multi-purpose Shaking Incubator can be used at various fields such as pharmacy, medical science, chemistry, biology, etc. We have succeeded in realizing CLS (Custom Logical Safe)-Control System that is designed for the convenience and safety for user.

1. Definition of CLS-Control System

The meaning is that **adjustable device with logical safety mechanism just for specific equipment**. The system is for safe operation of heating-type equipment under circumstance (for example, laboratories with flammable substances) that needs perfect thermal safety. The logic and construction of the safety device is the highest level and is designed by our accumulated technology. (**Patent application**)

2. Functions of CLS – Control System

- ① It consists of two parts that are Micro Processor (CPU) and Logic IC.
Micro Processor (CPU) has PID control function; therefore CPU performs control of temperature and heating.
Logic IC is designed to operate ahead of CPU function. The IC controls all safety devices; therefore operating of safety devices perfectly works against any electrical and electronic shocks.
- ② If once a safety device works, the power through parts of the unit shuts down immediately and the system lets the user recognize the defect components by alarming a certain sound or indicator.
Until user fixes (a) defect(s), the unit remains under a safe condition that is no power.
- ③ For additional convenience, there are two functions.
They are **Wait Off Timer** function and **Wait On Timer** function. The former stops unit's running automatically after the unit works for a setting time and the latter one restarts the unit after the unit is paused for a setting time.



- ④ The system has selective re-running function that you can choose. One is that you can let the unit re-work after power recovery or the other that you can prohibit the unit from re-work after power recovery.

- ⑤ Only 5V, 10mA passes between contact points of the safety device; therefore, the endurance lasts long because the contact points are merely damaged even though the unit continuously operates for a long period.

The sequence of the system is the following:

If once the safety device works, the system stops Thyristor that controls current flow of high-capacity heater. The next step is that separation of the contact points of Magnet Switch makes the power shut off, and therefore the mechanism prevents damage of contact points of the Magnetic Switch and creation of Noise.

When you start operating the unit, the system performs counter-sequence, and therefore damage of contact points of Magnet Switch and creation of Noise are prevented.

5.2 Function

1) Timer Function

Timer setting range is from 1 to 9999 Minute (You can't set timer below 1).

2) Dual Safety Device

① Over Temp. Limit

This device senses unit faulty condition using sensor (sensor, micro switch). If there is a faulty condition occurred, this propagates signal to main controller to shut down the whole system (in case of sensing faulty condition, buzzer rings and system shut down).

② Logic IC

This unit has built-in Secondary Safety Device. It is a Logic IC that works independent of main CPU. If once this device senses main CPU fault or Over Temp. Limit's faulty condition propagating signal, it shuts down whole system.

3) Start / Stop Switch

This switch propagates its signal to the controller through terminal block, and each button push reveals system on / off. In some case, whole system may be shut down because of Dual Safety Device working. The meaning of system shut down is to cut off final output and DC 12V for use of external load.

4) Automatic System Cruise Function

This function enables the unit to keep its operation (prepare) even though there is a temporary power failure.

5) Auto Tuning Function

PID Auto tuning is one of the operating function for rapid reply and high safety with self-measuring which involves the subjects concerning heat characteristic and velocity of heat response.



6) Dual P.I.D Function

Depend on a sample;

There are two ways to control a sample with high speed and low speed.

This built-in two-way control system is called Dual P.I.D Function.

PIDF : (PID Fast) This allows a little over-shoot to obtain a quick respond time to a set point

PIDS : (PID Slow) Respond time to a set point is slower than that of PIDF, but over-shoot is reduced than that of PIDF.

7) LOCK Function

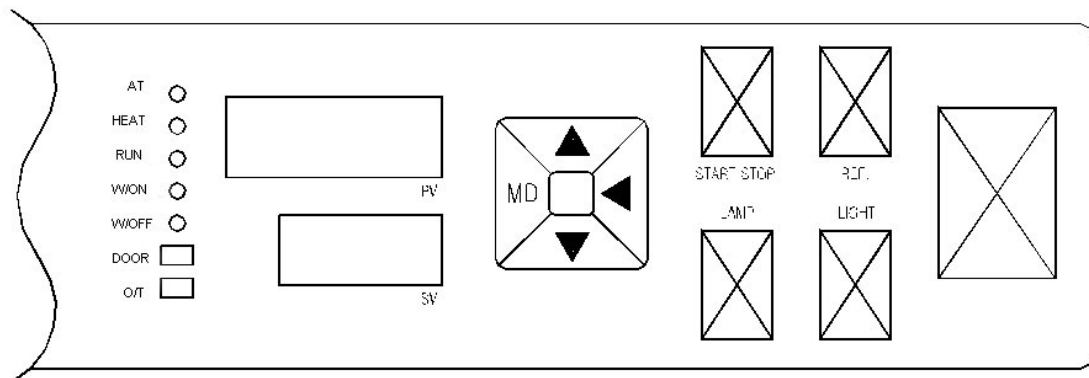
This lock function protects the setup value from incautious operation or hacking by other person.

8) ERROR Display Function

Error messages display on the indicator when user handles the unit improperly.

For example, flickering "LLLL" or "oPEn" indicates that snapping of input sensor or not being connected.

5.3 Name and operation



① MODE key

This is for setting Temperature, time.

② ▲, ▼ (Up, Down) key

This key is for increasing or decreasing the value at Temp. set mode and Timer set mode.

③ ◀ (Direction) key

This is for changing the value at section under the set mode.

④ AT LED

Flickering begins on Auto-tuning.

Press ▲, ▼ keys at the same time and Auto-tuning starts.

If you want to stop Auto-tuning function, press ▲, ▼ keys again simultaneously.

Any of keys on the control panel does not work at all and also Timer setting is cancelled during Auto-tuning process, but you confirm the setting temperature and setting time.

⑤ HEAT LED

It shows Heating function is “ON”

NOTE: When START/STOP Lamp is “OFF”, Heater does not work even though heat LED is flickering.

⑥ RUN LED

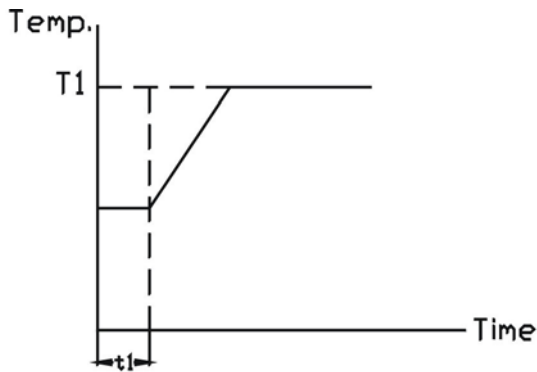
This is ‘ON’ when Temp. Controller is in the normal condition. If the unit does not operate, it is blink.



⑦ WAIT ON time (mod.2)

It shows system becomes “ON” in set time.

Buzzer rings for a couple of seconds at set time and LED flickers at the same time during functioning. Then, LED is “ON” state after system begins.



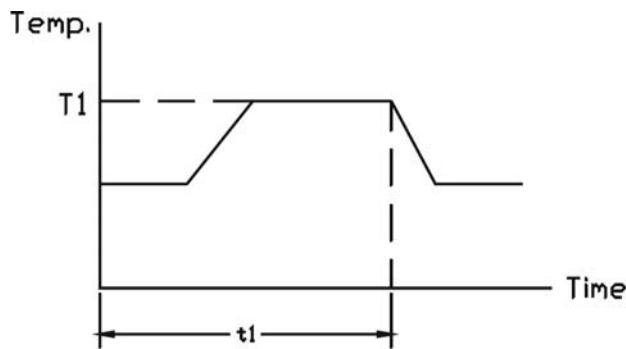
Heating–start in t_1 ,
 T_1 =set point of temperature
(Wait on time)

⑧ WAIT OFF time (mod.1)

It shows system becomes “off” in a specific period (set time).

While the unit is operating, LED keeps “ON” state.

The operating time will be at set time and then, buzzer rings for a couple of seconds and LED flickers simultaneously.



Heating–stop in t_1
 T_1 =set point of temperature
(Wait off time)

⑨ DOOR LED

When the door is open, the LED is blink and shaking motion stops.

If the door still remains open over 50 seconds from opening, a buzzer rings. If you close the door, the shaking motion restarts.

⑩ OVER TEMP. Protector LED

It lets you know heating temperature reaches a set point of Over Temp.

Limit

with LED turning on and Buzzer ringing. If you want to start heat system again under system shut down, set Over Temp. Limit value higher than PV value on PV monitor, and press START/STOP switch just 1 time. At this time,

check on RUN LED 'ON'.

5.4 Parameter setting

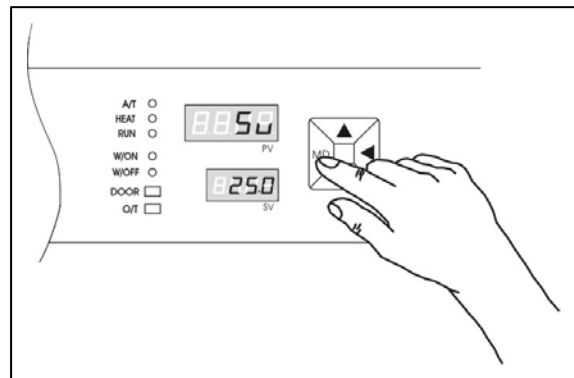
① Temperature Setting

Set temp. is shown when put [MD]

Key

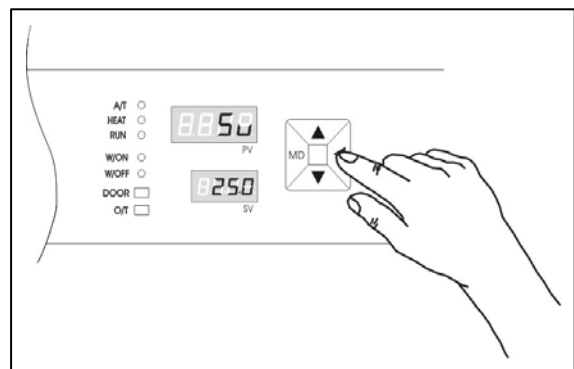
Present Temp. is shown on SV screen

.



Put ◀ key once, then SV value is flashing and set Temp. by putting ▲, ▼ key

The set Temp. value is changed with 0.1 unit.





If put ◀ key one more time, 1 digit figure is flashing, then set Temp by putting ▲▼ key

10 unit Temp is the same. Make 10 unit figure flashing by putting ◀ Key and set Temp. by putting ▲▼ Key, and finally put [MD] key to finish the setting.

The machine is operated with start/Stop button after setting it.

PV screen shows present Temp. inside the machine and SV shows setting Temp.

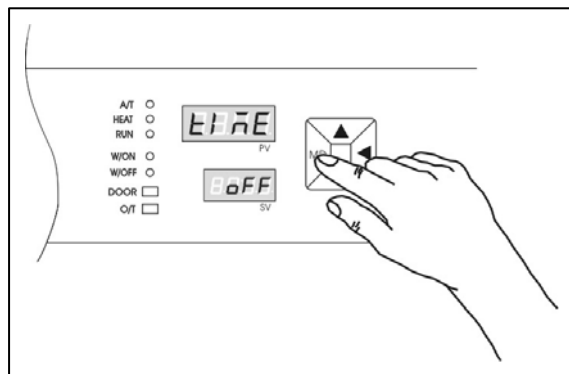
- ① If you want to set 35.0°C, put MODE Key 1 time with RUN LED on.
- ② Select Setting unit with ◀Key(0000)
- ③ Set 35 with ▲,▼Key
- ④ Temp. setting is completed with putting MD Key 1 time.
- ⑤ RUN Mode is shown with putting MD Key 2 times.
- ⑥.RUN Mode is shown automatically if Key was not put for 20 sec. and you do not put MD Key 2 times.
- ⑦ The machine is operated normally with putting START/STOP Switch one time after setting Temp. (In case Timer was not set)

② Timer Setting

Put [MD] key 2 times

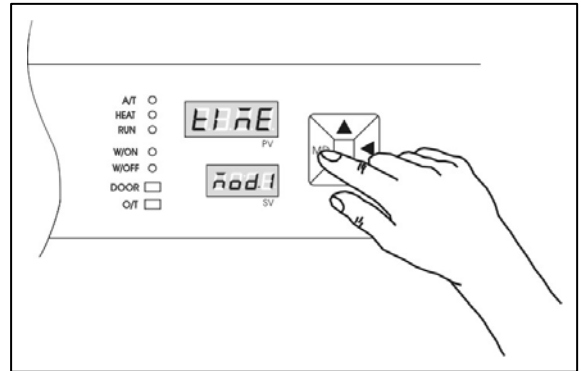
Figure as on the right side is shown.

SV screen is flashing with ◀ key, and off, Mode1, Mode 2 is shown with ▲,▼key. (Please refer the figure as below)



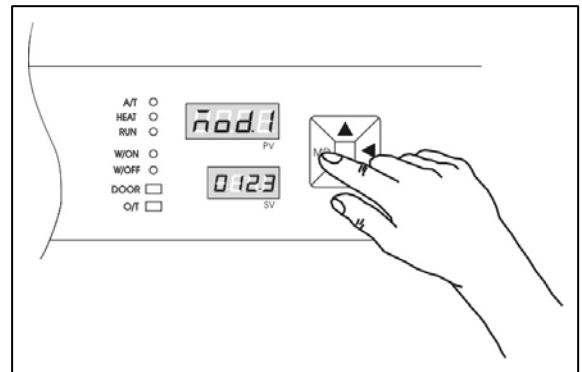
After selecting Timer Mode and put [MD] key, selected LED is on with Buzzer and the figure is shown (The figure is an example of Mode 1)

If you put [MD] key one more time with the figure as on the right side, Time can be set.



PV screen shows kinds of Timer and SV screen shows set time.

SV screen is flashing with ◀key, then move to necessary position, change set value(time) with ▲,▼ and conclude the set by putting [MD]key one more time. Values Below decimal is calculated as 1 min. for 1, 2 min for 2 etc.



RUN Mode is shown with the figure as one the right side when putting [MD] key one more time.

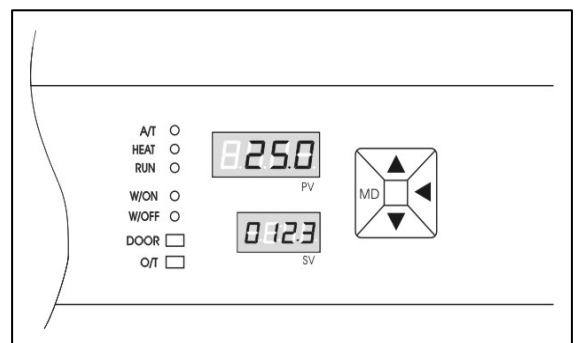
The example on the right side is for setting 123 min.

PV screen shows the Temp. inside the machine, SV screen shows the rest set time.

Set Timer is on with Start/Stop button.

LED shows the working Timer.

(Flashing LED means “waiting for operation, Lighting LED means “ on operation”.)



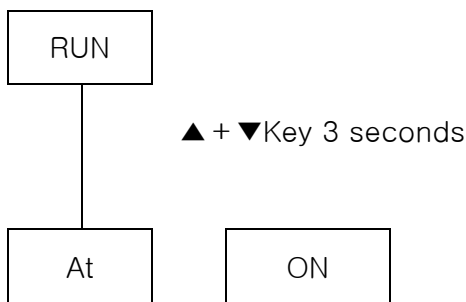


⚠ CAUTION

We are not responsible for any damages if you changes set values except for Parameter value.
Please contact technical service part.

③ How to perform Auto Tuning

Before performing Auto tuning, PV value and SV value must be different.
(Important : Please, do not set TIMER function.)



- Press and hold ▲, ▼ Key for 3 seconds at the same time.
- ON or OFF shows on Display.
- If it is OFF, please change to ON.
- Press START/STOP Switch.
- A/T LED on Display panel blinks during Auto tuning. (If you want to stop Auto tuning, please, press and hold ▲, ▼ Keys for 5 seconds.)
- Once the LED is off, Auto tuning is done.
- Auto tuning is recommended to performe for long time operating or sample changed.

④ Setting Temp. BIAS

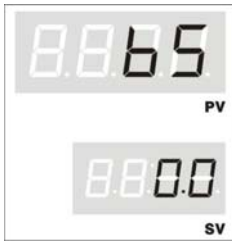
This is for compensating temp. difference.

(BIAS should be set when PV on the display is different from real temp.)

The display shows as below by putting [MD] button for 3 sec.

(The parameters are shown by order)





Put [MD] key continually until you see the parameter.

Changing set values is the same as temp. setting.

(Ex.: If display shows 25°C and real temp is 24°C, set the BIAS value as – 1°C.)

CAUTION

Changing any setting value except BIAS can affect badly to the function of the instrument. Please ask to service man of Jeiotech if the set values are changed or if you need to change it.

⑤ How to change set point

- Move to a Mode which you want to change a set point.
- Use ◀Key at a Mode and the mode blinks.
- Please, press ◀Key again and now you can change a set point.
- Please, use ▲, ▼ Keys to change value.
- Please, press MD Key to complete to change value.

⑥ Restore to RUN MODE manually

Please, press and hold MD Key for 3 seconds after completing to set each Mode. And then, the unit is back to Run mode.

⑦ Restore to RUN MODE automatically

The unit is back to Run mode if there is not any touch of Display panel for 20seconds.



6. Cautions

- 1 . You must plug the power cord into a grounded socket and check the main electricity that is fitted.
 - ※ Keep the unit away from the circumstance that includes the amount of moisture in the air. If liquid soaks into the parts of wiring, put the unit in the dry condition and use the unit after drying it completely.
2. Only authorized personnel must handle the electric parts of the unit.
3. Do not put explosive and flammable substances the chamber inside.
4. If poisonous chemical substances that could damage the human's skin or substances that could emit toxic gases overflow in the chamber, you must wear safety gloves against poisonous chemical substances and mask against toxic gases, and then you completely clean them in the chamber with dry clothes.
5. When cleaning the unit, plug the main cord out and clean contaminated surface only with dry and smooth cloth. If the contaminated parts still remain, use alcohol (MeOH or EtOH) with small quantity. And then dry it completely.
6. The unit is made of thin steel material. When you touch or clean the unit, be cautious of the sides and edges. (※ One can be hurt.)
7. If you do not use the unit for the long period, take the main cord off and put it in dry condition.
8. Before using any cleaning or decontamination method except those recommended by the manufacturer. Users should check with the manufacturer that the proposed method will not damage the equipment.

7. Causes of malfunction and its repairs

1. When the unit stops running

- Check on the main power supply plug is connected.
- Check on the main power switch is on.
- Check on the built-in fuse in the Fuse connector filer.
If you wish to change fuse, please use driver (-) and pull it

★ FUSE INFORMATION

- ① Model SI-300R/600R : 250V, 8A, Time delay type
- ② Model SI-300/600 : 250V, 5A, Time delay type
- Check on there is a power failure.
- Push START/STOP key.

2. When shaking does not work

- Err. 01: Switch off and turn it on again.
- Err. 08: Push any key on the control panel.
- Contact A/S center for other Error messages.

3. When there is no sufficient heating

- Check the RUN LED is 'ON' (No.6 on page 22)
- Check on the Over Temp. Limit setup value.

4. When the temperature doesn't increased.

- Check the RUN LED is 'ON' (No.6 on page 22)
- Check on the temperature set.
- Check on the Over Temp. Protector setting

5. When the temperature is out of control

- Check the RUN LED is 'ON' (No.6 on page 22)
- Perform Auto-Tuning.
- Increase the value of Over Temperature Limit and must press START/STOP key.

6. When the controller works abnormally.

- Check on there is other machine that needs large power temporarily.

- If you can't solve the troubles, please apply for service.
- If you want to repair our unit, please call qualified electric engineers.
- When you need some part change, please use pure licensed parts.
- We can't cover damages from accident, neglect, contamination, misuse or abnormal conditions of operation or handling, including over-voltage failures caused by use outside the Product's specified rating, or normal wear and tear of mechanical components.



8. After services

1. Check points before request A/S.
 - Check whether it is proper voltage.
 - Check fuse and suitable power.
 - Check grounded state.

2. When there are malfunctions caused in producing in spite of user's normal operation, repairs are provided free of charge for 2 year limited warranty from purchasing.
 - Please give us the information as below;
 - Malfunctioning parts and status (if possible, please explain the state of the problems in details.)
 - Type of model
 - Serial Number
 - Purchasing day/month/year

3. Malfunctions are to be fixed with charge in the below cases notwithstanding under warranty;
 - Malfunction due to the user's mistake, improper repairs, or remodeling the part or whole unit.
 - Malfunction due to the user's improper handling or carrying the unit after purchasing.
 - Malfunction due to disasters such as fire, flood, or abnormal power supply.
 - Malfunction due to user's not following the operation manual.

4. Contact our company or dealer for more information or questions.

9. Accessories

1. Flask Holder
 - ; 50ml, 100ml, 250ml, 500ml, 1l
2. Rubber Plate
 - ; For flat dishes just like Petri-dish.
3. Spring wire rack
 - ; For safety operation with test tube and other unstable container.

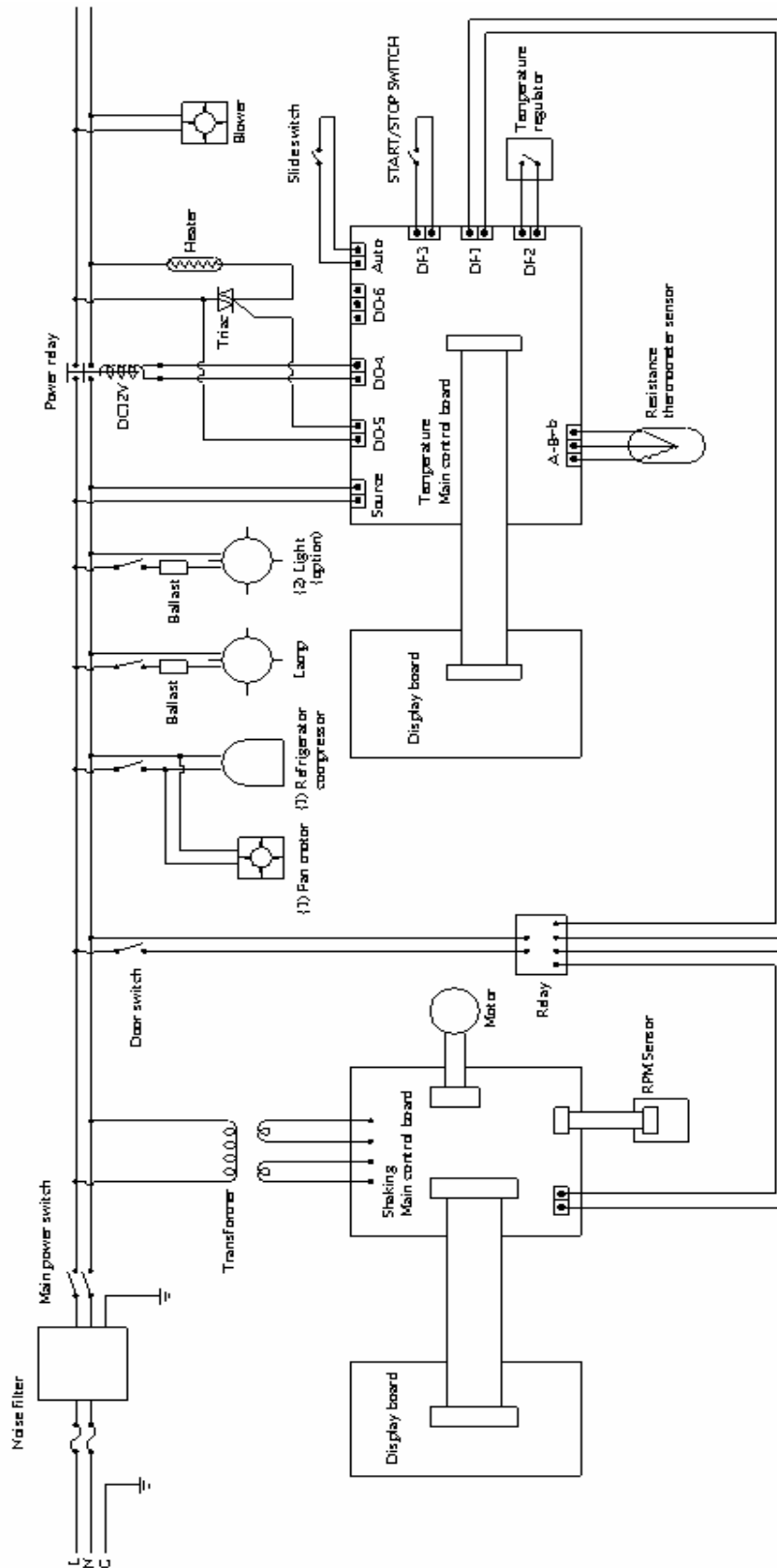
10. Specifications

| Model | | SI-300 | SI-300R | SI-600 | SI-600R |
|-------------------------------------|----------------|---|--------------|---|--------------|
| Permissible environmental condition | | Temperature : 5°C to 40°C Relative humidity : 50%~80% Altitude : Up to 2,000m Indoor use pollution : Degree 2 Installation category(Over voltage category) : II | | | |
| Shaking | Frequency | 10 to 300 rpm \pm 1 | | | |
| | Motion | Orbital (forward, Backward), Reciprocating (Optional) | | | |
| | Amplitude (mm) | 20, 30(Standard), 40 | | | |
| | Control | Programmable right, left rotation and control with microprocessor | | | |
| | Drive Motor | Brushless D.C motor | | | |
| | Timer | 999 hours 59 min | | | |
| Temp. | Range | Amb. +5°C to 60°C | 15°C to 60°C | Amb. +5°C to 60°C | 15°C to 60°C |
| | Accuracy | \pm 0.1°C | | | |
| | Uniformity | \pm 0.5°C at 38°C | | | |
| | Sensor | Pt 100 Ω | | | |
| | Control | Digital P.I.D-Auto Tuning | | | |
| Heater | | 800W | | | |
| Platform Size(W×D/mm) | | 330×330 | | 410×410 | |
| External Size(W×D×H/mm) | | 440×720×615 | | 540×830×615 | |
| Internal Size(W×D×H/mm) | | 410×410×320 | | 510×510×320 | |
| Safety Device | | Over Temp. Protector, Door Switch, Fuse | | | |
| Electric Requirement | | AC 230V, 50/60Hz (AC120V/60Hz) | | | |
| Power Consumption | | 4.0A (7.5A) | 5.5A (10.1A) | 4.0A (7.5A) | 5.5A (10.1A) |
| Net Weight (kg) | | 74 | 85 | 91 | 102 |
| Capacity | | 50ml Quantity ; 28ea 100ml Quantity ; 24ea 250ml Quantity ; 13ea 500ml Quantity ; 9ea 1l Quantity ; 4ea 2l Quantity ; 2ea | | 50ml Quantity ; 45ea 100ml Quantity ; 36ea 250ml Quantity ; 18ea 500ml Quantity ; 13ea 1l Quantity ; 7ea 2l Quantity ; 5ea | |

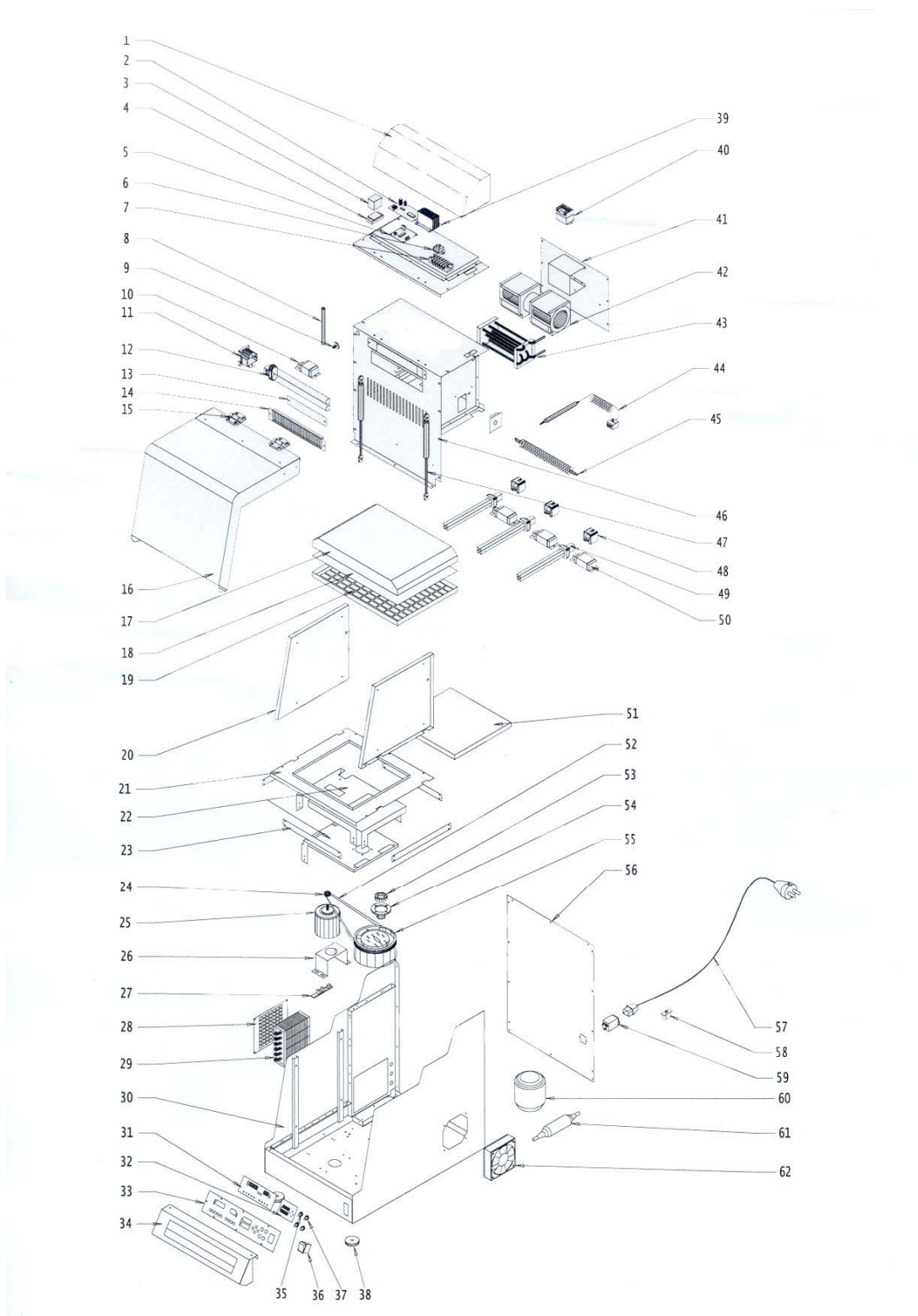
11. Circuit Diagram

Shaking Incubator (SI-300R / 600R) Circuit diagram

* Both Model SI-300 and SI-600 don't contain (1) marked item.
 * Light is option (2) marked item.



12. Exploded view





Parts List

| No. | Name | No. | Name |
|-----|-----------------------------------|-----|---------------------------------|
| 1 | Upper panel | 32 | Temp. display & operation board |
| 2 | Shaking control main board | 33 | Front label |
| 3 | Relay | 34 | Control panel |
| 4 | Relay socket | 35 | Start/Stop switch |
| 5 | Temperature control main board | 36 | Main power switch |
| 6 | Triac | 37 | Power switch |
| 7 | Terminal block | 38 | Foot |
| 8 | Resistance thermometer sensor | 39 | Transformer |
| 9 | Door switch | 40 | Power relay |
| 10 | Ballast | 41 | Frame cover |
| 11 | Lamp holder | 42 | Blower |
| 12 | Fluorescent lamp | 43 | Evaporator |
| 13 | Lamp cover | 44 | Temperature regulator |
| 14 | Lamp safety cover | 45 | Heater |
| 15 | Door hinge | 46 | Frame |
| 16 | Door | 47 | Gas spring |
| 17 | Lamp housing | 48 | Lamp holder |
| 18 | Lamp cover | 49 | Fluorescent lamp |
| 19 | Lamp housing safety cover | 50 | Ballast |
| 20 | Side cover | 51 | Shaking table |
| 21 | Vibrating frame cover | 52 | Driving belt |
| 22 | Vibrating frame | 53 | Bearing |
| 23 | Flat spring | 54 | Eccentric shaft |
| 24 | Motor pulley | 55 | Driving wheel |
| 25 | Motor | 56 | Rear cover |
| 26 | Motor bracket | 57 | Power cord set |
| 27 | RPM sensor board | 58 | Slide switch |
| 28 | Condenser cover | 59 | Fuse connector filter |
| 29 | Condenser | 60 | Refrigerator compressor |
| 30 | Body | 61 | Dryer |
| 31 | Shaking display & operation board | 62 | Fan motor |

☞ Part No. 17, 18, 19, 48, 49, 50 are options just for Model SI-300R/600R .

☞ Part No. 28, 29, 60, 61, 62 are included only for Model SI-300R/600R.