

OPERATION MANUAL

SHAKING INCUBATOR
(Model : SI-300/ 300R/ 600/ 600R)



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1. Feature

For efficient shaking, clock-wise and counter-clockwise is possible. And have the function of fixed point stopping which is suitable for cultivation of seeds which grow 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 some time to cultivate. And it also have the function of fixed point stopping for partial picking or adding of culture-fluid by CNC equipment.

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

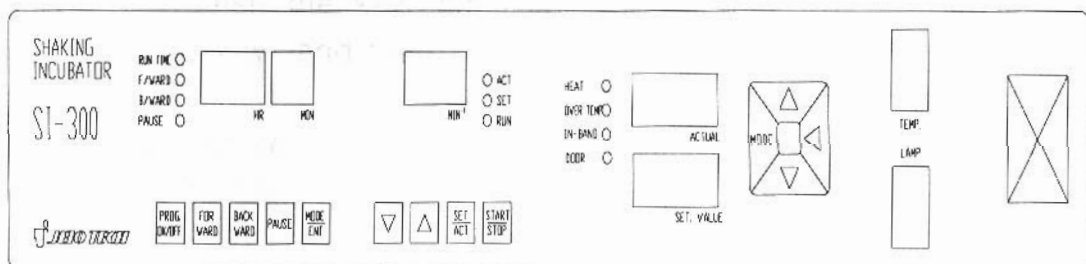
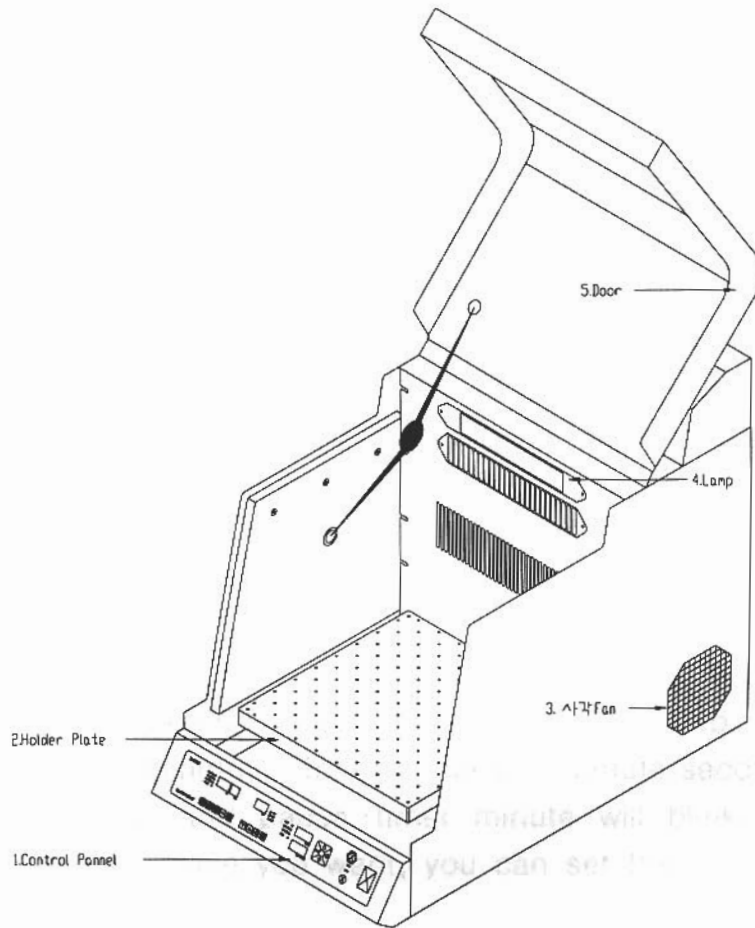
► Basic specification

1. Brushless DC motor(with function of feed back control and brake) and controller make possible from 10RPM to 300RPM and fixed position stopping.
2. Large sized fly wheel minimize vibration in high speed rotation by restoration its balance.
3. Clock-wise, opposite direction, and keeping fixed position make the most suitable for cultivation by setting each time set.
4. Slim structure make possible multiple structure for many test at once.
5. Various accessories for various containers.

2. Installation

1. Keep away from high humidity area or that of big temperature change in a day. It may decrease machine's life.
2. Install on the solid and flat floor.
3. Keep away from heat source like fireplace or heater.
4. Keep away from a lot of machines which make much electric currents. It may cause unusual operation.

3. Name of the parts and operation



1) Start/Stop Key

You can start and stop the motor with this key after setting RPM.

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

* Sometimes it takes several minutes to come to a complete stop, and will not start accelerating (even with lid closed) until it comes to a complete stop.

2) Set/act key

You can check setting RPM and actual RPM, and when you put a new RPM value in. 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 up(▲)/down(▼) key.

3), 4) UP, DOWN key

Increase or decrease the value on RPM SET MODE or TIMER SET 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. It is marked by a figure beside of minute position.

5) 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 up(▲)/down(▼) key.

6) 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 59minutes.)

7) Backward timer on/off key

Whenever you push the key, timer repeat 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) 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)

9) Total timer ON/OFF key

Whenever you push the key, timer repeat on and off. Set total timer with MODE/ENT key and push FORWARD key for setting direction of rotation or stopping. Total timer LED is lightening after Timer on and display setting time.

(If forward or backward timer is not on, total timer is not operate even though you put on total timer and also motor is not rotate.) (255 hrs. 59 min.)

10) 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.

11) BACKWARD TIMER LED

If you put on BACKWARD TIMER, it blinks. If BACKWARD TIMER is operating or BACKWARD TIMER SET MODE, it is not blinks.

12) FORWARD TIMER LED

If you put on FORWARD TIMER, it is blinks. If FORWARD TIMER is operating or in FORWARD TIMER SET MODE, it is not blinks.

13) TOTAL TIMER LED

If turn on the TOTAL TIMER, it is blinks. If TOTAL TIMER is operating or in TOTAL TIMER SET MODE, it is not blinks.

14) TIME display

It shows time of TOTAL TIMER. First three points displayed hour and behind two points shows minute value. On PAUSE TIMER displays, it means minute value.

15) RPM display

It display current RPM value and setting RPM value.

16) ACTUAL LED

On lightening ACTUAL LED, it shows current RPM value.

17) SET LED

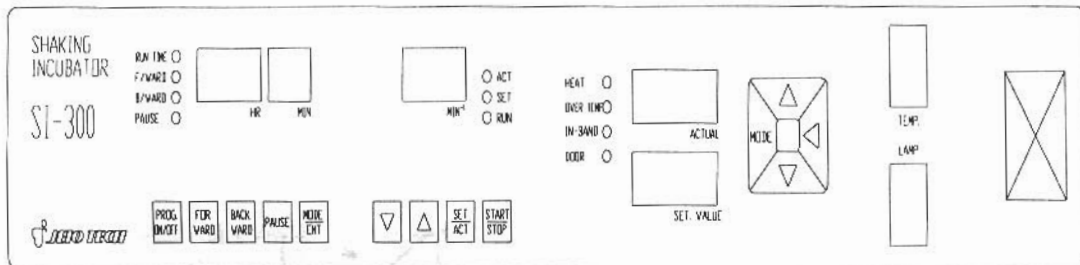
On lightening SET LED, it shows setting RPM.

18) RUN LED

RUN LED means this machine is operating.

It lightens when machine is operating, then the speed reach to setting value, it stops blinking.

4. Controller Operation



[A] Function of Controller

(1) Auto Tuning

PID Auto Tuning means a maintain function a high safety and rapid reply by setting and calculating of proper PID grade.

(2) Double PID function

There are two control methods, high speed control and low speed control depend on the control LED subjects.

Double PID function has above two methods.

(3) Display ERROR

Support to operator by displaying a error of controller operating.

(4) LOCK function

It's a safety function by keep to not change a setting value except main user.

It consists of 4 kinds modes.

OFF: No locking all setting mode

LOC1: All mode lock except SV, EV1, EV2

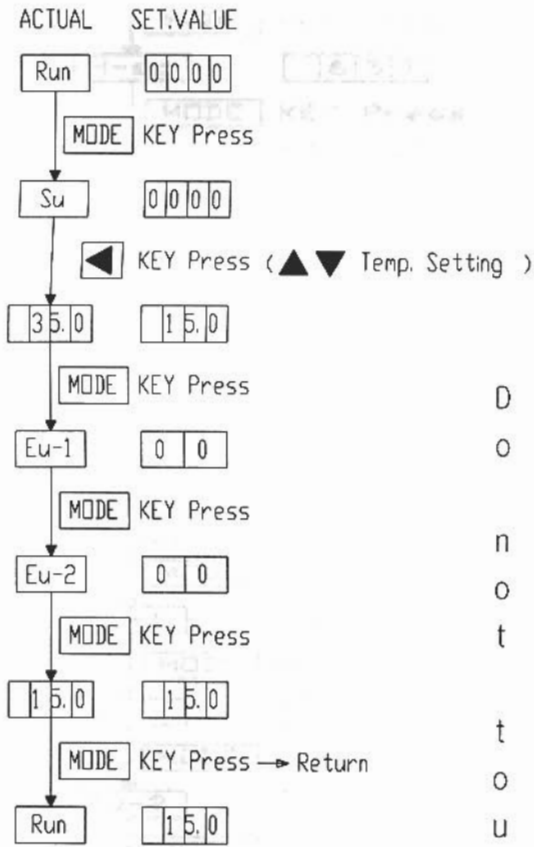
LOC2: All mode lock except SV

ALL: All mode lock

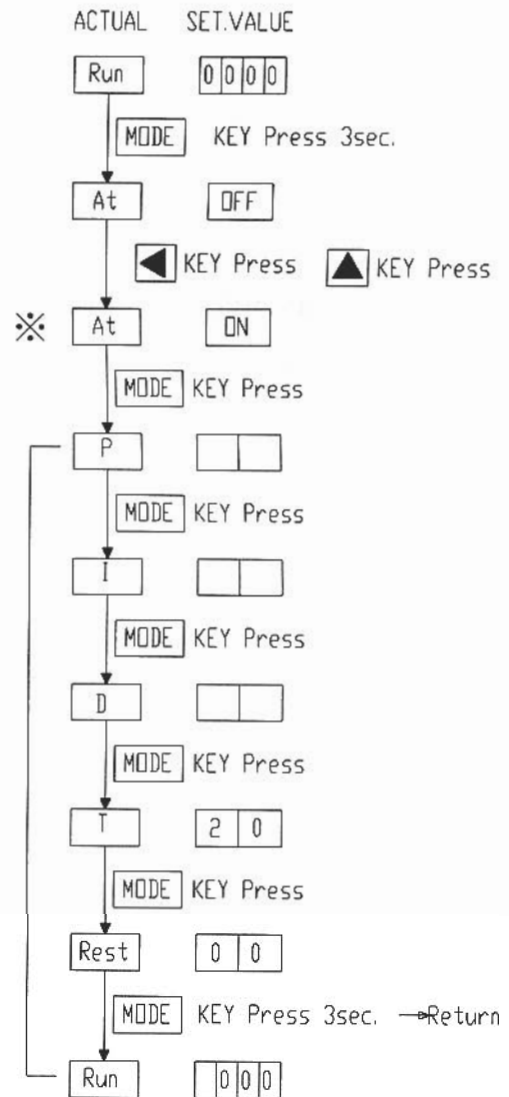
(5) In-b: Collect error occur from input sensor.
 (Setting range: -49~+50)

① Set Temperature
 (When using temp. setting)

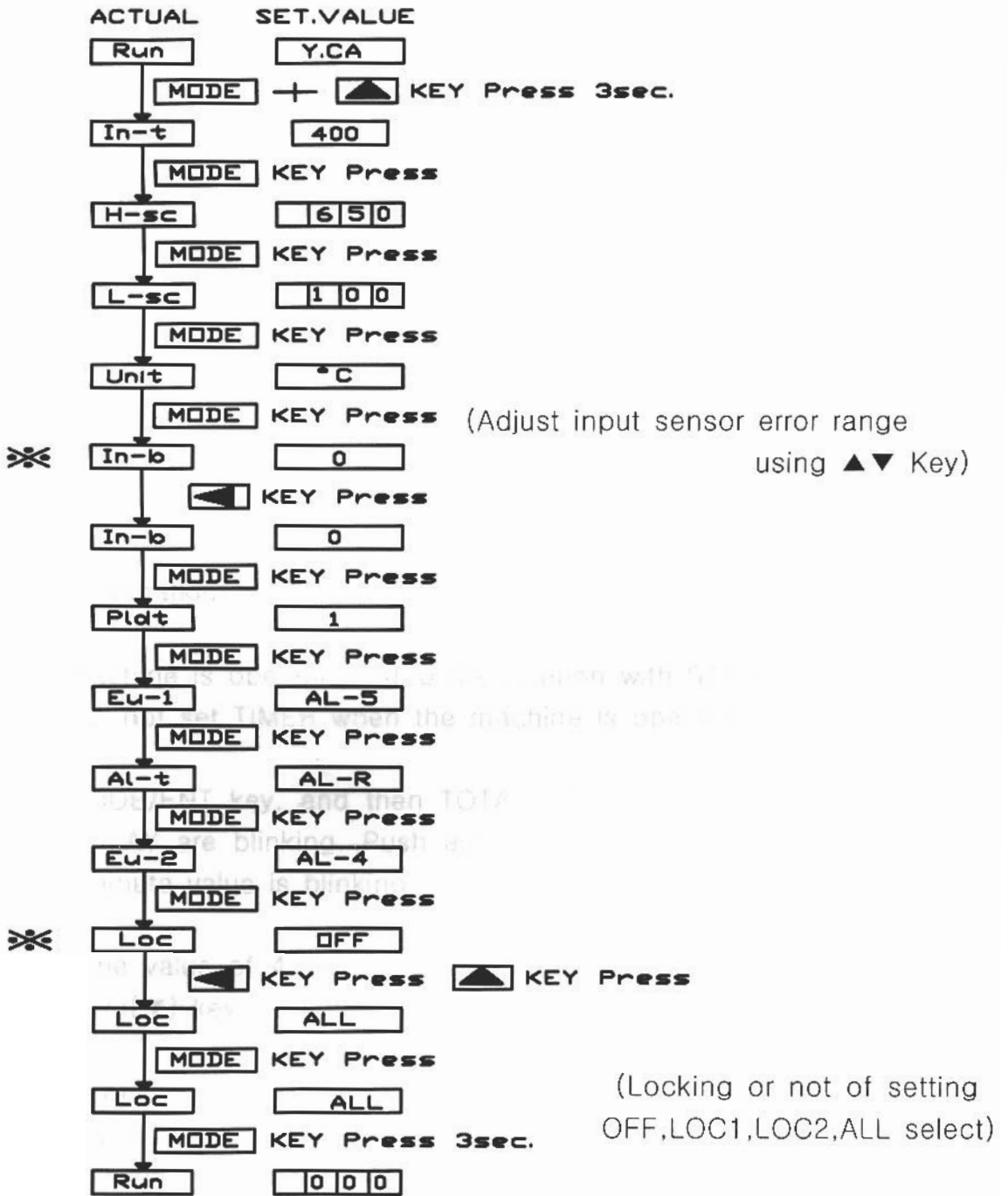
② Set Auto Tuning
 (When differ from setting temp.)



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③ Setting In-b. LOCK



[B] Setting RPM

- 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 up(▲)/down(▼) 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 mentioned from 1) to 3).
- 6) You can change RPM value from 10 to 300.

[C] 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 TOTAL 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) Select one value of 4 timers, and set time value and minute value by up(▲)/down(▼) key.
- 4) In case of maximum time value, total timer is adjusted 255 hours 59 minutes by 1 minute value.
 - * For other timers you can set to maximum 9minutes 50seconds by 10 minutes. Below decimal point means 10 seconds unit.
- 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, set desired timer turn on/off by proper key.
- 7) If you push START/STOP key, the machine is operating as you set.
- 8) If you want to stop the timer on operating, push START/STOP key.
 - * During timer operation, ACT/SET key and START/STOP key are available, but other keys are not available.

※ Caution

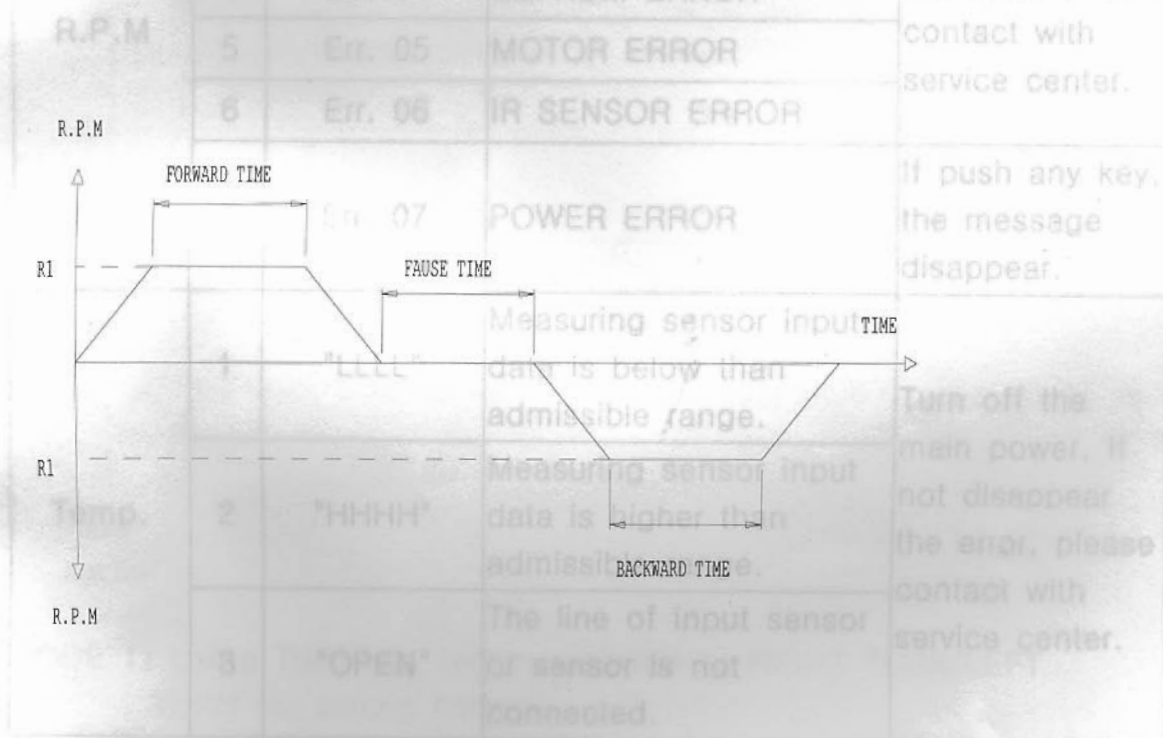
1. If you do not turn on the TOTAL TIMER, the machine can not operate.
2. In spite of turn on TOTAL TIMER, if you do not turn on FORWARD/BACKWARD TIMER, the machine can not operate.
3. The machine can not operate, if you turn on only TOTAL TIMER and PAUSE TIMER.

FIG 1. Total TIMING construction

After turn on TOTAL TIMER and TIMERS, turn START/STOP key. And start shaking with buzzer sound.

A shaking is completed as you setting clock-wise, not clock-wise, fixed point stopping. And when the total timer is displayed "0:00", the machine is stopped.

R1 = Setting RPM



1. If Err. 05 occur, maybe a circuit of motor damages, check the circuit.
2. If Err. 06 occur, maybe a circuit of IR sensor damages, check sensor.
3. Err. 07 means power supply is down and on again, therefore stop the machine with START/STOP key, and set from beginning again.

◆ ERROR CODE

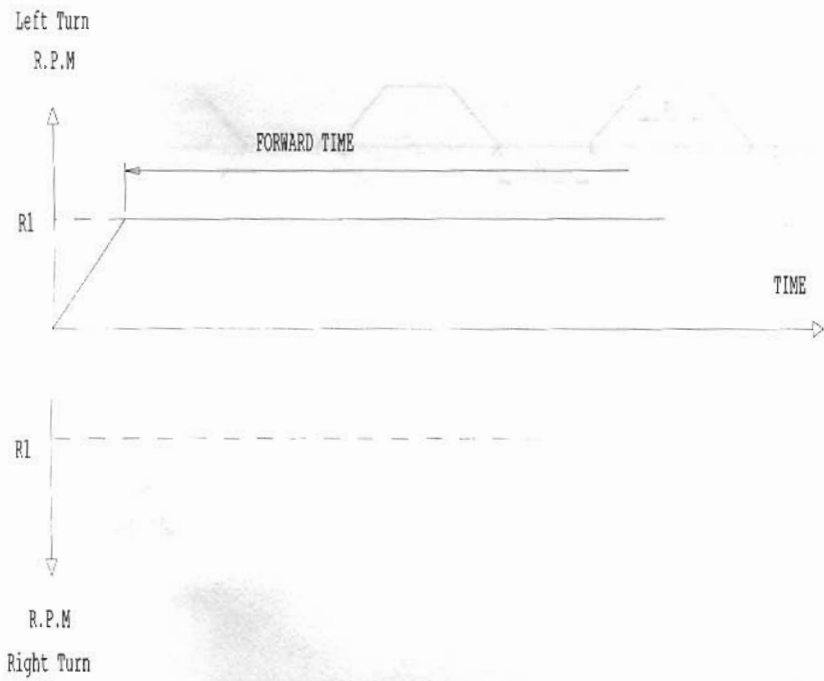
Controller	No.	ERROR CODE	Description	Action
R.P.M	1	Err. 01	ROM ERROR	Turn off the main power. If not disappear the error, please contact with service center.
	2	Err. 02	RAM ERROR	
	3	Err. 03	CALIBRATION ERROR	
	4	Err. 04	EEPROM ERROR	
	5	Err. 05	MOTOR ERROR	
	6	Err. 06	IR SENSOR ERROR	
	7	Err. 07	POWER ERROR	If push any key, the message disappear.
Temp.	1	"LLLL"	Measuring sensor input data is below than admissible range.	Turn off the main power. If not disappear the error, please contact with service center.
	2	"HHHH"	Measuring sensor input data is higher than admissible range.	
	3	"OPEN"	The line of input sensor or sensor is not connected.	

1. If Err. 05 occur, maybe a circuit of motor damages, check the circuit.
2. If Err. 06 occur, maybe a circuit of IR sensor damages, check sensor.
3. Err. 07 means power supply is down and on again, therefore stop the machine with START/STOP key, and set from beginning again.

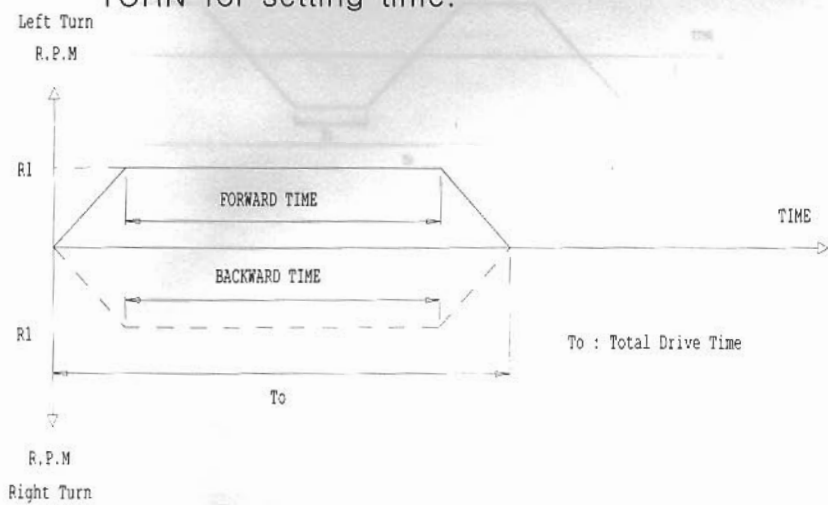
5. Short operation

This machine can be used by 5 modes as follows:

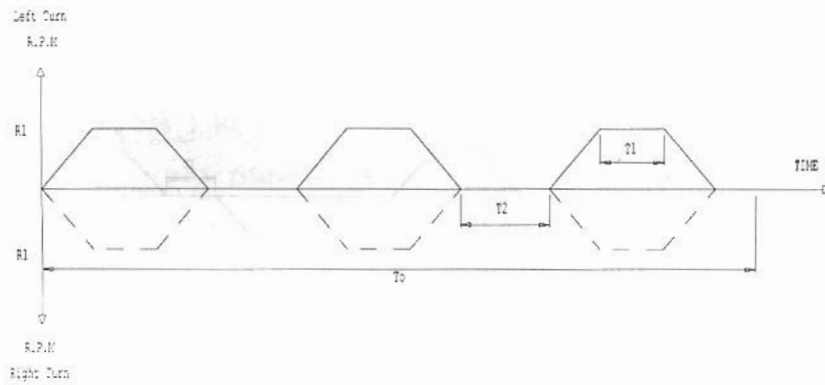
MODE 0) When do not timer



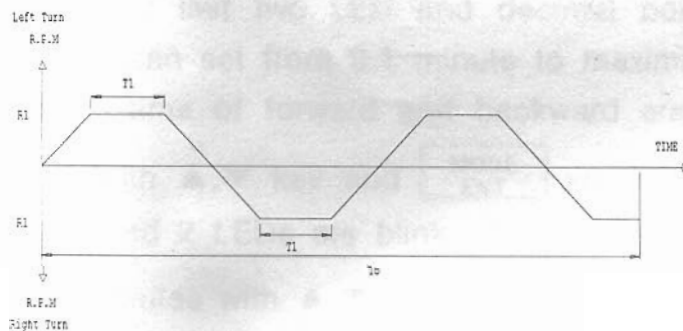
MODE 1) Using TIMER, it can be possible to RIGHT TURN/LEFT TURN for setting time.



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)

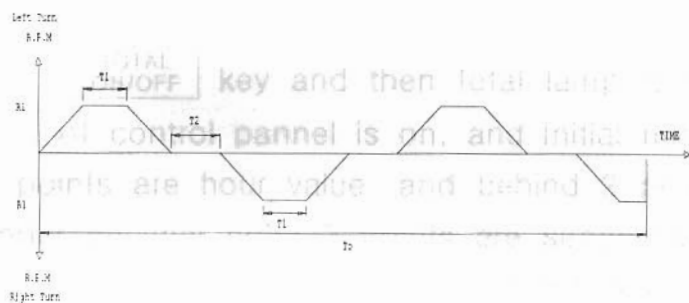


MODE 3) Turn right and left are repeated during setting time(t_0) by fixed RPM.



MODE 4) Right turn(t_1), keep stopping(t_2), left turn(t_1), keep stopping(t_2).

These operations are repeated during setting time(t_0).



is followed

the set minute value with Δ

is over with lightening forward

of last two LED and decimal point.

from 0.1 minute to maximum 9 minutes of setting

and backward are same. And also you

MODE key and then pause lamp

can set pause time from 1

MODE ENT key, then setting

MODE 1~4)

#1 and #2 are same to mode 0.

Setting t0, t1, t2 (t0=Total operation time, t1=rotation time right or left,
t2=stopping time)

Push key and then total lamp is lightening, 5 LEDs on left side of control pannel is on, and initial number 000.01 displays. First 3 points are hour value, and behind 2 points are minute value, and under decimal point 2 points are second value. You can set from 1 minute to maximum 255 hours 59 minutes.

For putting total run time(t0), push key, and then first 3 points are blinking. Then set hour value with ▲,▼ key, and push key, then hour value is set and at the same time behind 2 points is blinking.

Then set minute value with ▲,▼ key, and push key, t0 setting is over with lightening forward lamp and backward lamp, blinking of last two LED and decimal point. This means 0.0minute and you can set from 0.1 minute to maximum 9 minutes 50 seconds. Running time of forward and backward are same. And also you can set t1 with ▲,▼ key and key and then pause lamp lighten and behind 2 LEDs are blink. You can set pause time from 1 minute to 59 minutes with ▲,▼ key. And push key, then setting time is over.

[Mode 1]

If you want left turn of mode 1, make run time and f/ward lighten with and keys, and then start. If you want right turn proceed like left turn.

[Mode 2]

Use and (or) and keys, lighten run time, f/ward(or b/ward)LED and pause LED, and then start.

[Mode 3]

Lighten run time, f/ward LED, b/ward LED using , and and then start.

[Mode 4]

Lighten run time, f/ward LED, b/ward LED and pause LED using , , and key, and then start.

6. Operation

1. With main power switch off, connect power cord to 110V or 220V power supply.
※ Keep away from high humidity place. If electric parts are wet, dry completely in dry place and then use the machine.
2. Turn on the main power S/W.
3. When cleaning the machine, throw off main power plug, clean with dry and smooth cloth for polluted surface. If still remain the pollution, use alcohol(MeOH or EtOH) o small quantity. And then dry completely..
4. Be careful when clean the edge parts because it made of slip material.
5. If you do not use in the long time, throw off main power plug and keep in dry place.

7. Malfunction

1. Out of order

- (1) Check the plug, receptacle, voltage and fuse attached of receptacle.
- (2) Err. 01: Switch off and turn on again.
- (3) Err. 07: Push any key on control pannel.
- (4) Contact A/S center for other Error message.

[B] After service

(1) Check point before request A/S

- ① Check whether it is proper voltage, 110V or 220V.
- ② Check fuse and suitable power.
- ③ Check ground.

(2) When there are malfunctions caused in producing in spite of user's normal operation, repairs are provided free of charge for one year from purchase. Please check as follows ;

- ① Malfunctioning parts and status (if possible, please explain the situations of problem.
- ② Type of model
- ③ Serial number
- ④ Purchase day/month/year

(3) Malfunctions are to be fixed with charge in these cases ;

- ① Malfunction due to the user's mistake, improper repairs, or remodeling the part or whole of the unit.
- ② Malfunction due to the user's improper handling or carrying the unit after purchase.
- ③ 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..

8. Accessory

1. Flask Holder

50ml, 100ml, 250ml, 500ml, 1 l

2. Rubber plate

For flat dishes as like Petri-dish.

3. Spring wire rack

For safety operation with test tube and other unstable container.

9. Specifications

Model		SI - 300	SI - 300R	SI - 600	SI - 600R
Shaking	Range	10 to 300 RPM (± 1 RPM)			
	Control	Programmable Right, Left rotation and control with microprocessor (patent pending)			
	Stroke Length	20, 30, 40 mm available			
	Indication	Program, Timer, RPM digital			
	Drive Motor	Brushless D.C motor			
	Range	Amb.+5°C to 60°C	15°C to 60°C	Amb.+5°C to 60°C	15°C to 60°C
TEMP.	Control	P.I.D			
	Sensor	Pt 100 Ω			
	Accuracy	$\pm 0.1^\circ\text{C}$			
	Uniformity	$\pm 0.5^\circ\text{C}$ at 37°C			
	Indication	Digital LED Display 0.1°C increment			
Refrigeration	1/10 HP				
Heater	300W				
Platform Size(WxD/mm)	350 x 350			450 x 450	
External Size(WxDxH/mm)	440x720x615			540x830x615	
Internal Size(WxDxH/mm)	410x410x320			510x510x320	
Safety	Over Temp. Limit. Fuse. Lock				
Electric	500 W				
Power	AC 110V/220V, 50/60Hz				
Capacity	50ml \Leftarrow Quantity ; 20ea 100ml \Leftarrow Quantity ; 16ea 250ml \Leftarrow Quantity ; 9ea 500ml \Leftarrow Quantity ; 6ea 1 l \Leftarrow Quantity ; 4ea			50ml \Leftarrow Quantity ; 25ea 100ml \Leftarrow Quantity ; 20ea 250ml \Leftarrow Quantity ; 12ea 500ml \Leftarrow Quantity ; 9ea 1 l \Leftarrow Quantity ; 6ea	