Http:// www.mtops.co.kr   e-mail:misung@mtops.co.kr

Mtops ®

Hotplate

HSD120 / HSD150
HSD180 / HSD330

MANUAL

Thank you very much for selecting Mi-sung products.

For your safety,please read the following before using.

Main products

Temp controller
□ Heating Tape
Hot plate
Digital
□ Mantle,Analog
Mantle,Rota Mantle
□ Digital Stirrer
Analog stirrer

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General Information

Unpack your item carefully and inspect for damage and report such damage or missing parts to your supplier
right away.

Read your instruction manual carafully. Take time to save time while working with you item.

Make sure that every user has read and understood the instruction manual.

Please store the instruction manual in a place easily accessible to every user.

Safety Information

Please comply with all safety and accident-prevention regulations as in force for laboratory work!

Use extra care when working with flammable substance; refer to safety data sheets.

When connecting your item with your local power supply, please make sure your item is designed for your local supply voltage;
go by data plate on the item.

Turn your power switch OFF whenever the item is not used, or before disconnecting the plug.

Use extra care when working in the vicinity of flammable and explosive substances. Motor are non-sparking type, however,
the item itself is not explosion proof.

Please do not connect your instrument without a protective ground outlet.

Your item requires a solid stand.

Warning

To avoid electrical shock, always:

1. Use a properly grounded electrical outlet of correct voltage and current handling capacity.
2. Disconnectfrom power supply before servicing.

To avoid personal injury:

1. Do not use in the presence of flammable or combustible materials; fire or explosion may result.
   This item contains components which may ignite such materials.
2. Keep the item clean. Use non-abrasive cleaner. Alkali spills, hydrofluoric acid spills or phophoric acid spills may damage
   the item and lead to thermal failure. Unplug unit and remove spills promptly. Do not immerse unit for cleaning.
3. Do not remove or modify grounded power plug. Use only properly grounded outlets to avoid shoch hazard.
   Not rated for use in hazardous atmospheres.
4. Use appropriate hand and eye protection when handling hazardous chemicals.
5. Do not use in highly corrosive atmospheres; corrosive fumes and spill may damage your item and internal components,

Caution

Space instrument 12 inches away from combustible materials under any conditions.

1. Specifications

MODEL		Hot plate & Magnetic Stirrer			
		HSD120	HSD150	HSD180	HSD330
Temperature	Range	Max. 380℃			Max. 350℃
	Accuracy	±1℃			
	Controller	Digital PID auto-tuning			
	Timer	99hr 59min			
Heater power		350W	480W	680W	1400W
Stirring	Speed	100 ~ 1500rpm			100 ~ 1300rpm
	Speed display	Scale			
	Capacity(H2O)	up to 1L	up to 2L	up to 5L	up to 10L
Speed controller		Feed-back control			
Top plate		Ceramic coated top plate			
Dimensions	Plate area(mm)	120 x 120	150 x 150	180 x 180	300 x 300
	Overall(WxDxH)	160x280x107	160x280x107	200x310x107	310x430x120
Electrical supply		AC220V 50/60㎐ or AC110V 50/60㎐			

2.Functional Description(TIC)
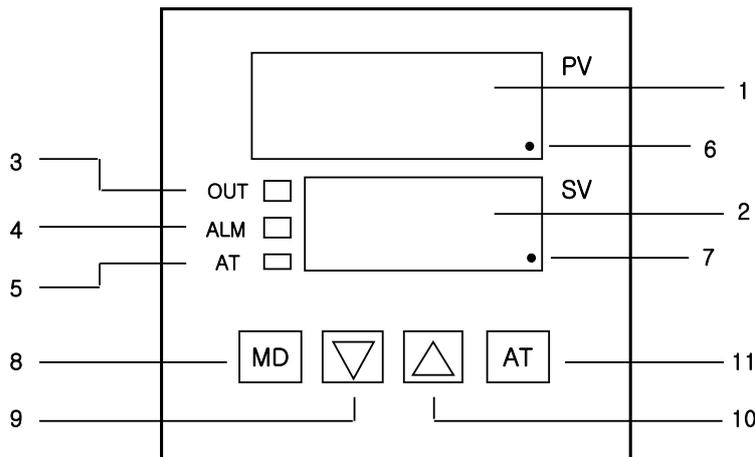
1) Displays processing value(PV) : Displays processing value in controlling and each kind of parameters in parameter set

2) Displays set value and parameter set(SV) : Displays set value in controlling and parameter value in parameter set. Press key No.9, then displays the remaining time.

3) Lamp of output control(OUT)

4) Warning lamp of highest and lowest(ALM)

5) Auto-tuning lamp(AT) :Press key No.11, then it starts PID auto-tuning with flikering of the lamp and the lamp turns off when it is finish.

6) Timer lamp: Press No.10 key of the Timer during controlling, then lamp will be flickered. After a set time, the light will be on; at a time, tENd will be appeared on SV. To back to the initial stage, press Up key more than 2 sec.

7) LBA Control lamp: It will be on when Control Loop Disconnection alarm appears.

8) Mode set key: Press it more than 2sec., the system will be changed to parameter set.

9) Down key(remainning time display key):Press it, set value decreases; Press more than 2sec, set value decreases consecutively. Press it for several sec. during timer ON, remaining time will be flickered.

10) Up key(Time ON/OFF key): If you press it, the set value goes up one by one; if you pres it more than 2sec, the set value goes up consecutively. If you press it during controlling, you can turn on/off the timer.

11) Auto Tuning Key: After parameter set, press AT more than 2sec., AT lamp(5times) will be flickered and calculating PID automatically.

3. How to set parameter
1) Parameter Set
Turned on, then PV displays current temp.; SV displays a set valve.
If you press the MODE key at this stage more than 2sec, parameter set is available.
If you press the MODE key, kinds of parameter will be changed one by one.
(See the following table.)

No.	Symbol	Setting Date	Description	Initial value
1	SV	Set Value	Set of the temperature required	30
2	tlm	Control ending Time set	* H.m display->Hours,Minutes Unit:00H01m~99H59m – Up key can modulate ON/OFF. The Timer begins working after current temp reaches set temp. After a set time reaches, it stops ending Control output . *The TIMER does not work in case of '0 set'.	0
3	ALS	Alarm mode set	9 Alarm modes display in picture form. You can set appropriate alarm mode by using up/down keys. See Alarm mode variables. (option)	----
4	ALH	High alarm	It sets the heighest Alarm limit. (It is absolute value)	0
5	ALL	Low alarm	It sets the lowest alarm limit. It is absolute value)	0
6	P	Proportional band	Possible to set a 0.1% unit within 0.1~999.8% range.	Automatically set for Auto Tuning
7	I	Intergral time	Possible to set a 1sec-unit within 5~9998 sec. range.	
8	d	Derivative time	Possible to set a 1sec-unit within 0~2500sec.range.	
9	LbA	Control loop break alarm	Possible to set a 1sec-unit withing 0~9998sec.range.	
10	InS	Input value	Possible to set a 0.1℃-unit withing -100.0℃ ~100.0℃ range.	0.0 or 1.0

11	LOC	Set data lock	LOCK -> Preventing from changing set value
			  on -> Impossible to change parameter set
			  oFF -> Possible to change parameter set
				oFF

12	PASS		Manufacturer Moder	

A. After completing parameter set , press the MODE key longer than 2sec.; you can finish parameter set.

PV displays current temperature, SV displays set temperature; then, controlling begins.

B. Press AT key more than 2sec, then the modulating system process automatically Auto-Tuning.

Plate size	P	I	d	LbA
120 x 120	1.0	531	133	1062
150 x 150	0.8	624	156	1248
180 x 180	0.6	655	163	1310
300 x 210	1.0	811	206	1622
300 x 300	1.0	799	199	1598
300 x 600	0.7	832	208	1664

※Constant value could be changed on auto-tuning.

※Use auto-tuning in case on big difference on the temperature.

4. How to use

16.Sensor S/W
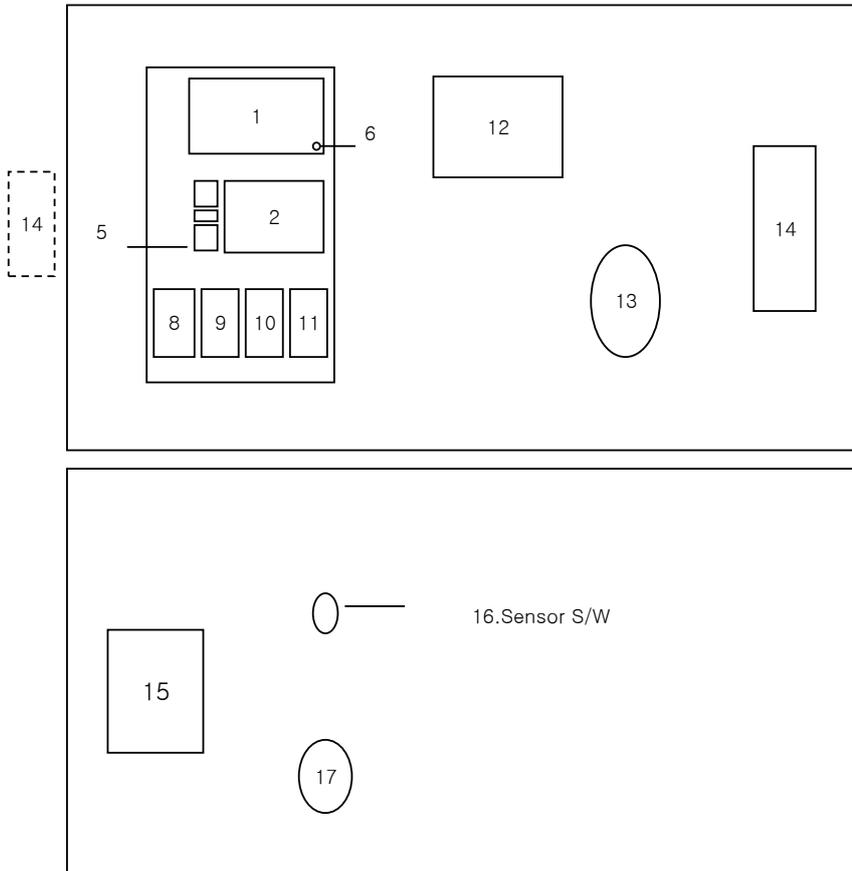
To use temp. controller

1-1.Connect the sesor on No.17 terminal of the rear side(Use external sesor)

1-2.If sensor is connected on No.17 terminal on the rear side, take it out and use internal sensor.

2.Connect No. 15 of the rear side with an electric outlet and switch on the instrument by No.14 of the rear side.

3.Press No. 8 key of the front side, then the parameter to set temperature will be appeared.

```
Su
      30
```
Press No.9 (downturn) and No.10 (upward) to set the required temperature.

4. After setting of the temeprature, press No.8 key on the front side for 2 seconds, then the temperature controller   runs on initial condition.

To use Timer

1.Press No.8 key on the front side for 2seconds, then the parameter to set temperature will be appeared.

```
Su
      30
```
Prees No. 8 key again. ⟶
```
tlm
      0
```
Set the time using No. 9 and 10 key.

Minimum 1 minute(0001) to Maximum 99hr59min.(9959)

2.After setting of time, press No. 8 key on the front side, then it return to the initia condition.

3.Press No.10 key on the front side for 2 seconds on timer run, then No. 6 lamp will be switched on and off.
  In case that time is not setted, it does not run.

4.Press No. 10 key for 2seconds on timer run, then it stop to run..

5.Press No. 9 key for 2 seconds, then the temperature display shows the remaining time.
   Press No. 9 key again for 2 seconds, then the temperature display shows setting value.

6.In case that the set of time is finished, "tENd" is showed and press No.10key to back to the initial condition.

1.Use without auto-tuning but do it in case of a big temperature difference.

2.Press No.11 key, then it starts with switching on and off.

3.Temperature error could be happened on auto-tuning but it is controlled correctly when auto-tuning is finished..

4.Temperature go higher than the setting value first time but it is returned to normal condition immediately.
  (Over-shoot condition)

5.In case that temperature goes down, it is differ as per the charater of the liquid and the ambient condition.

6.Be careful so that the contents are overflowed from the vessel. It makes the malfunction and damage
  of the instrument.

7.In case that the replacement of the sensor or the switch of internal and external sensor are needed, switch off the power and make it. If it is made under power ON, it cause a wrong operation.

To use Speed controller

1.Turn No.13 dial on the rear side to set the required speed.(front No.12)
    Note:

1)Speed is controlled from 100 to 1500 rpm by the dial.
  (Turn the dial clockwise, then speedis increased 10 by 10 rpm, and turn the dial counter clockwise,
    then speed is decreased 10 by 10 rpm)

2)To stop the speed, turn the dial counter clockwise till the end.

3)Set the required speed by dial, then it will arrive at the setting value in a few second and keep the
  constant speed by arithmetic logic unit.   (Smooth start function)

4)In initial operating, if the motor does not run, give the motor output fast and make it run until speed
    is arrive at 10rpm so that the motor runs.