Laboratory Equipment Manufacturer
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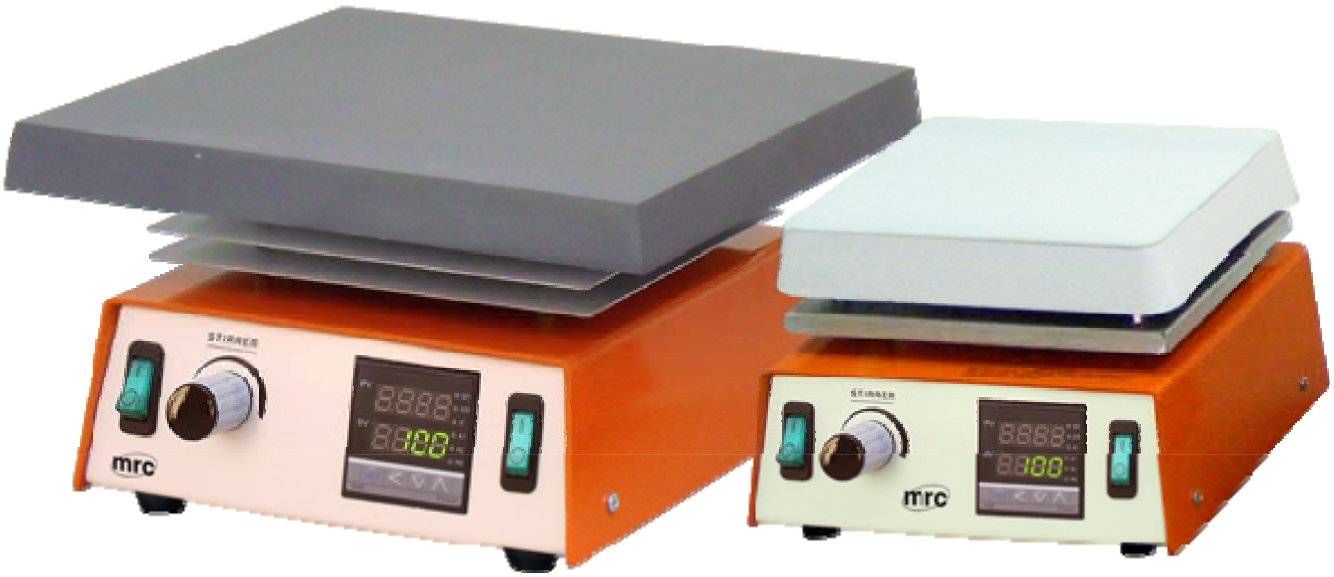
Operation Manual

MH-4D/GMH-5D/MHK-4D

DIGITAL MAGNETICSTIRRER



PLEASE READ THIS MANUAL CAREFULLY BEFORE OPERATION

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MRC.VER.01-10.13

DIGITAL HOT PLATE TYPE
OPERATION MANUAL

Specifications

Power - 230V, 50 Hz, 750W

Controller - FY400 - Thermocouple - K

Option - External/Internal Sensor - Metal plate only. Programable, RS232

Magnetic stirrer

Caution - There is hot surface even in off state please take care.

Important - Always use grounded power, connections.

- Before servicing disconnect power
- Use only authorized technician for service
- Do not use this instrument is placer there is explosion risks

Cleaning - To keep the plate clean you can use aluminum paper you can cover the Hot plate only but not the cooling plates under it.

No use of caustic soda in cleaning reagent

Stirring Mechanism

Make sure that stirring speed control is in off state
put inside the center of the cup
The magnet put the cup on the center of the plate increase stirring speed gradually.

Please read the following carefully before use:

- Do not use this product in a manner other than as stated in the Operating Conditions section of this manual as the protection provided by the equipment may be impaired.
- The plate temperature might remain dangerously high even after the heater was turned off.
  Don’t touch the plate and/or place any objects on top of it that are not meant to be heated.
- This product is designed for use in laboratory environments by persons knowledgeable in safe laboratory practices.
- Always wear safety glasses and other appropriate protective equipment when operating this product.
- The plate might be covered with aluminum foil to protect it, DO NOT cover any other part of the device and make sure that the radiation sheets underneath are untouched.
- The Aluminum topped plates are not designed to be used with metal containers.
  For heating of such containers it’s advisable to use a ceramic top hot plate.
- Connect only to grounded power source, make sure the voltage and frequency of your electrical outlet fits the requirements labeled on the device.
- Do not use in areas with explosive atmosphere, flammable/combustible liquids etc.
- Do not overweight the plate.
- Before cleaning the device, make sure to disconnect it from the power source.
- Do not immerse the product in any liquid.
- Position the product for use so that the power cord can be easily disconnected without having to move the product.

Heating Operation Principles

The heating element and a temperature sensor are located just beneath the top surface of the product. The microprocessor is responsible for regulating the heating produced by the heating element right beneath the plate surface. the microprocessor work is based upon the sensor temperature and the value set on the Heating Temperature Display. when the sensor temperature is not within range of the value set on the display, the display will FLASH. When the sensor temperature is within range, the value displayed will remain constantly ON. The Heating Temperature Display does not indicate the actual temperature of materials placed on top of the product or the actual temperature of the top surface.

When external temperature probe is connected to the hotplate, the closed loop control process described previously is extended to include temperature input from that probe . The microprocessor controlled heat, generated by the heating element, is based upon the sensor temperature located in the tip of the External Temperature Controller and the value set on the Heating Temperature Display. When the sensor temperature is not within range of the value set on the display, the display will FLASH. When the sensor temperature is within range, the value displayed will remain constantly ON. When the external temperature probe is connected to the product and properly placed into a liquid on the top surface, then the Heating Temperature Display does indicate and directly control the actual temperature of the liquid on the top surface.

Please note that the temperature of the liquid, measured by the external temperature probe, might be different then the temperature of the hotplate itself.

Operations

Connecting/Removing External Temperature Controller (Digital Thermostat models only)

1. Make sure that the stirrer and heater are both at OFF position (In some models, Check that both I/O switch are at O position).
2. Disconnect power cord.
3. Insert the temperature sensor (Thermocouple type K) into the yellow input at the back of the device.
4. See next section on how to set the thermostat controller to work with/without the external Temperature controller.

Installing Supportive Rod.

1. Make sure that the stirrer and heater are both at OFF position and make sure the surface is cold enough to touch (In some models, Check that both I/O switch are at O position).
2. Disconnect power cord.
3. Insert the rod into the holding loop at the back of the device (#).
4. screw the rod tightly into the loop.
5. make sure the device is stable and that it sits properly on the workbench.

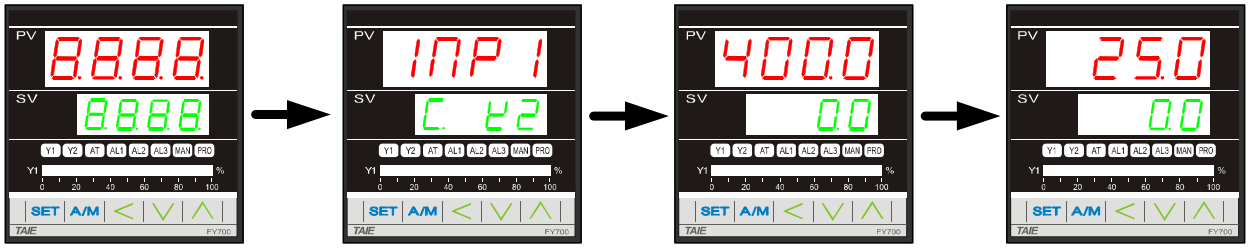
Using the stirrer (supported models only):

1. Make sure that the stirrer knob is at the OFF position before you insert the stirring magnet into the vessel (In some models, Check that the left side I/O switch is at O position).
2. Insert the stirring magnet slowly to the vessel and wait for it to settle in the button of the vessel.
   CAUTION, don't drop the stirring magnet to avoid splashes of hot liquids and chemicals.
3. Turn the stirring knob slowly to the desired speed (In some models, you'll need to turn on the stirrer I/O switch as well)
   Please note that the stirring speed might vary in accordance to the viscosity of the liquid.
4. before removing the stirring magnet, make sure that the stirring knob is back in the OFF position.
5. It's recommended to use forceps to get the stirring magnet out.

Operations

.1 Power On

Controller will display as following::



All LED and 7 segment displays will be lighted

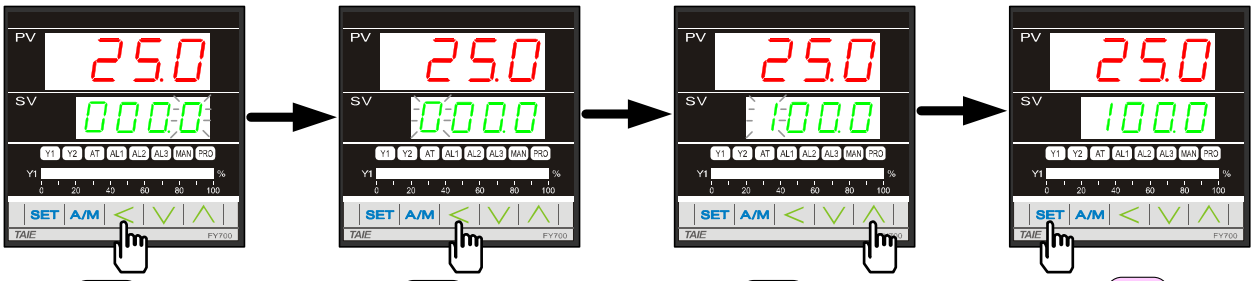
Display input type (K2)

Display range (0.0~400.0)

Ready for use

.2 Change the Set Value (SV)

Change SV from 0.0 to 100.0



Press < key. The SV number started to flash. The flashing digit indicates which digit can be set.

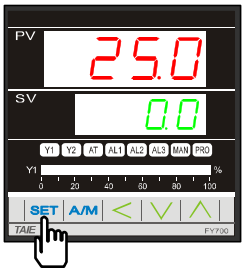
Press < key to select the hundreds digit.

Press ∧ key to change the number to 1

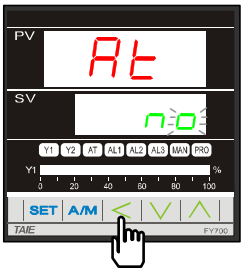
Press SET key to store the new set value.

.3 Autotuning (AT)

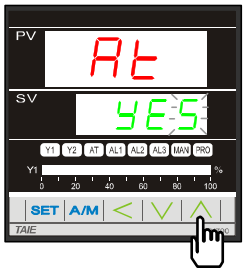
Use AT function to automatically calculate and set the optimize PID value for your system.



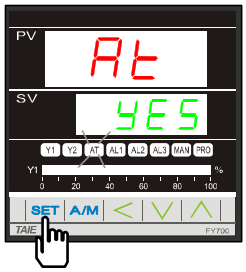
Press SET key
to display parameter AT.



Press < key
to change AT setting

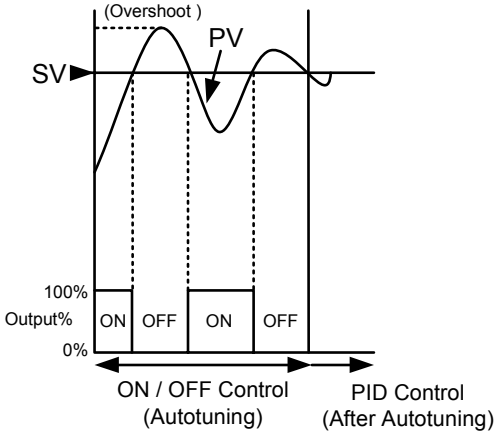


Press ∧ key
change AT to " YES "



Press SET key
Start auto tuning
(AT lamp will be
lighted on)

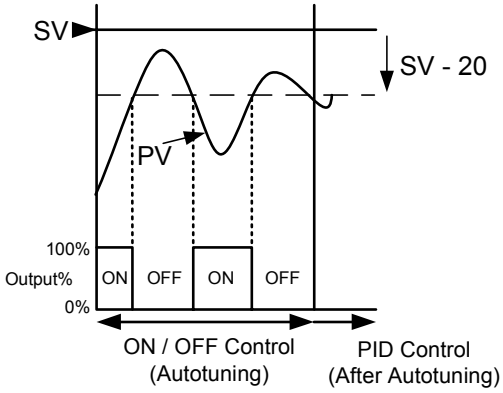
Autotuning
ATVL=0



Autotuning
ATVL=20

*Set ATVL to prevent overshoot occurred during autotuning process.

To set ATVL ,press SET key 5 seconds to enter Level 2 (PID Level) and then change the value.



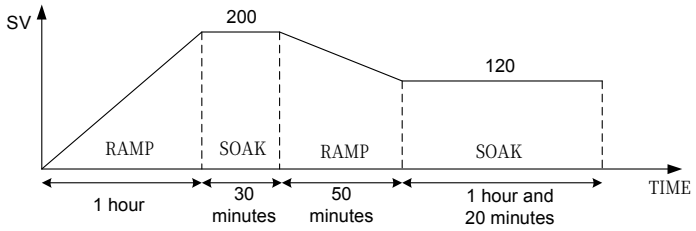
Autotuning failure

Possible cause 1： ATVL is too big. (If not sure, set ATVL=0)
Possible cause 2：Calculation time is too long.
(Set PID parameter manually)

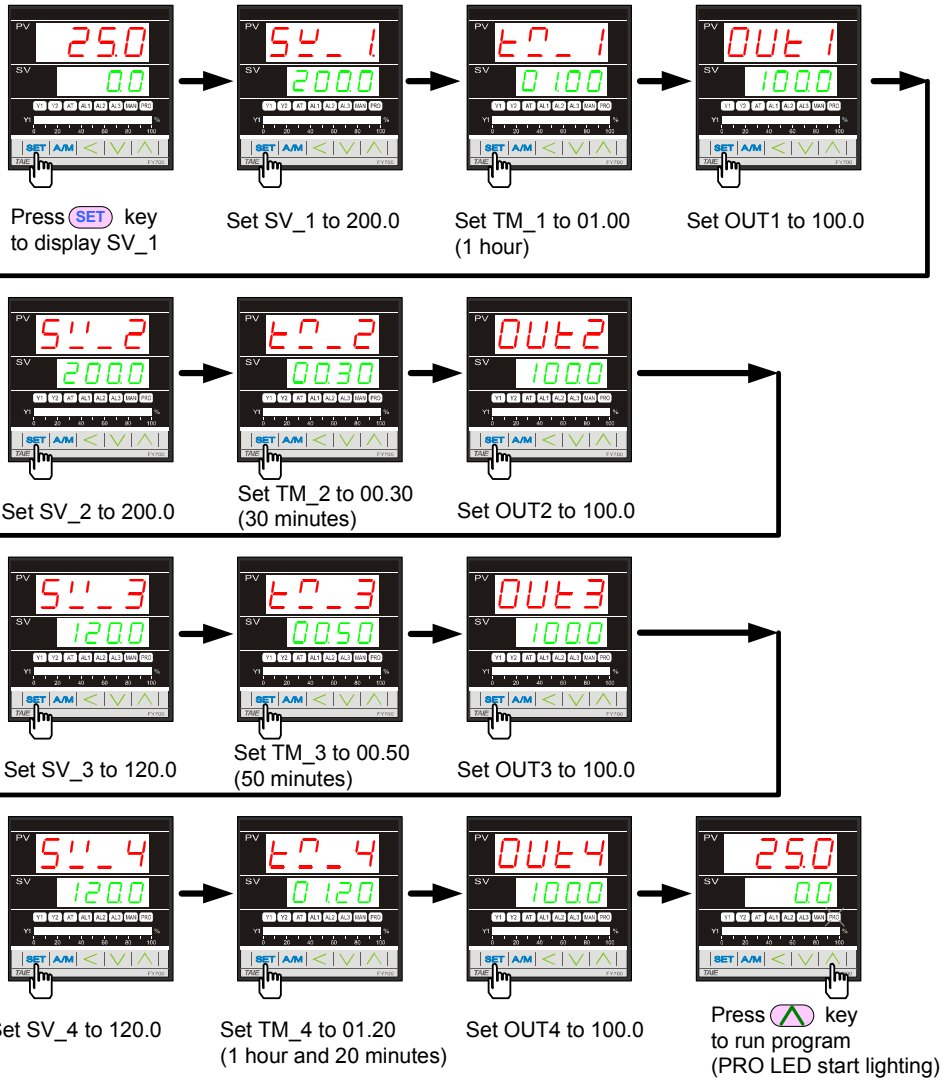
.4 Programmable RAMP / SOAK

ONLY AVAILABLE WITH PROGRAMABLE OPTION

Assume the temperature profile is as below (use total 4 segments)



Please operate conroller as following steps:



Maintenance

Caution, Disconnect the power cord from the power source before performing any maintenance on the device.

- It is important to keep this product dry and clean.
- Remove minor exterior liquid spills promptly.
- Clean exterior surfaces with a nonabrasive cleaner. Do not reconnect product to power input until all cleaned surfaces have dried.
- If liquid or wet solid material gets inside the product, immediately disconnect power to the product and discontinue use.
- Inspect the power cord regularly and replace if damaged. Use only replacement power cords available from authorized distributors.
- Do not immerse the product for cleaning.