

DIGITAL DISPLAY MAGNETIC STIRRER WITH HOTPLATE



YQ-701017 Hotplate Stirrer with Digital Display

YQ-701016 Hotplate Stirrer

I. Introduction

A magnetic stirrer is a laboratory instrument used for mixing liquids. It is mainly used for stirring, or heating and stirring low viscosity liquid or solid liquid mixture at the same time. Its basic principle is repulsion and attraction of magnetic, using magnetic field to push the magnetic stirring bar in the container to perform circumferential operation, so as to achieve the purpose of mixing liquid. With the heating temperature control system, it can heat and control sample temperature according to the specific experimental requirements, maintaining the temperature for the experimental conditions, ensuring liquid mixing meets the experimental requirements.

II. Features

1. YQ-701016 with ceramic coating aluminum alloy working plate: good looking, uniform thermal conduction, high temperature resistance and corrosion resistance. The Max is temperature 350°C, accuracy (±1°C).



2. LCD Display: Clearly and intuitively displays temperature and revolution. Timing function enables you to control temperature and revolution accurately.



3. With temperature sensor, you can monitor and control sample temperature in real time.



4. Adjustable sensor fixing bracket makes sensor monitoring and controlling more convenient.



5. Waterproof soft button contributes to comfortable touch feeling, and makes control more accurate.

Preface

Thank you for purchasing our products: Hotplate / Magnetic Stirrer. Users should read this Manual carefully, follow the instructions and procedures, and beware of all the cautions when using this instrument.

- Connect the device to an earthed power supply to ensure safety of machine and experiment; connect the power as the machine required.
- This equipment is forbidden to use in flammable and explosive, poisonous and strong corrosive experiments.
- Make sure horizontal installation.
- Non-professionals are not allowed to disassemble and repair this machine.
- Pay attention to the set temperature while dealing with flammable matters.
- Make sure to dry the resin container. If the temperature is setting too high, the container would be dissolved and then fall on the heater to cause fire.
- Overfilling will lead to overheat of working parts, which will dissolve the flammable material and cause fire.
- While the machine is working, DO NOT touch the top, window and exhaust port of the device to avoid high-temperature burns.
- Read the instruction book before operation.

Table 1

- When working, wear the personal guard to avoid the risk from: Splashing and evaporation of liquids. Release of toxic or combustible gases.
- Set up the instrument in a spacious area on a stable, clean, non-slip, dry and fireproof surface, do not operate the instrument in explosive atmospheres, with hazardous substances or under water.
- Gradually accelerate the speed if:
  - The stirring bar is breakaway due to the high speed.
  - The instrument is not running smoothly, or container moves on the base plate.
- Temperature must always be set to at least 25°C lower than the fire point of the media used.
- Beware of hazards due to:
  - Flammable material or media with a low boiling temperature
  - Overfilling of media
  - Unsafe container
- Process pathogenic materials only in closed vessels.
- If the case of the stirrer bar is PTFE, please note:
  - Elemental fluorine, three fluoride and alkali metals will corrode the PTFE and Halogen alkenes make it expansion at room temperature. Molten alkali, alkaline earth metals or their solution, as well as the power in second and third ethnic of the Periodic Table of elements will have chemical reaction with PTFE when temperature reaches 300~400°C.
- Check the instrument and accessories for damage before each time you use them. Do not use damaged components. Safe operation is only guaranteed with the accessories described in the "Accessories" chapter. Accessories must be securely attached to the device and cannot come off by themselves. Always disconnect the plug before fitting accessories.
- Ensure that the external temperature sensor is inserted in the media to a depth of at least 20mm.
- When using metal vessels, do not place the temperature sensors on the bottom of the vessel. Placing sensors on the vessel bottom can cause excessively high temperature to be measured especially in media which have poor conductivity. The tip of the measuring sensor must be at least 5mm from the vessel bottom, a distance of 10mm is ideal.
- The instrument can only be disconnected from the main power supply by pulling out the mains plug or the connector plug.
- The voltage stated on the label must correspond to the main power supply.
- Ensure that the mains power supply cable does not touch the heating base plate. Do not cover the device.
- Keep away from high magnetic field.
- Observe the minimum distances between device and device, wall and devices, distance above the assembly to make sure the distance is simultaneously excessive to 100 mm.



Proper Uses

The instrument is designed for mixing and / or heating liquids in schools, laboratories or factories. This device is not suitable for using in residential areas or other constraints mentioned in Chapter 1.

Inspections

1. Receiving Inspection
- Unpack the equipment carefully and check for any damages that may be caused during transport. If damaged, please contact manufacturer for technical support.
- Note: If there is any apparent damage to the system, Please do not plug it into the power line.

2. Listing of Items  
The packing includes the following items:

With Magnetic Stirrer

Items	Qty	Items	Qty
Main unit	1	Main unit	1
Power Cable	1	Power Cable	1
Stirrer bar	1	User Manual	1
User Manual	1	Rack with Rods	1
Rack with Rods	1	Fuse	1
Fuse	1		

Without Magnetic Stirrer

Table 2

Please check the instrument and appendix with the packing list when you first open the instrument packing case. If you find there is something wrong with the instrument and the appendix, do contact the vendor or the producer.

III Operating Modes

1. Magnetic stirrer with hot plate operation:

- Place the equipment on worktable, and then put the container with liquid on the hotplate.
- Switch on the power accords with the machine, then power indicator light will be lightened; turn on the power of regulation knob, and turn the knob clockwise, then the working indicator light will be lightened; in the process of regulating, the light intensity changes according to different regulation position, and the temperature rises as well.

2. Digital type operation:

- Panel indication
- Definitions of button:
- 1. "TEMP" button: In the non-set state, click the button can set or view the temperature set point and its internal parameters.
- 2. "SPEED" button: In the non-set state, click the button can set or view the speed set point and its internal parameters.
- 3. "TIME" button: In the non-set state, click the button can set all-running time. End of the timer runs, click the button can restart the temperature control.
- 4. "INC/SHIFT" button: In the non-set state, long press this button for 3 seconds to switch between two channel temperature and automatically save. In the setting status, click the button to increase the set value. If press and hold the button, the set value will increase continuously.
- 5. "DEC/AT" button: In the non-set state, long press this button for 6 seconds to enter temperature self-tuning selection state. In the setting state, click the button to reduce the set value. If press and hold the button, the set value will reduce continuously.
- 6. "STIR" button: Start or stop stirring.

Operation and using

1. When the controller is powered on, the up window of the controller shows the graduation and the instrument model (P2-C); the middle window of the controller shows the versioning (FSv1). The controller will get into the normal view state after 3 seconds.

2. Temperature, Speed and Time Setting  
In the non-set state, press the "TEMP" button to get into the temperature setting state. The display window shows the temperature setting state. Users can edit the temperature setting value by "INC/SHIFT", "DEC/AT" buttons. Then press the "TEMP" button again, the controller will return to normal view state and the setting value will be saved automatically. The setting way of speed and time is same as temperature.

3. Timing Function  
Using countdown timing, timing function has two modes to be chosen, operation timing and constant temperature timing. Time unit can be hours or minutes. Buzzer time after timing up can be set. The detailed setting method can be found in the internal parameter table 1. When the time is set to "0", it indicates the controller will run continuously.

When the time is over "0", if you choose the operation timing, the controller begins to time once powered on. If you choose constant temperature timing, the controller begins to time until the temperature reaches the set value. During timing, the time window of controller displays the rest running time and the "TIME" indicator light flashes. Once time period is over, the time window of controller display will prompt "END", the speed window of controller display will prompt "OFF", and the buzzer will sound. At this time, the controller can be restart by resetting the timer time.

4. Stir (speed) Function  
When the controller is powered on, stir function will not be disabled and the middle window will display "OFF". Click "STIR" button will enable stir function with the middle window display speed measurements. Click "STIR" button again, it will return to stop state.

5. Temperature Control Function  
In the non-set state, long press this button for 3 seconds to switch between two channel temperature. When switching to the first temperature control, the prompt "1" light, and switching to the second temperature control, the prompt "2" light.

6. Over Temperature Alarm  
When there is temperature deviation, over temperature alarm occurs, buzzer beep sound prompts, "ALMI" character lit, then disconnect the heating output. If temperature setting value and the alarm change, the "ALMI" character will lit, but the buzzer will not prompt.

7. Abnormal alarm for temperature measurement  
If the up window of the controller show the prompt "E-X", it indicates that the temperature sensor has some faults or temperature exceeds the measuring range or the controller itself is faulty, the controller will cut off the heat-output automatically, the buzzer will sounds continuously, "ALMI" indicator light is lit on, Please check the temperature sensor and its wiring carefully.  
E-1: indicates the first way temperature fault (PT100 thermal resistance);  
E-2: indicates the second way temperature fault (K type thermocouple);  
E-3: indicates the environment temperature fault.  
8. Press any key to mute the buzzer tweet.

Auto-tuning of PID

Use auto-tuning function when the temperature control is not good. Temperature will have great impact during Auto-tuning process. Users should understand this before using that function.  
In the non-set state, press the "DEC/AT" button for 6s, the controller will get into the pre-Auto-tuning state. The up window of the controller will prompt "AT". The middle window of the controller will show the values. Users can press "DEC" or "INC" button to switch prompting "0" or "1". When it prompts "1", the controller will run the auto-tuning program by pressing the "TEMP" button. The "AT" light will flash. When the auto-tuning ends, the light will stop flashing and parameter value will save automatically. In auto-tuning process, press "DEC/AT" button for another 6s, the controller will stop the auto-tuning program.  
During the Auto-tuning process, if Over-temperature alarms while the buzzer does not beep and "ALMI" warning light does not lit, the Heat-Out will be cut off; the "TEMP" button will be invalid.  
Internal parameters settings  
In the non-set state, press "TEMP" button for 3s, the controller will display password prompt "Lc". Adjust password to required value, then press "TEMP" button again, it will run into the internal parameter setting state. If press the "TEMP" button for another 3s, it will back to running state and the setting value will be saved automatically.

Parameter table -1

Parameter prompt	Name	Instruction of the function	(Setting range) factory set value
Lc	Password key	When Lc=3, enter the next parameters.	0
P	Proportional band	Adjustment of proportional function.	(0.1~300.0°C)30.0
I	Integration time	Adjustment of integration function.	(1~1000s) 200
d	Differential time	Adjustment of differential function.	(0~1000s) 150
T	Control cycle	The temperature control cycle.	(1~60s) 5
doT1	Sensitivity of the first sensor	0: SP without a decimal point. 1: SP has a decimal point.	(0~1) 0
AH1	Over-temp alarm in the first sensor	Works when selecting the first channel sensor. If "SV>(SP+AH1)", the "ALMI" light will turn on. The buzzer sounds and the heating output will turn off.	(0~100.0°C)20.0
Pb1	Zero point adjust in the first sensor	Works when selecting the first channel sensor. For error correction generated during low temperature measurement. Pb1= actual value - measure value	(-50.0~50.0°C)0.0
PL1	Full point adjust in the first sensor	Works when selecting the first channel sensor. For error correction generated during high temperature measurement. PL1=1000*(actual value - measure value)/ measure value	(-999~999) 0
SPH	Maximum set point	The maximum temperature set point.	(0~400.0°C)400.0

Parameter table -2

Parameter prompt	Name	Instruction of the function	(Setting range) factory set value
Lc	Password key	When Lc = 9, enter the next parameters.	0
FoP	Temp-point of fan-on	If "Ambient temperature > FoP", fan starts to work.	(0~80°C) 40
FcP	Temp-point of fan-off	If "Ambient temperature < FcP", fan stops to work.	(0~80°C) 30
nDt	Timer mode	0: With timer function, the under window displays the running time when the measured temperature reaches to the setting value. 1: With timer function, the under window always displays the running time.	(0~1) 1
Hn	Timer unit	0: Minute; 1: Hour	(0~1) 0
SPd	Constant temp Deviation	When SP >= (SV - Spd), the Controller get into the Constant-temp State.	(0.1~100.0°C) 0.5
EST	Timing Over Buzzer time	If the timing work is over, the Buzzer will beep for EST seconds. Note: If EST=9999, it means the buzzer will beep continuously.	(0~9999s) 5
PoT	"STIR" button effective time	"STIR" button will be effective until the button is pressed continuously Pot seconds.	(0~10s) 0
AH2	Over-temp alarm in the second sensor	When selecting the second channel sensor work. If "SV>(SP+AH2)", the "ALMI" light turns on. The buzzer sounds and the heating output turns off.	(0~100°C) 20
Pb2	Zero point adjust in the second sensor	When selecting the second channel sensor work. For error correction generated when the low temperature measurement. Pb2= actual value - measure value	(-50~50°C) 0
PI2	Full point adjust in the second sensor	When selecting the second channel sensor, if "SV>(SP+AH2)", the "ALMI" light will turn on. The buzzer sounds and the heating output will turn off. PI2 = 1000*(actual value - measure value)/ measure value.	(-999~999) 0

Parameter table -3

Parameter prompt	Name	Instruction of the function	(Setting range) factory set value
Lc	Password key	When Lc = 27, enter the next parameters.	0
Fc	Temperature unit	0: Centigrade; 1: Fahrenheit.	(0~1) 0

Parameter table -4

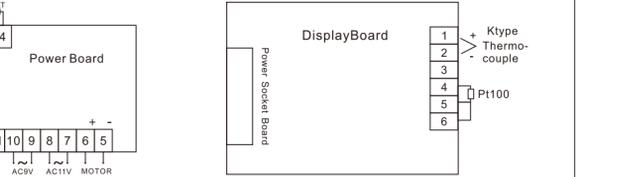
Parameter prompt	Name	Instruction of the function	(Setting range) factory set value
Lc	Password key	When Lc = 27, enter the next parameters.	0
rST	Reset to default values	0: cancel to reset to default value; 1: confirm to reset to default value.	(0~1) 0

Parameter table -5

Parameter prompt	Name	Instruction of the function	(Setting range) factory set value
Lc	Password key	When Lc = 3, enter the next parameters.	0
Pd	Proportional band	Adjustment of proportional function.	(1~99) 40
Id	Integration time	Adjustment of integration function.	(1~99) 2
InT	Speed rise time	Time required when speed from minimum to maximum.	(5~60) 10
dET	Slow down time	Time required when speed from maximum to minimum.	(5~60) 10
SdL	Minimum set point	The minimum speed set point.	(60~SdH) 200
SdH	Maximum set point	The maximum speed set point.	(SdL~6000) 2000
PoL	Pole pairs	Motor pole pairs	(1~32) 1
db	False range	False speed display range.	(0~99) 5

IV. Wiring

Special Notice:  
1. In order to reduce interference to the instrument when wiring, please pay attention to the separation of high voltage lines (such as power lines and load lines) and low voltage lines (such as sensor signal lines).  
2. 'L' and 'N' only represent the controller power supply, and the actual wiring does not need to distinguish live and earth lines.



V. Warranty

This instrument is warranted to be free from defects in materials and workmanship under normal use and service, for a period of 12 months from the date of invoice. The warranty is extended only to the original purchaser. It shall not apply to any product or parts which have been damaged on account of improper installation, improper connections, misuse, accident or abnormal conditions of operation.

For claim under the warranty, please contact with us, enclosing the invoice copy and giving reasons for the claim. You may send the instrument directly to us or we can send you the spare parts in your next order to help resolve your problem. For kind reminder, you would be solely liable for freight costs.

VI. Faults

- Instruments fail to power ON
  - Check whether the power cable is plugged
  - Check whether the fuse is broken or loose
  - Fault in power on self test
  - Switch OFF the unit, then switch ON and reset the instruments to factory default setting
- Temperature cannot reach set point
  - Check whether the safety temperature value is set too low
  - Stir speed cannot reach set point
  - Excessive medium viscosity may cause abnormal speed reduction of the motor
  - Heating cannot be started after set the temperature, or stirring cannot be started when adjust the control knob
  - Check the control panel has damages which may have arisen during transport

If these faults can't be resolved, please set the instruments to factory default setting, or take them to technical service center, or contact with the manufacturer.

VI. Maintenance and Cleaning

- Proper maintenance can keep instruments working in a good state and lengthen its lifetime.
- Do not spray cleanser into instrument when cleaning.
- Unplug the power line when cleaning.
- Only use cleansers advised below:

Dyes	Isopropyl alcohol
Construction materials	Water containing tenside
Cosmetics	Isopropyl alcohol & water containing tenside
Foodstuffs	Isopropyl alcohol & water containing tenside
Fuels	Water containing tenside

- Wear the proper protective gloves during cleaning of the instrument.
- Before using other method for cleaning or decontamination, the user must contact the manufacturer ascertain that this method does not destroy the instrument.
- The enamel makes the hotplate easier to care for and more resistant to acids and bases. Because of it, however, the heating plate is also more susceptible to extreme fluctuations in temperature and the force of impact. This can form cracks or cause coating flake off.
- To avoid contamination of hazardous, the instrument must be cleaned and put into initial packaging carton before being sent to service for repair.
- Use the instrument in a dry clean room with stable temperature.

VII. Storage and Transportation

- Keep it in dry and clean room with good ventilation and no corrosive gas
- Prevent it from wetting by the rain and avoid violent collision in transportation.