

# **Overhead Stirrer**

**(User Manual)**

## **Contents**

<b>Contents</b> .....	1
<b>Preface</b> .....	2
<b>Warranty</b> .....	2
<b>1. Safety Instructions</b> .....	3
<b>2. Proper Use</b> .....	3
<b>3. Inspection</b> .....	5
<b>3.1 Receiving Inspection</b> .....	5
<b>3.2 Listing of Items</b> .....	5
<b>4. Trial run</b> .....	6
<b>5. Digital type operation</b> .....	6
<b>5.1 The Main Technological Qualification</b> .....	6
<b>5.2 Control Panel Instructions</b> .....	7
<b>5.3. Operation and Use of Methods</b> .....	9
<b>6. Wiring</b> .....	11
<b>7.Faults</b> .....	12
<b>8.Maintenance and Cleaning</b> .....	13
<b>9.Storage and transportation</b> .....	13
<b>10.Main technical parameters</b> .....	14
<b>11.Working condition</b> .....	14










## **Preface**

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

## **Warranty**

You have purchased a Faithful instrument. 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. You may also send the instrument direct to our works or we send you the spare parts to help you resolve this problem in next order, enclosing the invoice copy and by giving reasons for the claim. You would be solely liable for freight costs.

## 1 Safety Instructions

	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 forbid to use in inflammable 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 the inflammable matters.
	Make sure dry the resin container, if the temperature is setting too high by accident, the container would be dissolved and then fall on the heater to cause fire.
	Overfilled of sample will lead to overheat of working room under parts, which will dissolve the inflammable material and cause fire.
	While the machine is working, don't touch the top, window and exhaust port of the device to protect from 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 increase the speed, reduce the speed if:
  - The stirring bar breakaway because of too 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.
- Check the instrument and accessories before hand for damage 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.

- 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 plate. Do not cover the device.

## 2 Proper Uses

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

## 3 Inspections

### 3.1 Receiving Inspection

Unpack the equipment carefully and check for any damages which may have arisen during transport. If it happens, 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.

### 3.2 Listing of Items

The packing includes the following items:

<u>Items</u>	<u>Qty</u>
<u>Main unit</u>	<u>1</u>
<u>Power Cable</u>	<u>1</u>
<u>User Manual</u>	<u>1</u>
<u>Rack with Rods</u>	<u>1</u>

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.

## 4 Trial Runs

- Make sure the required operating voltage and power supply voltage match.
- Ensure the socket must be earthed reliably.
- Ensure the power be off
- Plug in the power cable, ensure the power be on and begin initializing.
- Add the medium into the vessel with a stirring bar if with the magnetic stirrer function.
- Put the vessel on the work plate.
- Set the rated stirring speed and start stirring.
- Observe LCD display.
- Stop the stirring functions.

If these operations above are normal, the device is ready to operate. If these operations are not normal, the device may be damaged during transportation, please contact manufacture for technical support.

## 5 Digital type operation:

### 5.1 The Main Technological Qualification

1. Temperature Measure Range: -150.0-300.0 °C
2. Speed Setting Range: 20-2000 RPM
3. Time Setting Range: 0-9999 Min\Hour
4. The Error of Speed Measurement: < 1%
5. Working Condition: Voltage of Power Supply: 220V±10%  
Environmental Temperature: 0-50°C  
Relative Humidity: < 85%RH

### 5.2 Control Panel Instructions

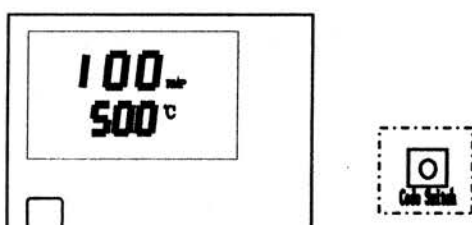


Figure 1

1. "Run/Stop Key": Press the key, you can run or stop the controller.
2. "Code Switch": Setting the speed value and inter parameters.

### Operation and Use of Methods

1. On power-up, the controller display **FS2P** on the upper display window and **S1.1** on the lower display window. After three seconds, the controller will be into normal display status.
2. **Speed set and view** (Note: Refer to the internal parameters table-4: **nod** parameter)
  - 1) When speed Set Mode is 0:
    - 1> When the timing function is disabled (internal parameters table-3: **ET=0**)

Press the **Code Switch** to enter setting mode. The controller displays **-SP-** on the upper display window and speed set value on the lower display window. Rotate the **Code Switch** to change the set value that you want. Press **Code Switch** again, the controller will exit setting mode, and set value will be auto saved.
    - 2> When the timing function is allowed (Internal parameters table-3: **ET=1**)
      - ① When the motor is allowed forward or reverse running  
(Internal parameters table-2: **Fr=0** or **Fr=1**)

Press the **Code Switch** to enter setting mode. The controller displays **-SP-** on the upper display window and speed set value on the lower display window. Rotate the **Code Switch** to change the set value that you want. Press **Code Switch** again, the controller displays **-ST-** on the upper display window and time set value on the lower display window. Rotate the **Code Switch** to change the set value that you want. Press **Code Switch** again, the controller will exit setting mode, and set value will be auto saved.
      - ② When the motor is allowed forward and reverse running  
(Internal parameters table-2: **Fr=2**)

Press the **Code Switch** to enter setting mode. The controller displays **-SP-** on the upper display window and speed set value on the lower display window. Rotate the **Code Switch** to change the set value that you want.

Press **Code Switch** again, the controller displays **-ST-** on the upper display window and total time set value on the lower display window.

Press **Code Switch** again, the controller displays **-FT-** on the upper display window and forward time set value on the lower display window.

Press **Code Switch** again, the controller displays **-PT-** on the upper display window and stop time set value on the lower display window.

Press **Code Switch** again, the controller displays **-RT-** on the upper display window and reverse time set value on the lower display window.

When the total time is 0, it indicates there is no timing function, the

controller continuous running. When the total time is not 0, after the timer stops running, the lower display area displays **End**. Press **Run/Stop** key, you can restart the controller running.

2) When speed Set Mode is 1:

Rotate the **Code Switch** to enter setting mode. The controller displays **-SP-** on the upper display window and speed set value on the lower display window. Rotate the **Code Switch** to change the set value that you want. After 1 second, the controller will exit setting mode, and speed set value will be auto saved. On stop state, Press **Run/Stop** key, **Run** identifier lights, the controller will start running. On running state, Press **Run/Stop** key, **Stop** identifier lights, the controller will stop running.

3) When speed Set Mode is 2:

Rotate the **Code Switch** to enter setting mode. The controller displays **-SP-** on the upper display window and speed set value on the lower display window. Rotate the **Code Switch** to change the set value that you want. After 1 second, the controller will exit setting mode, and set value will be auto saved. The controller will run or stop automatically according to the speed set value.

2. When the controller happen stall, Hall logical error, under bus voltage, over bus voltage, communication failure, the controller will automatically stop running, and displays the Fault code.

**Fault Code Description:**

- 1) The upper window displays **Er-1: Power module Fault**
- 2) The upper window displays **Er-2: Stall Fault**
- 3) The upper window displays **Er-3: Hall Fault**
- 4) The upper window displays **Er-4: Under bus voltage Fault**
- 5) The upper window displays **Er-5: Over bus voltage Fault**
- 6) The upper window displays **Er-6: Communication failure Fault**

### 5.3. Operation and Use of Methods

Press **Code Switch** for three seconds, the controller display **Lc** on the upper display window, password value is displayed on the lower display window. Rotate the **Code Switch** to change the password value. Press **Code Switch** again, if the password value is correct, controller will automatically enter the internal speed parameters state. Press **Code Switch** for three seconds, you can exit the internal speed parameters state, and each parameter will be auto saved.

Internal parameters table-1

Parameter indicator	Name	Instruction of the function	Setting range
<b>Lc-</b>	password	<b>Lc=3</b> ,enter the parameters list	0
<b>Pd-</b>	Proportional	Adjustment of proportional function	(1~100) 10
<b>Id-</b>	Integration	Adjustment of integration function	(1~100) 5
<b>InT</b>	Acceleration time	The time of from 0 to maximum speed	(1~60) 10
<b>dET</b>	Deceleration time	The time of from maximum speed to 0	(1~60) 10
<b>SdL</b>	Minimum set value	The speed minimum set value	(20~6000) 20

Internal parameters table-2



Parameter indicator	Name	Instruction of the function	Setting range
Lc-	password	Lc=9,enter the parameters list	0
EAr	Gear ratio	Large diameter gear/pinion diameter	(1.0~10.0) 1.0
PoL	Motor poles	The motor poles	(1~32) 4
dIF	Motor reference direction	0: clockwise rotation 1: counterclockwise rotation	(0~1) 0
FdS	Speed feedback	Speed feedback value	(0.1~10.0) 1.0
FdC	Current feedback	Speed feedback value	(0.1~10.0) 1.0
FrE	Carrier Frequency	PWM carrier Frequency	(5~15) 15
Po-	Motor Power	Motor Power	(1~750) 40
CL-	Over current multiples	Allow rated current multiples	(1.0~10.0) 5.0
Fr-	Motor rotation direction	0: Motor runs only clockwise 1: Motor runs only counterclockwise 2: Motor runs only forward or reverse	(0~2) 0
db-	Speed dead zone	The dead zone of speed	(0~100) 5

Internal parameters table-3

Parameter indicator	Name	Instruction of the function	Setting range
Lc-	password	Lc=101,enter the parameters list	0
Pb-	Zero correction	Update the measurement error Pb= actual value – measured value	(-99.9~99.9) 0.0
PK-	Full correction	Update the measurement error PK=1000×(actual value—measured value)/measured value	(-999~999) 0
SPL	Minimum set value	The temperature minimum set value	(-150.0~0.0) -150.0 °C
SPL	Minimum set value	The temperature minimum set value	(-150.0~0.0) -150.0 °C
SPH	Maximum set value	The temperature maximum set value	(0.0~300.0) 300.0 °C
dot	Decimal display	0: Disable decimal display 1: Enable decimal display	(0~1) 1
TSn	Temperature sensor selection	0: Disable temperature sensor 1: Enable temperature sensor	(0~1) 0

Internal parameters table-4

Parameter indicator	Name	Instruction of the function	Setting range
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indicator			
Lc-	password	Lc=103,enter the parameters list	0
ET-	Timing selection	0: Disable timing 1: Enable timing	(0~1) 0
Hn-	Timing Mode	0: Minute timing 1: Hour timing	(0~1) 0
rT-	Time Correction	Correction value = 【 Running time (second) -Actual time (second)】 *10 / Actual time (minute)	(-999~999) 0

Internal parameters table-5

Parameter indicator	Name	Instruction of the function	Setting range
Lc-	password	Lc=103,enter the parameters list	0
nod	Speed setting mode	0 : Press the <b>Code Switch</b> to set speed, Press <b>Run/Stop</b> key to control motor run or stop 1 : Rotate the <b>Code Switch</b> to set speed, Press <b>Run/Stop</b> key to control motor run or stop 2 : Rotate the <b>Code Switch</b> to set speed, according to set speed to control motor run or stop	(0~2) 0

Internal parameters table-6

Parameter indicator	Name	Instruction of the function	Setting range
Lc-	password	Lc=110,enter the parameters list	0
rEST	Restore factory parameter	Restore parameters to default value	(0~1) 0

## 6. Wiring

### Display Board Wiring

### Driver Board Wiring

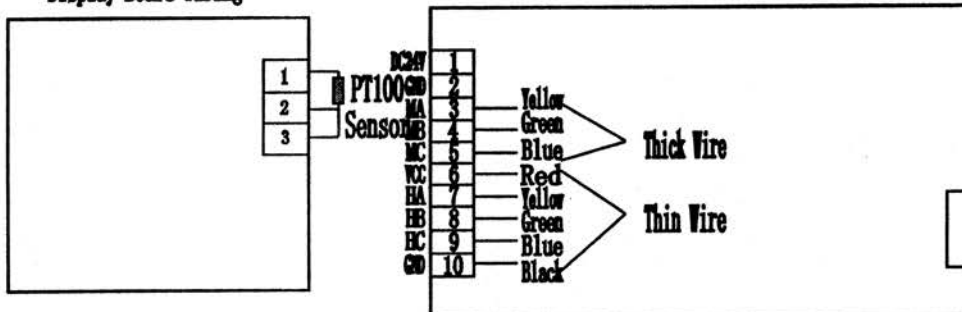


Figure 6

## 7 Faults

Instruments can't be 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 are not resolved, please set the instruments to factory default setting, or take the unit to your technical service center, or contact with the manufacturer.

## 8 Maintenance and Cleaning

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

<u>Dyes</u>	<u>Isopropyl alcohol</u>
<u>Construction materials</u>	<u>Water containing tenside/ isopropyl alcohol</u>
<u>Cosmetics</u>	<u>water containing tenside/ isopropyl alcohol</u>
<u>Foodstuffs</u>	<u>Water containing tenside</u>
<u>Fuels</u>	<u>Water containing tenside</u>

Table 5

- 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 result in cracks forming or the coating flaking off.
- The instrument must be cleaned and put it into the initial packaging carton before sending to service for repair, avoiding the contamination of hazardous.
- Use the instrument in a dry clean room and temperature stable environment.

## 9 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.

## 10 Main technical parameters

Model	OS20	OS20-PRO	OS40-PRO
Voltage	100-240V/50-60HZ		
Power (W)	60	60	80
Max. capacity (L)	20	20	40
Speed Accuracy (r.p.m)	-----	±1	±1
Speed Display	-----	±1	±1
Speed Range (r.p.m)	100-2500		
Plate Size (mm)	200*300	200*300	200*300

## 11 Working condition

Ambient temperature: 5~40℃;

Ambient humidity: ≤90%;

Voltage: 220V±10%, 50/60Hz or 110V+/-10%, 50/60Hz