TP-S30 Lab Spray Dryer

Operation Instruction

Thanks for your valuable trust and great support to TOPTION INSTRUMENT CO.,LTD, TOPTION brand spray drying machine through CE ISO reliable quality certification. Make your research more accurate & efficient is our mission.

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1. Spray drying machine structure design:

1	Atomizer	2	Large hoop
3	The exhaust pipe	4	Locking nut
5	Cyclone separator	6	No. 1 hoop
7	Collection bottle	8	Large hoop
9	Peristaltic pump	10	Drying chamber
11	Touchscreen	12	No. 2 hoop
13	The power switch	14	The feed tube
15	No.3 hoop	16	Collection pipe

2. Technical parameters of lab spray dryer

Air inlet temperature control	50～300℃	Air outlet temperature control	50～140℃
Evaporated water	3000mL/H	The largest feed rate	2000 ml/h
Electric heater	3.5KW AC220V	Draught fan	0.75KW
Maximum quantity of wind	5.6m^3/min	Maximum air pressure	1020Pa
Air compressor	0.75KW, he largest gas production 4.2 m^3/h	Working pressure of air compressor	2～4Bar
Equipment external dimensions	800*900*1450 （mm）L*W*H	Nozzle diameter	1.00mm
Equipment Weight	180KG	Operating environment temp.	10～40℃

Warning: this laboratory spray dryer applies only the aqueous solution material, organic solvent is disabled.

3. Random Component

Items	Name	Quantity
1	Stainless steel drying chamber	1
2	Stainless steel cyclone separator	1
3	Stainless steel sample collection bottle	1
4	Stainless steel sample collection tube	1
5	Transporting the silicone tube 6mm	2m
6	Spray pistol	1
7	Clamp (Stainless steel)	7

4. Installation Instructions

1) The installation of the Glass kiln:

Prop up the Glass kiln and then inserted into the fixed plate (PTFE in white on the block) , a nd lock the handle.

2) The installation of cyclone separator:

Fit the cyclone separator nut, seal ring and stainless steel gasket into the air outlet of cyclon e separator, and then inserted into the air outlet of device, adjust the position of the air outle tof the Glass kiln and the inlet of the cyclone separator, make two mouth straight alignmen t,by connecting two mouth clamp, at last tightening nut tightening cyclone separator.

3) Connect the aggregate bottle to the cyclone separator with threaded connector.

4) Connect the aggregate tube to the Glass kiln with threaded connector.

5) Connect the spray chamber into the device, and then connect 4 mm trachea (using for n eedle) to 6 mm blue trachea (using for spray).

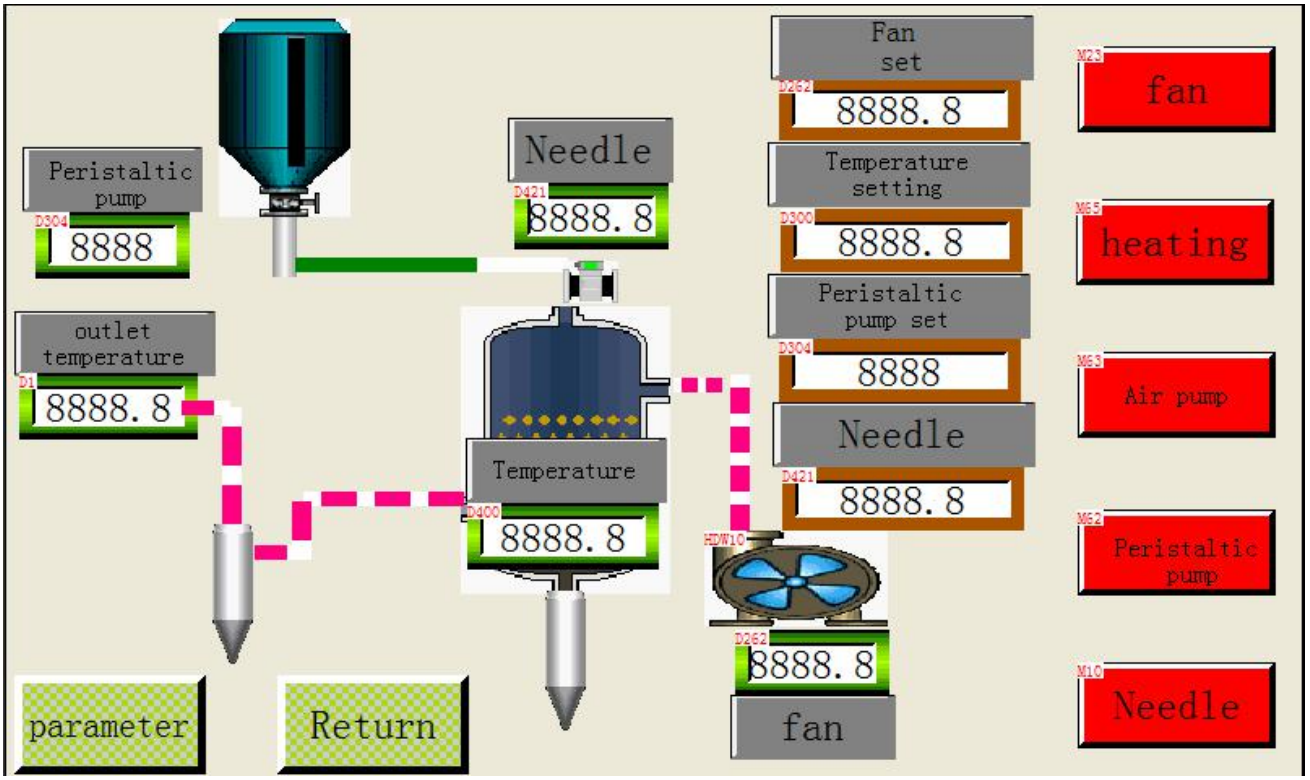
6) Install the food-grade silicone tube to the peristaltic pump, and insert the inlet of the spra ychamber.

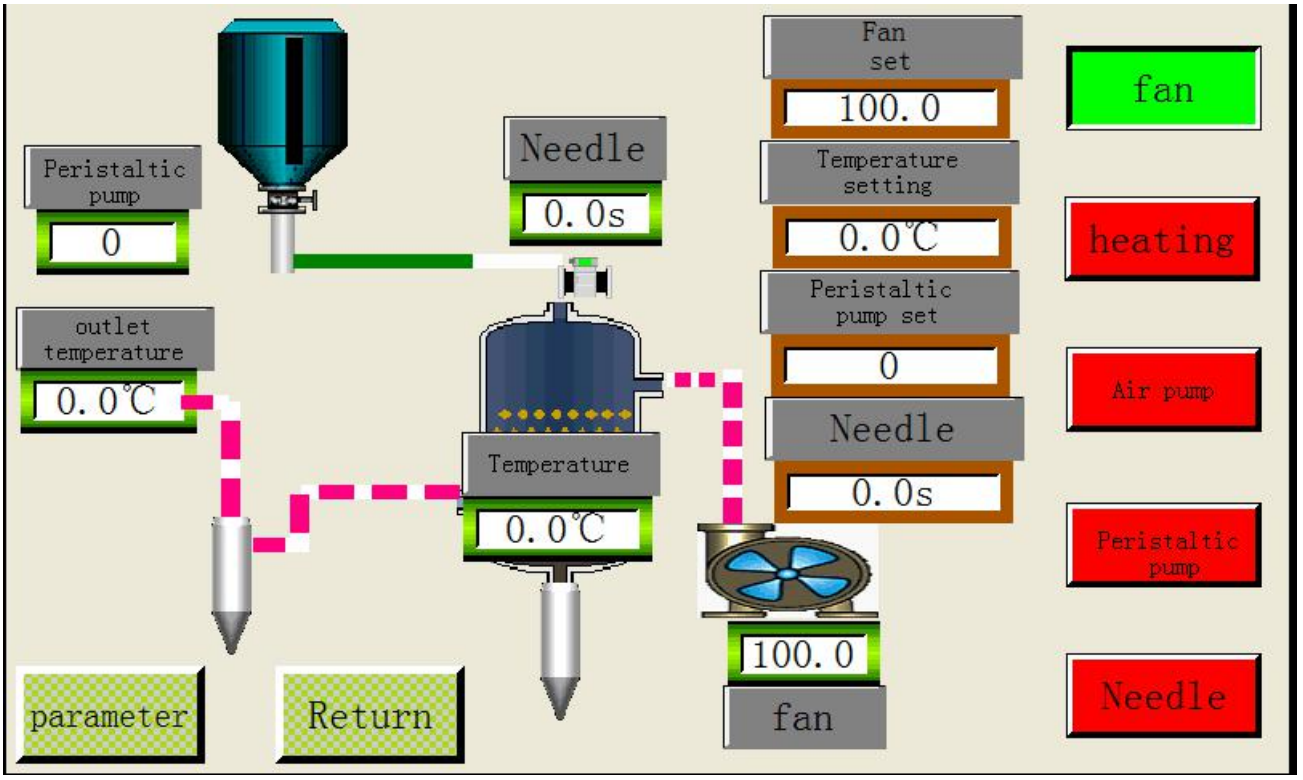
Note: all glassware is fragile, handle with care when installation and confirm all the components are installed in place before the electric operation.

5. Operating Instructions

1) Power on, and the screen displays as the following. Please select Chinese or English, a nd click it to enter the system.

2) Main interface shows as below, please choose “operating interface”, display as below:





- Interface red display button is closed state, please click, then display green means start th e system.

- **Fan**: please click the red button, display green means start, please click green button, disp lay red means closed.

- **Heater:** please click the red button, display green means start, please click green button, display red means closed.

- **Air pump:** please click the red button, display green means start, please click green butto n, display red means closed.

- **Peristaltic pump:** please click the red button, display green means start, please click gre en button, display red means closed.

- **Nozzle cleaner:** please click the red button, display green means start, please click green button, display red means closed.

Note: Heater will not start until you start the fan, if you close the fan, the heater will power o ff automatic.

3) Please choose parameters set, display as below:

- The Fan speed setting:

Set the rotational frequency of the fan :

Push the numerical boxes, pop-up keypad, press the CLR key will clear all the digital, then i nput the required value, and at last click the Enter to determine it.

- Peristaltic pump manual control:

Manual control the operation of peristaltic pump, click the peristaltic pump automatic button black area (above) (Show ON), peristaltic pump start automatically, display under, the perist altic pump stop (Show OFF).

- The needle setting:

Through the frequency of the needle, value means how many seconds start one time, click the value button, will display number key, press the CLR key will clear all the digital, then input your required value, and at last click the Enter to determine it.

- Peristaltic pump set:

Set the peristaltic pump feed rate r/m, click number box, will display value interface, press the CLR key to clear the value, then enter your required value, click determine key to ensure.

4) Temperature set: return to the main menu, select "temperature monitoring", enter the foll owing menus:

- Inlet air temperature set: set inlet air temperature, press numeric box, pop-up value keyp ad, press the CLR key to clear all value, then enter your required value, click the determine key to confirm.

- Inlet air temperature display value: display the actual value of inlet air temperature.

Inlet air temperature automatic adjustment finish, during the temperature self-adjustment pr ocess, if you want to stop its self-adjustment, please press the button.

- The outlet air temperature display values: according to the inlet air temperature setting shows the actual value of outlet air temperature.

- The inlet air temperature self adjustment: adjust the stability of the inlet air temperature, during drying process, when and only when you find there has larger fluctuation between a

ctual value of inlet air temperature and the set inlet air temperature, then need to use the inl et air temperature self-adjustment, to ensure that the inlet air temperature set value is consi stent with the inlet air temperature display values, before start the spray dryer, need to confi rm there has over 50 degree centigrade difference between the inlet air temperature set poi nt and the inlet air temperature display value, such as inlet air temperature set value is 120 degrees, then need inlet air temperature display value is below 70 degrees, set value is 50 degrees higher than display value.

- Click the inlet air temperature self adjusting button black area (above) (Show ON), the inle t air temperature self adjustment can start. After its slef adjustment process is finished, will stop automatic. If you want to stop its self-adjustment function when whole process is not fi nish, then you could click on the inlet air temperature self-adjustment stop button.

Note: Please wait the fan and heater start, then start the inlet air temperature self-adj ustment function.

6. Spray drying machine operating process:

1) Start red total power supply.

2) LCD screen: Chinese and English.

3) Start fan set 100.

4) Start heating set 180-220 (general common temperature).

5) Outlet temperature reach over 80 degree.

6) Start air pump.

7) Outlet temperature between 85-100.

8) Start peristaltic pump feeding material, peristaltic pump set 10.

9) Outlet temperature reach over 100 degrees, peristaltic pump speed set 15.20.25.30.

10) Needle set 6 seconds, to prevent the material in the nozzle clogging.

Note: before you start the peristaltic pump, please ensure the spray dryer inside the glass must be dry and without water.

7. Frequently Asked Questions and Solutions

Question	Possible cause	Solution
1) Fan doesn't work.	- Intermediate relay R201.2 damage. - The inverter damaged. - Damage of fan.	- Replace R201.2. - Contact with TOPTION compan y.

2) Electric heater doesn't work.	- Fan don't start. - Solid state relay SSR201 damage. - Damage of electric heater.	- Start the fan. - Replace the solid state relay SS R201. - Contact with TOPTION company.
3) Air compressor doesn't work.	- Intermediate relay R201.1 damage. - Air compressor is not start ed. - Air compressor damage.	- Replace R201.1. - Starting air press. - Contact with TOPTION compan y.
4) Equipment without electricity.	- Plus the socket is not reliable. - Circuit breaker NFB in closed position.	- Check the power converter for electricity. - Open NFB.
5) HMI touch screen no display.	- A button panel damage. - Switch power supply damage. - Intermediate relay R1.2 damage. -Touch screen is damaged.	- Replace the start button. - Replace the switching power supply. - Replace R1.2. -Contact with TOPTION company
6) Inlet air temperature display.	- PT-100 Temperature probe connection is loose. - PT-100 damage. -PT-100 Temperature module damage.	- Fastening. -Contact with TOPTION company.
7) Outlet temperature di splay.	- PT-100 Temperature probe connection is loose. - PT-100 damage. -PT-100 Temperature module damage.	- Fastening. - Contact with TOPTION.
8) Air inlet temperature cannot reach the set value.	- Fan air volume is too big.	- Modify the fan parameters.
9) Outlet temperature cannot reach the set value.	- Into the air volume is too bi g (peristaltic pump manual).	- Modify the peristaltic pump para meters.

10) Drying chamber on the bottom of the drop.	- The inlet air temperature is too low. - The atomizing air pressure is too low. - Compressed air leak. - Feed rate is too big.	- Increase the inlet air temperature. - Open the equipment back shroud dispatch pressure to 2-3 bar (¢6 blue trachea). - Check whether all connection leak. - Modify the peristaltic pump para meters.
11) Needle don't work	- Air valve is not open. - Pressure is too small. -Needle parameter setting is too big. -Solenoid valve damage.	- Open the valve (4 ¢ white trachea). - Large pressure reducing valve. - Modify the needle parameters. - Such as change of electromagnetic valve

8. The Prepare for Experiment

1) According to the installation instructions for the parts will be installed.

2) Press equipment start button, start the blower, start the air pump.

3) Set the air inlet, start heater.

4) When the inlet temperature reaches the setting value, start the peristaltic pump.

5) Import water firstly, and observe the change of materials and temperature, and reset the speed of the fan and the temperature of the air inlet , and import material after stable.

9. Stop Steps

1) When the material is used out, import water and spray all the material within the hose (ab out 5 minutes), closes the peristaltic pump.

2) Close the air compressor.

3) Close the heater.

4) When the temperature of air inlet drop to 40 C° , close the fan.

5) Take the fixation material bottle down, transfer the material to other container.

6) When the container become to cool completely, take down and clean.