Instruction Manual

REFRIGERATED SHAKING INCUBATOR, STACK
ZQPZ-228A

Code 5312140

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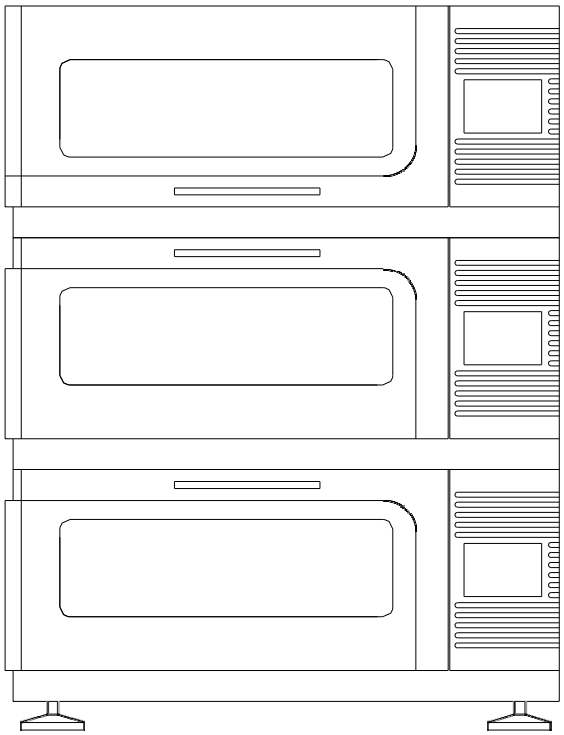
1 Product Overview

This product is suitable for microbial, viral, bacterial culture, fermentation, hybridization and biochemical reaction and cell tissue research. It provides effective help for the research of culture and enzyme engineering with different requirements of temperature, shaking frequency and amplitude. In medicine, biology, molecular science, pharmaceutical, food, environmental protection and other research and application fields have a wide range of important roles.

Product Features

(1) Vertical double-layer shaking plate, large workspace design;
(2) High quality stainless steel mirror chamber, easy to clean, anti-corrosion and durable.
(3) Unique design of centrifugal circulating air duct, forcing the air flow in the working room, the temperature is more uniform.
(4) Hollow tempered glass door, easy to observe the internal situation. Pneumatic vent design to meet the sample's demand for oxygen.
(5) Using imported fluorine-free refrigeration compressor, unique refrigeration working mode design.
(6) High quality servo motor control, accurate measurement of revolution, long life, maintenance free.
(7) Adopt high precision 16-bit true color touch screen computer control system. All function displays and set values in the same interface display, observation is more intuitive.
(8) Control system has a fixed value operation mode and program operation mode, a multi-purpose machine.
(9) Real-time curve and historical curve can be drawn, and screenshots can be printed; Store historical data for up to 1 year.
(10) Useable USB disk export backup or print output; You can choose to print the measurement data in data or curve mode in real time.
(11) Operation interface encryption lock function, to ensure the safety of the operation, timing lock all control functions.
(12) Specially equipped with external ambient temperature probe, the ambient temperature is displayed in real time on the panel, which is convenient to accurately control the temperature inside the box.
(13) With timing function, the time setting range is 0~999.9 minutes (hours).
(14) With power failure memory function, avoid data loss due to power failure and crash.
(15) Control system integrates lighting and ultraviolet sterilization function, easy to observe and sterilization.
(16) With over temperature sound and light alarm, automatic power off function. It has the function of fault self-diagnosis.
(17) With door control function, open the door automatically stop rotation.

2 Outline Diagram



Main Technical Parameters

Model	ZQPZ-228A
Standard Control System	7’ touch screen
Shaking Frequency	10-300rpm
Shaking Frequency Precision	±1rpm
Orbit	Φ26mm
Operating Temperature	4~65º C
Temperature Uniformity	±01ºC
Constant Temperature Fluctuation	±0.3ºC（37ºC）
Platform Size (mm)	850*530
Max Capacity/plate	100ml*106 or 250ml*65 or 500ml*45 or 1000ml*24 or 2000ml*15 or 3000*8
Timing Range	0~9999 hour, 59min
Power (KW)	1.5
Power Supply	AC220±10% 50~60Hz
External dimension (width x depth x height mm)	1450*920*600

Note:1) The performance parameters are tested under no-load conditions: ambient temperature is 20ºC and ambient humidity is 50%RH

2) Working environment temperature: 5-25º C

3 Instructions for Use

(1) Instrument should be placed on the flat ground, the environment should be clean and neat, dry and ventilated.

(2) Before use, each control switch on the panel should be in a non-working state.

(3) Culture test bottle: In order to make the instrument work stable performance is good, avoid large vibration, bottling should be evenly distributed, avoid partial load phenomenon, the culture medium of each bottle should be roughly equal. In addition, if it is not necessary, the test bottle should not be loaded too full, which will affect the circulation of the air flow and thus reduce the uniformity of the temperature field in the working room.

Precautions for installation and use

(1) The equipment should be installed in accordance with the above "outline diagram" requirements, superimposed together. The three-layer superposition form, the layer of the upturned door superimposed on the top. After the device is straightened, adjust the four adjustable feet at the bottom so that the four feet are evenly stressed, and lock the locking nuts of the feet to prevent loosening and unstable running of the device.

(2) There are two connected fixed screw holes on both sides of the equipment (located in the grooves on both sides). After the devices are placed in the superposition, connect them together with M8 bolts to prevent errors caused by oscillations.

(3) The equipment after long-distance transportation, handling and installation and debugging process, the equipment refrigeration system has a certain impact. In order to extend the service life of the equipment, after the installation and debugging of the equipment, it should be stored for 24 hours before it can be started.

(4) Before use, please confirm that the local power supply voltage meets the requirements (220V±5%), and is an independent power plug with good grounding.

(5) The oscillating tray of the equipment is a pull-out tray. When placing the experimental flask, loosen the two fastening handles at the front, pull out the tray to place the experimental object, and then push the tray back to the original position, and screw the fixed handle tightly. Close the door and start the machine after ensuring that the handle is fastened.

(6) Do not plug the power cord with wet hands, and do not pull the power cord to pull the plug.

(7) Do not connect the cord in the middle and use the long cord.

(8) Do not use damaged power cords or use non-specified power cords.

(9) Do not repair without authorization. Improper repair can result in fire or electric shock.

(10) Please clean the machine after the end of use, can not leave water droplets, dirt residue.

(11) There are the following circumstances, must unplug the power plug of the equipment:

① If there is an abnormal state (burning smell, etc.), remove the power plug immediately to terminate the operation of the device or disconnect the power supply with a short route.

② When replacing the fuse.

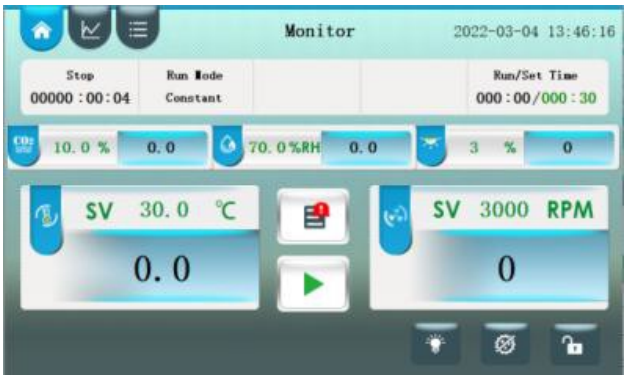
③ When the constant temperature shaking table fails and cannot be used normally.

④ When cleaning the machine at the end of use.

⑤ Out of use for a long time.

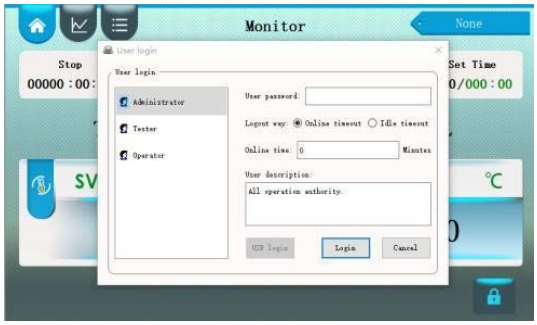
⑥ When moving this device.

4 Interface and Operation Main Interface



Users Login

After the system is started, the above [main interface] will appear. Users who are not logged in need to click the screen to log in, as shown in the figure below:



Administrator: has the highest operation rights and all rights. If you need to change, you need to contact the manufacturer of the instrument and ask for the login password, which can be changed under the guidance of the manufacturer's after-sales personnel.

Experimenter: no initial password, can set or select the basic parameters; The fixed mode or program mode can be selected, and the temperature, speed, humidity, concentration, illuminance target value and timing time can be set in the fixed mode. In program mode, only program number can be selected without editing permission.

Operator: No password initially, can only start and stop the system;

Note: Experimenters and operators can view real-time curves, work logs, historical data & curves, but can not delete, export and other operations.

Menu Interface

After the user completes the login at the login interface, click the label on the top left of the interface to enter the corresponding interface. Users can enter the [User Settings], [Historical Data], [Mode Settings], [System Settings] interface in the directory interface;

Main Interface (Display)

At the [main interface], the user can view the data to control, operation time schedule, various control output status of the system, control the operation of the system, heating, humidification, inflation, cooling, frost, illumination, speed output state, control state, control the output and shutdown operation of lighting and sterilization, and check the alarm records.

Key Instructions

Icon	Name	Description
	[Alarm]	Enter the alarm list interface, you can view the detailed alarm content icon in red indicates the current alarm
	[Run / Stop]	Click the pop-up sub-dialog box to bring the system to operation or stop;
	[lighting]	Click the light on or off, and turn on the button to turn blue (this function is optional)
	[sterilization]	Click on or off to turn blue (this function is optional)
	[lock screen]	White is unlocked; blue is locked state.
	[motor pause]	White is the running state of the motor, and blue is the suspended state of the motor.

Icon Description

name	icon	name	icon	name	icon	name	icon
heat		Press output		Press delay		refrigeration	
frost		Aerate		Humidification		dehumidification	
watering		Open the door		Alarm			

State Description

Display the five operating states of the system in the upper left corner of the [main interface], namely [Stop], [Wait], [Running], [Time], [Auto-tuning];

[Stop]: Close the heating, humidification, inflation, compressor and fan output;

[Appointment waiting]: If the reservation time is greater than the current time, the system will enter the reservation state after the operation, and after reaching the reservation time, enter the operation state;

[Running]: Running status, go into various numerical controls;

[Timing]: In the timing, the timing time to, the system automatically enters the stop state; [Auto-tuning]: PID self-setting, operating in the [User Settings] interface.

Alarm Record And Operation Log

Date	Time	Alarm description	End time
2022/03/04	14:40:19	Temp board com fault	
2022/03/04	14:34:19	Temp board com fault	
2022/03/04	14:33:03	Temp board com fault	
2022/03/04	14:19:51	Temp board com fault	
2022/03/04	14:18:58	Temp board com fault	
2022/03/04	14:06:16	Temp board com fault	
2022/03/04	14:05:03	Temp board com fault	
2022/03/04	14:03:34	Temp board com fault	
2022/03/04	13:53:02	Temp board com fault	
2022/03/04	13:38:07	Temp board com fault	
2022/03/04	12:59:03	Temp board com fault	

When an alarm occurs in the system, the buzzer calls a prompt, and the alarm record in the main interface has a red exclamation point prompt. Click to enter the alarm list interface to view the specific alarm content, and click the right arrow to view the operation log;

Type of alarm	Alarm instructions
Main temperature overflow	The main temperature sensor failed or incorrect wiring.
Door temperature overflow	Door temperature sensor has fault or incorrect wiring.
Evaporator temperature overflow	The evaporator temperature sensor has faulty or incorrect wiring.
Ambient temperature overflow	The ambient temperature sensor has failed.
Main over-temperature overtemperature alarm	Main temperature> set temperature + Temperature deviation, to produce overtemperature alarm.
Main under-temperature temperature alarm	Main temperature <set temperature-temperature deviation, produce undertemperature alarm.
Door temperature exceeds temperature alarm	Door temperature <set temperature-main temperature deviation produces overtemperature alarm of door temperature.
Open the door alarm	During operation, the door opens for a continuous (optional) time to generate the opening alarm.
Motor communication failure	No communication exists between the control board and the motor drive plate.
Motor IPM fault	Power module failure
The motor is blocked and turned fault	The motor is blocked and turned fault
Motor Hall fault	Motor Hall fault
Motor underpressure failure	Bus voltage voltage fault
Overvoltage fault of motor	Bus voltage overvoltage fault

Mode Setting

The system has six operation control modes, Pro_01, Pro_02, Pro_03, Pro_04, and Pro_05; users can edit the operation period (0~999), the number of segments (1~30), and time (0~999:59), temperature, speed, humidity, concentration and illumination in each operation mode;

Fixed Value Mode

The value setting mode can only set one temperature control point; the following table can be determined according to the timing mode in [user setting] and whether the time setting value is 0:

Time set value	Timing mode	Description
0	——	Timing time is always 0, and the continuous operation does not stop;
No 0	Running time	Click to run the system to start the timing, the timing time to the set time, stop running;
	Thermostatic timing	Click the operation system to control the temperature, and start the timing after reaching the constant temperature timing range. Stop the running after the timing time reaches the set time;

Program Schema

In the program mode, a plurality of temperature control steps and the control time of each step may be set, and the operation period of the mode; if the period is set to 0, it means that the reciprocating operation from the first paragraph to the last paragraph does not stop;

Time set value	Timing mode	Description
0	Running time	If the step time is not scheduled, the system jumps directly to the next set point to continue running. If the last paragraph, jump to the first paragraph, and the last cycle, the operation will stop;
	Thermostatic timing	The step time is not scheduled, and the system controls the temperature. After it reaches the constant temperature timing range, jump to the next set value to continue running. If the last paragraph is done, jump to the first paragraph, and if it is the last cycle, the operation will stop;
No 0	Running time	Click Run, step time to start time, step time reaches the set time, jump to the next set point to continue running, step time to start time again, if the last paragraph, jump to the first paragraph, such as and the last cycle, the operation will stop;
	Thermostatic timing	Click to run, the system control temperature, reach the constant temperature timing range after the step time timing, step time reaches the set time, jump to the next set value to continue to run, temperature still need to reach the constant temperature timing range after the step time to start again, if the last paragraph, jump to the first paragraph, such as the last cycle, run stop;

Action Instances

Fixed Value Mode

For example, set temperature 30.0℃, set speed 200RPM, stop for 30 minutes, set operation process as follows: then select [value mode] in [mode setting] interface, click edit button, enter [value mode] set edit interface, as shown in the figure above;

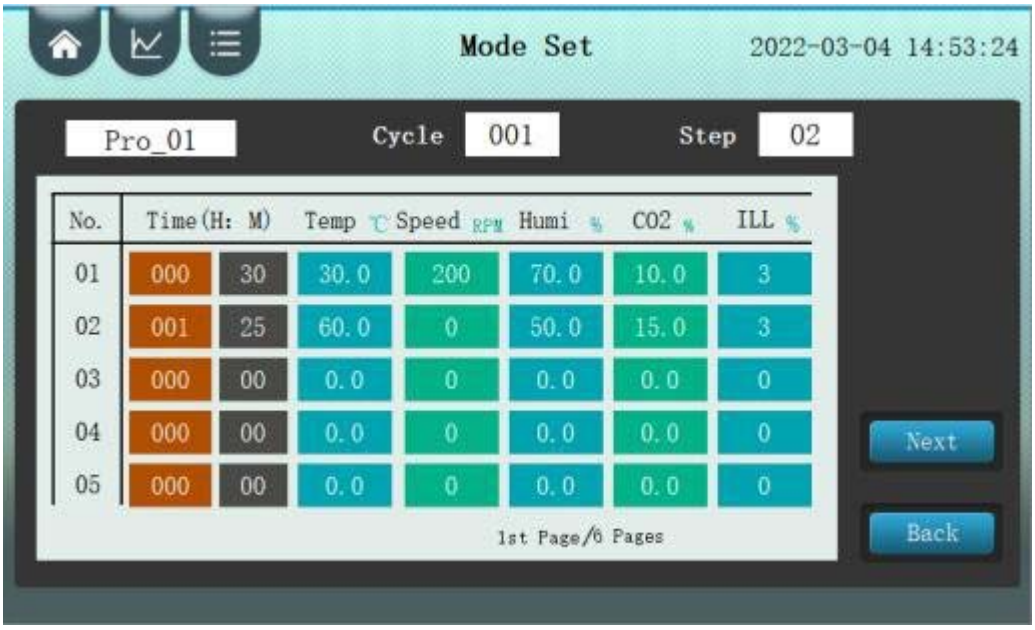
Order number	Content	Description
1	Time set	Click on the time text box (time: minute) to set it to 0:30
2	Temperature setting	Click on the temperature text box, set to 30.0
3	Speed setting	Click on the Speed text box, set to 200

Program Mode

For example, set Pro_01, when the temperature rises to 30.0 ± 0.5℃ for 30 minutes, speed control 200RPM, rise to 60.0℃ for 1 hour and 25 minutes, speed setting 0RPM, cycle is 1, as shown in the following table:

Number of steps	Set time	Set temperature	Set speed
01	0:30 (0 hours and 30 minutes)	30.0℃	200RPM
02	1:25 (1 hour, 25 minutes)	60.0℃	0RPM

The operation process is as follows: select the [user setting- timing mode]; select Pro_01, click the editing button, and enter the Pro_01 setting editing interface, as shown in the figure



order number	content	Description
1	Pro_1	Program name, click to edit
2	Cycle setting	Click on the cycle text box and pop up the number keyboard, set to 1
3	Step setting	Click on the segment number text box, pop up the number keyboard, set to 2
4	time set	Click the 01 and 02 time text boxes (time: minutes) to set to 30 and 1:25, respectively
5	Temperature setting	Click on the 01 and 02 segment temperature text boxes, respectively, and set to 30.0 and 60.0
6	Speed setting	Click on the 01 and 02 segment speed text boxes, respectively, and set to 200 and 0

Curve Interface

In the real-time curve interface, users can view the temperature, speed, humidity and concentration curve plots in the last 2 hours, where blue is the set value curve and red is the measurement value curve;

Historical Curve

In the [historical curve] interface, the user can view the trend of the historical data curve over a period of time. The historical curve corresponds to the data stored by the [historical data]. The upper and lower limits displayed in the historical curve are consistent with the real-time curve setting. The user can also set the time period to query;

Historical Data Interface Description

Users can enter the [Historical Data] interface and can view the temperature measurement, set point, speed measurement, setting point, humidity measurement, concentration measurement, setting point, illumination measurement, set point, operation and alarm state historical data of the system, and the saving interval can be set;

Export Data

If the user needs to export the historical data with the U disk, confirm that the U disk has been inserted to avoid system error, click [Export] button to confirm the export dialog box, the user should click OK to complete the data export; the exported file is saved in the U disk root directory, the file name " Historical Data + Save time. The pdf ", and the data format is the PDF file;

5 Common faults and solutions

Fault	Cause	Treatment
no power supply	The power plug is not properly inserted or disconnected	Plug or wire well
	The insurance fuse is broken and the ship switch is damaged	change
Do not heat up	Low setting temperature	Adjust setting temperature
	Heating pipe damage	Replace heating tube
	Control instrument damage	Change
	The temperature sensor is loose or damaged	Tighten the sensor or replace it
Overtemperature abnormal	Control instrument damage	Change
	Temperature sensor damage	Change
Fan out of operation	The fan is damaged. The startup capacitor is damaged	Change
Temperature unevenness	Too many samples or containers will cause poor air circulation	Do not put too many samples, improve the convection situation
Shaking plate is unstable	Foreign matter stuck at the bottom of the shaking plate, uneven placement of the instrument, control circuit failure	Remove the shaking plate, remove foreign bodies, adjust the instrument foot, make the instrument balance, notify the manufacturer for repair
No shaking	The gate switch does not operate Belt damage Control circuit failure	Check the gate switch Replace belt Notify the manufacturer for repair
noisy	Uneven placement of instrument Flask clamp fixing screw is loose Shake loose board Mechanical failure Too much loading and too fast speed	Adjust the instrument foot to balance the instrument Remove the swing plate and tighten the fixing screws Tighten the four corner fastening screws Notify the manufacturer for repair Reduce load and speed

6 Packing list

No.	Category	Name	Quantity	Confirmation √	Remarks
1	Product	Shaking Incubator	1		
2	Document	Operation Manual	1		
3	Document	Quality Certificate	1		
4	Document	Warranty Card	1		
5	Spare Part	Fuse	2		
6	Spare Part	Wrench	1		25/35
7	Spare Part	Handling extension	4		

The packing inspection is required to confirm the items before using the machine.
The items listed are consistent with the items packed.

7 Guarantee

Guarantee Conditions

1. Free maintenance conditions:

1.1 We provide one-year warranty since the invoice date. During the period, if there is any failure due to the defects in designing and manufacturing, our company guarantees to repair the instrument and change the necessary accessories free of charge. Please note that heating components are in the categery of consumables which are beyond the warranty scope.

1.2 After the warranty period, if there is any failure caused by designing and manufacturing, we will also have the instrument repaired and charge accessories and service fees accordingly.

We will charge fees under the following conditions during the warranty:

1.3 Failures caused by incorrect operation.

1.4 Failures caused by the incorrect modifications to the product or the inner parameters of the meter.

1.5 Failures caused by force majeure (such as fire, flood, earthquake ect.) or other external influences (such as voltage instability).

1.6 Failures caused by the operator’s non-observance of the instructions in the Operation Manual or by incorrect moving of the instrument.

1.7 Problems that arise in transit.

1.8 Regular check and maintenance required by the user.