

Operation Manual



BSCO-203

Cooled Shaking Incubator

Thank you for Choosing Biolab products. Please read the "Operating Instructions" and "Warranty" before operating this unit to assure proper operation.

Please send this "instruction manual" to the final operator!

- Please read and understand all the contents of the "Instruction Manual" before starting the operation. Our company will not be responsible for the adverse consequences caused by misoperation.
- The contents in the "Instructions for Use" may be changed and improved in the future, and the company will not notice at that time, so please understand.
- If the customer finds any abnormal phenomenon during use, please contact our company in time.

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When reading the "Instruction Manual", please keep it for reference at any time. At the same time, please fill in and send your warranty card (to our after-sales service center).

Index

1 Safety tips.....	4
2 Scope of application.....	4
3 Structure introduction.....	5
4 Working conditions.....	6
5 Technical parameters.....	7
6 Instructions for use.....	8

01 Safety tips

- 1) Instruments and equipment must be effectively grounded.
- 2) The external power supply must meet the requirements of the thermostatic water tank.
- 3) Plug and socket with good contact should be used, and the power must match.
- 4) It is not allowed to lengthen or shorten the power connection at will.
- 5) Do not heat inflammable, explosive, volatile and corrosive substances.
- 6) Repair shall not be carried out without authorization, and must be repaired by professional maintenance personnel.
- 7) When replacing the fuse, you must unplug the power plug.
- 8) You must fully read and understand the instruction manual of this product before operating.



Attention (otherwise it may affect the service life of instruments and equipment)

02 Scope of application

Vertical constant temperature shaker is a necessary and common equipment in laboratory. It is widely used in bioengineering, national defense, medicine, food, chemical industry, metallurgy, chemical analysis, petroleum and other fields, providing users with a high-precision, controlled and uniform temperature constant field source. It is an ideal constant temperature oscillation culture instrument for large, medium and small research institutes, universities, factory laboratories and quality inspection departments.

03 Brief introduction of the structure

This product is a shaking table with full temperature and constant temperature. The inner container is welded with stainless steel, and the outer shell is made of high-quality cold-drawn plate. At the same time, plastic spraying technology is adopted to improve the anti-corrosion effect, intelligent temperature control and temperature sensor Pt100 platinum resistance. The heating system consists of a high-efficiency U-shaped electric heating tube. In the constant temperature control part, the internationally advanced anti-integral saturation PID control system is adopted to prevent the temperature shock during the heating process, thus improving the control accuracy.

1. Adopt microcomputer temperature control PID to adjust high technology, with high temperature control accuracy.
2. The intelligent all-digital system can correct the deviation of temperature measurement, and the resolution of digital display reaches 0.1°C .
3. adopt PT100 temperature sensor.
4. The refrigeration system has multiple protection functions of overheating and overcurrent.
5. Intelligent instrument control, simple operation, high temperature stability and over-temperature alarm function for upper and lower limits.
6. Equipped with full-efficient anti-interference compressor.
7. The cooling speed is faster than similar products, and the noise is low and the vibration is small.
8. Double window display is adopted, and the oscillation frequency display and temperature control display are displayed separately.
9. The incubator and oscillator are integrated, which can be used for both static culture and dynamic culture.
10. The driving mechanism is a high-precision eccentric device, which has the advantages of stable rotation, firmness and durability, especially good weight cutting performance, and does not need to average the placement of the culture on the oscillating plate.
11. PID temperature compensation function is adopted for temperature control, which reduces the temperature overshoot and unnecessary fluctuation in the box.
12. The driving motor adopts a special DC adjustable motor with high speed regulation accuracy, which has less faults and long service life after use.
13. Beautiful appearance, large perspective door and high-efficiency and energy-saving lighting.

04 Working conditions

1. The ambient temperature is $+5 \sim 40^{\circ}\text{C}$.
2. Relative humidity $\leq 85\%$ RH.
3. Atmospheric pressure is $86 \sim 106$ kPa.
4. There is no strong vibration around, and the clearance around is more than 50cm.
5. The test chamber should be free from direct sunlight and heat source radiation.
- 6, no strong airflow through the box.
- 7, no high concentration of powder and corrosive substances around.

05 Technical parameters

product name	Horizontal Thermostatic Shaker(Room temperature type)
product model	BSCO-203
Temperature control range	4~60°C (when the ambient temperature is 25°C)
Rotational speed range (rpm)	30~300
Oscillation amplitude (mm)	Φ26
Tray size (mm)	920X500
Oscillation amplitude (mm)	Φ26
standard layout	500ml×28 branches
Maximum bottling capacity	2000ml×8 branches
Overall power (w)	1500W
Whole machine power supply	220V 50HZ
select to breed	USB data transmission and processing system, convenient and quick to trace the test process, instantly complete data download, list, mapping, 20-segment program-controlled system.

06 Instructions for use



JTWS-300 (横式)

1. Timing function

When the total timing time (remaining time) is set to "0", it means that there is no timing function, and the remaining time is displayed (normally open) and the controller runs continuously; When the set time is not "0", the system displays the remaining time (remaining time), stops running after the countdown, the time display area displays "power off", and the buzzer sounds for 1 minute. Click the "Run/Stop" key to restart the control.

Device operation.

2. Start and stop

Press and hold the "Run/Stop" key for 1 second to start or stop the operation of the controller.

3. Refrigeration function

The working mode of the compressor can be selected (intermittent, balanced and disconnected), and the compressor can be started and stopped manually or automatically in intermittent operation (see internal parameter table -4 for details).

4. Gating function

If the door is opened during operation, the controller will automatically stop the motor running, and then close the door switch, and the controller will automatically start the motor running.

5. Lighting and sterilization functions (see internal parameter table -3 for details)

Note: the lighting function works by clicking the lighting key; Sterilization function Long press the sterilization key for 3 seconds to take effect.

6. If no key is pressed within 1 minute in the set state, the controller will automatically return to the normal display state.

7. When the upper deviation overtemperature alarm is given, the "ALM" alarm lights up and the buzzer sounds;

When the lower deviation overtemperature alarm is given, the "ALM" alarm lights up, and the buzzer sounds. When the buzzer sounds, you can press any key to silence the sound.

8. Self-tuning function

The controller is in the running state: If the temperature control effect is not satisfactory, please start the self-setting function. After pressing the shift key for 5 seconds, the °C indicator light flashes, and the controller starts self-setting. After the self-setting is automatically finished, the °C symbol will light up. The control effect will be greatly improved at this time.

9. Ambient temperature query

Click the shift key to inquire about the ambient temperature, and click again to return.

10. When the controller has power module fault, hall error, bus undervoltage and bus overvoltage, and communication fault, the speed controller automatically stops running.

Temperature and its parameter setting

1. Click the "Temperature" key to enter the temperature setting state, and the temperature display area displays the position selection, which can be modified to the required setting value by shifting, increasing and decreasing keys; Click the "Temperature" key again to exit the temperature setting state, and the set value will be automatically saved.

2. Press and hold the "Temperature" key for 3 seconds to display (enter the password) prompt in the display area. Enter the password value in the display area to enter the temperature internal parameter setting state, and then click the "Temperature" key to modify various parameters. Press and hold the "Temperature" key for 3 seconds to exit this state, and the parameter value will be automatically saved.

Internal Parameter Table -1

Password 3

Parameter character	Nominal name	Set range	Say clearly	initial value
AL	Lower deviation alarm setting value	-50.0~100.0°C	0, alarm 1 if there is no alarm, and alarm for lower deviation. When the temperature is less than (temperature set value -AL)°C, turn off the refrigeration. The abnormal indicator lights up and the buzzer rings.	0.0°C
AH	Upper deviation alarm setting value	-50.0~100.0°C	On the deviation alarm, when the temperature exceeds (temperature set value +AL)°C, turn off the heating. When the temperature is less than (temperature set value -AL)°C, turn off the refrigeration. The abnormal indicator lights up and the buzzer rings.	5.0°C
AP	Allow the highest temperature protection of the equipment.	0.0~120.0°C	When the temperature exceeds AP, cut off the heating. When the temperature exceeds AP parameters for 2 minutes, the buzzer will keep ringing and turn off all outputs. It must be powered off before it can be restored.	120.0°C
P	Heating	1.0~60.0/	The smaller the Pu, the faster the response	6.0

	proportional belt		speed.	
I	Heating integration time	1 ~ 3600 seconds	The smaller the integral action time constant, I_u , the stronger the ability to correct static error.	120
d	Heating differential time	0~3600S	Differential action time constant, the greater d_u , the stronger the ability to prevent overheating.	100
Ar	Heating overshoot suppression	0~100%	Which is used for restraining temperature overshoot,	80%
t	Heating control period	1 ~ 99 seconds	Control heating output cycle	5 seconds
ct	Compressor protection delay	(0 to 3600) seconds	Delay protection time of compressor, and twice starting time $\geq CT$ seconds.	180 seconds
cn	Automatic control of refrigeration hand	(0~1)	0: The system automatically calculates the temperature point to start and stop the compressor; 1: Start and stop the compressor for manually setting the temperature point.	0
CL	Turn off the compressor	(-10.0~10.0)	Measured temperature = set value +CL value Turn off the compressor.	0
CH	Turn on the compressor	(-10.0~10.0)	Measured temperature = set value +CH value. Turn on the compressor.	0
pb	Zero adjustment of temperature	(-199~999)	$P_b = \text{actual measured temperature} - \text{currently measured ambient temperature}.$	0
pk	Full adjustment of temperature (slope)	(-199~2000)	In case of temperature deviation near the set temperature, the value $P_k = 4000 \times [\text{Mercury reading value} - \text{current measured value}] \div \text{current measured value}$ can be adjusted.	0
cb	Environmental temperature correction	-60.0~100.0	$C_b = \text{actual value} - \text{current measured value}$	0
rl	Lower temperature	-60.0~100.0	Set the lower limit of measuring temperature.	0.0

	ure setting			
rH	Upper temperature limit setting	-60.0~100.0	Set the upper limit of measuring temperature	65.0
HP1	Defrosting interval 1	0~9999h	Time between defrosting (set temperature < 5 degrees)	2.0
Ht1	Defrosting time 1	0~9999s	Defrosting holding time (set temperature < 5 degrees)	2.0
HP2	Defrosting interval 2	0~9999h	Time between defrosting (set temperature =5 degrees to 20 degrees)	3.0
Ht2	Defrosting time 2	0~9999s	Defrosting holding time (set temperature =5 degrees to 20 degrees)	3.0
HP3	Defrosting interval 3	0~9999h	Time between defrosting (set temperature > 20 degrees)	4.0
Ht3	Defrosting time 3	0~9999s	Defrosting holding time (set temperature > 20 degrees)	4.0

3. Press and hold the "Temperature" key for 3 seconds to display the prompt (password input) in the display area. Enter the password value in the display area to enter the internal temperature parameter setting state, and then click the "Temperature" key to modify various parameters. Press and hold the "Temperature" key for 3 seconds to exit this state, and the parameter value will be automatically saved.

Internal Parameter Table -4 Password 12

Parameter character	Parameter name	Set range	functional description	initial value
Co	Refrigeration	(0~6)	0 no refrigeration; 1. Balanced type; 2 start-stop type; 3. set the compressor open mode when the CTT value is \leq , and set the start-stop mode when the CTT value is $>$; 4. When the value of \leq ctt is set, the compressor is opened, and when the value of $>$ CTT is set, the compressor is not started; 5 compressor start-stop mode when setting \leq ctt value, and do not start the compressor when setting $>$ CTT value;	2

			6. set the compressor open mode when \leq (Art) ambient temperature +8 degrees, and do not start the compressor when $>$ (art) ambient temperature +8 degrees is set.	
ctt	cryogenic temperature	(0~100)	When the temperature is set to $<$ ctt, the compressor is normally open, and when it is $>$ ctt, the compressor is in start-stop mode. Note: CO=3 is valid.	37
ddt	Temperature waiting	(0.0~10.0)	When the control mode is multi-stage, when ddt $>$ 0.0; There is waiting; (Note: when running in the current section, if the time reaches the temperature, the system will stop at the current section and wait for the temperature to reach the current set value before executing the next section); Effective for multi-segment control secondary parameters (effective for multi-segment of program control mode)	0.0
Lct	Key lock	0 ~ 9999 seconds	Lct =0 unlock function; Only when Lct \neq 0, the system will automatically lock when the time is up.	0
CF	Temperature unit	0~1	0 degrees Celsius, 1 degree Fahrenheit	(0)
dr	Gated opening	0~2	0 no door control; 1 normally open and effective; 2 Short circuit is effective	(2)
dt	Open door temperature control	0~1	After opening the door: 0 control the temperature; 1 Do not control the temperature	(1)
db	Open the door and call the police	0~1	0 open the door without alarm; 1 open the door prompt tone; 2 open the door and call the police often.	(0)
dp	Temperature decimal point selection	0~1	0: No decimal point 1: With one decimal point.	(1)
Flt	Temperature filtering	0.0~10.0	Temperature display filtering	(2.0)
Fls	velocity filtering	0~10	Velocity display filtering	(20)
Stt	Shutdown mode	0~2	0: Stop the temperature and speed at the same time after the timing; 1: Stop the motor without stopping the temperature after the timing; 2: Only stop the temperature after the timing, without stopping the motor;	(0)
srn	Boot mode	0~2	0: Temperature and rotation speed run at the same time when starting operation; 1: Only the rotation speed is controlled when starting operation, and the temperature is not controlled; 2: Only the temperature is controlled	(0)

			when starting operation, and the speed is not controlled;	
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Speed and its parameter setting

1. Click the "Speed" key to enter the speed setting state, and the speed display area displays the position selection, which can be modified to the required setting value by shifting, increasing and decreasing keys; Click the "Speed" key again to exit the speed setting state, and the set value will be automatically saved.

2. Press and hold the "Speed" key for 3 seconds, and the speed display area will display a prompt (password input). Enter the password value to enter the speed internal parameter setting state, and then click the "Speed" key to modify various parameters. Press and hold the "Speed" key for 3 seconds to exit this state, and the parameter value will be automatically saved.

Note: It is forbidden to modify the speed parameter during the operation of the controller. If it needs to be modified, please stop the controller and modify it again.

Internal Parameter Table -2

Password LK:3

parameter character	Parameter name	Set range	functional description	Range (ex-factory value)
p	Proportional gain	(100~800)	Velocity proportional gain	four hundred
I	Integral coefficient	(100~800)	Velocity integral coefficient	500
su	starting voltage	(1-60.0%)	starting voltage	3.0
ku	Output limiting	(0-600.0)	Output limiting	3.5
rp	Motor pole logarithm	(1~16)	Pole logarithm of DC brushless motor	four
cc	gear ratio	(1.00~20.00)	Large gear diameter/small gear diameter	2.80
rL	Speed setting lower limit	(20~2000)	Minimum value of speed set point	40
rH	Speed setting upper limit	(0~6000)	Maximum value of speed set point	300

dr	Starting direction	(0-1)	Starting direction of motor: 0 forward rotation, 1 reverse rotation.	0
cct	Forward rotation time	(0-9999)h/m	Forward rotation time, set to 0 to cancel forward and reverse rotation function.	0
nct	reversing time	(0-9999)h/m	Reverse time, set to 0 to cancel the forward and reverse function.	0
sot	stop time	(0-9999)h/m	Motor pause time	0
tn	Positive and negative time unit	(0-1)	0: minute; 1 hour; 2 seconds	0
UP	acceleration	(0.1~600.0)	The motor speed rises every second.	10.0
dn	deceleration	(0.1~600.0)	Motor speed drop per second	60.0

time setting

1. Click the "Time" key to enter the state of setting the total timing time, and the time display area displays the position selection, which can be modified to the required setting value by shifting, increasing and decreasing keys; Click the "Time" key again to exit the state of setting the total timing time, and the set value will be automatically saved.
2. Press and hold the "Time" key for about 3 seconds, and the temperature display area will display a prompt (password input). Enter the password value to enter the time internal parameter setting state, and modify it to the required password value by adding, subtracting and shifting keys. Click the "Time" key again. If the password value is incorrect, the controller will automatically return to the normal display state. If the password value is correct, it will enter the time internal parameter setting state. Click the "Time" key again to modify each parameter in turn. Press the "Time" key for another 3 seconds to exit this state, and the parameter value will be automatically saved.

Internal Parameter Table -3 Password LK:3

parameter character	Parameter name	Set range	functional description	Range (ex-factory value)
pn	Power-on mode	0~1	0, power-on motor stops; 1, power-on operation; 2, power-off memory function	(1)
pb	Program control selection	0~2	0: fixed value control; 1:99 section slope control; No slope control at 2:99;	(0)
cy	Cycles	0~99	Set it to program mode to display this parameter, and it will be hidden automatically when it is set to top. When cy > 0 is equal to CY, the system will stop automatically, and when cy=0, it will be infinite loop.	(0)

tn	Timing mode	0~1	0, start running timing; 1. Timing with stable temperature	(0)
Hn	Timing unit	0~1	0,-minutes (m); 1- hour (h)	(0)
ly	Lighting delay	0~9999M/h	When the lighting is turned on, it will automatically turn off after the delay time is not 0. "When the delay time is 0", the delay is invalid and the lighting must be turned off manually.	(0)
Srp	Disinfection time	0~9999M/h	When the sterilization lamp is turned on, it will automatically turn off after the delay time is not 0. "When the delay. When the interval is 0 ",the sterilization lamp must be turned off manually if the delay is invalid.	(0)
Srt	Disinfection interval	0~9999M/h	The interval between two disinfections	(0)
FAn	Fan mode	0~2	0: No fan; 1: Start the running fan normally open; 2: The door-opening fan stops and the door-closing fan starts.	(1)
dst	Open the door for emergency stop	0~1	0: Emergency stop without opening the door; 1. There is an emergency stop when the door is opened Note: Emergency stop means to stop as soon as the door is opened.	(1)
non	Make an appointment for starting time	0~9999m	When non > 0, the controller is powered on and automatically turned on after non minutes; Note: the clock symbol of the display flashes when the machine is scheduled to start, and the operation is started when the time =non	(0)

			value, and the clock symbol is always on.	
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Note: m is expressed as minutes; H is expressed as hours.

2. Press and hold the "Temperature" key for 3 seconds to display (enter the password) prompt in the display area. Enter the password value in the display area to enter the temperature internal parameter setting state, and then click the "Temperature" key to modify various parameters. Press and hold the "Temperature" key for 3 seconds to exit this state, and the parameter value will be automatically saved.

(seven) product maintenance and matters needing attention

- 1, after use, should slow down the speed, such as the machine stops running, can take out the items.
2. When closing the door, gently close the door until the door is sucked. Do not use too much force.
3. Do not sprinkle the solution in the machine, so as not to affect the normal use of the instrument.
4. When the equipment works for a long time, the rotating speed shall be controlled within 220 rpm.

06 Maintenance

- 1, The correct use and attention to the maintenance of the instrument, make it in good working condition, can prolong the service life of the instrument.
2. During the continuous operation, the instrument should be inspected regularly every three months: check whether there are water drops, dirt, etc. falling on the motor and control elements; Check fuses, control elements and fastening screws.
3. The bearing of the transmission part has been filled with proper amount of grease (No.1 calcium-sodium base) before leaving the factory. During the continuous operation of the instrument, grease should be filled every six months, and the filling amount accounts for about 1/3 of the bearing space.
4. After long-term use, the natural wear of the instrument is normal. After one year of use, if the motor is found to have abnormal noise, the bearing of the transmission part is worn, and the belt is loose or cracked; The enterprise will continue to provide high-quality service and assist in handling the failures such as the failure of electronic control components.



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