Operation Manual

BSBT-301

Benchtop Shaking Incubator

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

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01 Structure and working principle

The shaking incubator is composed of a microcomputer temperature control system with LCD Display, Stainless steel inner material, The Body is Composed of environmental protection foam , transparent glass door, stainless steel oscillation car and rack, stainless steel inner chamber and refrigeration system

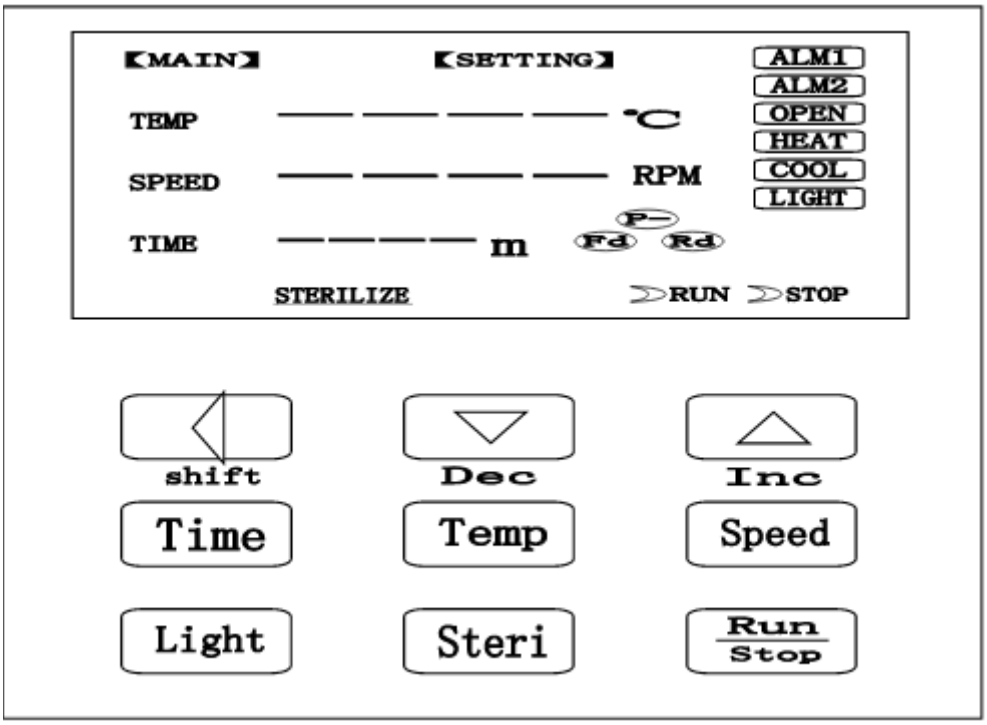
Transparent glass door is good for insulation and observing the platelet preservation condition.

stainless steel material is easy to clean and disinfect, oscillating frame divided lots of layers, each layer can put numbers of platelet bags, frame grid can be taken out independent, easy to operate, oscillation frame was working by a constant speed motor for horizontal shaking The machine is equipped with multiple axial flow fans to keep temperature evenly in the box.

02 Technical parameter

①temperature range: 0 ℃-60℃±2℃
②shake frequency: 60-250r/min
③Amplitude: 28mm
④capacity: 500mlx3x 200mlx4 100mlx5 50mlx5
⑤Working Mode: continuous
⑥Voltage: AV220V/ 50HZ
⑦Power: 660 W
⑧LCD display
⑨ timer: 0-9999mins

03 Panel Instruction



(1) Controller is powered on, the temperature display window showing "HY - 2", speed display window showing"8888", the time display window showing "8888", all identifiers is lighting, the machine into the normal display status after 4 seconds.

(2) · Prohibit temperature and speed control function
Temperature value is less than the set temperature value, temperature display window showing"OFF", said the ban on temperature control function.
Speed value is less then set speed value, speed display widow showing “OFF”, said the ban on speed control function

(3) · Timing function
When total timing set to "0", said there was no timing function, the controller run continuously; When timing setting is not "0", after the time stop running (see the ndt parameters: the internal parameter table 7), the time display shows "End", buzzer call for 1 minute. Click the run/stop "button, can restart the controller.

(4) Start and Stop
Long press the "run/stop" key for 1 second can start or stop the controller .
Runtime identifier light "RUN", "STOP" when to STOP identifier to light.

(5) · refrigeration function

Compressor works can choose (intermittent type, balanced type and open type), intermittent work can choose manual or automatic start-stop compressor (see the NDC, CP, Htd, Crc, Cnp parameters: the internal parameter table – 2).

(6) · Memory function when power off
By modifying off electrical parameter values (see the "rES" parameters: the internal parameter table - 2) can choose whether to have memory function when power supply drop.

(7) · Lighting and sterilization function (see the Lt, St parameters: the internal parameters of table 1)
Note: click on lighting lighting function work; Sterilization function long press for 3 seconds sterilization work.

(8) In the condition of setting if without any key pressed for 1 minute, the controller will automatically return to normal display state.

(9) · Over temperature alarm, "ALM1 identifier" light, buzzer, buzzer can press any key when singing sound.

(10) · When the controller (Er - 1) power module fault occurring, locked-rotor (Er - 2), hall error (Er - 3), bus bar under voltage (Er - 4), bus over-voltage (Er - 5), communication failure (Er - 6), "ALM2 identifier to light," speed controller automatically stop running.

(11) · If the temperature controller display window "-", said temperature sensor failures or the controller itself, please carefully check the temperature sensor and its wiring.

04 Temperature and its parameter setting

1 · Click on the "temperature" button, enter the temperature setting state, flashing temperature display area, can be modified by shift, increase and decrease key to the desired set point; Then click on "temperature", exit temperature setting state, the value is automatically saved.

2 · Long press "temperature" button for 3 seconds temperature display area to show the password prompt "Lc", speed display area shows the password value, enter the password value into the temperature internal parameters setting state, then click on "temperature" can modify the parameters. Long press "temperature" button for 3 seconds, exit this state, the parameter value automatically saved.

Intrinsic parameter-1

Parameter code	Parameter name	Parameter function	factory default (range)
Lc	Password	“Lc=3”view and modify parameters	0
AL-	Over-temperature alarm margins	when “test temp. > set temp. +AL ”, alarm light is on, alarm beeps, stop runing, heating output	(0～20.0℃) 5.0
Ct-	Compressor delay start	Compressor startup time delay protection, compressor minimum time interval from stop to restart	(0～600s) 180
uP-	The compressor Start threshold	When compressor working in Continuous way If "temperature measured values ≥ temperature setting value + uP" and the compressor start delay time is over, start the compressor Note:This parameter is only effective in manual start-stop compressor mode, in the automatic mode is invalid	(-10.0～10.0℃) 0.4
dn-	The compressor shut down threshold	When compressor working in Continuous way If "temperature measured values ≤ temperature setting value + dn" and the compressor is closed Note:This parameter is only effective in manual start-stop compressor mode, in the automatic mode is invalid	(-10.0～(uP-0.1)) 0.2
Lt-	Lighting close delay close	Open lamp, delay after Lt time automatically shut down."Lt = 0", the time delay is invalid ,must manually close the lighting. Lights, delay shut down automatically after St time."St = 0", the time delay is invalid must manually shut the sterilization lamp	(0～9999min) 0
St-	The sterilization lamp close time delay	After sterilization lamp open, delay St time shut down automatically."St = 0", the time delay is invalid must manually shut the sterilization lamp.	(0～9999min) 0
T-	Control cycle	Heating Control cycle	(1～60s) 5
P-	Proportional band	Time scale functional governing	(0.1～50.0) 15.0

I-	Integration time	Integration functional governing	(1 ~ 2000s) 380
d-	Differential time	Differential functional governing	(0 ~ 2000s) 100
Pb-	Zero adjustment	Correction (low temperature) generated when the measuring error of the sensor. Pb = actual temperature - meter measurements	(-99.9 ~ 99.9℃) 0
PK-	Full adjustment	Correction (high temperature) generated when the measuring error of the sensor. PK = 1000 * (the actual temperature value - instrument measurements)/instrument measured values	(-999 ~ 999) 0

Intrinsic parameter-2

Parameter code	Parameter name	Parameter function	factory default (range)
Lc	password	"Lc = 9 to view and modify the parameter values.	0
rES	power supply drop memory function	0: no memory function when power supply drop 1: power lost memory function	(0 ~ 1) 0
FAn	fun style chose	0 : The fan is short axial fan 1 : The fan is long axial fan	(0 ~ 1) 0
ndc	compressor working way	0: compressor only intermittent work; 1: compressor according to the CP (see below) the value of the compressor balance type or intermittent work; 2: compressor according to Htd (see below) judging the value of the compressor balance type or intermittent work;	(0 ~ 2) 0

CP-	The compressor works fixed switching points	When "NDC = 1", If the temperature set point or CP ", the compressor work in intermittent way, whereas work in balanced way	(0～100.0℃) 30.0
Htd	The compressor works automaticall y switching points	When "NDC = 2" If the temperature set point ≥ ambient temperature + Htd ", compressor work in continuous way, otherwise work in balanced way.	(-50.0～50.0℃) 0.0
Crc	The compressor Start and Stop mode	When the compressor work in continuous way, 0: automatic start-stop compressor (according to the environmental temperature and set point); 1: manual start-stop compressor (according to the internal parameters in table 1 of the uP and dn value);	(0～1) 0
Cnp	Ban on compressor Working temperature point	Setting Value ≥Cn when temperature is "p", prohibit the compressor work. Note: this way is the highest priority, the controller to perform this command first, then to judge compressor balance or intermittent work.	(0～100.0℃) 42.0
nP-	Maximum power output	The percentage of maximum power heating output	(0～100%) 100
Co-	Shut off the heating output deviation	When the temperature measured values ≥setting value + Co, shut off the heating output.	(0.0～20.0℃) 5.0
SPL	Temperature setting min value	temperature setting min value data	(-50.0～100.0℃) 0.0
SPH	temperature setting max value	temperature setting max value data	(SPL～100.0℃) 60.0
Adr	address	The machine factory produce address	(1～16) 1

Intrinsic parameter-3

Parameter code	Parameter name	Parameter function	factory default (range)
Lc	password	"Lc = 18" to view the environment temperature.	
Ht	Environment temperature	the environment temperature of The controller	

Intrinsic parameter-4

Parameter code	Parameter name	Parameter function	factory default (range)
Lc-	Password	“Lc=27”to view or modify the parameter value	0
CdS	apillary, pressure release function selection	0: relay for pressure relief function; 1: relay for capillary function;	(0～1) 0
CAP	Capillary switch Setting value	When the temperature setting ≥ CAP ", start relay; When the temperature setting < CAP ", close the relay.	(-50.0～100.0℃) 0.0
dpL	Pressure release (cooling) solenoid valve start valve	When the compressor work in balanced way, If the temperature measurement ≤ temperature setting value + dpL ", start the electromagnetic valve; When the compressor to off work, if the compressor stop working, the starting electromagnetic valve.	(-10.0～0.0℃) 0.0

dpH	Pressure release (cooling) solenoid valve start valve	When the compressor work in balanced way, If "temperature measured values ≥ temperature value + dpH,compressor work, electromagnetic valve closed; Note: when the compressor work in balanced way, if the "dpL = 0" and "dpH = 0", the electromagnetic valve is closed.	(0.0～10.0℃) 0.0
ndF	The evaporator Frost way	0: no frost function; 1: solenoid valve frost; 2: electric heat pipe frost;	(0～2) 0
dt1	frost relase The time interval 1	When the setting temperature ≤ 8.0 ℃ the frost time interval."Dt1 = 0" no frost.	(0～240h) 24
Ft1	frost relase The time 1	When the setting temperature ≤ 8.0 ℃ for solenoid valve frost, Ft1 for electromagnetic valve conduction time; for electric heat pipe frost, Ft1 to stop the compressor working time. Note: if frost electric heating tube, frost time try try to less than the compressor started delay time.	(0～600s) 180
ot1	When frost full power heating time 1	When the setting temperature≤ 8.0 ℃ For electromagnetic valve, frost ot1 is invalid; If the frost electric heating tube, ot1 for frost full power when the heating time.	(0～Ft1) 60
dt2	frost relase The time interval 2	When the "8.0 ℃ < temperature setting value ≤16.0 ℃ frost time interval."Dt2 = 0" no frost.	(0～240h) 48
Ft2	frost relase The time 2	When the "8.0 ℃ < temperature setting value≤16.0 ℃ If the solenoid valve frost, Ft2 for electromagnetic valve conduction time; If the electric heat pipe frost, Ft2 means stop the compressor working time. Note: if frost electric heating tube, frost time try to less than the compressor started delay time	(0～600s) 180

ot2	When frost full power heating time 2	When the "8.0 ℃ < temperature setting value≤16.0 ℃ If the solenoid valve frost, ot2 is invalid; If the electric heat pipe frost, ot2 for frost full power heating time	(0～Ft2) 60

Speed and parameter setting

1. Click on the "speed" button, enter the speed setting state, speed display flashing, can through shift, increase, decrease key set to the desired set point;Click on the "speed" button again, exit speed setting state, the value is automatically saved.

2. According to the "speed" button for 3 seconds long temperature display area to show the password prompt "Lc", speed display area shows the password value, input speed internal parameters set password value into the state, then click on the "speed" button can modify the parameters.Long press the "speed" button for 3 seconds, exit this state, the parameter value automatically saved.

3. Note: the speed in the process of the parameters in the controller running from modification, if you need modify, please stop controller to modify again

Intrinsic parameter-5

Parameter code	Parameter name	Parameter function	factory default (range)
Lc	password	“Lc=3”to view and modify the parameter value。	0
Pd-	The proportional gain	Speed proportional gain.	(1～100) 10
Id-	Integral coefficient	Speed i ntegral coefficient	(1～100) 5
InT	speed up time	Motor speed up to the time needed for the new Settings.	(1～60) 10
dET	Speed down time	Motor speed down to the time needed for the new Settings.	(1～60) 10
SdL	speed setting min value	speed setting min value date	(20～6000) 20
SdH	Speed setting max value	speed setting max value date	(SdL～6000) 600

Intrinsic parameter-6

Parameter code	Parameter name	Parameter function	Factory default(range)
Lc-	password	“Lc=9”To view and modify parameter value	0
EAr	The gear ratio	Big Wheel diameter/ small wheel diameter.	(1.0～10.0) 1.0
PoL	Motor pole logarithmic	Brushless dc motor logarithmic	(1～32) 4
dIF	The motor rotation Reference direction	DIF = 0: clockwise direction as positive DIF = 1: rules for positive counterclockwise direction	(0～1) 0
FdS	Speed value feedback	Speed feedback coefficient values	(0.1～10.0) 1.0
FdC	Current feedback value	Current feedback coefficient value	(0.1～10.0) 1.0
FrE	Carrier frequency	Brushless motor carrier modulation frequency Note: change the carrier frequency, need to restart the controller	(5～15) 15
Po-	Motor power	Brushless motor power Note: the user according to the actual motor power to adjust the parameters	(1～400) Low voltage driver: 80 High voltage driver: 200
CL-	Flow ratio	Motor over-current protection, allowing multiple rated current	(1.0～10.0) 5.0
Fr-	Motor rotation direction	o: the motor run only to forward; 1: the motor run only in reverse; 2: the motor can be positive &negative operation ;	(0～2) 0
db-	Show no sensitive area	Speed shows no sensitive area	(0～100) 2
dF-	False display range	When speed set point ≥dF , the speed set point display value and speed display values are all false	(0～6000) 6000

Time setting

1. When the "Fr = 0" or "Fr = 1: motor in forward or only run only in reverse: Click on the "time" button and enter the total timing time setting, time display flashing, can through shift, increase, decrease the key changes to the desired setting point; Then click on "time" from the total time setting status regularly, value is automatically saved.

2. When "Fr = 2" : the motor can be positive &negative operation: : Click on the "time" button and enter the total timing time setting, time display flashing, can through displacement, increase, reduce the key changes to the desired set point; Then click on "time" in turn, are in turn time setting, stop time setting, reverse time setting state, and then click on the "time" button, the exit time setting state, the value is automatically saved.

When into the state of forward time setting, forward identifier "Fd" light, time display area;
When to stop time setting state, stop identifier "P -" light, time display area flicker;
When into the reverse time setting state, reverse identifier "Rd" light, time display area;
Note: total timing timing can choose minutes and hours; Forward, stop, reverse time timing for minutes.

3. Long press "time" key about 3 seconds, the temperature display area shows the password prompt "Lc", speed display area password value, by increasing, reducing, and the shift key, modification to the required password value. Then click on "time", if the password value is not correct, the controller automatically return to the normal display status, if the password value, right into the time internal parameter set state, then click on "time" can modify the parameters in turn. Long press "time" button for 3 seconds, can withdraw this state, the parameter value automatically saved.

Intrinsic parameter-7

Parameter code	Parameter name	Parameter function	Factory default(range)
Lc-	Password	“Lc=3”to view and modify parameter value	0
ndt	Timing mode chose	0: after running time, running time, only stop speed, constant temperature	(0～3) 1

		1: after running time, running time, at the same time to stop the speed and temperature Start the time after 2: temperature reach the set value, to the running time, only stop speed, constant temperature 3: timing starts after the temperature reach the set value, to the running time, at the same time to stop the speed and temperature Timing at the beginning of the "m" or "h" start flashing, End of the time, the time display shows "End" Note: this parameter in the operation of the modification is prohibited	
Hn-	total timing mode	0: timing time in minutes 1: timing time by the hour Note: this parameter in the operation of the modification is prohibited	(0～1) 0
rT-	Total timing modify total timing mopd	Revision total timing timing error, Revised = [running time (in seconds) - real time (in seconds)] * 10 / real time (points)	(-999～999) 0

Note: the value internal parameter table factory has debugging confirmation, users do not need to adjust themselves.

7. Matters need pay attention and maintenance

a · When moving the machine, Forbid Inversion and greater than 45 angel putting the Incubator.

b · Do not change the setting value frequently during using, in case to cause overload for the compressor, and affect the equipment service life.

c · To ensure cooling condenserive heat dissipation, machine backside and wall should keep a distance of more than 20 cm, boxes both sides should keep more than 25 cm gas

d · In order to keep the nice appearance, Do not use The corrosion solution to clean machine. Can use the dry cloth or alcohol to keep the chamber neat.

e · Every Six months should clean the machine and the chamber. To check the Oscillation car. Make sure power off during cleaning equipment.

f · Should cut off power and keep equipment chamber dry when it is not using

g · To insure the temperature evenly inside, should often check if axial flow fan inside is working normally.

h · Do not touch crash the probe · So as not to cause temperature abuse.

i · When the equipment not working, should contact with professional Maintenance personnel or sale department.

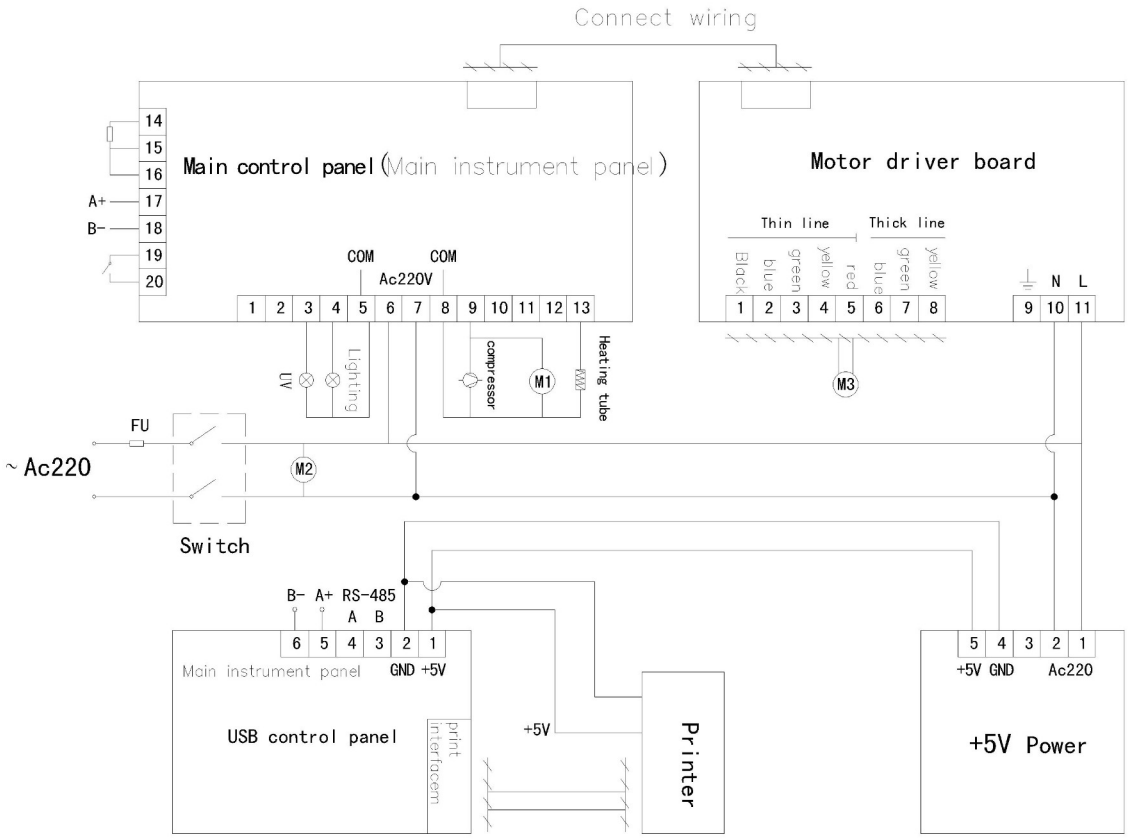
j · If need move ,repair or clean the machine, should keep the power off

k · The Equipment should place at Ventilated, dry and non-corrosive gases warehouse

05 Trouble Shooting

Touble shooting	check/solution
Temperature display no values Temperature setting have values	Abnormal temperature sensor, check the temperature sensor.
Temperature rise less than the set value	whether the temperature set point temperature below shows; Check whether the electric heating tube is damaged: Check the control board and related wiring.
The speed up rating is low	Check whether the studio fan stalling: 1. The fan 2. Relevant connection line fault , check whether the use of voltage in ~ 220 v (voltage fluctuation within 10%)
Low temperature warning	·Check the fan, heater is working correctly.
Over temperature alarm	·Check the fan and compressor is working correctly (please refrigeration compressor does not work should repair personnel diagnosis maintenance).
Boot up without any display	Check whether the power switch is open Check into line plug line, has ~ 220 v Check whether the fuse is damaged Please check the fault according to the wiring diagram

06 The wiring diagram



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