INCUBADOR CON AGITACIÓN REFRIGERADO
REFRIGERATED SHAKING INCUBATOR
INCUBATEUR RÉFRIGÉRÉ À AGITATION

Ref. | Code | Réf. LND004 - Mod. 651

Este manual es parte inseparable del aparato por lo que debe estar disponible a todos los usuarios del equipo. Le recomendamos leer atentamente el presente manual y seguir rigurosamente los procedimientos de uso para obtener las máximas prestaciones y una mayor duración del mismo.

This manual should be available for all users of these equipments. To get the best results and a higher duration of this equipment it is advisable to read carefully this manual and follow the processes of use.

Ce manuel est une partie indissociable de l'appareil et doit être mis à la disposition de tous les utilisateurs de l'équipement. Nous vous recommandons de lire attentivement ce manuel et de suivre scrupuleusement les procédures d'utilisation afin d'obtenir des performances maximales et une plus longue durée de vie de l'appareil.

LANGUAGE INDEX

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1. SAFETY WARNINGS BEFORE USE

■ Do not store volatile, flammable or explosive products in this device, otherwise it may cause explosion or fire.
■ The incubator must not be placed in a place exposed to rain, moisture or splashing water, otherwise it may cause accidents such as leakage, short circuit or electric shock.
■ Do not insert metal objects such as nails or wire into any openings or gaps of the equipment. Otherwise, accidental contact between such objects and moving parts may cause electric shock or injury.
■ Do not insert fingers, sticks or other foreign objects into the air outlet or air inlet. The internal fan is running at high speed, and if you touch the high-speed rotating blades, it will cause damage to the device or personal injury.
■ Non-professional personnel are not allowed to disassemble, repair or modify the equipment, otherwise fire or electric shock accidents may be caused due to improper operation.
■ The power plug or power wire must not be damaged or destroyed. If the plug is loose, the power cord must be replaced, otherwise it may cause fire or electric shock.
■ This device should be installed on a solid ground. If the ground is not solid enough or the installation location is not suitable, the device may fall over and cause personal injury.
■ Please use the dedicated power supply indicated on the nameplate of this device. The power socket must be connected to a ground wire. This device must be reliably grounded to prevent accidental leakage from causing electric shock or fire.
■ Never plug or unplug the power plug with wet hands, otherwise there is a risk of electric shock.
■ Before performing any repair or maintenance on this equipment, be sure to disconnect the power supply to prevent electric shock or personal injury.

■ Always wear gloves when repairing or maintaining the equipment to prevent personal injury from edges or sharp corners.
■ Do not damage the power cord or use unspecified power cords. Do not connect the power cord in the middle or use extension cords. Otherwise, electric shock or fire may occur.
■ Do not unplug the power plug during operation, and do not pull the power cord to unplug the power plug.
■ If you find that the device is running abnormally, unplug the power cord immediately to stop the device from running. Running the incubator in an abnormal state may cause electric shock or fire.
■ If the appliance is left unused in an unsupervised area for a long period of time, ensure that children do not have access to the appliance and that the appliance door cannot be completely closed.
■ Adjust the feet so that the equipment is installed horizontally. All four feet should be contacting the supporting surface without any hanging or looseness.
■ Use an independent power socket equipped with a grounding wire and plug the power plug tightly when in use.
■ Before moving the device, unplug the power plug. When moving, the tilt angle in any direction should be less than 45 degrees.
■ Be careful when touching the inside of the door; it may be hot.
■ The setting of internal parameters must be the responsibility of specific management personnel to prevent the controller program from being disrupted due to lack of understanding of the setting operations.
■ The equipment should be installed at a distance of more than 20 cm from walls and objects.
■ Open and close the door gently.
■ The surface of the equipment must not come into contact with volatile chemicals such as gasoline and thinners.
■ Keep the inside and outside of the incubator clean and remove debris and stains regularly.

2. MAIN FEATURES

■ The housing is made of cold-rolled steel plate and spray-painted surface.
■ The inner surface of the chamber is made of mirror stainless steel (SUS304), which is easy to clean and has excellent chemical resistance.
■ Brushless DC motor, maintenance-free, with stable torque.
■ Mechanical three-axis eccentric drive system makes the machine run smoothly, stably, durable and reliable.
■ It adopts PID control technology, LCD display, and has parameter memory and over-temperature alarm functions.
■ It has a power-off recovery function. When the external power supply suddenly fails and then comes back on, the device automatically resumes operation according to the original set program.
■ The circuit controlling the acceleration ensures that the oscillation starts slowly and stops with a delay, thus ensuring the safety of the experimental samples.
■ It has forward and reverse bidirectional oscillation function, and the time of forward, reverse and stop can be set at will.

■ The temperature control mode is easy to switch. When the temperature setting value is lower than the lower limit of the temperature setting, there is no output for heating and cooling, there is no temperature control inside the box, the circulating fan stops rotating, and the equipment operates at ambient temperature.

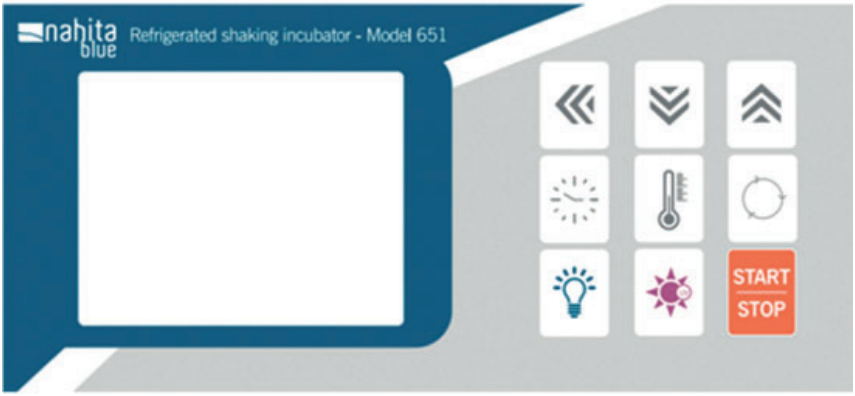
■ It is equipped with safety gate protection. When the door is opened, the rotation slowly stops; when the door is closed, the equipment slowly rotates again and continues to run according to the original set program, thus protecting the safety of user and samples.

■ The ultraviolet lamp is hidden in the air duct to prevent the leakage of ultraviolet rays and protect the safety of users.

3. TECHNICAL PARAMETERS

Model / Code	651 / LND004
Shaking mode	Cyclotron oscillation
Amplitude	Ø 26 mm
Speed range	30 - 400 rpm
Speed accuracy	±1 rpm
Control method	PID
Display	LCD, with black background and white characters
Convection method	Forced convection
Drive mode	Eccentric three-axis
Door opening method	Manual door opening
Ambient temperature requirement	5 - 28 ºC
Temperature control range	4 - 65 ºC
Temperature resolution	0,1 ºC
Temperature fluctuation	≤±0,5 ºC (at 37 ºC)
Temperature uniformity	≤±1 ºC (at 37 ºC)
Timing range	1 - 9999 minutes / hour
Shelf size	450 x 280 mm
Maximum capacity	15 x 250 mL / 8 x 500 mL / 6 x 1000 mL
Standard configuration	10 x 250 mL
Equipment dimensions (LxWxH)	670x585x500mm
Chamber dimensions (LxWxH)	500x330x257mm
Power	840W
Net weight	52kg
Gross weight	63kg
Power supply	220VAC, 50/60Hz

4. CONTROL PANEL



	Shift
	Reduce
	Increase
	Speed
	Temperature
	Time
	Start operation/Stop operation
	UV lamp
	Illumination (model 651 does not have this function)

5. PREPARATION BEFORE USE AND STARTUP

- The incubator should be placed in a firm, flat, dry place away from direct sunlight.
- Prepare the water tray and place it at the bottom of the incubator (drain outlet).
- To ensure smooth operation, the equipment must be placed horizontally. It must not be suspended or unstable.
- To ensure sufficient heat dissipation, the incubator must be kept at least 20cm away from walls and objects.
- Power connection: Use a dedicated power socket with a capacity not less than the corresponding input power in the product technical parameters and an AC voltage of 220V/50Hz. Check and confirm that the local voltage meets the requirements and allow a 10% voltage deviation.

6. SETTING OF TEMPERATURE INTERNAL PARAMETERS

- Click the button to enter the temperature setting state. The temperature display area flashes and you can modify it to the desired setting value through the shift, increase and decrease keys. Click the button again to exit the temperature setting state and the setting value will be automatically saved.
- Press and hold the button for 3 seconds, the temperature display area will display the password prompt “Lc”, the speed display area will display the password value. Enter the password value to enter the temperature internal parameter setting state, and then click the button to modify each parameter. Press and hold the button for 3 seconds to exit this state, and the parameter value will be automatically saved.

Internal parameters – Table 1

Parameter	Name	Parameter function description	(Range) Factory value
Lc	Password	“Lc=3”, the parameter value can be viewed and modified.	0
AL H	Upper deviation Over temperature alarm	When “temperature measurement value >temperature setting value + ALH”, the alarm light turns on, the buzzer sounds, and the heating output is disconnected.	(0-20,0 ºC) 5,0
ALL	Lower Deviation Over temperatu re alarm	When “temperature measurement value <temperature setting value + ALL “, the alarm light will light up and the buzzer will sound. When “ALL=0 “, there is no lower deviation alarm function.	(-50,0-0 ºC) 0
Ct-	Compressor start delay	Compressor start delay protection time, the minimum time interval from compressor stopping to restarting.	(0-600 seconds) 180

uP-	Compressor start threshold	When the compressor works in intermittent mode, If “temperature measurement value ≥ temperature setting value + uP “ and the compressor start delay time is reached, start the compressor. **Note: This parameter is only valid in manual compressor start and stop mode and is invalid in automatic mode.**	(-10,0-10,0 ºC) 0,4
dn-	Compress or shutdown threshold	When the compressor works in intermittent mode, If “temperature measurement value ≤ temperature setting value + dn “, turn off the compressor. **Note: This parameter is only valid in manual compressor start and stop mode and is invalid in automatic mode.**	(-10,0- (uP-0,1)) 0,2
Lt-	Lighting close delay	The light turns on and turns off automatically after a delay of Lt. “Lt=0 “, the delay is invalid and the light must be turned off manually.	(0-9999 minutes) 0
St-	UV lamp close delay	The sterilization lamp is turned on and automatically turns off after a delay of St. “St=0 “, the delay is invalid and the sterilization lamp must be turned off manually.	(0-9999 minutes) 0
T-	Control cycle	Heating control cycle.	(1-60 seconds) 5
P-	Proportio nal band	Time proportional action regulation.	(0,1-50,0) 10,0
I-	Integration time	Integral action regulation.	(1-2000 seconds) 500
d-	Derivative time	Differential action regulation.	(0-2000 seconds) 200
Pb-	Zero adjustment	Corrects the error caused by the sensor (low temperature) measurement. Pb = actual temperature value - instrument measurement value	(-99,9-99,9 ºC) 0
PK-	Full scale adjustment	Corrects the error caused by the sensor (high temperature) measurement. PK=1000* (actual temperature value - instrument measurement value) / instrument measurement value	(-999-999) 0
Fil	Temperature coefficient	Adjusting temperature sensitivity	(1-200) 50
TdB	Temperature insensitive zone	Temperature display insensitive area	(0 - 20,0 ºC) 0,1

Internal parameters – Table 2

Parameter	Name	Parameter function description	(Range) Factory value
Lc	Password	“Lc=9”, the parameter value can be viewed and modified.	0
R	Power off memory function	0: No power-off memory function 1: With power-off memory function	(0 - 1) 0
FAn	Fan type selection	0: The fan is a short-axis fan 1: The fan is a long-axis fan	(0 - 1) 0
ndc	Compressor How it works	0: The compressor works only intermittently; 1: The compressor determines whether it is working in balanced or intermittent mode based on the value of CP (see below). 2: The compressor determines whether it is working in balanced or intermittent mode according to the value of Htd (see below).	(0 - 2) 0
CP-	Compressor working mode: fixed switching point	“ndc=1 “, If the “temperature setting value ≥ CP “, the compressor works in intermittent mode, otherwise it works in balanced mode.	(0 - 100,0 ºC) 30,0
Htd	Compressor working mode: automatic switching point	“ndc=2 “, If the “temperature setting value ≥ ambient temperature + Htd”, the compressor works in intermittent mode, otherwise it works in balanced mode.	(-50,0 - 50,0 ºC) 0,0
Crc	compressor Start-Stop mode	When the compressor works in intermittent mode, 0: Automatically start and stop the compressor (according to the ambient temperature and set value). 1: Manually start and stop the compressor (according to the values of uP and dn in the internal parameter table-1).	(0 - 1) 0

Cnp	Compressor operating temperature point	When “temperature setting value ≥ Cnp “, the compressor is prohibited from operating. **Note: This working mode has the highest priority, that is, the controller executes this command first, and then determines whether the compressor works in balanced or intermittent mode.**	(0 - 100,0 ºC) 42,0
nP-	Maximum power output	Maximum power percentage of the heating output.	(0 - 100 %) 100
Co -	Turn off heating output deviation	When “temperature measurement value ≥ temperature setting value + Co “, the heating output is turned off.	(-50,0 - 50,0 ºC) 0
SPL	Límite inferior de ajuste de temperatura	Lower limit of temperature setting value	(-50,0 - 110,0 ºC) 0,0
SPH	Temperature setting upper limit	Upper limit of temperature setting value	(SPL - 110,0 ºC) 60,0
Adr	Correspondence address	The communication address of this machine.	(1 - 16) 1

Internal parameters – Table 3

Parameter	Name	Parameter function description	(Range) Factory value
Lc	Password	“Lc=18”, puede comprobar la temperatura ambiente.	0
Ht	Ambient temperature	The ambient temperature of the controller.	(0-20,0 ºC) 5,0
Hpb	Temperature correction value	Correct the error caused by ambient temperature measurement.	(-20 - 20 ºC) 0

Internal parameters -Table 4

Parameter	Name	Parameter function description	(Range) Factory value
Lc	Password	“Lc=567”, you can view and modify the parameter value.	0
rST	Restore factory settings	0: Do not restore factory defaults 1:Restore factory settings (restore parameters in parameter tables 1, 2, 3, 5, and 8 to default values)	(0-1) 0

Internal parameters – Table 5

Parameter	Name	Parameter function description	(Range) Factory value
Lc	Password	“Lc=27”, the parameter value can be viewed and modified.	0
CdS	Capillary, pressure relief, fan function selection	0: The relay is in pressure relief function 1: The relay is a capillary function 2: The relay is for fan function	(0 - 2) 0
CAP	Capillary Switching setting value	When the compressor is operating in a balanced mode, When “temperature setting value ≥ CAP”, start the relay. When “temperature setting value < CAP”, turn off the relay.	(-50,0 - 100,0 ºC) 0,0
dPL	Pressure relief (cooling) solenoid valve start threshold	When the compressor is operating in a balanced mode, If “temperature measurement value ≤ temperature setting value + dpL”, start the solenoid valve. When the compressor is working in disconnected mode, if the compressor stops working, the solenoid valve is started.	(-10,0 - 0,0 ºC) 0,0
dPH	Pressure relief (cooling) Solenoid valve shutdown threshold	When the compressor is operating in a balanced mode, If “temperature measurement value ≥ temperature setting value + dpH”, close the solenoid valve. When the compressor is operating in the disconnected mode, if the compressor starts to operate, the solenoid valve is closed. **Note: When the compressor works in a balanced mode, if “dpL=0” and “dpH=0”, the solenoid valve is always in the closed state.**	(0,0 - 10,0 ºC) 0,0

FWf	Evaporator defrosting method	0: No defrost function 1: Solenoid valve defrosting 2: Defrosting of electric heating tube	(0 - 2) 0
dt1	Defrosting time interval 1	When “temperature setting value ≤ 8.0ºC”, the defrost time interval. When “dt1=0”, there is no defrost in this section.	(0- 240 hours) 24
Ft1	Defrosting time 1	When “temperature setting value ≤8.0ºC”, If it is solenoid valve defrosting, Ft1 is the solenoid valve conduction time. If the defrosting is done by electric heating tubes, Ft1 is the time to stop the compressor. **Note: If the defrosting is done by electric heating tubes, the defrosting time should not be shorter than the compressor start-up delay time.**	(0- 600 seconds) 180
ot1	Full power heating time during defrosting 1	When “temperature setting value ≤8.0ºC”, If it is solenoid valve defrosting, ot1 is invalid. If it is defrosting with electric heating tube, ot1 is the full power heating time during defrosting.	(0- Ft1) 60
dt2	Defrosting time interval 2	When “8.0ºC < temperature setting value≤16.0ºC”, the defrost time interval. When “dt2=0”, there is no defrost in this section.	(0- 240 hours) 48
Ft2	Defrosting time 2	When “8.0ºC < temperature setting value≤16.0 ºC “, If it is solenoid valve defrosting, Ft2 is the solenoid valve conduction time. If the defrosting is done by electric heating tubes, Ft2 is the time to stop the compressor. **Note: If the defrosting is done by electric heating tubes, the defrosting time should not be shorter than the compressor start-up delay time.**	(0- 600 seconds) 180
ot2	Full power heating time during defrosting 2	When “8.0ºC < temperature setting value ≤16.0 ºC”, If it is solenoid valve defrosting, ot2 is invalid. If it is defrosting with electric heating tube, ot2 is the full power heating time during defrosting.	(0- Ft2) 60

7. SETTING OF SPEED INTERNAL PARAMETERS

■ Click the button to enter the speed setting state. The speed display area flashes and you can use the shift, increase, and decrease keys to modify to the desired setting value. Click the button again to exit the speed setting state and the setting value will be automatically saved.

■ Press and hold the button for 3 seconds; the temperature display area will display the password prompt “Lc”, and the speed display area will display the password value. Enter the password value to enter the speed internal parameter setting state, and then click the button to modify each parameter. Press and hold the button for 3 seconds to exit this state, and the parameter value will be automatically saved.

Note: The speed parameters cannot be modified during the operation of the controller. If you need to modify them, please stop the controller and then modify them.

Internal parameters – Table 6

Parameter	Name	Parameter function description	(Range) Factory value
Lc	Password	“Lc=3”, the parameter value can be viewed and modified.	0
Pd-	Proportional gain	Speed proportional gain.	(1 - 100) 10
Id-	Integration coefficient	Speed integral factor.	(1 - 100) 5
InT	Acceleration time	The time required for the motor to accelerate to the new set value.	(1 - 60) 10
dET	Deceleration time	The time required for the motor to decelerate to the new set value.	(1 - 60) 10
SdN	Speed setting lower limit	Minimum speed setting value	(5 - 6000) 20
HkDJ	Speed setting upper limit	Maximum speed setting value	(SdL - 6000) 300

Internal parameters – Table 7

Parameter	Name	Parameter function description	(Range) Factory value
Lc	Password	"Lc=9", the parameter value can be viewed and modified.	0
EAr	Gear ratio	Large gear diameter / small gear diameter. **Note: When setting this parameter, be sure to match the maximum speed, otherwise it will cause data overflow and other system failures, and the system will not be able to operate normally.**	(0,5 - 30,0) 1,0 o (0,50 - 30,0 0) 1,00
PoL	Motor pole pairs	Number of pole pairs of brushless DC motor.	(1 - 32) 4
dIF	Motor rotation Base direction	dIF=0 : Clockwise rotation is defined as positive direction dIF=1 : Counterclockwise rotation is defined as positive direction	(0 - 1) 0
FWf	Speed feed-back value	Speed feedback coefficient value	(0,1 - 10 , 0) 1,0
FqV	Current feed-back value	Current feedback coefficient value	(0,1 - 10,0) 1,0
FWf	Carrier frequency	Brushless motor carrier modulation frequency **Note: When changing the carrier frequency, the controller needs to be restarted.**	(5 - 15) 15
Po-	Excitation voltage	Servo motor excitation voltage Note 1	(1 - 400) Low voltage driver: 80 High voltage driver: 200
CL-	Overcurrent protection value	Motor overcurrent protection value Note 2	(1,0 - 10 , 0) 5,0

E	Reduction ratio accuracy	0: EAr has 1 decimal place 1: EAr has 2 decimal places **Note: In the driver board of the old protocol, this parameter modification is invalid for EAr (the default EAr is 1 decimal point)**	(0 - 1) 0
Fr-	Motor rotation direction selection	0: The motor runs only in forward direction 1: The motor runs only in reverse direction 2: The motor can run in forward and reverse directions	(0 - 2) 0
db-	Show insensitive zone	Speed display insensitive area	(0 - 100) 2
dF -	Fake Display Interval Points	When the speed setting value ≥ dF, the speed setting value and speed display value are both false display values.	(0 - 6000) 6000

Note 1: This parameter is valid only when the servo motor is connected. When the 1.6NM motor is connected, the parameter value is 20; when the 3N.M motor is connected, the parameter value is 55.
Note 2: The default protection current is 5A. Users need to modify this parameter according to the actual rated current value of the motor.

8. TIME SETTING

1. When “Fr = 0” or “Fr = 1” the motor runs only in forward rotation or only in reverse rotation. Click the button to enter the total timing time setting state. The time display area flashes and can be modified to the desired setting value through the shift, increase and decrease keys. Click the button again to exit the total timing time setting state and the set value will be automatically saved.
2. When “Fr = 2” the motor can run forward and reverse directions. Click the button to enter the total timing time setting state. The time display area flashes and can be modified to the desired setting value through the shift, increase and decrease keys. Then click the button in sequence to enter the forward time setting, stop time setting and reverse time setting states respectively. Click the button again to exit the time setting state and the set value will be automatically saved.

When entering the forward time setting state, the forward identifier “Fd “ lights up and the time display area flashes.
When entering the stop time setting state, the stop identifier “P- “ lights up and the time display area flashes.
When entering the reversal time setting state, the reversal identifier “Rd “ lights up and the time display area flashes.

Note: The total timing time can be selected in minutes or hours; the forward and reverse timing time is in minutes; the stop time is in seconds.

3. Press and hold the button for about 3 seconds; the temperature display area displays the password prompt “Lc”, and the speed display area displays the password value. Modify the value to the required password value by using the increase, decrease and shift keys. Click the button again. If the password value is incorrect, the controller automatically returns to the normal display state. If the password value is correct, it enters the time internal parameter setting state. Click the button again to modify each parameter in turn. Press and hold the button for 3 seconds again to exit this state, and the parameter value will be automatically saved.

Internal parameters – Table 8

Parameter	Name	Parameter function description	(Range) Factory value
Lc	Password	“Lc=3”, the parameter value can be viewed and modified.	0
ndt	Timed mode selection	0: Start timing after running. When the running time is up, only stop the speed and not the temperature. 1: Start timing after running, stop speed and temperature at the same time when the running time is up. 2: Start timing after the temperature reaches the set value. When the running time is up, only stop the speed and not the temperature. 3: Start timing after the temperature reaches the set value, and stop the speed and temperature at the same time when the running time is up. When the timer starts, “m” or “h” starts flashing, and after the timer ends, the time display area shows “End”. **Note: This parameter is not allowed to be modified during operation.**	(0 - 3) 1
Hn-	Total timing mode	0: Timing in minutes 1: Timing in hour Note: This parameter is not allowed to be modified during operation.	(0 - 1) 0
rT-	Total timing correction	Correct the overall timing error, Correction value=[Run time (seconds) - Actual time (seconds)] * 10/Actual time (minutes)	(SdL - 6000) 300

9. KEY OPERATION AND DISPLAY INSTRUCTIONS

1. When the controller is powered on, the temperature display window displays “HY - T”, the speed display window displays “v10”, the time display window displays “8888”, all identifiers light up (except the “P-” indicator which flashes), and it returns to the normal display state after 4 seconds.
2. Disable temperature and speed control functions

When the temperature setting value is less than the lower limit of the temperature setting, the temperature display window displays “OFF”, indicating that the temperature control function is prohibited. When the speed setting value is less than the lower limit of the speed setting, the speed display window displays “OFF”, indicating that the speed control function is prohibited.

3. Timing function

When the total timing time is set to “0”, it means there is no timing function and the controller runs continuously; when the set time is not “0”, it stops running after the timing ends (see ndt parameter in internal parameters Table-8 for details) , the time display area displays “End”, and the buzzer beeps for 1 minute. Click the “Start/Stop” button to restart the controller.

4. Start and stop

Press and hold the “Start/Stop” button for 1 second to start or stop the controller. The “RUN” identifier lights up when running, and the “STOP” identifier lights up when stopping.

5. Refrigeration function

The compressor working mode can be selected (intermittent, balanced, disconnected), and the compressor can be started and stopped manually or automatically when working in intermittent mode (see ndc, CP, Htd, Crc, Cnp parameters in internal parameters Table-2 for details).

6. The compressor pressure relief or temperature reduction function can be optionally controlled by a solenoid valve (Note: MTHYH(S)-C 31 00, MTHYH(S)-C 31 0 1).
7. Optional evaporator defrost function, defrost control mode can choose solenoid valve defrost or electric heating tube defrost.
8. Power-off memory function

By modifying the power-off memory parameter value (see “R “parameter in internal parameters Table-2 for details), you can choose whether to have the power-off memory function.

9. Gating function

When the door is open, the “OPEN” identifier lights up; otherwise, the “OPEN” identifier goes out. If the door is opened during operation, the controller automatically stops temperature control and motor operation.

When the door switch is closed, the controller automatically starts temperature control and motor operation.

10. Lighting and sterilization functions (see Lt, St parameters: internal parameters Table-1)

Note: This model does not have lighting function, only ultraviolet sterilization function. The sterilization function works by pressing and holding the UV button for 3 seconds.

11. In the setting state, if no key is pressed within 1 minute, the controller will automatically return to the normal display state.
12. When the upper deviation over-temperature alarm occurs, the “ALM1” identifier lights up and the buzzer sounds.

When the lower deviation over-temperature alarm occurs, the “ALM1” identifier flashes and the buzzer sounds. You can press any key to silence the buzzer when it sounds.

13. When the controller has power module failure (Er-1), stall (Er-2), Hall error (Er-3), bus undervoltage (Er-4), bus overvoltage (Er-5), or communication failure (Er-6), the “ALM2 “ identifier lights up, and the speed controller automatically stops running.
14. If the temperature display window of the controller shows “----”, it

means that the temperature sensor or the controller itself is faulty. Please carefully check the temperature sensor and its wiring.

10. COMMON FAULTS AND TROUBLESHOOTING METHODS

Fault	Causes	Troubleshooting
No display after booting	Power not connected	Check if there is voltage at the power socket
	The power plug is not plugged in properly	Check whether the power plug is in reliable contact with the socket
	The power switch is not turned on	Turn on the power switch on the right side of the device
	The fuse is damaged	Replace the power fuse with one of the same specification
The rocker plate does not rotate	Door switch not working	Check whether the door is closed properly
	There is something stuck at the bottom of the rocker plate	Remove foreign matter
	Belt damage	Notify your distributor
	Control circuit failure	Notify your distributor
The rocker plate is not stable when rotating	The incubator is not placed stably	Adjust the incubator feet to make the equipment stable
	There is a foreign object obstructing the bottom of the rocking board	Remove foreign matter
	Control circuit failure	Notify your distributor
The measured temperature is higher than the set temperature or the incubator enters the high temperature alarm state	The door is not closed tightly	Close the door tightly
	The incubator has not yet entered the constant temperature state	Wait a moment and observe
	Circulation fan damaged	Notify your distributor
	Refrigeration system failure	Notify your distributor
The incubator is too noisy	The incubator is not placed stably	Adjust the incubator feet to make the equipment stable
	Flask clamp fixing screw loose	Remove the rocker plate and tighten the screw with the tool
	Rocker plate loose	Tighten the fixing screws at the four corners of the rocker plate
	There is a foreign object hitting the bottom of the rocker	Remove foreign matter
	Mechanical failure	Notify your distributor