



Laboratory Equipment Pty Ltd

INSTRUCTION MANUAL FOR SHAKING INCUBATORS

Laboratory Equipment Pty Ltd

"Proudly Australian Owned and Operated."

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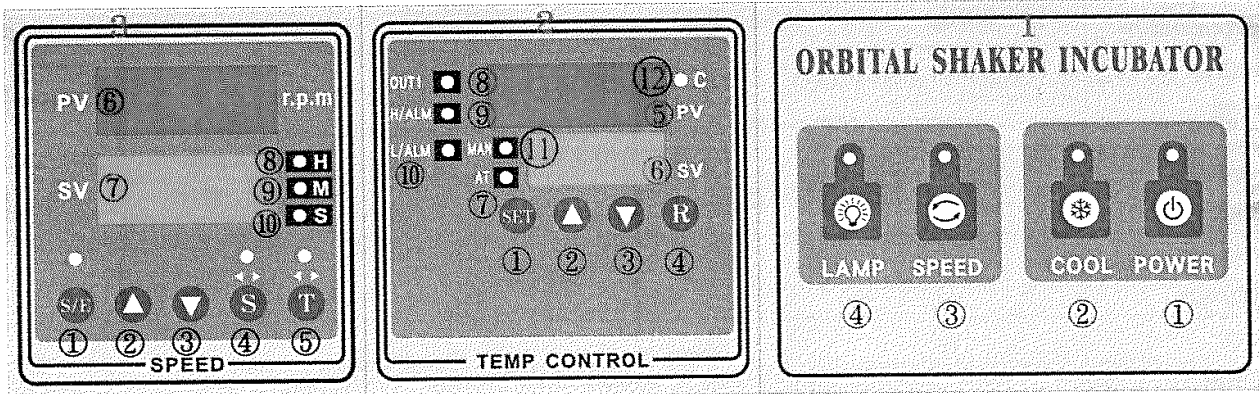
1. Specifications





Model	LM-80D LM-80RD	LM-570D LM-570RD	LM-590D LM-590RD	LM-600D LM-600RD
Specifications				
Temp. Range	AMBIENT+5 ~70°C 0°C ~70 °C (Low temperature model only)			
Shaking Speed	20-300 rpm		20-250 rpm	
Temp. Accuracy	±0.1°C			
Temp. Control	PID Temperature Controller			
Temp. Display	LED Digital Display			
Timer	999h./999min./999 sec.			
Volume	80L	150L	560L	834L
Shelf	1	1	2	2
Shaking Plate mm	440x340	480x380	740x480	960x600
Inside Dimensions	500x400x400	600x500x500	860x600x1100	1100x690x1100
Outside Dimensions	585x595x768	680x690x890	940x800x1840	1190x920x1840










Power Voltage: 110V/220V/240V 50Hz/60Hz

“Customized” order for different capacity is acceptable.

2. Panel & Key Description



Number	Key	Description / Function
1. Power		
①	Main power switch	Turn on/off main power
②	Cooling switch	Turn on/off to start compressor (For low temp model use only)
③	Speed switch	Turn on/off to start the shaker
④	Lamp switch	Turn on/off the light
2. Temperature control		
①		For setting and calling up parameters.
②		To increase the value of digits.
③		To decrease the value of digits.
④		To return and confirm
⑤	PV	To display process value, menu symbol and error code.
⑥	SV	To display set point value, parameter value or control output value.

⑦	AT	Auto-tuning lamp flashes during auto-tuning.
⑧	OUT	Control output lamp 1. Light on when heater is activated
⑨	H/ALM	Over-Heat Temperature alarm. Lights on, when PV value over than set temperature 5°C, and turns off the heater.
⑩	L/ALM	Ineffective
⑪	MAN	Manual controlled, lamp flashes during manual control mode
⑫	C	Process Unit Indicator- Celsius
3. Speed		
①		To suspend / start working Indicator light on when suspend. Press  for 5 seconds to power on/off
②		To increase the value of digits.
③		To decrease the value of digits.
④		Setting speed / parameter
⑤		Timing setting Locking keys
⑥	PV	Display actual RPM (revolutions per minute)
⑦	SV	Display setting RPM or TIME
⑧		Hour indicator Lamp
⑨		Minute indicator Lamp
⑩		Second indicator Lamp

3. Operation

Installation

- 1 Check the working voltage is □110V/60Hz or □220/50Hz
- 2 After confirming the working voltage is correct, insert the power cord to socket
- 3 Turn on the power, the present temperature will display on the temperature control; PV is the actual temperature of inner box; SV is the set temperature
- 4 Please turn on the cooling system below 30°C degrees

3.1 Setting the Temperature

Turn on the temperature controller/power switch. The temperature displays light up and after a few seconds, the upper display shows the present value (PV) or chamber temperature. The lower display shows the set value (SV) or set temperature.

Press ▲ to increase temperature gradually.

Press ▼ to decrease temperature gradually.

Setting temperature upon what you need.

Setting low Temperature

For a set point that requires the use of the refrigeration system, set the temperature and then flip the refrigeration switch up to turn it ON. Because of a delay timer, the compressor will not turn on to begin cooling until after several minutes. Similarly, when the switch is turned off, or if the compressor shuts off in case of a power failure, the compressor will not restart for a few minutes.

When the compressor kicks on, the temperature will start to decrease.

If the compressor is on and the temperature does not go down after 5 minutes, turn the refrigeration switch off to prevent damage and request for service.

3.2 Setting parameter

Press **SET** for 5 seconds and release to enter setup menu.

Press **SET** to select the desired parameter. The PV display indicates the parameter symbol, and the SV display indicates the selected value of parameter.

3.2-1 Lockout

There are four security levels can be selected by using LOCK parameter.

Press **SET** and hold until appears **SET** on the display, release **SET**.

Then re-press **SET** scroll to the parameter LOCK.

Set the lock value to your desired function

Selected	Display	Description
NONE	<i>nonE</i>	No parameter is locked, user can change it freely.
SET	<i>SEt</i>	All setup data are locked (Default setting)
USER	<i>uSEr</i>	All setup data as well as user data. Except set point are locked to prevent from being changed.
ALL	<i>ALL</i>	All parameters are locked to prevent from being changed.

3.2-2 Modify inaccurate temperature value (SHIF)

In normal condition, set SHIF to "0", sometimes PV value is inaccurate because of detecting from different point; at this time please modify it by SHIF value.

When SHIF=0, then PV=100°C

If SHIF setting = 20.00, then PV= 120°C

If SHIF setting = -10.0 , then PV= 90°C

For example:

PV (actual temperature) is 100°C and SV (temperature setting) is also 100°C.

If Thermometer appears 120 °C then set SHIF value 20

If Thermometer appears 90 °C then set SHIF value -10

When SHIF setting is completed, and then press R to make sure.

3.2-3 Auto-calculating

Instrument has been set the best PID value; we suggest executing auto-calculating when temperature is unstable. Enter auto-calculating:

Press SFT and hold until appears A-L on the display.

Press SFT for at least 5 seconds. The AT indicator will begin to flash and the auto-tuning procedure is beginning.

Note: To enable auto-calculating the lock parameter should be set with NONE.

3.2- 4 Manual control

Enter manual control mode for testing or system failure.

Press **SET** and hold until appears **Hand** on the display

Press **SET** for 5 seconds then the MAN indicator will begin to flash and the SV

display will show **H---**. The controller now enters the manual control mode. **H---**

Indicates output control variable for output 1, and **L---** indicates control variable for output 2. Now you can use up-down key to adjust the percentage values for the heating or cooling output.

The controller performs open loop control as long as it stays in manual control mode.

Exit manual control

To press **R** the controller will revert to its normal display mode.

4. Shaking Operation

4-1 For a continuous Run

Press and hold **S/P** to turn on the power.

PV display shows the present rpm value and SV shows the set rpm value.

Default rpm value: 100

Default slow-start: STOP

At operation mode	At suspend mode Indicator light on when
Press ▲ to increase the value of digits. Press ▼ to decrease the value of digits. Set RPM(revolutions per minute)	Press S , SV display flashes Press ▲ to increase the value of digits. Press ▼ to decrease the value of digits. Press S to store the value.

4-2 For a Timed Run

Default time: NIL

Press **S/E** to suspend

Press **T** to set timing, indicator light on.

Use the appropriate **▲**, **▼** to change to your desired set time in hours, minutes and seconds and press **T**, SV flash.

Press **▲** to increase gradually

Press **▼** to decrease gradually

After setting, press **T** to make sure, the press **S/E** to start.

During timer mode, press **S** to display RPM and **T** to display remaining time

Cancellation of time setting: At suspend mode, press **S** to set speed. **T** indicator light off. Timer function closed.

4-3 Setting the Allowed Speed

Press and hold **S** to enter parameter setup, if display "LOCK" please refers to 4-4 to unlock it.

Use the **S** to change Lo or Hi or Adj

Use the appropriate **▲**, **▼** to change the value to your desired settable RPM.

Lo - Set lowest speed (default value: 20 RPM)

Hi -Set highest value (default value: 250 RPM)

Adj - Adjust inaccuracy

4-4 Lock

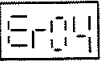
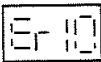
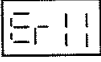
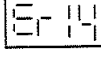
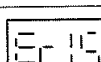
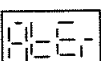
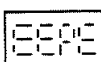
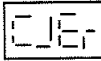
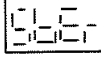

Press and hold $\text{\textcircled{T}}$ to enter parameter *Loct*

nonE - Unlock (default)

SEt - Set parameter to lock (Please unlock if need to change parameter value)

ALL - Set all keys to lock (At lock mode, only displays LOCK, no key is available.)

5. Error code for temperature controller

Error Code	Display Symbol	Error Description	Trouble Shooting
4		Parameter setting conflict, for example: When OUT2=COOL, user cannot select DIRT,PB and TI can not be "0"	If user selects OUT2=COOL to control cool/heat, then PB and TI can not be "0" and OUT1 should select REVR.
10		Function code error during signal communication	Use correct function code
11		Communication error: register address out of range	Do not issue an over-range register address to the valve
14		Try to change the "read only data" or to change the "protected data value" during signal communication	Avoid changing "read only data" or "protected data value"
15		Data address is overflowed during signal communication	Avoid input data overflowed
26		Auto calculating failure	<ol style="list-style-type: none"> 1. Try again 2. Don't change the setting value during auto calculating 3. PB/TI can not be "0". 4. Press "R" key 5. Give up auto calculating
29		Permanent storage EEPROM fault	send it back to maker for repair
30		Cold junction compensation for thermocouple malfunction	send it back to maker for repair
39		Input sensor break, or input current below 1mA if 4-20mA is selected, or input voltage below 0.25V if 1-5V is selected	send it back to maker for repair
40		analog circuit fault	send it back to maker for repair

6. Troubleshooting Guide

Problem	Possible Cause	Remedy
LED is off when power on	<ul style="list-style-type: none"> a. NO power input b. Power plug is loose c. Abnormal voltage input d. Fuse blowout e. Power cord disconnection or bad connection 	<ul style="list-style-type: none"> a. Check power supply system b. Plug in firmly or replace the socket c. Check power supply and stop using temporarily d. Check power voltage and reset e. Replace switch f. Replace power cord
After temperature setting, Heating LED=(OUT1) is off	<ul style="list-style-type: none"> a. Chamber(bath)inside actual temperature is higher than setting temperature b. PT platinum breakdown c. Thermometer output signal...nil 	<ul style="list-style-type: none"> a. Waiting for temperature dropping or cooling b. Replace c. Ask for repair
Heating LED is on but temperature can not rise	<ul style="list-style-type: none"> a. Heater disconnection b. Bad heater circuit c. Bad control circuit d. High temperature protection-setting, locking e. Water level of floating ball is too low(water bath) 	<ul style="list-style-type: none"> a. Ask for repair b. Ask for repair c. Ask for repair d. Reset e. Water supply
Temperature keep rising and out of control	<ul style="list-style-type: none"> a. Temperature is out of control b. Heater circuit is out of control c. P.I.D. value is not correct d. S.S.R. breakdown 	<ul style="list-style-type: none"> a. Ask for repair b. Ask for repair c. Re-calculating automatically d. Ask for repair
Temperature can not drop down	<ul style="list-style-type: none"> a. Cold media run out b. Compressor breakdown 	<ul style="list-style-type: none"> a. Ask to repair b. Ask to repair
Temperature tolerance is large	<ul style="list-style-type: none"> a. Temperature is unstable b. P.T.D. value is not correct c. Temperature setting is too close to room temperature d. circulating fan or motor cannot work e. PT platinum bad connection f. Air circulation inside is blocked g. Cooling system frosted and bad circulation 	<ul style="list-style-type: none"> a. Suspend for 30 minute b. Re-calculating AT automatically c. Add cooling system or dropping ambient temperature d. Ask for repair e. Ask for repair f. Improve articles placement g. Defrost

Problem	Possible Cause	Remedy
Signal lamp lights, but motor does not turn.	<ol style="list-style-type: none"> 1. Coil of motor is broken 2. Speed control PCB is defective. 3. Door safety switch is disconnected. 4. Pulley belt is loose and belt has fallen off. 5. Drive counter weight is loose. 	<p>Replace motor.</p> <p>Replace speed control board.</p> <p>Check and replace switch.</p> <p>Tighten pulley, reinstall belt and adjust its tension.</p> <p>Remove platform and tighten counter weight nut.</p>
Motor is noisy.	Bearing(s) are old, polluted or oxygenated.	Replace motor.
Platform is noisy.	<ol style="list-style-type: none"> 1. Load is not balanced. 2. Platform is not secured. 3. Flasks are loose in clamps. 	<p>Balance load.</p> <p>Tighten screws.</p> <p>Bend each arm of clamp inwards.</p>
Shaker is wobbly	RPM is set too high or too low.	Operate at a lower speed that is acceptable or make sure load is evenly distributed.
Speed cannot be controlled	<ol style="list-style-type: none"> 1. Speed control PC board is defective. 2. Power switch is off. 	<p>Replace speed control board.</p> <p>Turn switch on.</p>

7. Spare Part List

NO.	Item No.	Description
1.	F010-B41	Temperature controller
2.	F024-12A11BWHO	Fan
3.	F363-RPM	Speed PCB
4.		
5.		
6.		

8. General Maintenance

1. Wipe machine with wet cloth first then wipe with dry cloth again every time after using. Please clean it with neutral lotion if there is any dirt.
2. Please plug out for not using machine for a long time.
3. Please don't put overweight article on the shelf to extend its service life.
4. When shaking, any liquid flowing from machine please wipe off immediately.
5. If possible, do not change default value to avoid parameter error.