



Laboratory Equipment Pty Ltd

**INSTRUCTION MANUAL
FOR ECONOMY FAN FORCED
OVEN**

Laboratory Equipment Pty Ltd

"Proudly Australian Owned and Operated."

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Introduction

Congratulations on the choice of a Labec oven. Labec products are manufactured, tested and calibrated to meet published standard specifications under our strict quality assurance guidelines.

This Instruction Manual is for the guidance of operators of Labec Economy Fan Forced Ovens and should be read before the oven is connected to the electricity supply.

It is hoped that this manual will supply all the information that the customer should require for satisfactory operation of the oven. If, however, there are any questions that remain unanswered then the customer should contact our Service Department.

Unpacking

Remove all packing and protective wrapping from both the interior and exterior of the oven. Check the oven for possible transit damage. Ensure all ordered accessories are present. If any physical damage or shortage is evident, do not discard the packaging material until the oven is inspected by the distributor, agent or manufacturer.

NOTE: All claims for shortage or damage must be made within fourteen days (14) from delivery.

Subject to our standard published conditions of sale, we have reasonable grounds to believe that we have ensured, so far as is reasonably practical, that the products listed in our catalogue and brochures have been designed and constructed so as to be safe and without risk to health when properly installed and used in their environment by appropriate and trained personnel, and where applicable, in accordance with our published instructions.

Installation Electrical

This equipment must be tagged and tested according to A S/NZS3760:2010 prior to use and thereafter on a regular basis depending upon the environment.

It is preferable to locate the oven close to a powerpoint and recommend that double adaptors are not used. Check the total wattage if connecting to multi point outlets. Check the rating plate for power requirements. Installation is to be carried out by a qualified electrician in accordance with the power requirements of the product specifications.

Location

Select a location free from draughts and away from direct sunlight or other heat sources.

Heating

Heating of the oven is by means of elements located in the air duct or surrounding the working chamber bonded to the chamber walls.

Operation

Connect the chamber to an alternating current supply of voltage as specified on the rating plate mounted on the side or rear of the chamber.

DANGER: THIS OVEN MUST NOT BE CONNECTED TO DIRECT CURRENT SUPPLY

Turn on the mains and check to see that the illuminating lamp is illuminated.

Set the target temperature or setpoint temperature using the up and down arrows on the front of the controller.

Final adjustment of the temperature controller may be required after the chamber has reached operating temperature and this should be checked with a suitable thermometer located in the chamber (A thermometer is not supplied with the chamber).

When the temperature inside the chamber reaches the set point, the indicator light will go out, and after a constant temperature for 30 minutes, the oven enters into constant temperature state.

Loading the oven shelves shall be of such design as will not impede the circulation of fresh air or the exhaust from the oven. It has been demonstrated experimentally, that the use of grid-type shelves covering more than one half of the shelf area may lead to considerable increase in temperature differential. Notwithstanding the requirements of this clause, serious blockage may occur when the oven is heavily loaded with stock. The best procedure in such cases is to insert the loaded shelves after heating up the oven. **To ensure even heat and air distribution leave gaps between the products on the shelves and a minimum of 50mm from each of the walls, back and door to allow air to pass around the product.** Never allow product to touch or contact the rear wall where the elements are located as this may result in fire as the element surface temperature is much hotter than the overall air temperature in the oven and may ignite if in contact.

After finishing use, turn off the power and remove all samples from the chamber.

Keep the chamber clean, wipe the door sealing rubber with a soft cloth to remove dirt, avoid cleaning with chemicals to prevent damage to the seal.

If the oven will be unused for extended time, daub neutral grease on galvanised parts to prevent corrosion, cover the oven with a dust cover and store in a clean, dry room to protect the electronics from moisture.

Temperature Control

Labec ovens are fitted with solid state proportional action digital temperature controllers which operate from a sensitive thermocouple or Rtd inserted in the working space of the chamber. The controller has been calibrated at 100°C (or 150°C for 300°C model ovens) and before any adjustments to temperature settings are made allow the oven temperature to stabilize for at least one hour. If a thermometer port is located at the top of the cabinet, it is important to ensure that the sensor for the thermometer is located well into the chamber when checking the chamber temperature. If a digital controller is fitted, please read the enclosed operating instructions when setting the controller temperature - see Appendix A.

Digital Over Temp Safety Controller

The oven is fitted with an overheat safety controller. It must be set to slightly above the desired set point temperature and will prevent overheating. It will turn off the heaters if this temp is reached and sound an alarm. Set the Over Temperature Controller around +20°C above set temperature on first use. Setting too close will prevent the oven from stabilising at its set temperature. After stabilising, set it down to around 10°C above set point. Any closer may cause alarm after opening and closing the door. Depending on the way you use the oven you may need to set it higher

Timer

If a timer is fitted, set the time period (allowing for heat up time) required by turning the dial around to the correct time period. Adjust the screw at the bottom of the timer to adjust time periods (do not adjust the screw at the top). After the time period elapses the fan and controller remain on but the heaters will switch off. To reset, turn the mains power off then on again.

Fan

This oven has a fan speed controller with option for fan off (gravity convection only) or fan on with three speeds, speed 3 is the fastest. If you change fan speed, you may need to run an autotune. The oven will arrive calibrated for us with the fan on. If you wish to use the oven without the fan, you will need to run an autotune. Do not operate the oven with the fan and then switch off the fan without running autotune. The temperature will not be accurate.

Caution

Please read and follow the IQOQ document supplied with this oven each and every use.

Please observe the following safety measures before using your LABEC equipment.

- These ovens are **NOT FLAME PROOF** and under no circumstances should inflammable, combustible or explosive material be placed in the oven.
- Low ignition temperature materials and those materials which give off inflammable or explosive vapors should not be placed in the oven.
- Avoid heating substances which give off corrosive vapor.
- Users are advised of the dangers of heating combustible materials. The manufacturer can recommend special types of elements which will prohibit the oven's temperature reaching known ignition points.
- Observe those rules pertaining to wiring and installation of electrical appliances as recommended by the local supply authority.

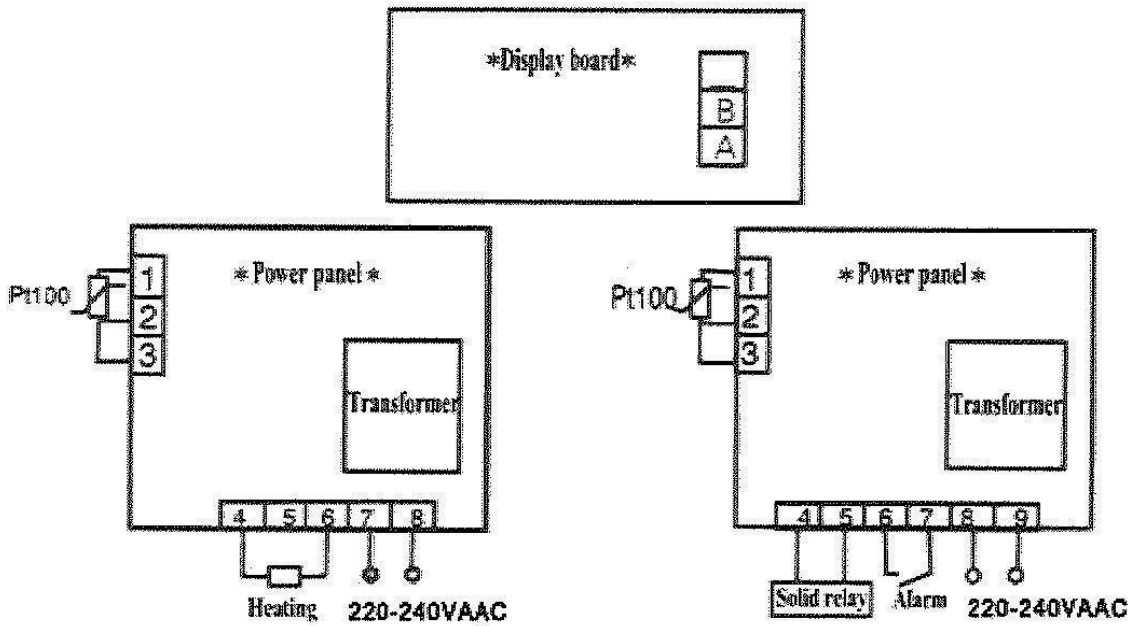
WARNING

It is detrimental for any of the substances listed below to be inside this equipment. The interior of the oven may be damaged if exposed to any of them. Corrosion of the stainless steel and other surfaces will be directly attributable to the presence of one or more of these substances and will not be a defect or failure for which the manufacturer will accept responsibility.

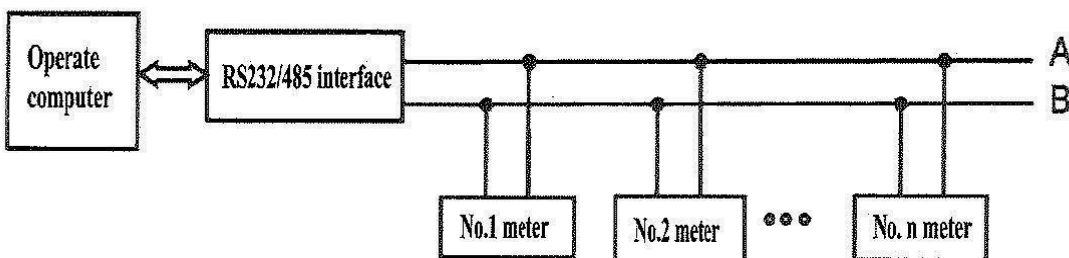
ORGANIC SUBSTANCES	SALT	ACIDS	MISCELLANEOUS
ALKAFORM	AMMONIUM BROMIDE	ACETIC	BROMIDE
ANAESTHESIA	AMMONIUM CHLORIDE	BORIC	CHLORINE
CARBON	CALCIUM CHLORIDE	CARBOLIC (PHENOL)	FLUORINE
TETRACHLORIDE	CALCIUM HYPOCHLORITE	CHROMIC	IODINE
FORMALDEHYDE	FERRIC CHLORIDE	HYDROCYANIC	SULPHUR DIOXIDE
LYSOL (CRESOLS ETC)	HYDROGEN PEROXIDE	NITRIC	
TRICHLOROETHYLENE	MAGNESIUM CHLORIDE	OXALIC	
	MERCURIC CHLORIDE	HYDROCHLORIC	
	POTASSIUM CHLORIDE	PHOSPHORIC	
	POTASSIUM HYPOCHLORITE	SULPHURIC	

	POTASSIUM HYPOCHLORITE	SULPHUROUS	
	SODIUM CHLORIDE	TARTARIC	
	SODIUM HYPOCHLORITE		

Wiring Diagram



Communicating Junction



Safety Information

Isolate the oven from the electrical supply before changing elements or thermocouples or undertaking other routine maintenance. Ensure that the oven is cold.

When reconnecting the oven, ensure that the electrical connections are sound including earth supply continuity.

Wear appropriate safety clothing when operating the oven including a heat resistant face shield (tinted for eye protection), gloves and apron.

Load and unload "hot" work with oven tongs.

Do NOT use the oven in the presence of inflammable or combustible chemicals fire or explosion may result.

To avoid fire, do not expose combustible materials to heat from the open oven door.

Troubleshooting

SYMPTOM	REMEDY
No Power (Indicator Light is off)	<ol style="list-style-type: none"> 1. Check oven is plugged in and power switched on. 2. Ensure the mains power supply point is functioning by using a test appliance on the power socket. 3. Check the internal RCD has not tripped.
Failure to heat or maintain temperature (Indicator light is on)	<ol style="list-style-type: none"> 1. Check the timer is set correctly. 2. Check the timer is reset (turn off/on) 3. Ensure the temperature controller set point is above ambient. 4. Check the safety controller fitted above the main controller setting.
Temperature cannot reach the set point	<ol style="list-style-type: none"> 1. Ensure the exhaust port is closed. 2. Ensure the chamber is not overfilled, decrease the amount of product to improve hot air convection.
The fan doesn't work	<ol style="list-style-type: none"> 1. Check the fan motor.
Controller is displaying -----	<ol style="list-style-type: none"> 1. The temperature sensor requires replacement.
Controller is displaying STOP	<ol style="list-style-type: none"> 1. Timer is up, press the program key for 3s to start.

If the fault cannot be found, call your distributor or the manufacturer quoting the serial number of the unit from the manufacturers label.

Maintenance

The cabinet is finished with stainless steel and to maintain appearance should be wiped over with a cloth and non abrasive cleanser. The chamber is manufactured from stainless steel and may be cleaned with a cloth and non abrasive cleanser. If the chamber is grained stainless steel a stainless steel scratch pad may be used. The pad should be rubbed in the same direction as the grain pattern of the stainless steel.

Some ovens are fitted with a fan motor with sealed and pre-lubricated bearings which should not require maintenance for some time depending upon the extent of usage. The shelves are

manufactured from stainless steel and a cloth and non abrasive cleanser should be used. The door gasket should be cleaned with detergent only, ensuring it is dried completely after washing.

Safety Note Insulation

This oven contains refractory fibres in its thermal insulation. The materials used may be in the form of fibre blanket or felt, vacuum formed board or shapes, mineral wool slab or loose fill fibre. Normal use of the oven will not result in any significant level of airborne dust from these materials but much higher levels may be encountered in maintenance or repair.

Whilst there is no evidence of any long-term health hazards, we strongly recommend that safety precautions are taken whenever the materials are handled.

Exposure to dust from fibre which has been used at high temperature may cause respiratory disease.

When handling fibre, always use an approved mask, eye protection, gloves and long sleeved clothing.

After handling, rinse exposed skin with water and wash work clothing separately.

Before commencing any major repairs we recommend reference

to: - ECFIA Bulletin Number 11

- Guidance Note EH46 (UK Health and Safety Executive.)

We will be pleased to provide further information on request. Alternatively our Service Department will quote any repairs to be carried out at your premises or at our works.

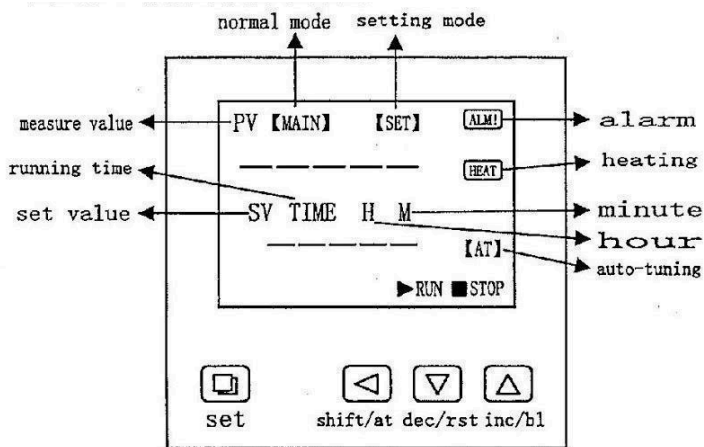
Declaration of Conformity

Each product is thoroughly inspected and tested to not only ensure that it meets the specifications provided, but to also meet Australian Electrical Standard AS3820 and EMC Standard AS/NZ1044:1995, and therefore being accredited with a C Tick label.

Appendix A

Temperature Controller Instructions

A. Panel Instructions



Definitions of Symbols;

1. {MAIN}: Only in normal state (not setting mode), this symbol appears.
2. {SET}: Only in setting mode, this symbol appears.
3. RUN: This symbol always appears unless the timing program is over.
4. STOP: This symbol appears to show you the timing program has finished.
5. {AT}: This symbol twinkles only when you start an Auto-tuning procedure.
6. ALM!: This symbol appears to show the over-temperature alarm.
7. HEAT: This symbol appears or twinkles to show you the heater is working.

B. Operation

i) When the controller is switched on, display windows show the version number and the value of the temperature range for 3 seconds, then it starts running.

ii) button: In the setting state, click on the button to shift the set value.

iii) button: In the setting state, click on the button to reduce the set value. If you keep pressing the button, the set value will decrease continuously.

iv) button: In the setting state, click on the button to increase the set value. If you keep pressing the button, the set value will increase continuously. In the normal status, click on the button to open or close the back light lamp.

v) In the setting mode, if no button is pressed within 60 seconds, the controller will automatically return to normal display.

vi) Temperature and time setting;
No timing function;

Press the "SET" button in the non-set state, windows display the prompt "SP" and temperature set value. Using the "SHIFT", "DEC" and "inc" buttons, users can modify the settings to the desired value, then press the "SET" button again, the controller will return to the normal display, the setting value will be saved automatically.

With timing function;

Press the "SET" button in the non-set state, windows display the prompt "SP" and temperature set value. Re-press the "SET" button, windows display the prompt "ST" and time set value. Press the "SET" button again, the controller will return to the normal display, the setting value will be saved automatically.

When the set time is "0", it indicates the timer is inoperative, the controller will run continuously. If there is time set, the under window of the controller will display temperature setting value or the running time according to the value of "ndt" in Parameters Table 2. When display the running time,

the unit decimal point is lit, start timing when the measured temperature reaches the set value. When the run timer is over the under window of controller will display “End”, the buzzer will sound for 60 seconds, it can be muted by pressing any button, press the “RST” button for 3 seconds at this time, the controller will restart.

vii) When the over-temperature alarm sounds, the buzzer beeps continuously, “ALM” warning light is lit.

viii) When the buzzer sounds, press any key to mute.

ix) If the controller upper display window displays “----”, said temperature sensor or the controller itself fails, please carefully check the temperature sensor and wiring.

3. Auto-tuning of PID

Use the auto-tuning function when the temperature control is not good.

In the non-set state, press the “AT” button for 6 seconds, the window displays ‘AT’ and ‘oFF’, change ‘oFF’ to ‘oN’, by ‘Inc’ or ‘Dec’ button, then the controller will run the auto-tuning program, the “AT” symbol flashes, after auto-tuning end, the light stops flashing, parameter value is saved automatically. In the auto-tuning process, press the “AT” button for another 6 seconds, the controller will set the auto-tuning program.

In the auto-tuning process, the “SET” button is invalid, the under window always displays temperature set value.

Action please: the temperature is not precisely controlled when you start an auto-tuning program, there must be an over-temp situation, please take out any items from the oven before auto-tuning.

4. Internal Parameters setting

In the non-set state, press the “SET” button for 3 seconds, the controller will display the password prompt “Lc”. Adjust password to the required value, then press the “SET” button again, it will run into the internal parameter setting state. If the “SET” button is pressed for another 3 seconds, it will return to the running state, the setting value will be saved automatically.

Parameter Table 1

Parameter	Name	Instruction of the Function	Factory set value (setting range)
Lc-	Password	When Lc=3, enter the next parameters	0
ALH-	Over-temp	If “SV>(SP+ALH)”, the ALM light turns on. The buzzer sounds and the heating output turns off.	(0~100.0°C) 20.0
ALL-	Under-tem	If “SV<(SP-ALL)”, the ALM light flashes, the buzzer sounds.	(0~100.0°C) 0
P-	Proportional	Adjustment of proportional function	(1~400.0°C) 35.0
I-	Integration	Adjustment of integration function	(0~2000S) 200
d-	Differential	Adjustment of differential function	(0~1000S) 200
T-	Control	The temperature control cycle.	(1~60S)

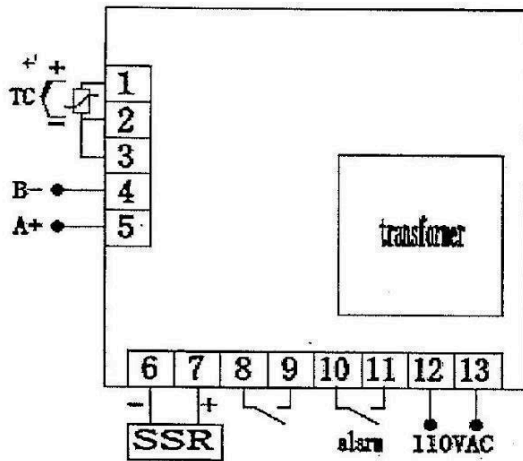
			5
Pb-	Zero Point	When the zero error is comparatively larger, to update this value should be needed. Pb= actual value - measure value	(-12.0~12.0°C) 0
PL-	Full Point	When the full point error is also comparatively larger, to update this value should be needed. PK=1000x(actual value - measure value)/measure value	(-999~999) 0
Addr	Address	The communication address. Invalid	(1~32) 1
Loc	Setting	0: You are allowed to alter the set value of temperature and time; 1: the set value of temperature or time is not allowed to be altered	0(0~1)

Parameter Table 2

Parameter	Name	Instruction of the Function	(Setting range) Factory set value
Lc-	Password	When Lc=9, enter the next parameter.	0
ndA-	Temp	0: With over-temp alarm only. 1: With over-temp alarm and under-temp alarm at the same time.	(0~1) 0
ndt-	Timer	0: No timer function. 1: The timer gets to work as soon as the set temperature value is achieved. 2: The timer starts to work as soon as the instrument gets to work.	(0~2) 1
Hn-	Timer unit	0: Minute. 1: Hour.	(0~1) 0
SPD	Timer	When measured value of temperature > SPD+ set value of temperature, timer gets to work.	(0.1~100.0°C) 0.5
SPT	Constant	In timing mode (set value of temperature is achieved), the buzzer reminds you when the tip time you've set is achieved.	(0~9999S) 0
EST	Tip after	When the timing program is over, the buzzer reminds you as soon as the tip time you've set is achieved.	(0~9999S) 0

EH-	Timer end	0: Continue to maintain the constant temperature when the running time is over 1: Stop the temperature control when the running time is over.	(0~1) 0
ndo-	Switch-out	0: When timing program is over 1: When over temperature alarms	(0~2) 0
SPL-	Minimum Set Point	The minimum temperature set point.	(-50.0~50.0) 0
SPH-	Maximum	The maximum temperature set point.	(0~400.0) 300

6. Wiring



2. PCD-C6001