Laboratory Equipment Pty Ltd

INSTRUCTION MANUAL FOR ECONOMY FAN FORCED OVENS

Laboratory Equipment Pty Ltd

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I. Summary

OEF range drying oven is widely used for drying, baking, melting, sterilizing and curing in labs of industrial enterprises, scientific research institutions, and health and medicine units etc.

II. Structure features

1. High-quality cold rolling steel case with electrostatic spraying surface ensures the aesthetics and longevity of the product.
2. Stainless steel chamber; foursquare semicircle transition; adjustable shelf, airduct lateral plate and bottom heater covering are knock-down construction, which is convenient for cleaning.
3. PID digital intelligent temperature controller with function of temperature setting, time dual screen displaying, over-temperature alarming and timing.
4. The heater and fan are reasonably constructed by placing them under the working room; circulation fan will be closed when it reaches the target temperature to prevent the powdery sample from blowing away.
5. Independent temperature limiter alarm, which can auto-switch with temperature controller and alarm when over temperature limit.
6. Air-tightness adjustable buckle lock door to ensure a good seal.

Optional accessories:

a. RS485/232 interface for connecting computer by principal computer software to control temperature switch.

b. Micro type printer, which can continuously print the temperature record of the running

machine.

c. Independent power cut alarm system to help the user process sample immediately.

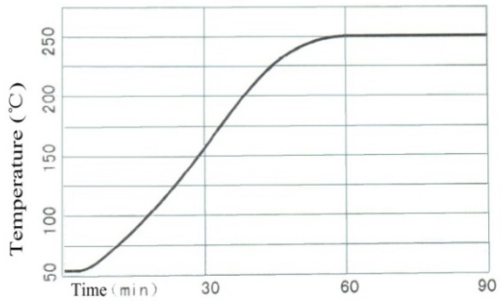
d. Independent temperature limit alarm system; auto-break-off when over temperature limit.

III. Product structure diagram and parameters

1. Main technical parameters

Model	OEF-230	OEF-625
voltage	AC240V 50Hz	AC415V 50Hz
power(w)	3000	7200
Temp. range	RT+10~200℃	RT+10~200℃
Temp. fluctuation	±1.0℃	±1.0℃
Inner Chamber Size(mm)	600×500×750	660×760×1250
Exterior size(mm)	730×670×1220	895×925×1830
Shelf load	15/kg	15/kg
N.W(kg)	70	120
Shelf No.	2pcs	2pcs

2. Temperature profile



Note: according to the different model type, the time of warming up is different

IV. Working conditions

The drying oven works under the following conditions:

1. Temperature ranges between 5~40℃;
2. Relative humidity less than 85% RH;
3. Power: voltage 240V, frequency 50Hz;
4. No violent vibrations and corrosive gas surround the oven.

V. Attentions

	Install the outer ground protection to ensure safety of machine and experiment; ensure power as the machine required.
	This equipment is forbid to use in inflammable and explosive, poisonous and strong corrosive experiments.
	Make sure horizontal installation.
	Non-professionals are not allowed to disassemble and repair this machine.
	Pay attention to the setting temperature when dealing with inflammable matters.
	Make sure dry the resin container, if the temperature is setting too high by accident, the container would be dissolved and then fall on the heater, which will cause fire.
	Overfilled of sample will lead to overheat of working room under part, which will dissolve the inflammable material and cause fire.

	While the machine is working, don't touch the device top, as well as observation window and exhaust port to keep away from high-temperature burns.
	Read the instruction book before operation.

VI. Operational notes

1. Put the material needs drying into container (advice: size of drying material should not over 2/3 of the shelf); then close the container door and switch power, and next switch on the blower.
2. Heating

   Set the temperature as needs (see details in meter instruction), then the temperature starts to rise; when temperature inside working room reaches the set point, the indication light will go out, after constant temperature for 30min, the working room goes into constant temperature state.

   Note: don't close blower when the temperature is rising, or else it will accelerate ageing of heater.
3. Working time:

   Decide the drying time according to humidity of sample.

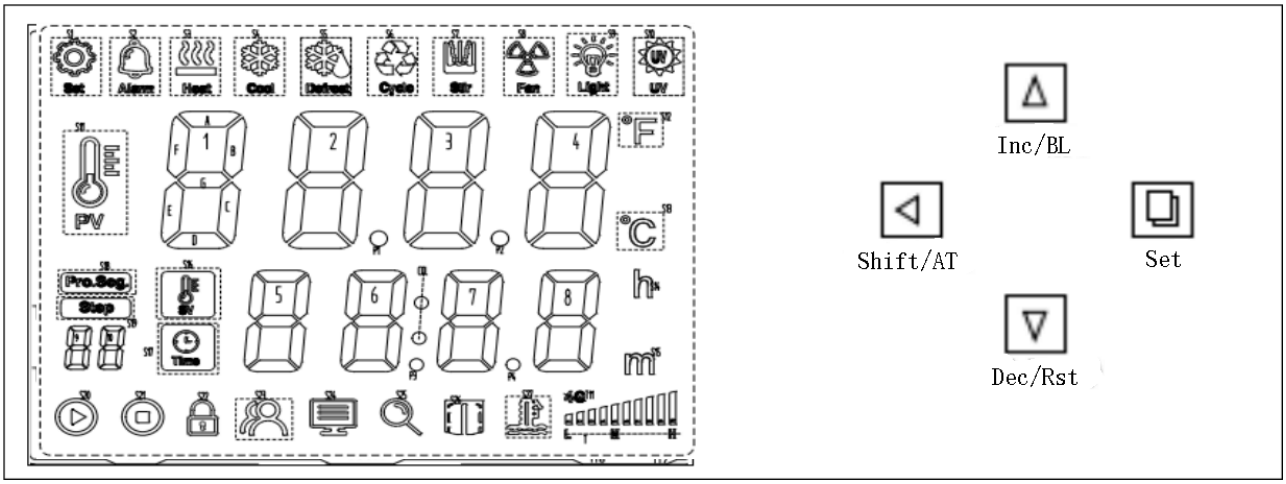
   Note: for example, if the sample humidity is big, the sample on each layer should not be too thick to ensure intensive drying of sample.
4. After finishing drying, turn off power, and then bring the sample out.
5. Keep the drying oven clean, wipe the container sealing rubber strip by soft cloth and clear the dirt out; avoid cleaning it by chemical solution to prevent chemical reaction damage on sealing rubber strip.
6. If the oven is unused for a long time, daub neutral grease or Vaseline on galvanized parts to prevent corrosion; cover the oven with plastic dust cap, and store it in the dry room to keep the electric device against wet.

VII. Fault treatment

Phenomena	Causation	Treatment Method
1.No power supply	a. poor plug contact or line broke	a. Connect the plug and line.
	b. Fuse protector is broken.	b. Change the fuse protector.
2.No temperature rising inside container	a. Low setting temperature	a. Readjust and set temperature
	b. Heater is broken.	b. Change the heater
	c.Temp. controller is broken	c. Change the temperature controller
	d. Temp. sensor is loose.	d. Screw up the sensor nut.
	e. Temp. sensor is broken	e. Change the temperature sensor.
3. No temperature rising alarm	a. Set temp. of Detached temp. limiter is low	a. Readjust the temperature 30℃ above setting temperature.
	b. Detached temp. limiter sensor is broken.	b. Change the detached temperature limiter sensor
4. Temperature cannot reach the setting point.	a. Exhaust port is fully opened	a. Shut off the exhaust port.
	b.The container is overfilled, no hot air convection.	b. Decrease amount of sample to improve convection condition.
5. The fan doesn't work.	The fan motor is broken	Stop work and check electric capacity and motor
6.Displaying-------	The sensor is broken	Change the sensor
7.Display STOP	Time-up	Press the program key for 3s to start

VIII. Temperature controller instruction

1．Panel Instructions



Indicator definition

1．“ ”Indicator light: this light is on during operation and off at the end of operation; This light flashes during self-tuning.

2. “ ”Indicator light: this light flashes during self-tuning.

3．“ ”Indicator light: with heating output, this light is on, otherwise it is off.

4．“ ”Indicator light: this light is on when over temperature alarm is given, otherwise it is off.

2、 Operation and usage

- When the controller is powered on, the upper row of the display window displays "graduation number (P, C, K, s)", and the lower row displays "range value" for about 3 seconds, and then enters the normal display state.
- Reference and setting of temperature and constant temperature time

Click the "set" key to enter the temperature setting state, the prompt "SP" is displayed in the lower row of the display window, and the temperature setting value is displayed in the upper row (the first bit value flashes), which can be modified to the required setting value through the shift, increase and decrease keys;Then click the "set" key to enter the constant temperature time setting state, the prompt "ST" is displayed in the lower row of the display window, and the constant temperature time setting value is displayed in the upper row (the first bit value flashes), which can be modified to the

required setting value through the shift, increase and decrease keys;Then click the "setting" key to exit this setting state, and the modified setting value will be saved automatically.

remarks:FCH table will enter the time setting after setting the wind speed level, and display the character "FS -" with 11 levels in total, 0: user-defined, used in conjunction with parameter fs2;1 ~ 10: the wind speed increases in turn, and the default is 5;If wind speed adjustment is not required, this parameter can be ignored.

- In case of over temperature alarm, the buzzer will sound continuously“ ”The warning lamp is on.If an over temperature alarm is generated due to changing the temperature setting value“ ”The alarm light is on, but the buzzer does not sound.
- Press any key to silence when the buzzer sounds.
- "Shift / self-tuning" key: in the non-setting state, press and hold this key for 6 seconds to enter or exit the system self-tuning; Click this key in the setting state to shift the setting value and modify it.
- "Decrease / rerun" key: in the non setting state, when the operation is finished, press and hold this key for 3 seconds to restart the operation; In the setting state, click this key to decrease the set value, and long press this key to continuously pass the set value.
- "Add / backlight" key: in the non setting state, click this key to turn the LCD backlight on or off (this function is only available for LCD series);In the setting state, click this key to increase the set value, and long press this key to increase the set value continuously.
- In the setting state, if no key is pressed within 1 minute, the controller will automatically return to the normal display state.
- If "-" is displayed on the upper row of the controller display window, it indicates that the temperature sensor or the controller itself is faulty, please carefully check the temperature sensor and its wiring.

3.System self-tuning

When the temperature control effect is not ideal, the system can be self-tuning.In the process of self-tuning, the temperature will have a large overshoot. Users should fully consider this factor before system self-tuning.

In the non setting state, press and hold the "shift / self-tuning" key for 6 seconds to enter the system self-tuning program, and the "run / at" indicator flashes. After the self-tuning is completed, the indicator stops flashing, the controller will get a group of better system PID parameters, and the parameter values will be saved automatically.In the process of system self-tuning, long press the "shift / self-tuning" key for 6 seconds to abort the self-tuning program.

In case of over temperature alarm during system self-tuning, the "ALM" alarm light does not light and the buzzer does not sound, but the heating alarm relay will be disconnected automatically.The "set" key is invalid during system self-tuning.In the process of system self-tuning, whether there is constant temperature time setting or not, the lower row of the controller display window always displays the temperature setting value.

4、 Reference and setting of internal temperature parameters

Long press the setting key for about 3 seconds, the password prompt "LC" is displayed in the lower row of the controller display window, and the password value is displayed in the upper row. The required password value can be modified by pressing the increase, decrease and shift keys.Click the setting 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 temperature internal parameter setting state, and then click the setting key to modify each parameter in turn.Press and hold the setting key for 3 seconds to exit this state, and the parameter value will be saved automatically.

Internal parameter TABLE-1

Parameter indication	Parameter name	Parameter function description	(range) factory value
Lc-	password	When "LC = 3", you can view and modify the parameter value.	0
AL-	Over temperature Deviation alarm	When "temperature measurement value > temperature setting value + Al", the alarm light is on and the buzzer sounds (see v. disconnect the heating output)..**3**）	(0～100℃) **Note 1**
T-	Control cycle	Heating control cycle.	(1 ~ 60 seconds) Note 2
P1-	Proportional band 1	Time proportional action adjustment 1, only the temperature SP < DC is effective.	(1.0 ~ range value) 35.0
I1-	Integration time 1	Integral action adjustment 1, only the temperature SP < DC is effective.	(1 ~ 1000 seconds) 400
d1-	Differential time 1	Differential action regulation 1, only the temperature SP < DC is effective.	(0 ~ 1000 seconds) 200
P2-	Proportional band 2	Time proportional action adjustment 2, only the temperature sp ≥ DC is effective.	(1.0 ~ range value) 25.0 FCH set to 35.0
I2-	Integration time 2	Integral action adjustment 2, only the temperature sp ≥ DC is effective.	(1 ~ 1000 seconds) 400
d2-	Differential time 2	Differential action adjustment 2, only the temperature sp ≥ DC is effective.	(0 ~ 1000 seconds) 200

dc-	Inflection point temperature	Select different P, I and D operation according to the temperature setting value.	(0 ~ range value) 80
Pb-	Zero adjustment	Correct the error caused by sensor (low temperature) measurement. Pb = actual temperature value - instrument measured value	(-50～50℃)0
PK-	Full adjustment	Correct the error caused by sensor (high temperature) measurement. PK = 1000 * (actual temperature value - instrument measured value) / instrument measured value	(-999～999) 0
Et-	Timing function	When et = 0, there is no timing function;When it is 1, the power on starts timing, and when it is 2, the set value starts timing	(0 ~ 2) Note 2

FCD is set to 5 and FCH is set to 50.

Note 2: If relay output is selected, the heating control cycle shall be 20 seconds, the current output shall be 1 second, and other models shall be 5 seconds.

Note 3: if fcd-300x and fcd-310x series, the factory value of timing function is 2 and that of other models is 0.

Internal parameter table-2

Parameter indication	Parameter name	Parameter function description	(range) factory value
Lc-	password	When "LC = 9", you can view and modify the parameter value.	0
Co-	Off heating output deviation	When "temperature measured value ≥ temperature set value + CO", turn off the heating output.	(0～50℃) 5
Hn-	Constant temperature timing mode	0: minute timing;1: Hour timing	(0～1) 0
En-	Constant temperature at the end of operation	EN = 0, close output after operation; EN = 1, continue constant temperature after operation;	(0～1) 0
Lt1-	Maximum power output 1	Percentage of maximum power of heating output, valid only for temperature SP < DC.	(0～100)70

Lt2-	Maximum power output 2	Percentage of maximum power of heating output, valid only for temperature sp ≥ DC.	(0～100)100
rH-	Range value	Set according to the temperature measurement range.	FCD:(0～400℃) 400 FCH:(0～500℃) 500

Internal parameter table-3

(This parameter table of LCD series is used as standard configuration, and this parameter table of digital series is used as optional configuration.)

Parameter indication	Parameter name	Parameter function description	(range) factory value
Lc-	password	When "LC = 23", you can view and modify the parameter value.	0
FC-	Celsius / Fahrenheit switching	0: Celsius 1: Fahrenheit	(0～1)0
Ad-	postal address	The communication address of this machine.	(1～32) 1
p-t	Print interval	When P-T = 0, do not print.	(0 ～ 9999) 0 seconds

Parameter indication	Parameter name	Parameter function description	(range) factory value
Lc-	password	When "LC = 33", you can view and modify the parameter value.	0
LK-	Key backlight time	No operation, backlight auto off time, 0 normally on	(0～10)0min

Parameter indication	Parameter name	Parameter function description	(range) factory value
Lc-	password	When "LC = 133", you can view and modify the parameter value.	0
FS2-	Fan voltage duty cycle	User defined voltage duty cycle adjustment parameters This parameter is valid when FS = 0	(15～100)55

5.Wiring diagram

(LCD series communication as standard and digital series communication as optional)