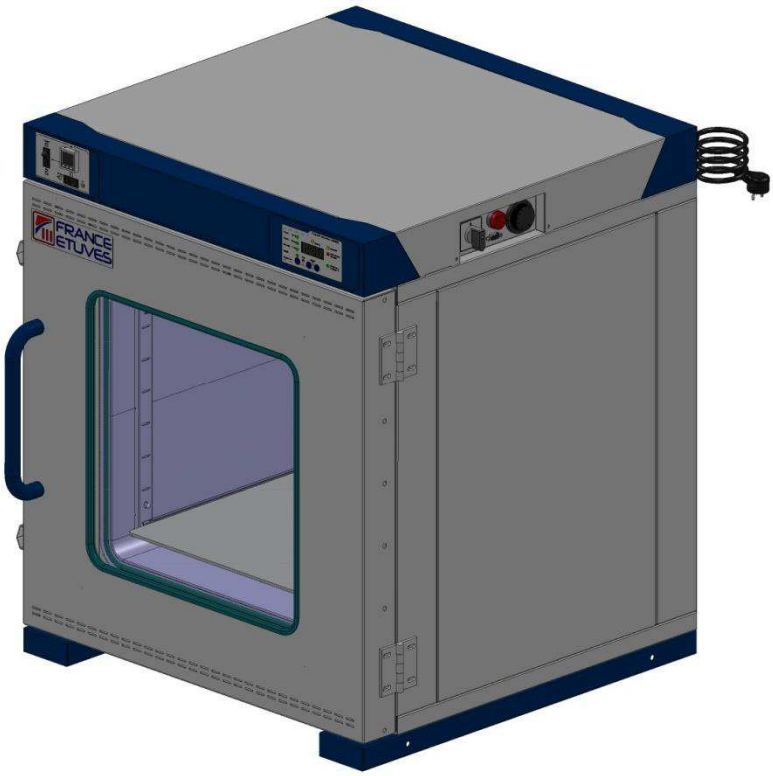
USER MANUAL
XFL VACUUM OVENS



CONSULT THIS MANUAL BEFORE THE COMMISSIONING OF THE DEVICE

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1. WARRANTY AND RESPONSIBILITIES LIMITATION

1.1. Warranty

Universal ovens are guaranteed against defective materials for a period of 18 months from the date of issue of the delivery slip.

Warranty is limited to free change of defective parts, and does not entitle to any indemnification whatsoever.

Interventions under warranty are made in our workshops. On demand repairing may be made at customers' premises: business trip and stay expenses of our technicians must be paid by the customer.

Warranty does not apply if damage is due to negligence, lack of supervision or maintenance and incorrect use of the device.

You can call our After-Sales Service. Before calling, please note the oven's serial number that you will find on a name plate located on an external wall of the oven.

1.2. Responsibilities limitation

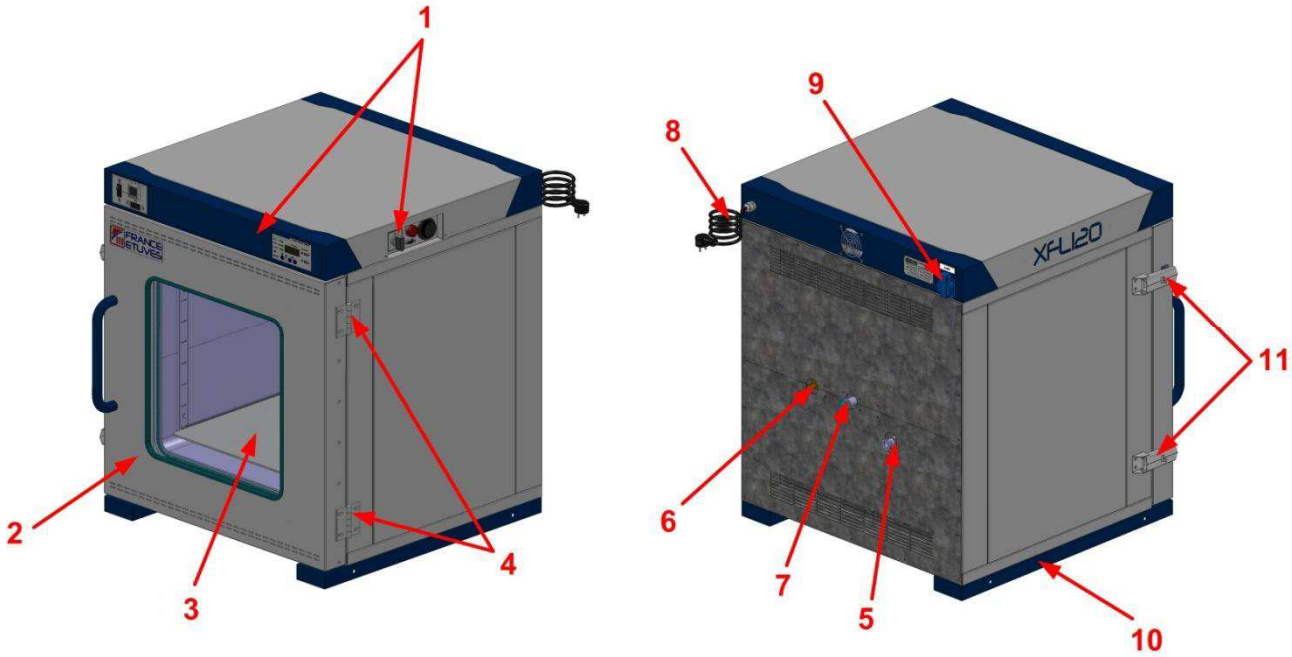
WARNING: THIS DEVICE IS NOT DEFLAGRATION PROOF.

Treating volatile, flammable, explosive products is under the responsibility of the drying oven's user.

2. UNIT DESCRIPTION

2.1. General description

The exterior is made of steel sheet coated with blue and white epoxy paints. The inside is made of stainless steel.



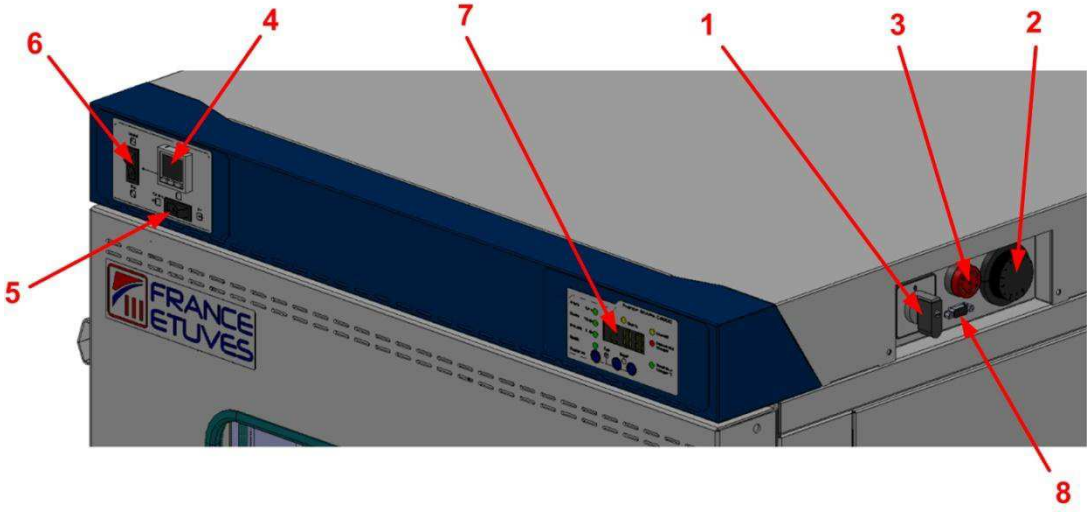
1	Control panels	7	DN16 KF Passage
2	Door with porthole	8	Power cord
3	Tray	9	Electrical plug for vacuum pump

4	Hinges	10	Feet
5	Pumping connection	11	Locking catches
6	Breaking the vacuum connection		

2.2. Technical data

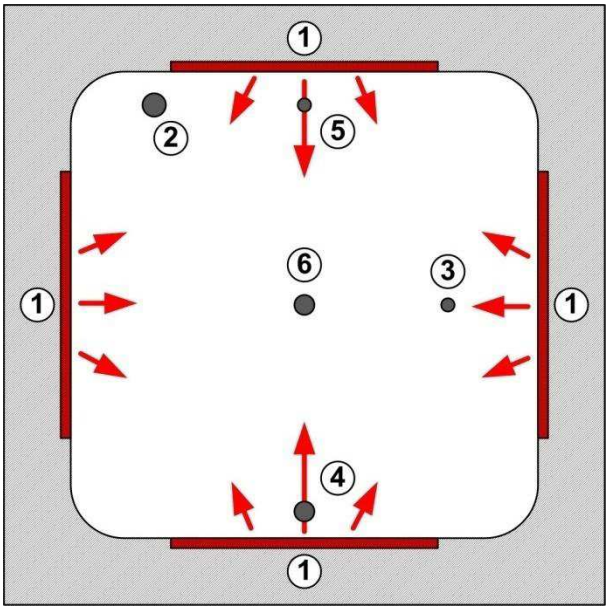
	XFL020	XFL050	XFL120	XFL240	XFL320	XFL512
Volume (L)	20	51	110	220	316	512
Internal dimensions LxPxH (mm)	250x320x250	320x500x320	470x500x470	470x1000x470	650x750x650	800x800x800
External dimensions LxPxH (mm)	520x575x610	585x755x680	815x820x890	815x1320x890	995x1095 x1120	1145x1180 x1270
Approximate weight (kg)	65	85	170	235	315	370
Supply voltage	230V ~1P 50/60Hz 16A			230V ~1P 50/60Hz 20A	400V ~3P + N 50/60Hz 20A	
Heating power (W)	800	1200	2400	3600	6000	9000
Mini / maxi temperature	Ambient temperature + 20°C / 200°C					
Vacuum limit (mbar)	1					

2.3. Control panel



1	"ON / OFF" button	5	Selector "Vacuum / Closed / Air"
2	Safety thermostat	6	Selector "Controlled vacuum / Maximum Vacuum"
3	Default indicator with buzzer	7	Temperature controller C3000
4	Display / Vacuum Level Controller	8	Connector Sub-D9, RS232

2.4. Operating principle



Front view

1 : Radiation heating
2 : Air pumping
3 : Breaking the vacuum
4 : Temperature probe passage
5 : Measurement of vacuum
6 : DN16KF passage

2.5. Temperature control

The temperature control is provided by the C3000 controller.

Functions of the controller:

- Temperature measurement by probe,
- Measured and set point temperatures display,
- Delayed start: from 1 min to 99 h 59 min,
- Heating-up ramp,
- Heating timer: from 0 to 99 h 59 min,
- Repeat loop,
- Buzzer at the end of the cycle,
- Over temperature cut-out,

2.6. Safety

The safety of the oven and of the objects is ensured by a safety thermostat with graduated setting button.

It measures temperature inside the oven and takes charge of the control if the temperature controller fails.

When the measured temperature is higher than the value set in the thermostat, heating is cut off until the temperature goes down again below its setting value.

An overheating is indicated by the default indicator with buzzer.

To set it, consult the part “4.3. Safety thermostat setting”.

2.7. Trays

The trays are made of aluminium and put on supports.

	XFL020	XFL050	XFL120	XFL240	XFL320	XFL512
Tray dimensions (mm)	224x280	294x460	444x460	444x960	624x710	772x760
Maxi number of trays	3	5	7		11	15
Maxi load per tray (kg)	30					
Maxi authorized weight in the oven (kg)	60		90		200	

2.8. Options

Below is a summary of the various options available for the XFL vacuum oven range:

Temperature extension max. 300°C:

The maximum authorized temperature in the vacuum chamber is changed from 200 ° C to 300 ° C. The equipment of the oven is adapted in order to reach this temperature.

4 programs of 16 segments Vacuum profiler :

Consult attached leaflet if your oven is equipped with this option.

4 programs of 16 segments temperature profiler:

Consult attached leaflet if your oven is equipped with this option.

Temperature and vacuum NANODAC profiler / recorder and controller :

Consult attached leaflet if your oven is equipped with this option.

Viton gasket:

The silicone vacuum chamber gasket is changed by viton gasket (molded gasket for XFL020 and XFL050 and tubular gasket for other models).

2.9. Accessories

Below is a summary of the various accessories available for the XFL vacuum oven range:

Additional tray :

Supply of an additional aluminium tray with 2 supports.

Pump unit 1 mbar :

Supply of a lubricated vacuum vane pump allows to reach a vacuum of 1 mbar inside a vacuum chamber. The pump is supplied with its connection hose, an oil mist filter on the exhaust of the pump and all the connection items required for the installation.

Pump unit 10 mbar :

Supply of a diaphragm vacuum pump allows to reach a vacuum of 10 mbar inside a vacuum chamber. The pump is supplied with its connection hose, an oil mist filter on the exhaust of the pump and all the connection items required for the installation.

Fixed base assembly (Adjustable feet) For XFL020 to XFL240:

If you ordered this accessory, consult attached leaflet.

Base assembly with casters for XFL020 to XFL240:

If you ordered this accessory, it will be described in an attached document.

Fixed subframe assembly for XFL320 and XFL512:

If you ordered this accessory, consult attached leaflet.

Subframe with casters assembly for XFL320 and XFL512:

If you ordered this accessory, consult attached leaflet.

Paperless recorder 2 channels (temperature):

If you ordered this accessory, consult attached leaflet.

Data acquisition software for recorder 2 channels:

If you ordered this accessory, consult attached leaflet.

Portable paperless recorder with digital graphic display 4 channels (temperature):

If you ordered this accessory, consult attached leaflet.

3. COMMISSIONING

3.1. Unpacking

Check that no packing materials are inside the oven.

3.2. Installation

The ground or the support under the oven must be level, flat and adapted to the weight of the oven and its load. You must be careful not to have more than 3 mm of level difference between two points on all the area of the oven.

It is recommended to let a minimum space of 500 mm around the oven for maintenance.

3.3. Pneumatic connection

Consult the user manual before switching on the pump.

Double check the characteristics of the pump to know to what temperature hot air pumping is tolerated.

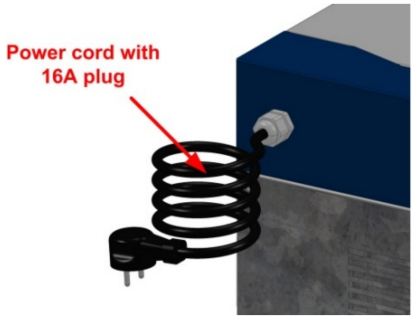
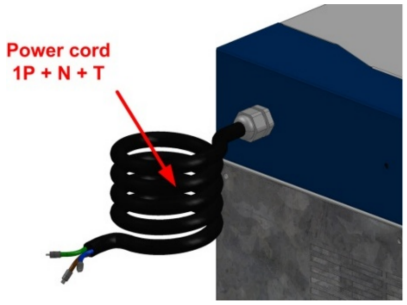
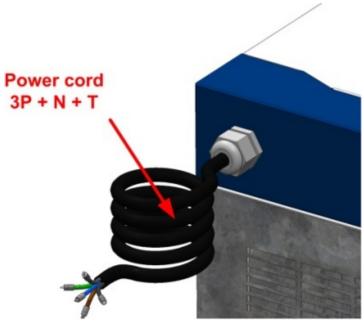
Connect the pump to the pump connection located on the backside of the oven via a suitable pipe. It is also possible to connect the vacuum breaking to pressurize with an inert gas.

In the table below you will find the types of connectors according to your oven model :

	XFL020	XFL050	XFL120	XFL240	XFL320	XFL512
Pumping connector	Nipple for Ø7 pipe int.		DN16 KF connector		DN25 KF connector	
Breaking the vacuum connection	Nipple for Ø4 pipe int.		Nipple for Ø7 pipe int.			Nipple for Ø13 pipe int.

3.4. Electrical connecting

The electrical connecting must be realized by a qualified technician.

XFL020 / XFL050 / XFL120	XFL240	XFL320 / XFL512
		
Connect the cord plug to a 230V supply with 16A protection	Connect the power cord to a 230V supply with 20A protection	Connect the power cord to a 400V supply ~3P+N with 20A protection

Connect the power supply to your vacuum pump to the power outlet on the back of the oven.

3.5. Monitoring the oven from a PC

It is possible to monitor the oven from a PC using monitoring software installed on the PC.

With a bus cable series RS232, connect the oven to the PC via the sub-D9 plug.

3.6. First commissioning

The commissioning of the oven must be realized by an authorized, trained and competent technician.

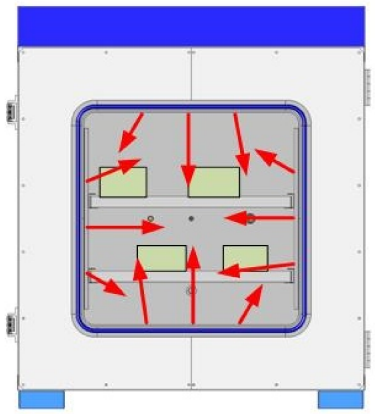
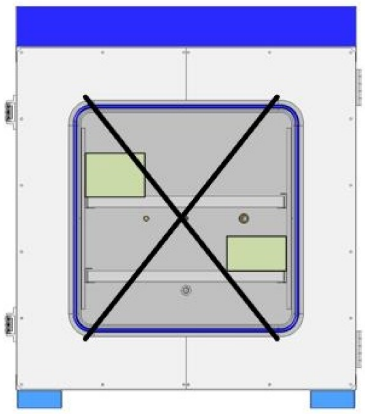
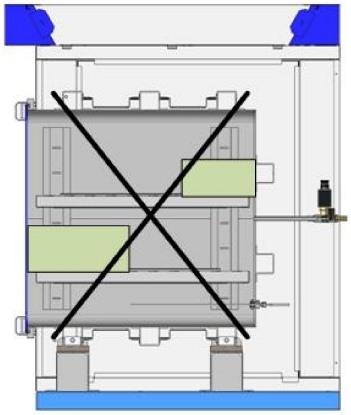
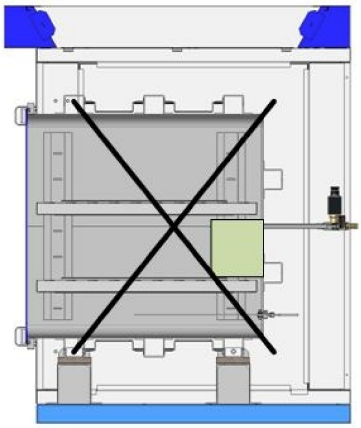
Risks: the persons who intervene on the oven must wear Personal Protective Equipment.

Switch on the main switch (§2.3 Rep. 1)

4. USE

4.1. Loading

The persons in charge of loading / unloading must protect themselves by wearing Personal Protective Equipment.

<table>
<tr>
<td> 
Front view</td>
<td> 
Front view</td>
<td> 
Profile Cutting</td>
</tr>
<tr>
<td>Share your objects on the trays in order to ensure a good heat distribution.</td>
<td colspan="2">Your objects must not to touch the inner walls of the oven. Let a sufficient space between the objects and the inner walls.</td>
</tr>
<tr>
<td colspan="3"> 
Profile Cutting</td>
</tr>
<tr>
<td colspan="3">Do not load objects at the bottom of the oven. They could bock the air pumping holes, vacuum breaking and vacuum level measurement.</td>
</tr>
</table>

4.2. Power on

1. Check that your objects are correctly loaded
2. Close the door with adjustable locking catches
3. Switch on the main switch
4. Set the safety thermostat

   NB: Consult the part "4.3 Safety thermostat setting”
5. Set a set point temperature on the temperature controller

   NB: Consult the part 5. Temperature controller

4.3. Safety thermostat setting

1. Switch on the main switch
2. Set the safety thermostat at the maximum temperature
3. Set a set point temperature in the temperature controller
4. Once the set point temperature is stabilized, decrease slowly the setting of the thermostat until the default indicator with buzzer activates
5. Increase the safety value by a few degrees until the default indicator with buzzer is switched off

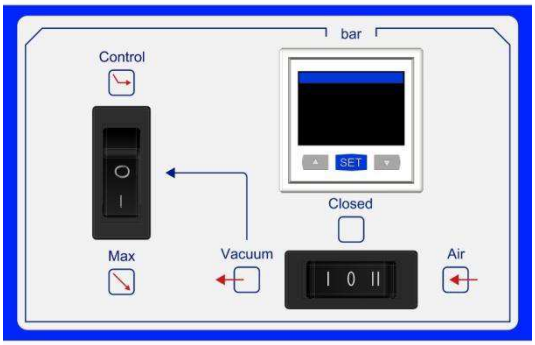
4.4. Pump down / Breaking the vacuum

Consult the user manual before switching on the pump.

Double check the characteristics of the pump to know to what temperature hot air pumping is tolerated.

It is advised to evacuate before heating the oven. Do not undersize the vacuum pump.

The 3-position switch "VACUUM / CLOSED / AIR" and the 2-position switch "CONTROL / MAX" are used to manage the vacuum:



<u>In position VACUUM</u> :

The pumping solenoid valve is open, allowing the vacuum pump to pump air into the working volume. The vacuum level is indicated on the digital display.

The switch "CONTROL / MAX" allow then to selects either to regulate the vacuum level according to a set point (Control) or to pump at maximum pump capacity (Max).

Consult the part 6. Vacuum controller to set the vacuum level set point. To control the vacuum level, the controller controls the pump solenoid valve.

<u>In position CLOSED (power off)</u>:

Pumping and vacuum breaking solenoid valves are closed, blocking any evacuation or venting.

<u>In position AIR</u> :

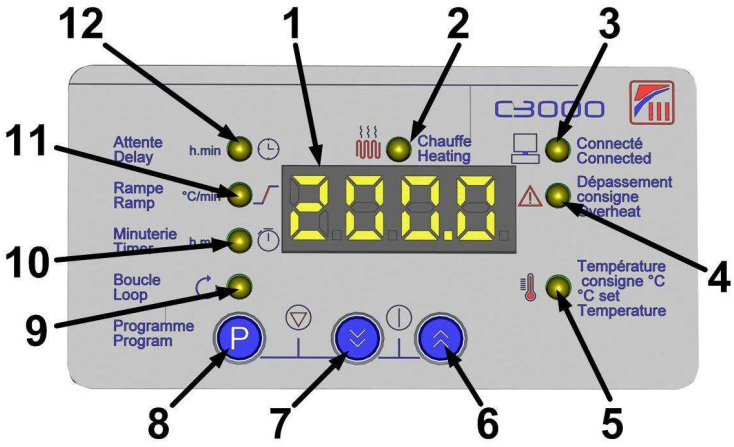
The pump solenoid valve is closed. The decompression solenoid valve opens, allowing the oven to be pressurized. Pressurizing allows to open the door.

4.5. Power off

Switch off the main switch.

5. TEMPERATURE CONTROLLER C3000

5.1. Description



1	**Digital display**
2	**Heating indicator**
3	**Connected indicator**
4	**Overheat indicator**
5	**°C Set Temperature indicator**
6	**Increment key**
7	**Decrement key**
8	**Program key**
9	**Loop indicator**
10	**Timer indicator**
10	**Ramp indicator**
12	**Delay indicator**

5.2. Simple control

The simple control allows to heat at an only constant temperature.

At the starting of the oven, the controller switches on and activates heating to reach the set point temperature entered at the time of the last starting. The digital display alternately displays the set point temperature and the measured one.

Setting the set point temperature:

Press the ***Increment*** and/or ***Decrement*** keys to set the new set point temperature.

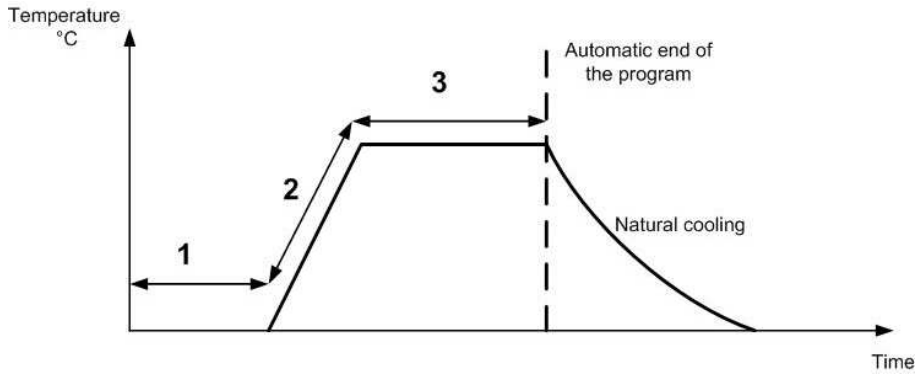
After few seconds, the distal display displays again the measured temperature then alternately the new set point temperature and the measured one.

5.3. Program mode

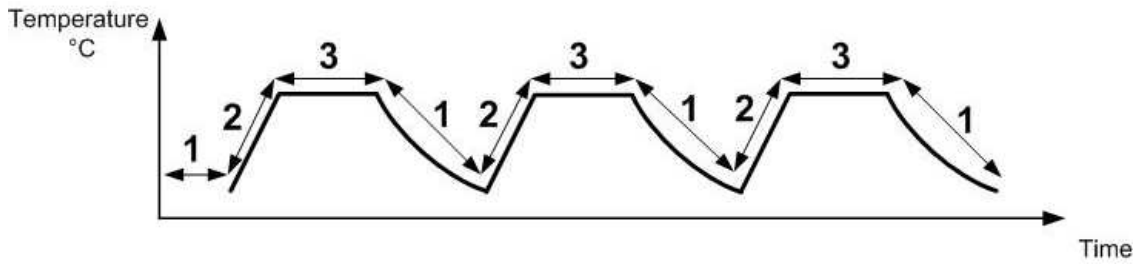
The program mode allows to make an automatic temperature cycle.

A cycle is composed of 3 steps:

Step	Name	Description
1	Wait time	Delay during a defined time before activating heating. Facultative step.
2	Ramp	Progressive increase of the temperature following a limited ramp (°C/min), until reaching the set point temperature.
3	Timer	Stabilization at the set point temperature during a defined time.



The loop option allows to repeat the cycle indefinitely.



In loop mode, the natural cooling period is equal to the wait time. If the wait time is zero, the cycle will maintain the Timer step continuously.

Setting the program parameters:

When you are setting the program's parameters, the controller activates heating to reach the last adjusted set point temperature. So it is advised to set beforehand the set point temperature at 0°C so that the objects do not begin to dry before the beginning of the program; consult the part "5.2. Simple control".

	Procedure	Parameter setting
1.	Press the ***Program*** key. The ***Delay*** indicator lights. The last wait time set during the previous programming appears on the digital display	Step 1 = Wait time
2.	Press the ***Increment*** and/or ***Decrement*** keys to set the new wait time (from 0 minute to 99 hours).	
3.	Press the ***Program*** key. The ***Ramp*** indicator lights. The last ramp value set during the previous programming appears on the digital display.	Step 2 = Ramp
4.	Press the ***Increment*** and/or ***Decrement*** keys to set the new ramp of temperature increasing (from 0.1°C/min to 20°C/min).	
5.	Press the ***Program*** key. The ***Timer*** indicator lights. The last timer time set during the previous programming appears on the digital display.	Step 3 = length of the Timer
6.	Press the ***Increment*** and/or ***Decrement*** keys to set the new timer time (from 1 minute to 99 hours).	
7.	Press the ***Program*** key. The ***Loop*** indicator lights.	Loop option
8.	Press the ***Increment*** and/or ***Decrement*** keys to select YES (loop option activation) or NO (loop option inhibition).	

Launching the program :

1. Set the set point temperature to maintain during the step Timer.

2. Press simultaneously the ***Increment*** and ***Decrement*** keys.

The program is launched.

During the wait time (if programmed), the TIME message followed by the remaining wait time and the measured temperature are displayed. The ***Delay*** and ***Loop*** (if the Loop option is activated) indicators flash.

At the end of the wait time, the RAMP message followed by the ramp value and the measured temperature are displayed. The ***Ramp*** and ***Loop*** (if the Loop option is activated) indicators flash; the ***Heating*** indicator lights.

At the end of the temperature increasing ramp, the TIME message followed by the remaining time of the temperature stabilization and the measured temperature are displayed. The ***Timer*** and ***Loop*** (if the Loop option is activated) indicators flash.

At the end of the stabilization time at the set point temperature, the controller cuts off heating (if the Loop option is inhibited) and a beep sounds. To cut the beep off, stop the program.

If the Loop option has been activated, the cycle is continuously repeated until the intervention of the operator.

Stopping the program:

To stop the program, press simultaneously the ***Program*** and ***Decrement*** keys.

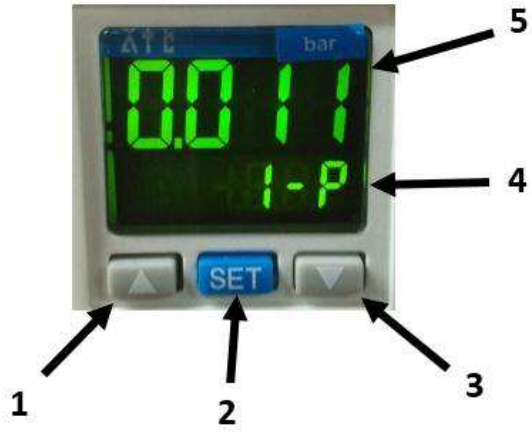
Important: At the program stopping, the controller keeps controlling at the last set point temperature set (the program one).

The beep is cut off (if the Loop option is inhibited). The STOP message appears on the digital display; all indicators of the controller light.

To heat no longer, set the set point temperature at 0°C.

6. VACUUM CONTROLLER

6.1. Description



1	***INCREMENT KEY***
2	***PROGRAM KEY « SET »***
3	***DECREMENT KEY***
4	***MENU***
5	***VALUE OF VACUUM MEASUREMENT BY THE CONTROLLER (BAR)***

6.2. Control

The simple control allows the vacuum oven to be maintained according to the set point programmed by the user.

Setting the vacuum set point:

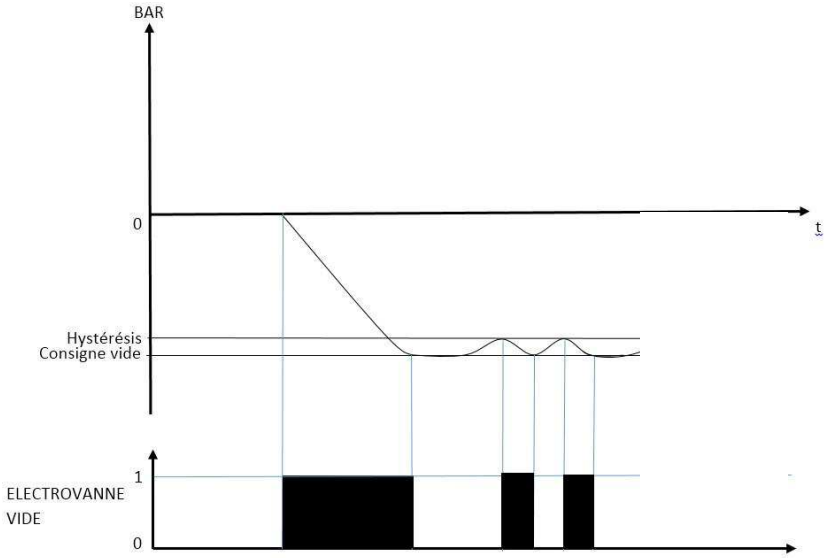
Press the « ***SET*** » key to select the output 1 of the controller (), change the set point (vacuum in BAR) by pressing the « ***"increment*** *or* ***decrement"*** », the oven will automatically switch to the set point value.

Changing the set point:

If the new set point value is lower than the previous (example: we go from -0.3 bar to -0.5 bar), the controller will activate the pump solenoid valve until it reaches the new set point.

On the other hand, if the new set point is higher than the previous one (example: we go from -0.3 bar to -0.1 bar), the user must set the "VACUUM / CLOSED / AIR" knob to the "air" position until the pressure increased to a higher value than the new set point. When the button is turned back to the "vacuum" position, the controller will activate the pump solenoid valve until it reaches the new set point.

Hysteresis:



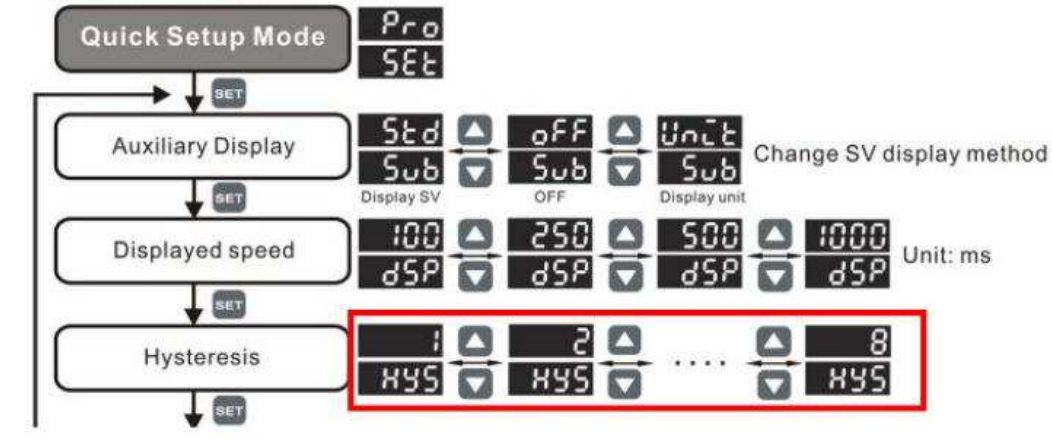
The pump solenoid valve is activated as long as the pressure is higher than the set point, As soon as the pressure reaches the set point, the solenoid valve is deactivated.

When the pressure increases above the set point and the hysteresis then the pumping is activated again.

Setting the hysteresis:

Rentrer dans le menu « QUICK SETUP MODE » ➔ Appuyer 4s sur SET
Sortir du menu « QUICK SETUP MODE » ➔ Appuyer 2s sur SET

- **Advanced Setup Mode:**



7. TROUBLESHOOTING

For any repairs which do not require the power on of the oven, disconnect the oven from the electrical network.

Any repairs must be realized oven at ambient temperature.

Any repairs must be realized by authorized, trained and skilled technicians.

The persons in charge of troubleshooting must protect themselves by wearing the appropriate PPE: Helmets and safety shoes, anti-heat and anti-pinch gloves.

The safety instructions must be respected for all maintenance operations. The France Etuves company cannot be responsible in case of incidents due to the non-respect of these instructions.

In case of malfunction, under normal use, please consult the following table:

Technical issues	Probably causes	Remedies *
The oven does not start (The main switch is switch on but the controller does not light)	The oven is not correctly connected.	Check the connecting of the oven.
	Your electrical supply is defective.	Check your electrical supply.
	Defective fuse.	Check and change if necessary the fuse.
	Defective temperature controller.	Check and change if necessary the controller.
The default indicator with buzzer is activated	Safety value set on the thermostat is too low.	Check that the safety value is not set too low. If not, check and change if necessary the probe. *
	Control chain problem.	Check and change if necessary the probe, the controller and the solid state relays.*

The controller start, but the oven does not heat	The set point temperature is lower than the temperature measured in the oven	The set point temperature must be higher than the temperature measured in the oven. Check the status of the solid state relays
	The Default indicator is switched off; the set point temperature is higher than the temperature measured in the oven: Defective solid state relay and / or heating elements powers	Check that the solid state relays are supplied. See electrical diagram If they are supplied, check the heating elements powers.
	Control chain problem.	Check and change if necessary the probe, the controller and the solid state relays.*
The temperature controller displays incoherent values (e.g.: 329, 526)	Badly connected or defective temperature probe.	Check the state and the connection of the probe on the back of the control board.*
The oven is abnormally noisy	The oven is not on a flat surface and / or level ground.	Check that the oven is installed on a flat ground and is levelled.
	The coils on the solenoid valves are incorrectly fixed	Check the fixing of the coils on the solenoid valves
The pump-down does not occur	Incorrectly loaded oven: Blocked suction and/or blowing areas.	Check that your objects are correctly loaded. See the part “4.1. Loading”.
	Door incorrectly closed	Check the state of the door and adjustable locking catches.
	Damaged door seal	Check and change if necessary the door seal
	Defective vacuum sensor	Check and change if necessary the vacuum sensor
	Defective EV1 and / or EV2 Solenoid valve	Check and change if necessary the Solenoid valves. *
	Defective KM1 contactor	Check and change if necessary the contactor. *
	The vacuum circuit or the pumping system problem.	Check and change if necessary The vacuum circuit and the pumping system. *
	Defective vacuum pump.	Check and change if necessary the vacuum pump. *
The venting does not occur	Incorrectly loaded oven: Blocked suction and/or blowing areas.	Check that your objects are correctly loaded. consult the part “4.1. Loading”. *
	Defective vacuum sensor.	Check and change if necessary the vacuum sensor

	Defective EV1 and / or EV2 Solenoid valve	Check and change if necessary the Solenoid valves. *

* The operation must be realized by a trained, skilled and qualified technician.

8. MAINTENANCE

For any repairs which do not require the power on of the oven, disconnect the oven from the electrical network.

Any repairs must be realized with the oven at ambient temperature.

Any repairs must be realized by authorized, trained and skilled technicians.

The persons in charge of troubleshooting must protect themselves by wearing the appropriate PPE: Helmets and safety shoes, anti-heat and anti-pinch gloves.

The safety instructions must be respected for all maintenance operations. The France Etuves company cannot be responsible in case of incidents due to the non-respect of these instructions.

8.1. Periodic cleaning

Element	Periodicity	Cleaning
External sheets	When they are dirty	Use a damp sponge.
Internal sheets	When they are dirty	Use cleaning materials suitable to stainless steel.
Window	When it is dirty	Use cleaning material for panes that work effectively against the type of waste on the window.

8.2. Preventive maintenance

REGULARLY CHECK THAT THE SAFETY DEVICES OF THE OVEN WORK. TEST EACH DEVICE UNTIL IT ACTIVATES.

Element	Periodicity	Test / checking *
Safety thermostat / default indicator with buzzer	Weekly	Increase to the maximum the safety thermostat value. Set the set point temperature in the controller and wait for it stabilizes. Decrease the setting of the thermostat until the default indicator with buzzer activates. The default indicator with buzzer activates, heating is cut off: the safety thermostat is functional, if not replace it. **Important: after the test, do not forget to set the safety thermostat before using the oven again.**
Fans of the control panel	Monthly	Check that the fans of the control panel work when the oven is starting. If not, replace it. *
Connection of the terminal ends, plugs and wires on the electrical parts	Monthly	Tighten the terminal ends, plugs and wires on the electrical parts located in the top part of the oven.

* The operation must be realized by a trained, skilled and qualified technician

8.3. Setting of the C3000 controller offset

The control chain had been tested and calibrated in factory. However it is advised to calibrate it again each year. To adjust the offset of the controller, you need first compare the measurement of the oven with a calibration probe inserted by the access port.

Explanations about C3000 offset:

A null offset is transcribed by 0.0.

A 0.1 offset is equivalent to have +0.1°C.

A 0.2 offset is equivalent to have +0.2°C.

A 553.5 offset is equivalent to have -0.1°C.

A 553.4 offset is equivalent to have -0.2°C.

Etc.…..

1. Power the oven up.

2. Press the “P” key of the controller for about 5s until a value (value of the old offset adjustment) appears on the controller’s display.

3. Adjust the offset value with the “up arrow” and “down arrow” keys.

After few seconds, the controller changes display; the value is automatically recorded.

Example :

Problem: the C3000 controller displays 150°C whereas the calibration probe measures 149°C. You must decrease the offset value with 1.0 (= 10 tenth).

If the offset set in factory is 0.4, you must decrease the offset value until 553.

Déclaration de conformité UE
EU Declaration of conformity

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Produit / *Product:* Etuves sous vide / *Vacuum ovens :*
XFL020, XFL050, XFL120, XFL240, XFL320 et XFL512
Température maxi / *Max. temperature* : 300°C

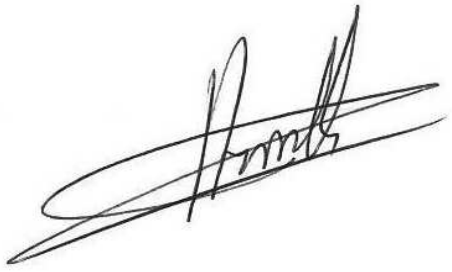
Ce produit est conforme aux directives CE suivantes: / *This product complies with the following directives:*

Directive 2014/35/UE matériels électriques basse tension
Low voltage directive 2014/35/EU
and
Directive 2014/30/UE compatibilité électromagnétique
Electromagnetic compatibility directive 2014/30/EU
and
Directive machine 2006/42/CE
Machinery directive 2006/42/CE

Le produit est marqué CE.
The product is CE marked.

FRANCE ETUVES
Chelles, 2017

Philippe LEMBLÉ, Directeur



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