

# O V E N S



**User Manual**  
Ref : AP414-AP714/E/  
rev1.1

 **Froilabo**  
Precision for life

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## 1. CERTIFICATE OF CONFORMITY

Meyzieu, 24 June 2013,

FROILABO SAS certifies that the appliances mentioned below:

### Air PERFORMANCE / EXPERT universal oven

Comply with the technical directives applying to them:

- European Directive covering machines: 89/392/CEE, modified by directives 91/368/CEE, 93/44/CEE, 93/68/CEE.
- European Directive covering electromagnetic compatibility: 89/336/CEE, modified by directives 92/31/CEE and 92/68/CEE.
- European Directive covering low voltage appliances: 73/23/CEE, modified by directive 93/68/CEE.

*Note: These appliances are not designed to operate in explosive environments (ATEX). Moreover they cannot be used to store flammable, corrosive or explosive substances*

## 2. WARRANTY

FROILABO SAS guarantees optimum operation of these appliances according to the installation and usage conditions indicated in this manual.

**The duration of the warranty is: 24 months.**

During this period, in the event of a malfunction of your appliance, the warranty is limited to an improvement in the operation, a repair free of charge or the replacement of equipment if it is evident that the malfunction or breakdown is caused by faulty material or workmanship. **All other claims for compensation are excluded.**

## 3. GENERAL INFORMATIONS



**Make sure that persons using these appliances are trained for the work.**

Persons using these appliances must be informed regularly of the possible dangers linked to their work and of the safety measures to be observed.

Make sure that all persons installing, using or repairing these appliances are aware of the possible danger connected to their work; the safety measures to be followed and that they have understood the operating instructions.

**If you use hazardous substances, or ones that could become hazardous, only persons with perfect knowledge of these appliances can operate them. These persons should be able to assess the possible risks overall. If you have any questions about the use of the appliance or method of operation don't hesitate to contact us. FROILABO can in no circumstances be held responsible for the quality of the substances stored in the ovens.**

## 4. INSTALLATION OF APPLIANCES

### 4.1. Delivery

Après réception, merci de vérifier la livraison :

AP/AE - 60 litres	AP/AE - 120/240 litres
1 electricity supply cable	
2 rack supports	4 rack supports
1 rack (AP), 2 racks (AE)	2 racks (AP/AE)
1 installation and use CD	

### 4.2. Location

Place the appliances in a position where they are protected from the sun's rays and other heat sources, in a sufficiently ventilated place.

Room temperature should be between **+18°C** and **+30°C** and should be a minimum of **7°C** below the set point. Place the appliances in a place that is little affected by temperature variations. This can considerably affect the stability and the precision of the appliances.

### 4.3. Spécifications techniques

#### SPECIFICATIONS PERFORMANCE/EXPERT

		Ovens Convection		
		AP/AE60	AP/AE120	AP/AE240
Temperature range		Amb +10°C to 250°C		
Temperature uniformity +/- (°C)*	at 70°C	0,7	0,6	0,7
	at 150°C	1,5	1,4	1,5
	at 250°C	5	5	5
Temperature stability (°C)		0.2	0.2	0.2
Time for temperature elevation (min)**	at 70°C	8	9	10
	at 150°C	20	30	24
	at 250°C	38	50	45
Recovery time after door opening of 30 secs (min)**	at 70°C	1,5	2	2
	at 150°C	2,5	3	3,5
	at 250°C	3,5	4	4,5

#### ELECTRICAL SPECIFICATIONS

	Front panel IP55
IP rating	Front panel IP55
Power supply	220-230V 50/60Hz 10A
Power (W)	1000      1000      2000

\* Not including measure uncertainties, FROILABO procedure : 9 points caracterisation according to NFX15-140 norm  
 \*\* 98% of the value  
 Testing at an ambient temperature of 25°C and a variation in the supply voltage of +/- 10%

#### EXTERNAL DIMENSIONS

	Ovens Convection		
	AP/AE60	AP/AE120	AP/AE240
Amb +10°C to 250°C			
Length (mm)	526	626	626
Height (mm)	640	750	1230
Depth (mm)	579,5	679,5	679,5
Exterior depth (mm)	26.5	26.5	26.5
Side clearance (mm)	100	100	100
Height (mm) stackable kit	30	30	30

#### INTERIOR DIMENSIONS

Actual volume (l)	58	118	230
Length (mm)	400	500	500
Height (mm)	390	500	980
Depth (mm)	370	470	470
Shelves standard/max (AP)	2/6 (1/6)	2/10	2/18
Weight per shelf/total (kg)	20/50	20/70	20/90
Shelf dimensions L X P (mm)	380x320	480x430	480x430
Empty weight/Gross weight (kg)	39/53	53/69	79/97

### 4.4. Construction

The monobloc exterior bodywork is made from **electro-galvanized steel** and protected by epoxy paint. The inside tank is made from **304L stainless steel**. The support racks, rack brackets and racks are also made from 304L stainless steel as are all the interior accessories.

### 4.5. Loading

To avoid any risk of damage to the structural parts and to guarantee the technical performance announced, it is important to respect the following instructions:

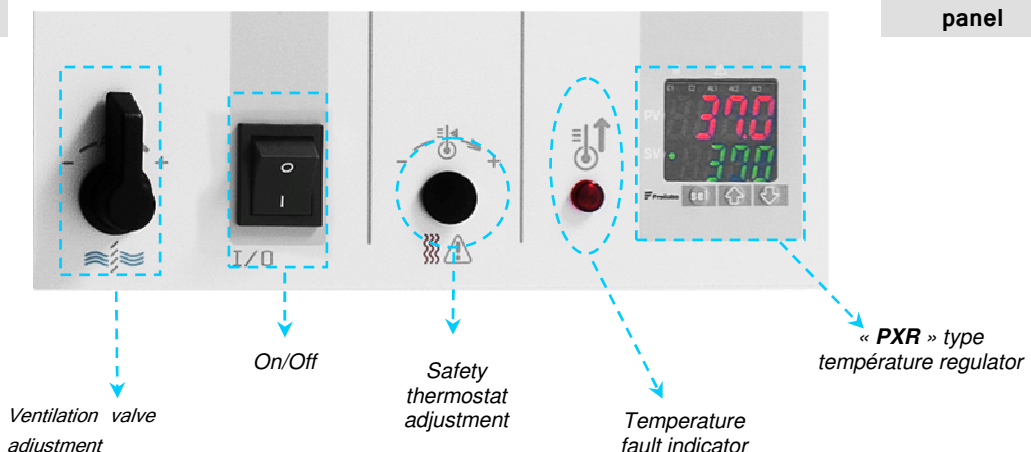
- Never place **highly corrosive materials** in the oven,
- Never place **explosive or highly flammable materials in the oven,**
- Never obstruct the whole surface of a rack,
- Leave a minimum clearance of **5 cm** along internal faces,
- Leave a minimum of **2cm** between the products placed in the oven
- Spread the load evenly.



These appliances are not explosion proof

## 5. GENERAL USE

### 5.1. Control



## 5.2. Starting up / Stopping the oven

### 5.2.1. Starting up

1. Connect the appliance to a 230V 50Hz 10A + Neutral + Earth supply protected by a 30 mA differential circuit breaker.
2. Press the **On/Off** knob (0/1) to start the appliance.
3. Enter the temperature setting on the regulator, using the **↑**(S2) and **↓**(S3) keys
4. Wait for the appliance to stabilize at the temperature setting.
5. Adjust the safety thermostat and load the appliance.

### 5.2.2. Stopping


1. Press the **On/Off** knob (0/1) to stop the appliance.
2. Disconnect the appliance safely.

## 5.3. Safety devices

### 5.3.1. Safety thermostat

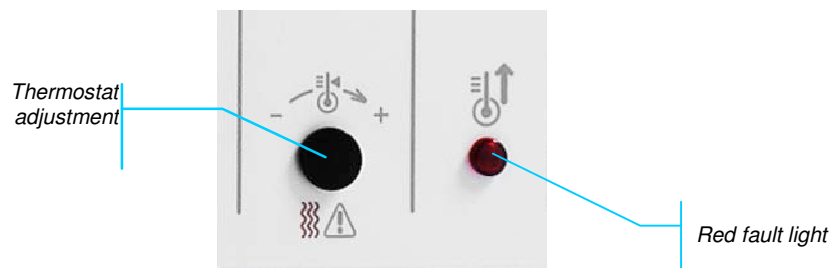
These appliances are fitted with a class 2 safety thermostat to the **NF EN 61010-2-010 standard**, (equivalent to 3.1 DIN). It protects the oven and its contents from undesirable overheating (accidental changing of the setting, regulation system malfunction, etc.).

#### Réglage du thermostat de sécurité

 **The thermostat should be adjusted when the appliance is started up for the first time, and each time the set point is changed**

1. Remove the white plug from the control panel strip to access the safety thermostat.
2. Set the safety thermostat to its maximum setting using a flat screwdriver (turn clockwise).
3. Allow the oven to stabilize at the temperature setting.
4. Turn the thermostat anti-clockwise until you hear a click (the red light on the front panel goes on).
5. Turn back slightly clockwise until you hear the click (the red light goes off).
6. Replace the white plug.

→ **The safety system is operational.**



### 5.3.2. High temperature alarm

These appliances are fitted with a following high temperature alarm: a maximum temperature difference between the oven (PV) and the temperature setting (SV) is acceptable in the oven.

If the temperature measured (PV) exceeds this difference the alarm triggers and red light **AL1 goes on**. The high temperature alarm value is factory-set to **+10°C** above the temperature setting. It is possible to insert a time delay for this alarm. This value is factory-set to **0 sec**. Hence, by default the alarm triggers as soon as the high temperature alarm value is reached.

#### Adjusting the high temperature alarm

1. Press the **SEL** key for 1 second to display parameter block no 1.
2. Display parameter (**AL1**), using the **↑**(S2) and **↓**(S3) keys and select by pressing **SEL**.
3. Change parameter (**AL1**), using the **↑**(S2) and **↓**(S3) keys
4. Press **SEL** to confirm.

#### Delay the high temperature alarm

1. Press the **SEL** key for 5 second to display parameter block no 3.
2. Display parameter (**DLY1**), using the **↑**(S2) and **↓**(S3) keys and select by pressing **SEL**.
3. Change parameter (**DLY1**), using the **↑**(S2) and **↓**(S3) keys
4. Press **SEL** to confirm.

#### 5.4. PXF température regulator

See appendix at the end of the document

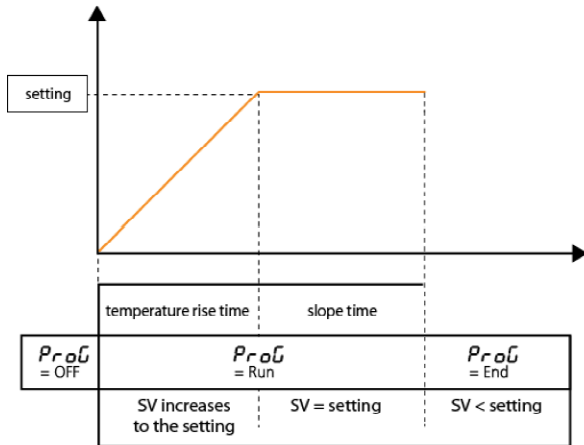
## 5.5. Functions programmable on PERFORMANCE models

### 5.5.1. Slope function

Serves to programme the speed of temperature rise of the oven and then maintain the temperature of the enclosure at the temperature setting for a maximum time of 99h59min (per programming segment).

The oven will operate according to the diagram below starting from switching ON (0/1).

Depending on whether or not the step time TMI5 is programmed, the oven will stop by operation of the 0/1 knob or at the end of the programmed TMI5 time. To restart the oven, either use the 0/1 knob or the RUN function.



programming procedure AP/AE	
AP/AE	Adjustment
SU-1	Temperature setting
FN-1r	Rise time = 0 to 99 hour 59min
FN-1S	Slope time (optional) = 0 to 99 hour 59min
Mod	= 0 if starting by RUN = 8 if starting power

To select a parameter:

Press **SEL** for 3s. Display Su - 1 using the **↑**(S2) and **↓**(S3) keys and then confirm with **SEL**. Choose the temperature setting using the **↑**(S2) and **↓**(S3) keys and confirm with **SEL**. Repeat the operation for the other parameters.

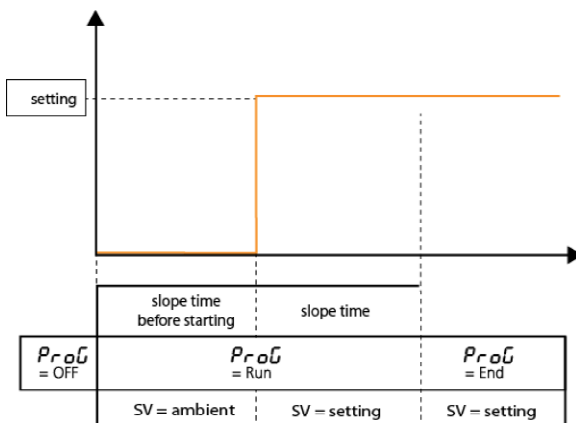
### 5.4.2. Program run (differed)

Serves to differ the start of heating of the enclosure in relation to switching on.

The oven will operate according to the diagram below.



**This appliance is not fitted with an internal clock. The time delay for the start of heating is set in hours and minutes and not by the programming of a start time.**



slope time before starting = 0 to 99 hour 59 min

programming procedure AP/AE	
AP/AE	Adjustment
SU-1	= 0
FN-1r	= 0
FN-1S	Slope time before starting = 0 to 99 hour 59 min
SU-2	Temperature setting
FN-2r	= 0
FN-2S	Slope time = 0 to 99 hour 59 min
Mod	= 0 if starting by RUN = 8 if starting power

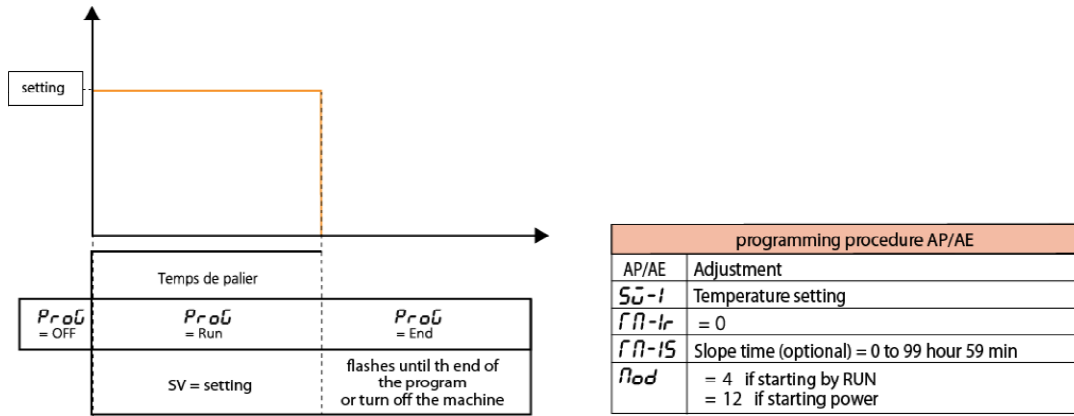
It is always possible to programme a temperature rise time by entering the parameter TM2r of the desired value.

Depending on whether or not the step time TMI5 is programmed, the oven will stop by operation of the 0/1 knob or at the end of the programmed TMI5 time. To restart the oven, either use the 0/1 knob or the RUN function.

### 5.4.3. Programmed stoppage

Serves to stop the heating of the enclosure automatically at the end of a fixed time after starting.

The oven will operate according to the diagram below from switching on (O/I).



The oven will stop by operating the O/I knob after the programmed TMI5 time. To restart the oven use either the O/I knob if the oven is stopped, or the RUN function RUN depending on the mode chosen (12 or 4).

#### 5.4.4. Adjustable air outlet valve

Depending on the applications, it may be useful to adjust the opening of the air outlet situated at the back of the appliance. This adjustment is done by means of the knob on the oven control panel.

**Note:** The temperature homogeneity and stability performance are given with the outlet valve closed.

## 6. FUNCTIONALITIES SPECIFIC TO THE EXPERT MODEL

Air Expert (AE) ovens have the following equipment as standard:

- Programme cycles of 8 temperatures,
- Adjustable ventilation speed.
- A RS485 communication interface (transfer software, cable and USB protocol on option)
- Cable routing

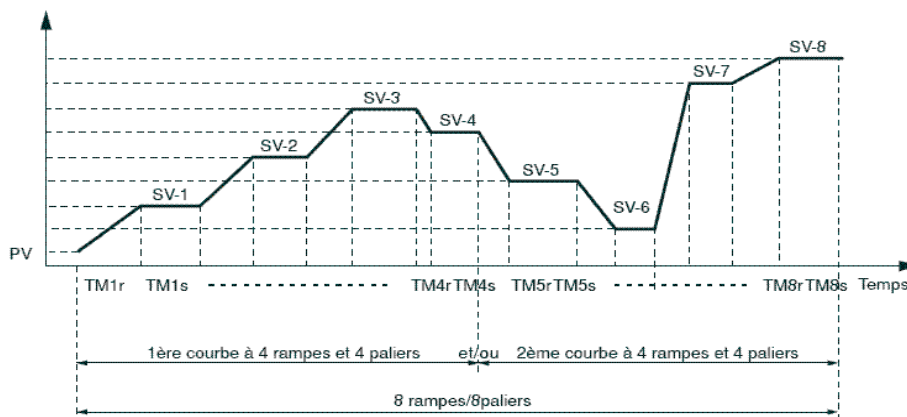
### 6.1. Programming an 8 temperature cycle

This function enables a cycle of 8 temperatures (up to 16 segments) to be programmed and to generate several set points (SV) such as those shown on the graph below.

It is possible to programme:

- 1 cycle of 8 slopes and 8 steps (16 segments)
- 2 cycles of 4 slopes and 4 steps (8 segments x2)

The cycle runs starting from the value measured (PV).



Cycle of 8 maximum temperatures.

SV-x : temperature setting, TMxr : rise time (slope), TMxs : step time



Take care over the adjustment of the safety thermostat. It should be adjusted according to the highest temperature in the cycle.



## 6.2. Configuration to the parameters

### 6.2.1. Selection of the temperature cycle

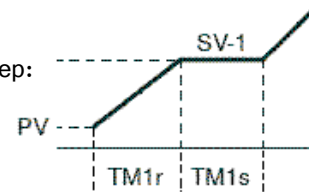
It is possible to select the temperature cycles according to your application, to do this use the **PTn** function of the block no 2.

Description	PTn	Cycle	Number of temperatures/cycle
Execution of the temperature cycle 1 to 4	1	1	4
Execution of the temperature cycle 5 to 8	2	2	4
Execution of the temperature cycle 1 to 8	3	1 + 2	8

### 6.2.2. Adjustment of the temperatures, rise time and step time

Regardless of the cycle chosen, allocate the following parameters for each step:

- Temperature setting (**SV-x**),
- Rise time (slope) (**TMxr**),
- Step time (**TMxs**).



Example for step no 1

**Note:** *x* represents the step number (1 to 8).

### Adjustment of the setting (SV)

Adjustment scale: ambient temperature +5°C to 250°C.

PTn	Number of T°/cycles	Active step	Step temperature	Rise time	Step time
Symbol			SV	TMxr	TMxs
Scale of adjustment			25°C* to 250°C	99h59min	99h59min
PTn 1	4	1 to 4	SV-1 to SV-4	TM1r to TM4r	TM1s to TM4s
PTn 2	4	5 to 8	SV-5 to SV-8	TM5r to TM8r	TM5s to TM8s
PTn 3	8	1 to 8	SV-1 to SV-8	TM1r to TM8r	TM1s to TM8s

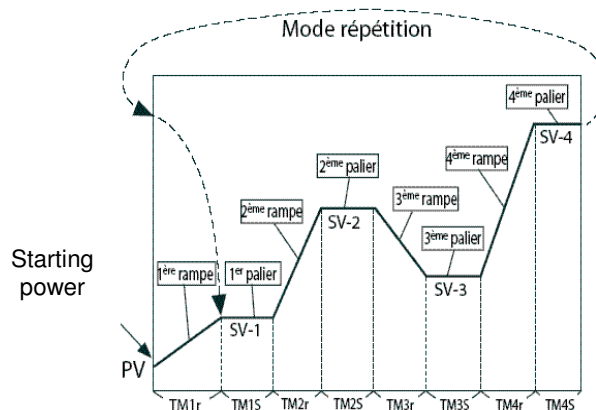
\* The oven can only adjust efficiently for a temperature equal to or above the ambient temperature + 5°C.

## 6.3. Selection of the operating mode

There are 16 operating modes for a programmed temperature cycle, accessible via the parameter **Mod** (block no 2).

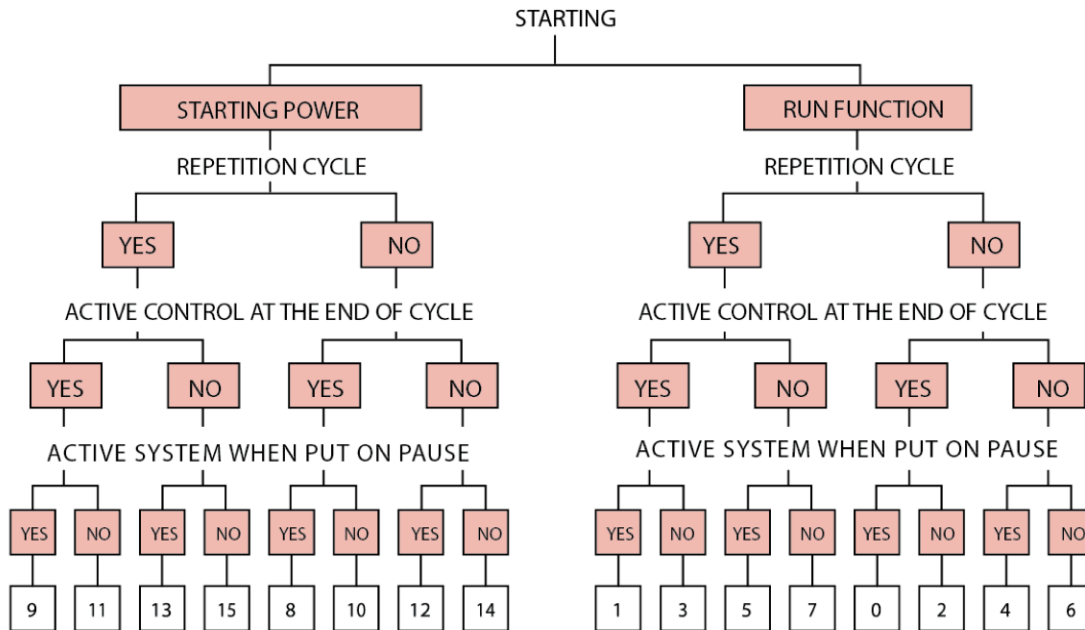
The following parameters can be adjusted:

- Starting of the temperature cycle: the temperature cycle can be activated either by the appliance being switched on (0/1) or by using the RUN function.
- Programme end management: determines the regulation status at the end of the temperature cycle.  
**Stop mode:** no regulation, the temperature at the end of cycle flashes.  
**Regulation active:** the last temperature of the cycle is regulated.
- Management in the event of a voluntary stoppage of the programme: determines the regulation status when the temperature cycle is put into pause (HLD function).  
**Stop mode:** no regulation, the temperature setting flashes.  
**Regulation active:** the current temperature setting is regulated.
- Repetition mode: Causes repetition of the cycle when the previous the cycle is finished.



Example of the cycle 1 of 4 steps repeated

## Lists of the available operating modes



### 6.4. Configuration of a temperature cycle

1. Press the **SEL** key for 3 seconds; the (PUOF) programme is displayed
2. Display **Su-1** (value of the 1<sup>st</sup> step) using the ↑(S2) et ↓(S3) keys. Confirm (SEL)
3. Change the value flashing **Su-1** using the ↑(S2) et ↓(S3) keys. Confirm (SEL)
4. Display **TM-1r** (rise time) using the ↑(S2) et ↓(S3) keys. Confirm (SEL)
5. Change the value flashing **TM-1r** using the ↑(S2) et ↓(S3) keys. Confirm (SEL)
6. Display **TM-1s** (step time) using the ↑(S2) et ↓(S3) keys. Confirm (SEL)
7. Change the value flashing **TM-1s** using the ↑(S2) et ↓(S3) keys. Confirm (SEL)
8. Repeat the procedure for the next slopes/steps.
9. Display the chosen parameter of the operating mode (Mod) using the ↑(S2) et ↓(S3) keys and choose the desired mode (0 to 15).

### 6.5. Starting the temperature cycle

Depending on the mode chosen, the temperature cycle programmed will be run directly either by switching on (On/Off), or by the RUN function of the regulator. In this case :

1. Press the **SEL** key for 1 second..
2. Display the parameter (ProG) and choose RUN (rUn) with the é(S2) and ê(S3) keys
3. The temperature cycle starts from the current temperature (PV).

**Note:**

- To interrupt the cycle momentarily select HLD (HLd).
- To cancel the interruption chosen RUN (rUn).
- To stop the cycle chosen OFF (off).
- End is displayed when the cycle is finished.

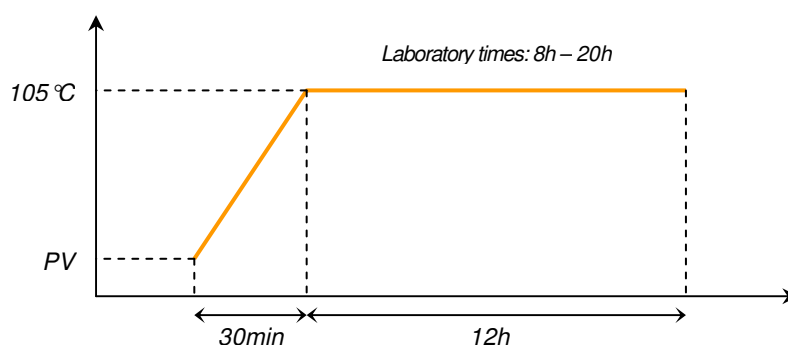
### 6.6. Important notes

It is possible to programme a temperature cycle with a number of steps different from 4 or 8. To do this, simply put the values of the unused steps to 0 and configure the Mod parameter according to the desired protocol.

**Note:** The rise times must be coherent with the performances of the appliance.

### 6.7. Example of the use of the programmer : the Chronorupteur timer

The oven needs to operate according to the curve below:



Every day the operator runs the oven at **105°C** for **12h**. The cycle starts when the operator switches the appliance on and stops automatically after 12h and is not repeated.

#### 6.7.1. *Adjustment of the temperature, rise time and step time*

- Adjust the temperature setting (**SV-1**) to **105°C**.
  - Adjust the rise time (**TM-1r**) to **00.30** (00h30).
  - Adjust the step time (**TM-1s**) to **12** (12h).
- Note:** the rise time and step time 2 to 4 should be set to 0 (not used)

#### 6.7.2. *Selection of the temperature cycle*

This cycle contains **1 step only**. Adjust the parameter (**Ptn**) to 1: execution of the 1<sup>st</sup> to 4<sup>th</sup> step.

#### 6.7.3. *Selection of the operating mode*

The cycle is started as from the switching on of the oven. When the cycle is finished it is not -> « **Stop** » mode  
At the end of the cycle the oven temperature must be regulated -> « **regulation active** » mode. Select the parameter **Mod** on **12**.

**Note:** Simply pressing the **ON/OFF** knob automatically starts or stops the programmed temperature cycle.

## 7. AJUSTABLE AIR RENEWAL

### 7.1. Delivery

EXPERT ovens are supplied with an inlet pipe

### 7.2. Installation

The inlet pipe fits on the oven door. To do this:

1. Remove the inside and outside plugs.
2. Remove the cellular silicone plug in the insulation.
3. Insert the pipe in the hole on the outside of the door, while aligning the two lugs with corresponding notches.
4. Lock by turning ¼ turn.

### 7.3. Operation

**Note:** operation in the air renewal mode degrades the oven performance.

Fresh air is introduced by the hole in the door. It is integrated into the internal convection and escapes by the outlet fitted with an adjustable flap behind the appliance.

To adjust the air renewal rate, swivel the outlet flap:

- **Flap closed:** renewal rate close to 0.

- **Flap fully open:** maximum renewal rate.

Maximum renewal of the internal volume per hour: **AE60:** 50 times, **AE120:** 35 times, **AE240:** 35 times

**Note:** To reduce the temperature rise time when starting up the oven, close the extraction flap during the rise phase, and start the renewal once the oven has stabilised.

## 8. RS485 COMMUNICATION INTERFACE

AIR EXPERT (AE) ovens are fitted as standard with a RS485 communication interface.

The transfer software, cables and USB protocol are available on option and enable the transfer of data from the appliance and also the control of the enclosure from a PC.

## 9. CABLE ROUTING

A 22mm diameter cable chute is situated on the left of the appliance. It facilitates the routing of cables and sensors and hence the monitoring of the performance of the appliance and its qualification.

## 10. AIR EXPERT OPTIONS

### 10.1. Remote control and data center

#### 10.1.1. *Control Manager software*

AIR EXPERT (AE) ovens are fitted as standard with a RS485 connector. Users wishing to control their ovens remotely and save the parameters can acquire the Control Manager software offered as an option. Use of the Control Manager software makes it possible to monitor the adjustments and programme the oven remotely from a PC and also transfer and record the temperatures and their evolution over time as well as automatically drawing the temperature curves.

This software makes it possible to manage and store simultaneously data supplied by several regulators and provides very wide versatility as to the choice of the data and its format:

- Determination and frequency of data acquisition.
- Selection of the types of data to draw.
- Curve drawing start and stop.
- Automatic or manual scrolling of the line.
- Modification of the extent of the line.
- Automatic or manual updating of the curve (depending on of the acquisition speed).

It also possible to copy the image, save the image, make up, print, choose scales, etc.

#### 10.1.2. *Communication kit*

The communication kit consists of:

- A CD containing the Control Manager software operating on Windows 98 and more recent OS.,
- A RS485/USB cable with USB protocol,
- Complete operating and installation instructions

## 11. MAINTENANCE PERFORMED BY THE USER

### 11.1. Safety rules



**Before doing any maintenance work. It is essential to switch off the appliances with the ON/OFF knob and then disconnect the supply cable.**

### 11.2. Maintenance

Do not clean the oven with a water jet to avoid causing splashing onto the appliance.

In the same way as a motorist maintains his vehicle to keep it in the best possible working order, the use of a cooler necessitates a minimum of maintenance to ensure permanent optimum operation of the appliance.

#### 11.2.1. *External surfaces*

Wash with warm water with water or a neutral (noncorrosive) detergent. Rinse and dry thoroughly.

#### 11.2.2. *Inside tank*



**Never use disinfectant bleach, even heavily diluted. Never rub stainless steel with steel wool or any other abrasive. Take care over the risk of burns.**

Ovens and incubators are fitted with removable racks for easier maintenance. For this, follow these instructions:

1. Remove the racks with a flat screwdriver.
2. Clean the whole of the tank with a soft cloth soaked in methylated spirit.
3. Refit the racks taking care over their direction (if a rack is reversed all the screws cannot be refitted).

**Any serious problem will require intervention by our Maintenance Department, or diagnosis and help by telephone.**

Depending on the type of contract, FROILABO undertakes to intervene within predetermined times in the event of a breakdown. To take out a maintenance contract, please send the contract request fax (page 13)

### 11.3. Problems and solutions



Any work on an appliance must be done by qualified personnel. Respect the settings of the safety systems (see *11.1. Safety rules*).

SYMPTOMS	POSSIBLE PROBLEMS	SOLUTIONS
The regulator does not light up	Plug disconnected	Check the supply cable connection
	Switch in the "O" position	Set the switch to position "I"
	Faulty mains supply	Check the electrical installation
	Faulty supply cable	Replace the cable
The regulator lights up but the appliance does not heat up	No temperature setting has been adjusted	Adjust the setting value
	The safety thermostat has triggered: the red light is on	Adjust the safety thermostat
	The thermal fuse is open	Call customer service
	The appliance has a lot of inertia	Normal operation, wait for the appliance to stabilise
	The load prevents hot air circulating	Check the positioning of the load
The appliance heats up until the safety thermostat triggers	The safety thermostat is not set to the correct value	Adjust the safety thermostat
	Set point exceeded during the first start up, or a problem (door opening)	Normal operation, wait for the appliance to stabilise
The regulator displays L.L.L.L or U.U.U.U.	Sensor broken	Call customer service
	Temperature range exceeded	Check the ambient temperature

## CONTRAT D'ENTRETIEN

(Formulaire à faxer au 01.60.37.41.78)

### VOS COORDONNÉES :

Mme  Mlle  M  Nom .....

Société ou établissement .....

Fonction .....

Service .....

Téléphone \_\_/\_\_/\_\_/\_\_/\_\_/\_\_/\_\_ Fax \_\_/\_\_/\_\_/\_\_/\_\_/\_\_/\_\_

Adresse .....

Code postal  Ville .....

(Formulaire à faxer au 01.60.37.41.78)

### VOTRE DEMANDE :

Contrat d'entretien  Renouvellement  n° de contrat actuel .....

Type d'appareil .....

Température .....

Marque .....

Pour les congélateurs :

Secours CO<sub>2</sub> oui  non  Secours LN<sub>2</sub> oui  non

Nombre d'appareils .....

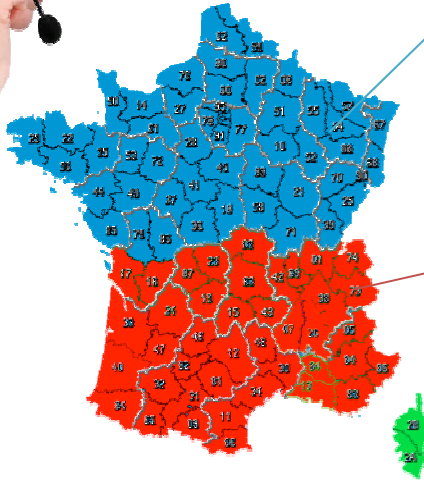
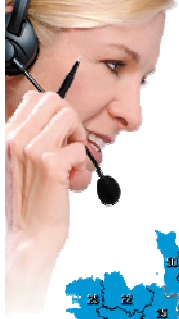
Nombre de visites souhaitées par an .....

Disposez vous déjà d'un contrat d'entretien FROILABO oui  non

Si oui, n° de contrat .....

## 13. CUSTOMER SERVICE

Any serious problem will require intervention by our Maintenance Department, or diagnosis and help by telephone.



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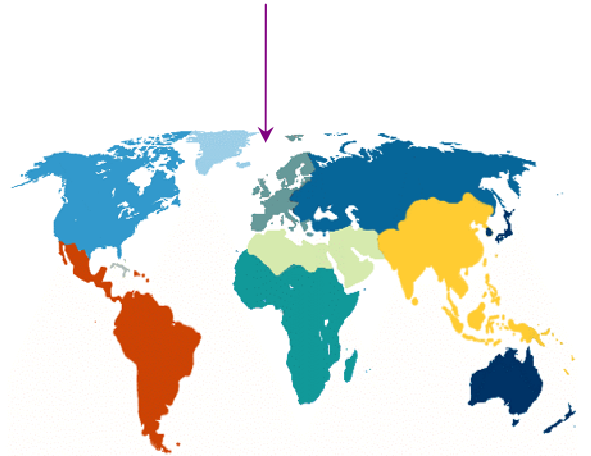
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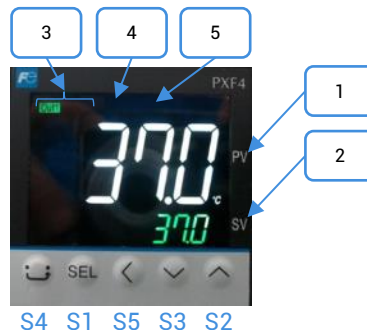
# Regulator PXF4:

Operation and programming for  
incubators BP & BE

**Froilabo**  
Precision for life



# 1. PXF4 temperature regulator



## Functions buttons

Mark	Designation
S1	Selects the parameter blocks and displays the name or value of the chosen parameter
S2	Increases the value of the set temperature In case of prolonged pressure, the value increases more rapidly Switch from one parameter to another
S3	Increases the value of the set temperature. In case of prolonged pressure, the value decreases more rapidly Switch from one parameter to another
S4	Return to main menu
S5	Back

## Display and indicators

Mark	Description	Designation
1	Display temperature / selected parameter	Indicates the actual temperature Displays the symbols of the parameters in the setting mode Display errors codes
2	Setpoint temperature (SV)	Display the setpoint temperature (SV) Display the parameter values
3	Regulated exit light	<b>Out1:</b> the light comes on when the incubator is heating up <b>Out2:</b> the light comes on when the incubator is cooling down
4	Alarm output / Indicator stericycle EV1	<i>BIO PERFORMANCE:</i> The indicator goes out when the temperature alarm <b>AL1</b> is on. <i>BIO EXPERT:</i> The indicator goes out when the sterilization temperature is reached (only during the stericycle)
5	Alarm output EV2	<i>BIO EXPERT:</i> The indicator goes on when the temperature alarm <b>AL2</b> is on.

## 2. Starting up / Shutdown the incubator

### Commissioning:

1. Connect the device to a 230V / 50Hz / 10A + Neutral + Earth electrical network, protected by a 30mA differential circuit breaker.
2. Press the **ON/OFF (O/I)** button to turn on the unit.
3. Enter the setpoint on the regulator using **↑** (S2) et **↓** (S3) keys.
4. Wait for the unit to stabilize at the set temperature.
5. Adjust the safety thermostat (cf. below) then load the appliance.

### Shutdown:

1. Press the **ON/OFF (O/I)** to stop the device.
2. Unplug the device safely.

## 3. Safety

### Safety thermostat:

These devices are equipped with a class 2 safety thermostat, according to standard NF EN 61010-2-010, (equivalent to DIN 3.1).

It protects the incubator and its contents from unwanted overheating (involuntary modification of the setpoint, malfunction of the control system, etc.).

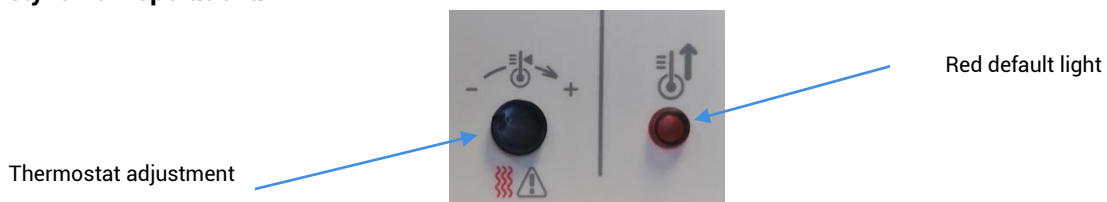
### Setting the safety thermostat:



**The thermostat must be adjusted to the first commissioning of the device, as well as to each setpoint change.**

1. Remove the black cap from the console panel to access the safety thermostat.
2. Set the safety thermostat to its maximum temperature using a flat screwdriver turn to the right).
3. Allow the incubator to stabilize perfectly at the set temperature.
4. Turn the thermostat to the left until you hear a click (the red LED on the front panel lights up).
5. Raise very slightly to the right until you hear a click (the red light goes out).
6. Reposition the black cap.

**Safety is now operational.**



### High visual alarm:

These devices are equipped with a high temperature alarm: a maximum deviation between the temperature in the enclosure (PV) and the set temperature (SV, Set Value) is admitted in the enclosure.

If the measured temperature (PV) crosses this gap, the alarm is triggered and the red LED EV2 comes on.

The high alarm value is set at the factory at + 10 ° C above the set temperature. It is possible to delay this alarm. This value is set at the factory at 0 sec. By default, the alarm is active as soon as the high alarm value is reached.

#### Setting the high temperature alarm:

1. Press **SEL**.
2. Display AL2 parameter using ↑ (S2) et ↓ (S3) keys and select by pressing **SEL**.
3. Modify parameter AL2, using ↑ (S2) et ↓ (S3) keys
4. Validate by pressing **SEL**.
5. Return to main menu by pressing the home button (S4).

#### High temperature alarm delay:

1. Press and hold **SEL** until CH 1 appears.
2. Select block parameter n°5 CH 5 using ↑ (S2) et ↓ (S3) keys and validate using **SEL**.
3. Display parameter (DLY2) using ↑ (S2) et ↓ (S3) keys and select by pressing **SEL**.
4. Modify the parameter (DLY2), using ↑ (S2) et ↓ (S3) keys.
5. Validate by pressing **SEL**.
6. Return to main menu by pressing the home button (S4).

#### Thermal fuse:

In addition to the safety thermostat, these devices are equipped with a thermal fuse. It protects the incubator from unwanted overheating. Its cut-off temperature is 190 ° C.

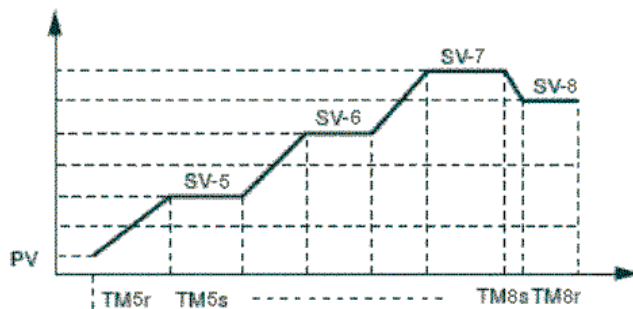
#### Hot surfaces:



**Beware of hot surfaces on the back and top cover of the machine (screw head).**

## 4. Programming a temperature cycle

It is possible to program a temperature cycle (up to 128 segments) and generate 64 set point (SV)  
The cycle runs from the measured value (PV).



SV-x: setpoint temperature

TMxr: ramp time

TMxs: level time

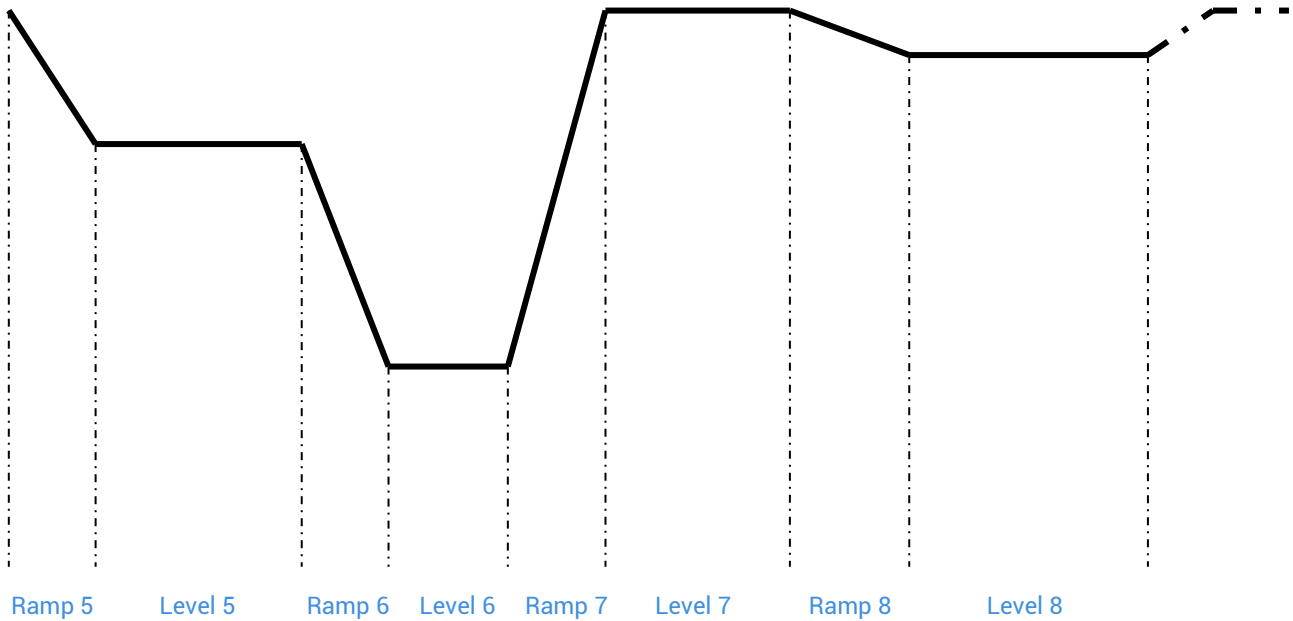


**Pay attention to the setting of the safety thermostat. This must be adjusted to the highest temperature of the cycle.**

**Step n°1: Draw the temperature cycle based on this diagram.**

**Ramp:** temperature ramp between two instructions. It is defined by its duration.

**Level:** given time during which a temperature setpoint is executed.



**Step n°2: Fill in the table of values defining the cycle.**

For unuse level, the **TMxs** and **TMxr** values must be set to « 0 ».

Ramp 5	___ / ___ hour/min	TM5r
Level 5	___ / ___ hour/min	TM5s
	_____°C	SV-5
Ramp 6	___ / ___ hour/min	TM6r
Level 6	___ / ___ hour/min	TM6s
	_____°C	SV-6
Ramp 7	___ / ___ hour/min	TM7s
Level 7	___ / ___ hour/min	TM7s
	_____°C	SV-7
Ramp 8	___ / ___ hour/min	TM8r
Level 8	___ / ___ hour/min	TM8s
	_____°C	SV-8

**Step n°3: Program the controller and set the conditions for stopping and starting the cycle and automatic repetition.**

### To program the regulator:

1. From home menu, press **SEL** until CH1 Pid is displayed.
2. Then select CH3 using **↑** (S2) et **↓** (S3) keys.
3. Press **SEL** 1 time to enter the programming menu.
4. Set the **PtN** parameter to define the number of used segments. Press **SEL**, the parameter starts blinking, set the value using **↑** (S2) et **↓** (S3) keys and validate using **SEL**.
5. Display SV-x using **↑** (S2) et **↓** (S3) keys and validate using **SEL**. Choose the setpoint temperature using **↑** (S2) et **↓** (S3) keys and validate using **SEL**.
6. Repeat operation with the other parameters.

### To program the regulation cycle:

Depending on the mode chosen, the programmed temperature cycle will be started directly either at power-on (On / Off) or by the RUN function of the controller. In that case:

1. Press 1 time the **SEL** button.
2. Display (**ProG**) parameter and choose **RUN (rUn)** using **↑** (S2) et **↓** (S3) keys.
3. Temperature cycle start from actual temperature (**PV**).

#### **Nota:**

- To pause the cycle, select **HLD (HLd)**.
- To cancel the interruption, choose **RUN (rUn)**.
- To stop the cycle, select **OFF (oFF)**.
- End is displayed when the cycle is over.

There are 16 operating modes for a programmed cycle accessible via the Mod (CH3).

The following parameters can be set:

Start of the temperature cycle: the temperature cycle can be activated either when the device is switched on (0 / 1) or by using the **RUN** function.

End of program management: determines the status of the control at the end of the temperature cycle.

**Stop mode:** no regulation, the end of the cycle temperature flashes.

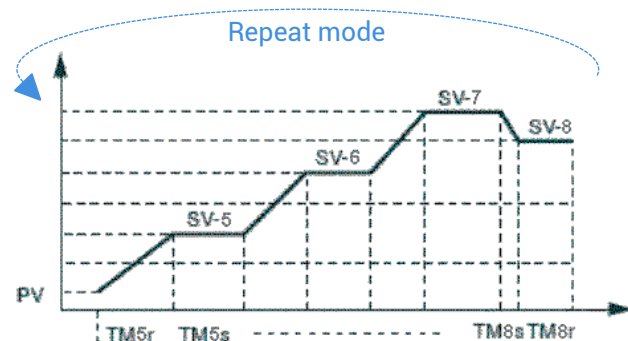
**Active regulation:** the last temperature of the cycle is regulated.

Management in case of voluntary program shutdown: determines the status of the control at the end of the temperature cycle (HLD function).

**Stop mode:** no regulation, the set temperatures flashes.

**Active regulation:** The current set temperature is regulated.

Repeat mode: Allows repetition of the cycle when the previous cycle is completed.



**Nota:** The rise times must be consistent with the performance of the device.

## 5. Example of programmer use: the chrono-breaker timer

**Step 1:**

Designation	Parameter	Value
Set point 1	SV-1	37 °C
Ramp time 1	TM-1r	1.0 (hr.min)
Level time 1	TM-1S	94.0 (hr.min)
Set point 2	SV-2	37 °C
Ramp time 2	TM-2r	0.0 (hr.min)
Level time 2	TM-2S	50.0 (hr.min)

Designation	Parameter	Value
Set point 3	SV-3	4°C
Ramp time 3	TM-3r	1.0 (hr.min)
Level time 3	TM-3S	22.0 (hr.min)
Set point 4	SV-4	0 °C
Ramp time 4	TM-4r	0.0 (hr.min)
Level time 4	TM-4S	0.0 (hr.min)

*Step 2:*

Temperature cycle starting using is manual (launching via **PROG** parameter) and repeat: **MOD :1**

**Nota:** This cycle of temperatures is pre-programmed by default on the refrigerated incubators.

### 5.12 Parameter tree

DESCRIPTION	BLOC	ACCESS
Starting / stopping the programmed temperature cycle	Ope	From home menu press SEL 1 time
Setting the alarm threshold		
Locking		
Setting the temperature cycle	CH3 PRG	From home menu hold on SEL until CH1 Pid is displayed then select CH3
High alarm delay	CH5 ALM	From home menu hold on SEL until CH1 Pid is displayed then select CH5
Offset adjustment	CH6 SEt	From home menu hold on SEL until CH1 Pid is displayed then select CH6
Communication settings	CH9	From home menu hold on SEL until CH1 Pid is displayed then select CH9
Réservé	CH11 dSP	
Réservé	CH13 PASS	

**Nota:** if no adjustment is made for 30 seconds, the display will reset to (PV) / (SV) values displayed when the power is turned on.