CERINNOV Group TOMORROW'S SOLUTIONS TODAY

ζetamix

ζetasinter

MANUAL

ZETASINTER 4L by cerinnov group

ELECTRIC TUBULAR FURNACE 1350°C D150MM

Dear Customer,

We thank you for the installation of this new equipment and for the trust you have shown by relying on the services of the CERINNOV Group and the company NANOE.

Read this document and proceed according to its instructions before first use. This will ensure the safety and proper functioning of your equipment and preserve its warranty.

We advise you to keep this instruction manual in a suitable place so that you can refer to it whenever necessary.

We would like to draw your attention to the fact that during normal operation, but also when it is turned off after a cycle, your oven may have hot surfaces with a risk of burns.

We recommend that all interventions on your equipment be carried out by specialized technicians from CERINNOV and never by other technicians who are not personally related to our services.

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1 Description

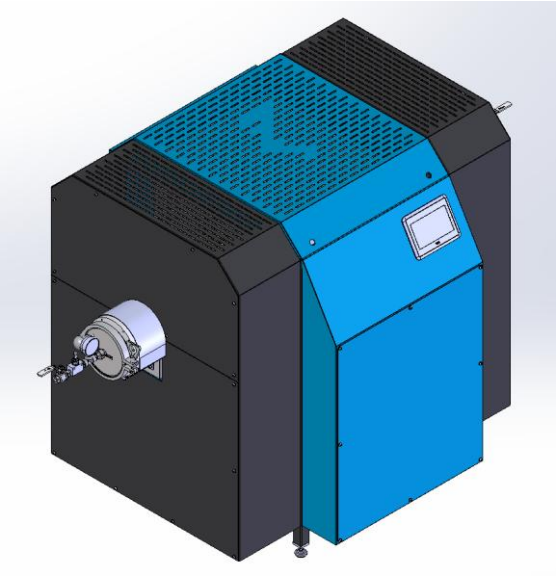
1.1 General Description

ZETASINTER by Cerinnov Group **electric furnaces** are tube furnaces suitable for thermal debinding and sintering of printed metal parts from the ZetaPrint process.

They have a heating chamber with a capacity of about **4.5 liters,** and allowing a maximum temperature of **1350°C** to be reached under gas flow of neutral gas or slightly reducing gas: nitrogen, argon, hydrogenated argon.

The chamber is a sealed silicon carbide tube with a length of 1500mm and an external diameter of 150mm. Heating is provided by electrical resistors over a useful length of 300mm.

They are equipped with an automatic temperature timer for fully configurable cooking curves with multiple heating, tiering, and cooling modes.



1.2 Technical informations

Model	ZETASINTER by Cerinnov Group
Tension	230 V
Phases	1
Current	16 A
Power	6.5 kW
Weight	280 kg
Capacity	4.5 L
Maximum temperature	1350°C
Nature of the tube	Silicon Carbide
Serial Number	Consult the tray on the side of the oven

2 Instructions for use

2.1 First time use

Before any production, the oven must be subjected to two specific and consecutive baking programs.

Program 1 is designed to extract all moisture from the kiln materials up to 600ºC.

Program 2 allows electrical resistors to acquire an anti-corrosion surface layer. This protection is obtained by a step of several hours at a temperature of 1050°C.

Implementing these two programs before any further heating is very important and mandatory to ensure the durability of the equipment.

Please find the details of the programs below.

Program 1 - Maximum temperature of 600°C – Empty oven

- Open the oven chimney completely
- Load the controller program with the following data:
    - Rise to 600°C in 6 hours (100°C/h)
    - Plateau at 600ºC for 2 hours
    - Complete cooling (room temperature).

Program 2 – Maximum temperature of 1050°C – Empty oven

- Close the chimney from only 600ºC
- Load the controller program with the following data:
    - Rises to 800°C in 8 hours (100°C/h)
    - Climb to 1050°C in 2 hours (125°C/h)
    - Plateau at 1050°C for 3 hours

Once these two programs are complete, the oven will be able to be used for heating your products.

2.2 Daily use

The oven **should not be used as a dryer or oven**. The charging of products with high humidity will lead to a gradual and accelerated degradation of the insulation and structure.

The furnace **must never operate without first placing the appropriate refractory blocks** on either side of the heating zone inside the tube, otherwise the flanges and seals will be damaged.

Heating under hydrogenated gas must be preceded by a vacuum of the oven.

The oven should never be opened above 150°C. This would affect its lifespan.

Use at maximum temperature reduces the life of the resistors and insulation. The maximum recommended temperature for regular and prolonged use is **1350°C**.

3 Security

The electrical elements of the furnace are protected by screwed metal sheets. This ensures protection against electric shocks caused by contact with the resistors.

4 Hazards and Warning

Hot surfaces: surfaces with a high temperature that can lead to serious burns.

Danger of being crushed : risk of crushing the feet, risk of falling heavy objects.

Danger of electrocution: risk of electric shock, potentially fatal.

Attention :

Only qualified personnel can work on the control cabinet and the heating elements located behind the protective sheets. All work must be carried out without the voltage and installation must be recorded.

Don't get the equipment wet!

5 Maintenance

As it does not require any special preventive maintenance, it is important to keep the refractory lining in good condition. Energy efficiency also depends to a large extent on the condition of the insulation.

Item	Monthly	Quarterly	Biannual	Action
Joints	Check Status			Change if necessary
Thermocouple		Check Status		Change if necessary
Controller	Check Status			Change if necessary
Refractory			Check Status	
Tube			Check Status	Change if necessary
Resistance	Check Status			Change if necessary

Electrical resistors and refractories must be checked regularly and their good condition confirmed. Contact CERINNOV after-sales service for your replacement coils.

6 Cleaning

The oven does not require specific cleaning processes, but requires a minimum of care to ensure the best operating conditions, always seeking a rational use of energy and increasing its durability.

You should clean the inside of your oven regularly. Splinters and other materials resulting from the breakage of parts can interfere with their normal operation.

Exterior cleaning of equipment should be done with a damp cloth and never with the appliance plugged in.

Avoid using solvents.

7 Guarantee

We guarantee the oven for **12 months** after invoicing for construction defects and materials provided that they are used according to the instructions for use. The radiant elements (resistors) have a 6-month warranty.

Any costs resulting from problems not covered by this warranty will be borne by the customer.

Covered by the warranty:

- Manufacturing defects;
- Defects in the materials that make up the equipment (e.g. temperature programmer).

Excluded from the warranty:

- Normal cracking and shrinkage of the refractory materials during the first firings (due to the different expansion of the materials making up the furnace);
- Damage caused by accident, neglect, misuse, or connection to improper voltage;
- In the event of the intervention of people outside our technical services.

8 Manufacturer

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TÜVRheinland CERTIFIED Management System ISO 9001:2008 www.tuv.com ID 9105078469

CERINNOV – Unipessoal, Lda
Rua Paulo VI, nº2490, Vale Sepal
2415-614 Leiria – PORTUGAL

9 Technical Support

CERINNOV has a team of experienced technicians who are able to clarify any doubts related to the equipment that may not be explicit in this document.

CERINNOV provides the best support and the supply of spare parts.

Support Technique

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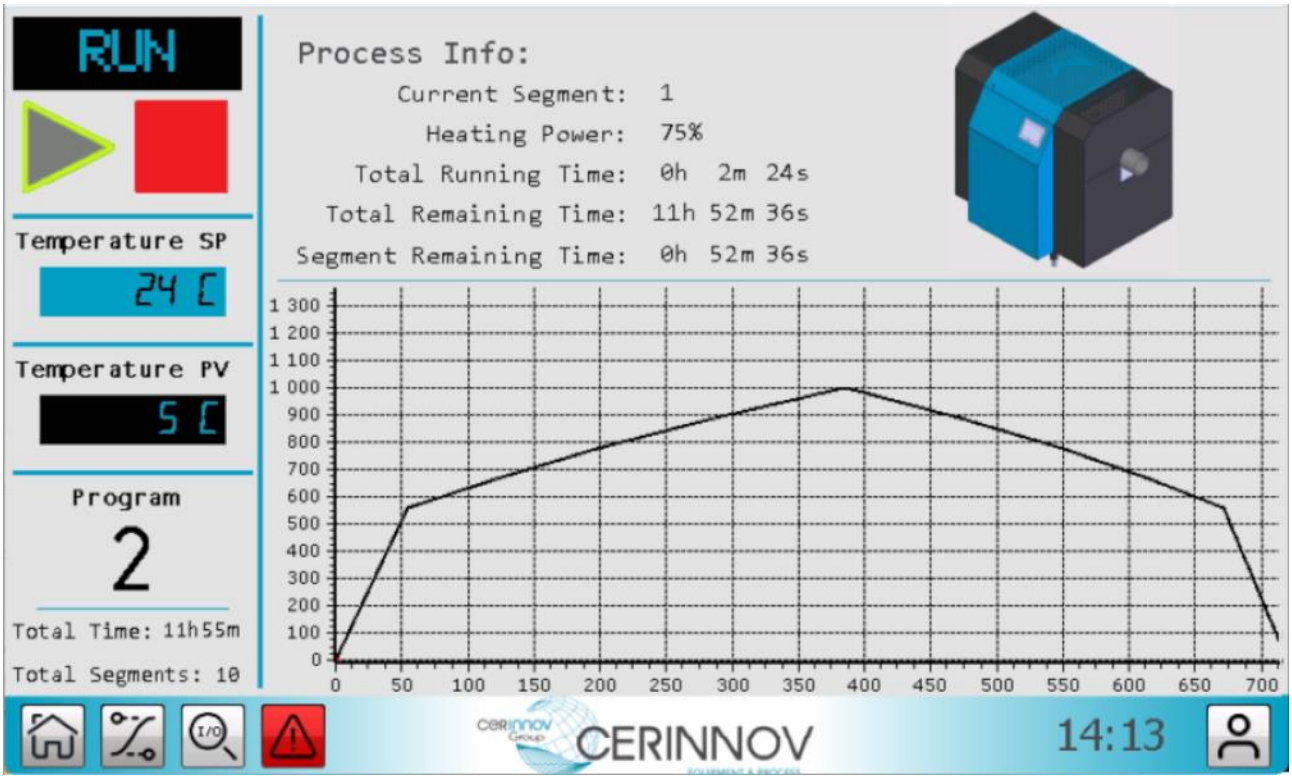
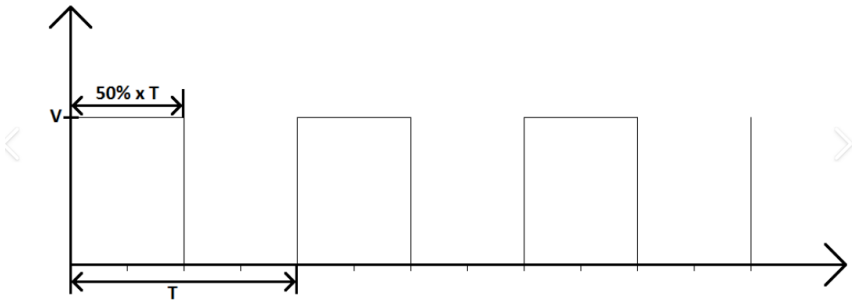
10 Controller Instructions for Use

10.1System Description

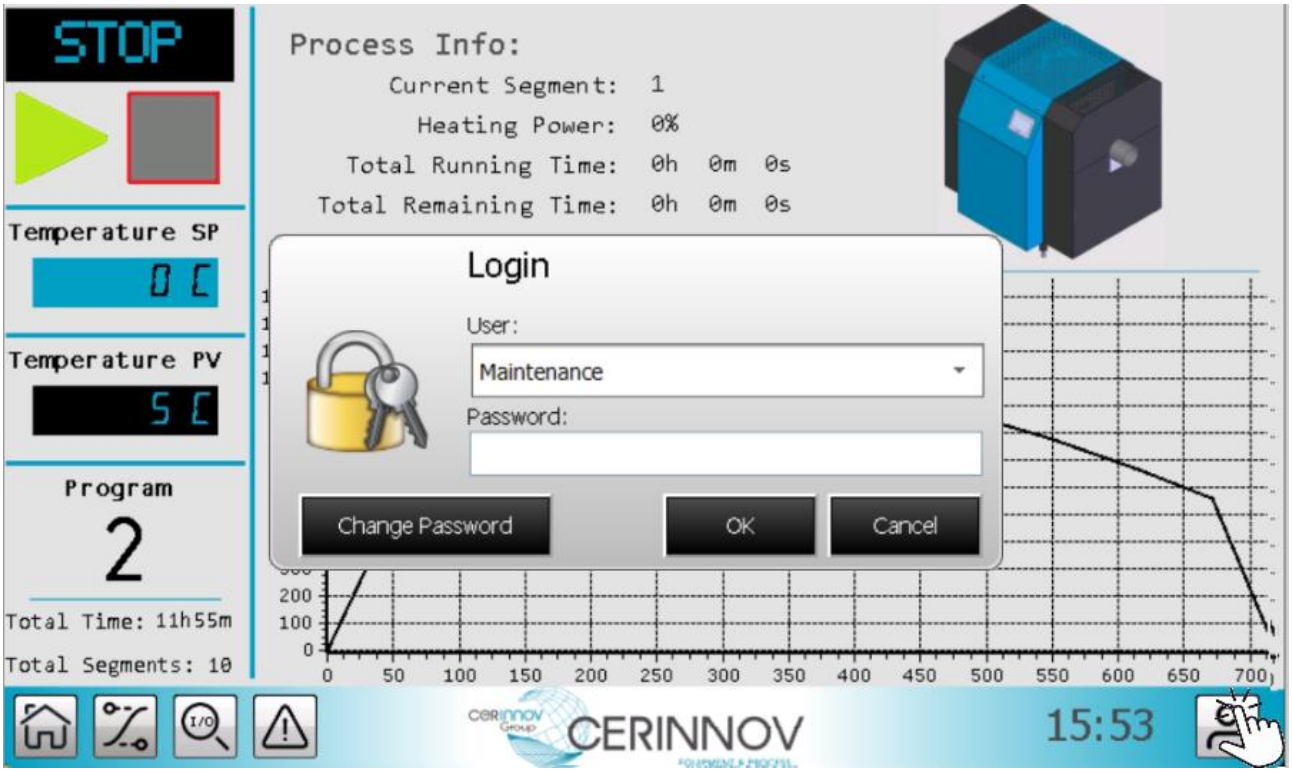


The console allows you to set the furnace's heating programs (thermal cycle) and to view the temperature monitoring and the electrical power consumed in real time.



The controller regulates the electrical power in such a way as to respect the previously recorded thermal cycle.

10.2User Account

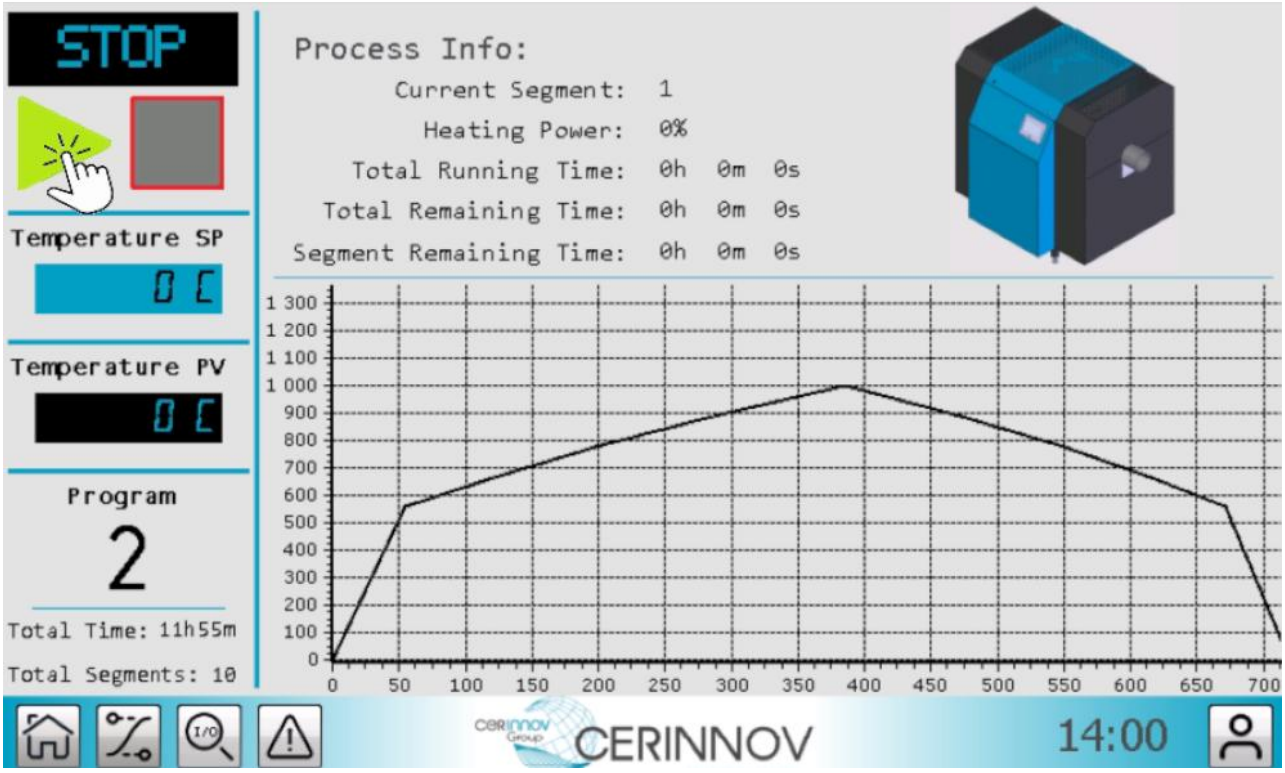


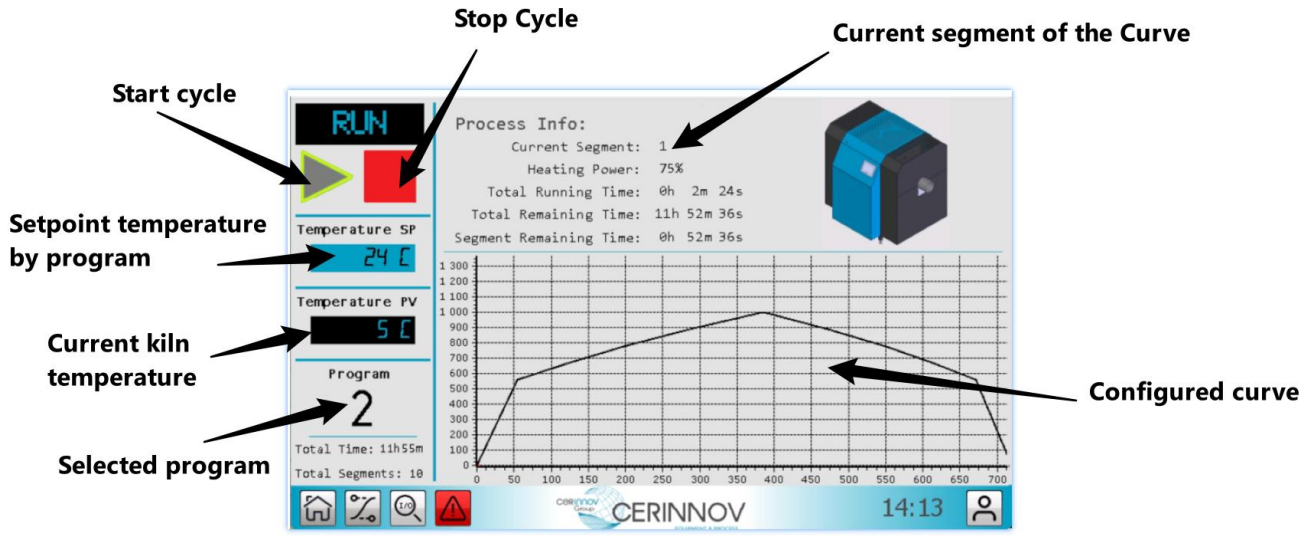
Setting up thermal cycles requires logging in with the "Maintenance" account. The default password is 0.

10.3Footer

This section is always visible to the user. It allows you to select either the page to be viewed, or the heating curves, or to access and modify the parameters of the curves, or to access user accounts or to display events and alarms.

10.4Home





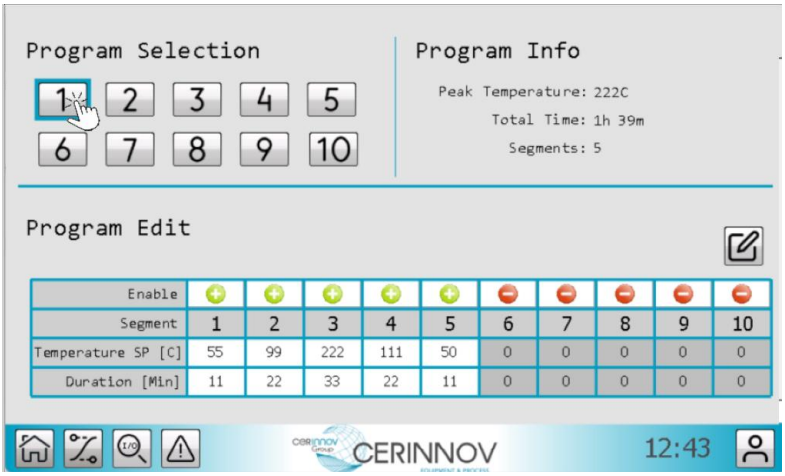
On the main page, you can start the cooking cycle, view the time left before the cycle ends as well as the current temperature and set temperature.

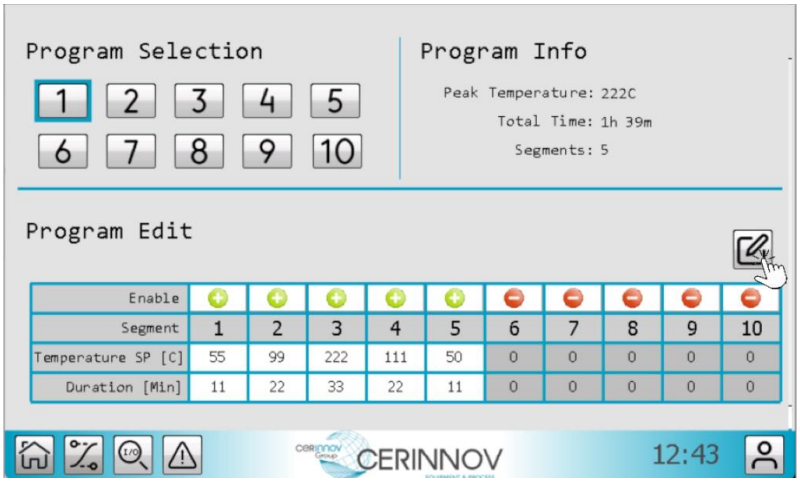
Below this, it is possible to display a configurable list of graphs for the current cooking.

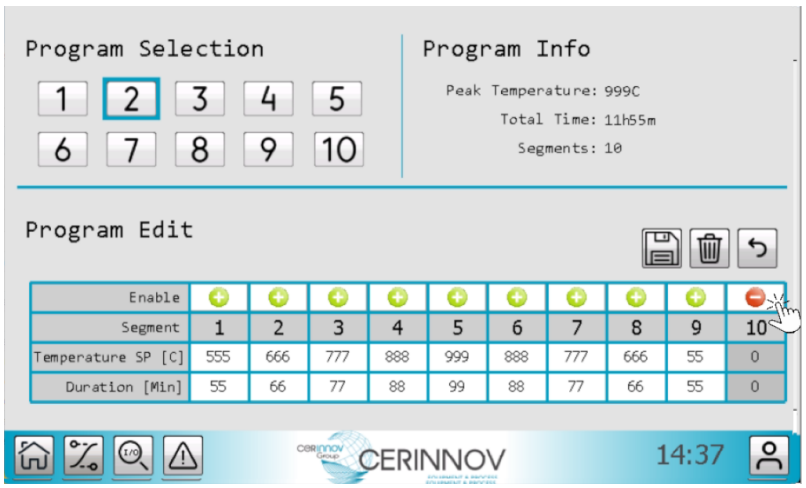
10.5Configuring the heating curve

On this page, you must choose the curve you want to configure, select user account "Maintenance" and then click on edit. You can program different segments of the curve and enter the duration and temperature of that segment.

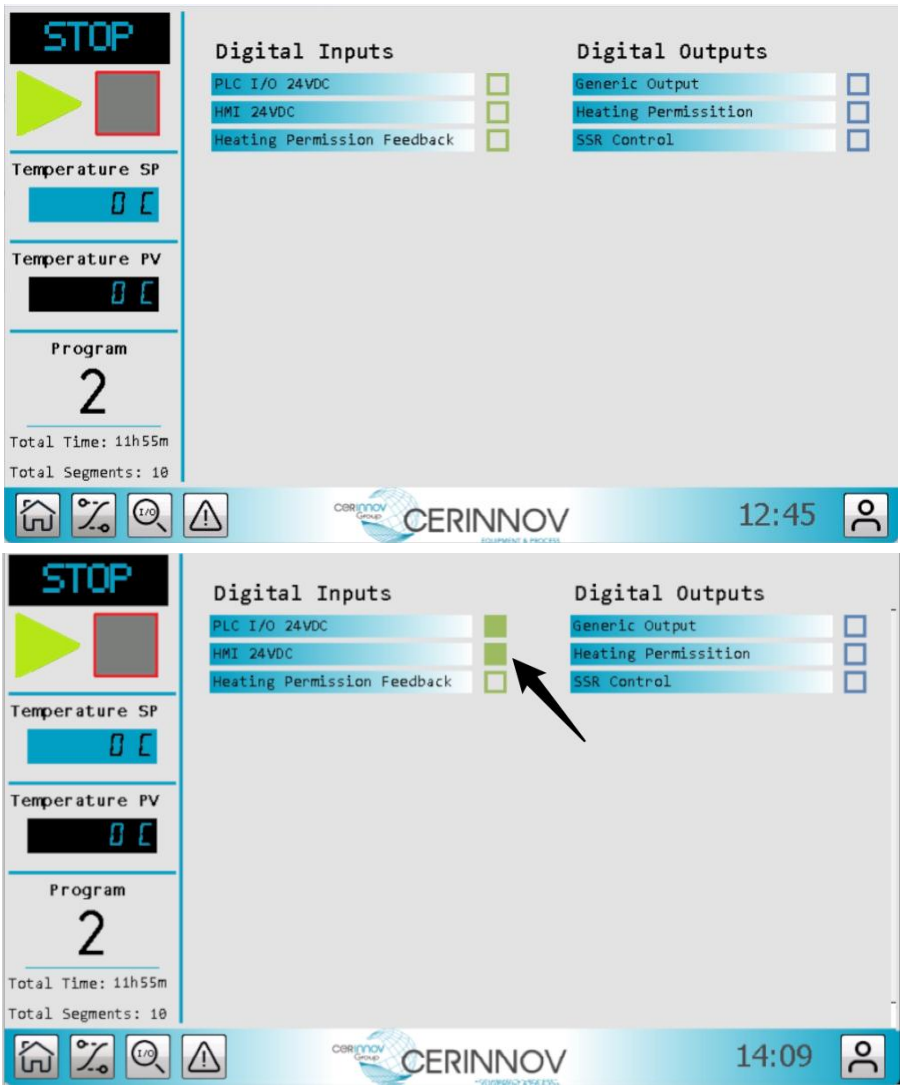
Finally, you need to back up this configuration.







10.6Digital Inputs / Outputs



This page is intended for monitoring the system by allowing you to view the signals that the PLC receives and sends. It can be used to identify the absence of a signal such as:

Entries:

"PLC I/O 24VDC" - power supply for the control circuit

"HMI 24VDC" - power supply for the console

"Heating Permission Feedback"

Outputs:

"Generic output" - Generic output of the PLC (reserve)

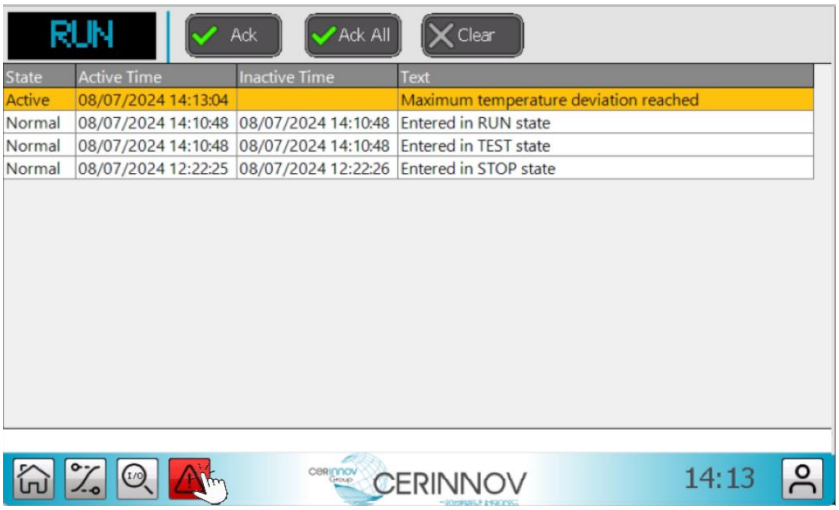
"Heating Permission" - Command to activate the heating supply circuit

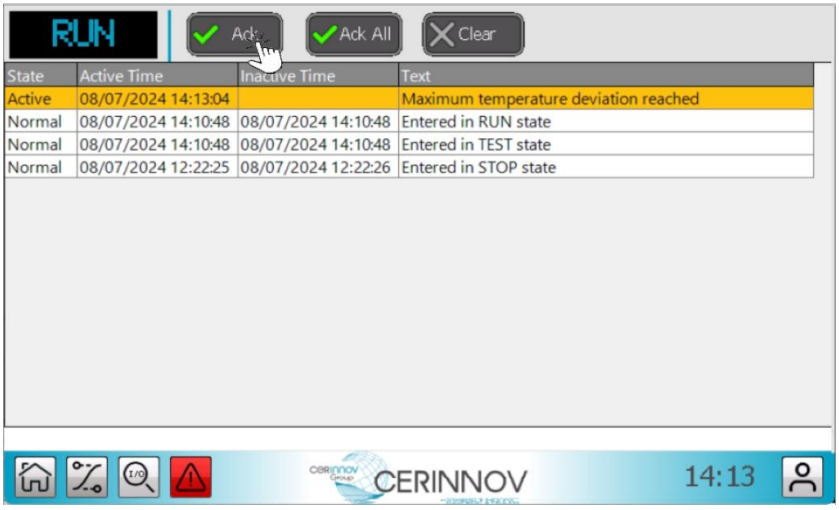
"SSR Control" - Heating activation

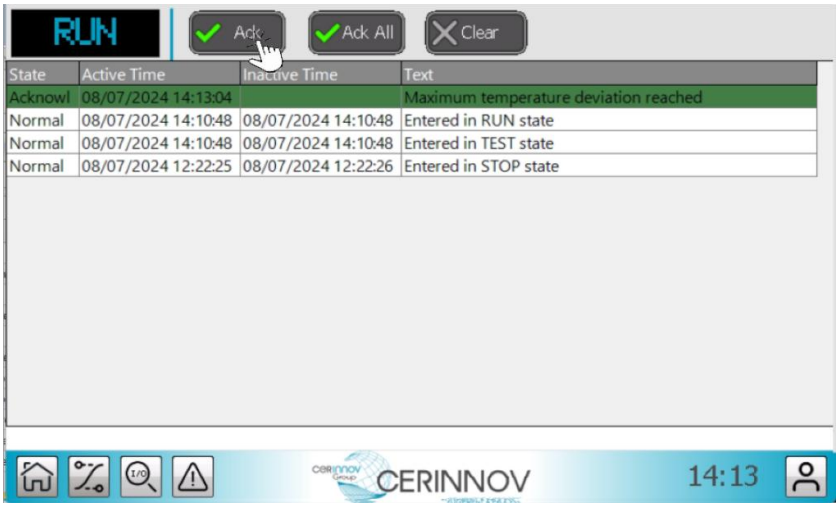
10.7Alarms & Events page

This page displays all oven alarms and events. Alarms are indicated by a red button.

Active alarms appear on a yellow background. If you want to acknowledge an alarm, you can click on the "Ack" button and the alarm will appear on a green background.







10.8List of alarms and events

NUMBER	DESCRIPTION
Actn01	Entered in FAIL state
Actn02	Entered in RUN state
Actn03	Entered in STOP state
Actn04	Entered in PAUSE state
Actn05	Entered in TEST state

NUMBER	DESCRIPTION
Warn01	Maximum temperature deviation reached
Stop01	Entered in RUN state
Stop02	Entered in STOP state
Stop03	Entered in PAUSE state
Stop04	Entered in TEST state