ПРОМИШЛЕНА ЕЛЕКТРОНИКА

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PROGRAMABLE THERMAL CONTROLLER

Instructions for use

Thank you for purchasing products from Апронекс ООД. These instructions show you how to mount, connect and use the thermal controllers. Please read these instructions before using the product. Keep these instructions on hand when using the products.

Contents

1. DESCRIPTION AND CONNECTION OF THE APPARATUS

1.1 Technical information

PURPOSE

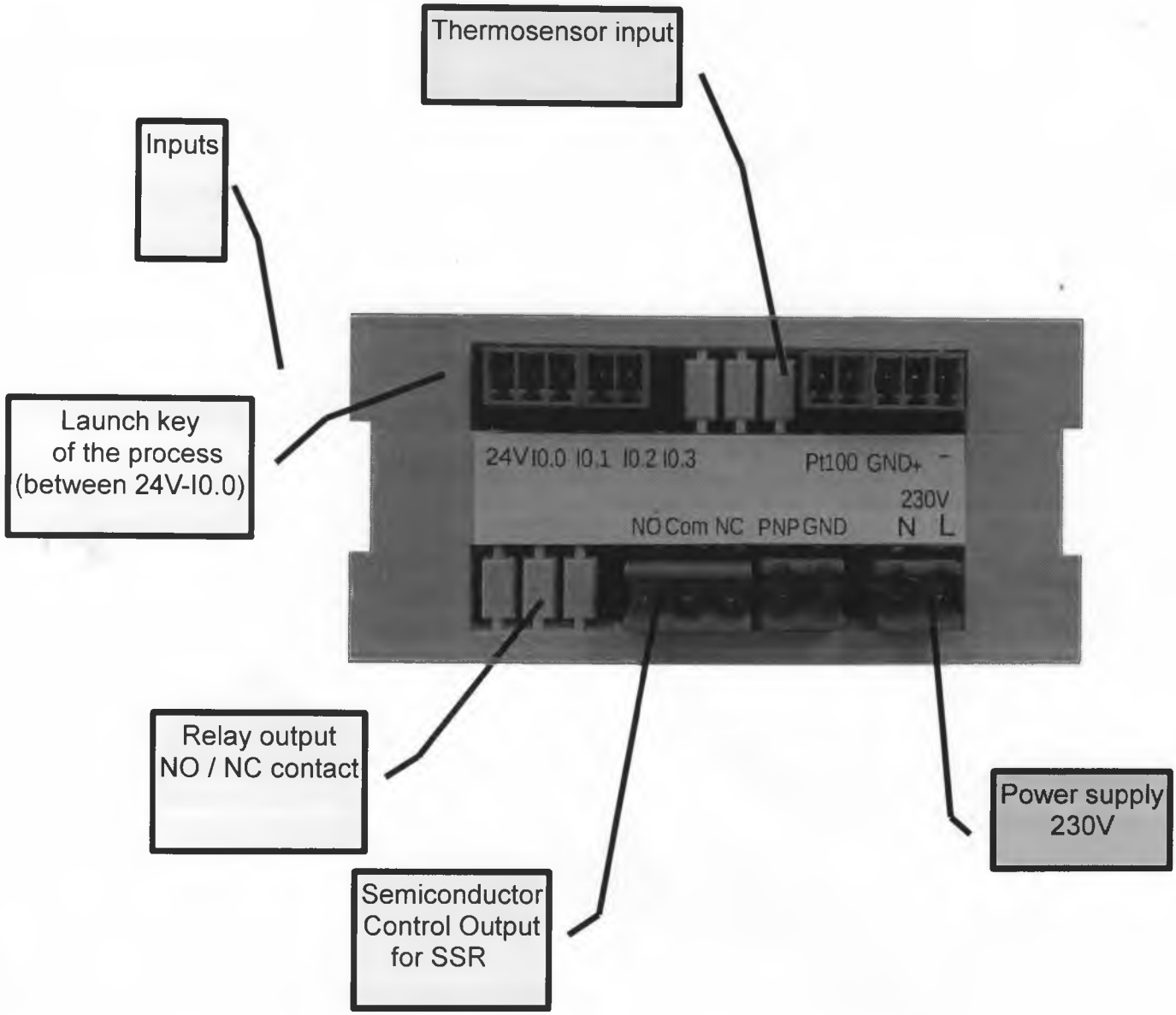
The controller is designed for control of a ceramic production furnace. The controller is capable of utilizing a five-phase program and storing 10 programs in its memory.

TECHNICAL PARAMETERS

Power supply voltage	***85 - 256V/AC 50,60HZ***
Thermal sensor type	According to the regulator label
Outputs	1 R or 1SSR
Display	ome 6-discharging, 7-segment
Accuracy	3.00%
Protection	IP20
Dimensions D x W x D	120 x 100 x 50 mm
Work temperature	0 - 40 °C
Humidity	Up to 80% RH

The appliance is mounted on a panel with an aperture of 93 x 45 mm and a wall thickness of at most 12 mm and is clamped to it by the two tensioners.

1.2 Connecting the appliance



Powering the appliance.
The appliance is powered by 230 VAC.

The supply terminals are:
Terminals 13 - L
Terminals 14 – N

NOTE:

Before connecting the appliance to the power supply, check carefully what voltage your appliance is intended for! If the terminal is for DC, connect 12-24VDC to power the unit.

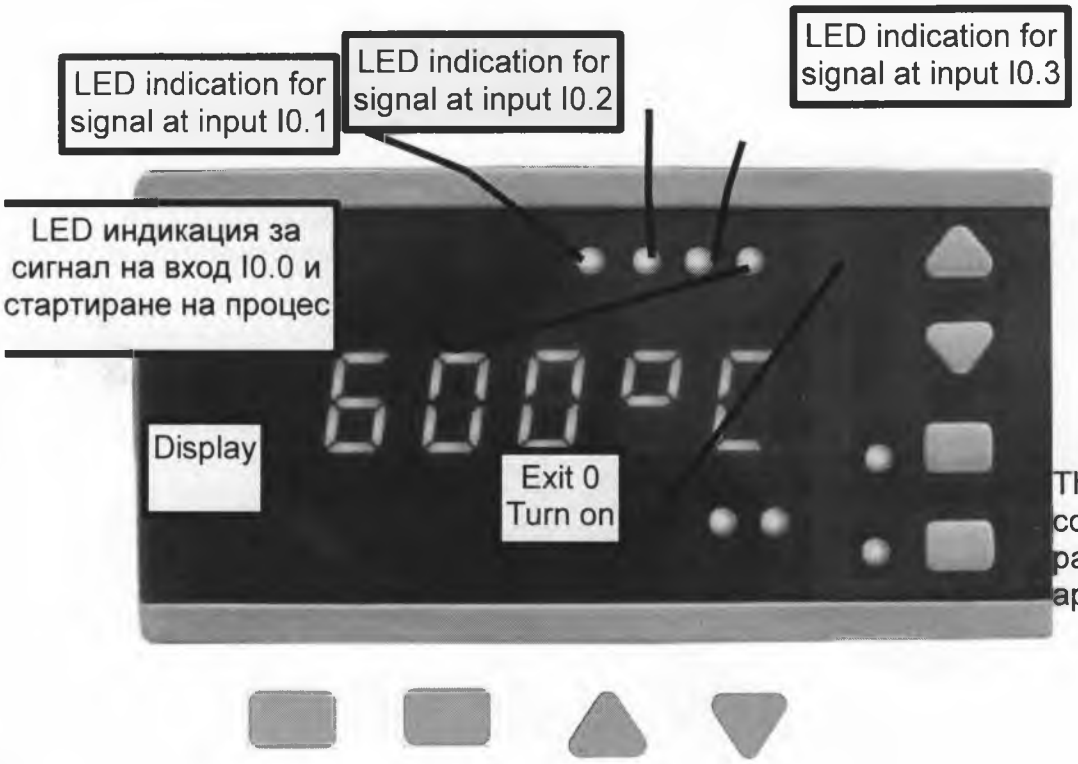
It is recommended that the devices be connected to a separate power supply for the CIP and A (Control Meters and Automation) and not to the power supply of the plant.

Note:

To enable the output relay to be switched off without switching off the thermostat, insert a switch between terminals 1 and 2 (24V and I0.0)

1.3 Description of the control panel

The control panel consists of a 6-digit display, 10 LEDs and four buttons, as shown in Figure 2:



Фиг. 2.

The four buttons for controlling and parameterizing the appliance are:

DOWN button. Used to decrease the selected value.

UP button. Used to increase selected value.

SET button. Used to store to memory, as well as to exit from the programming mode in which you are logged in.

ROLL button. Used for sequential selection of programming mode - menu functions.

2. WORKING WITH THE APPLIANCE

After switching on the appliance to power it up, the display goes through the "ApronEcS" introduction, after which the device is in its basic state. The display shows the current measured temperature in the OS.

Figure 3

Changing the set temperature value can be done at any time using the buttons ▲ up ▼ down.
After you have changed it, it will automatically save to the memory storage and will load the next time you turn on the controller.

By pressing the Roll button , the display will show "TYPE 15" - which means that the controller type is 15 ie. profile thermostat with relay hysteresis control law, a semiconductor relay, five profile levels and 11 selectable programs, taking into account the "zero" program where the controller works as an ordinary thermoregulator.

When the Roll buttonis held for about 5 seconds, the display will show "PASS 0", meaning a password.

Figure 4

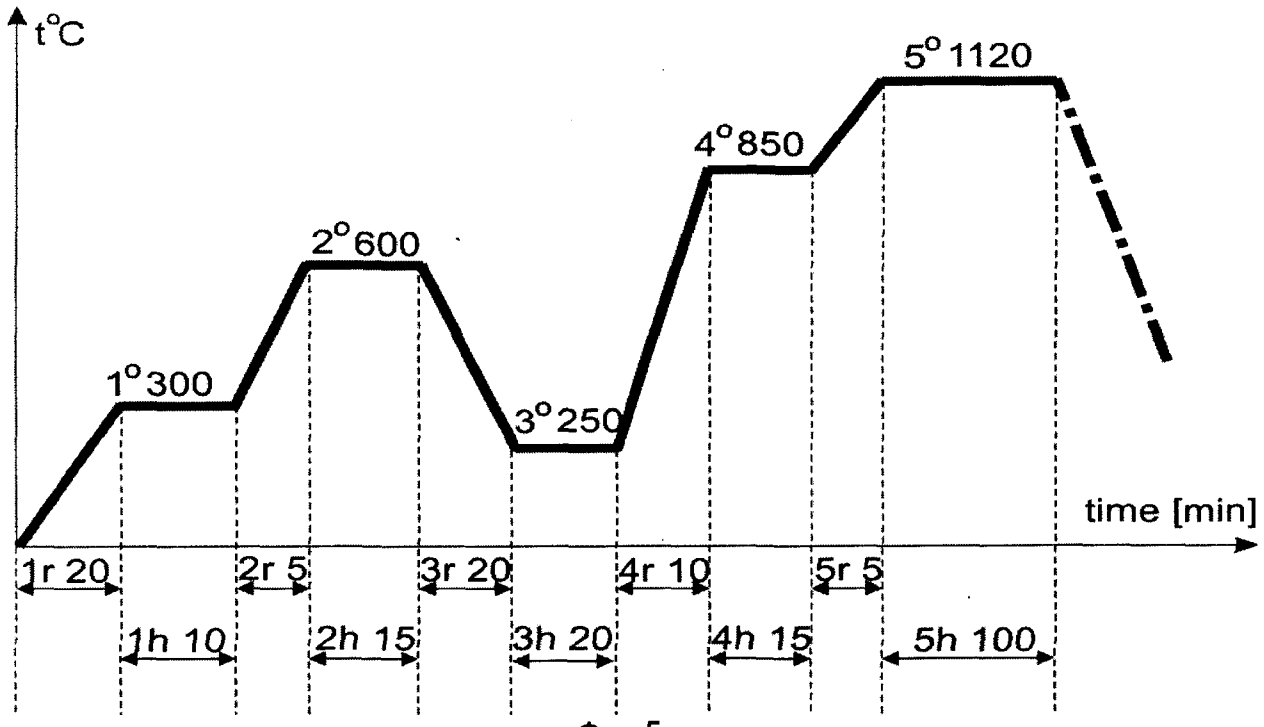
After that, through the ▲ and ▼ buttons you can select the password number that is required. The following table shows the password functions:

Password number	Function
PASS 0	Is not used
PASS 1	Is not used
PASS 2	Is not used
PASS 3	Is not used
PASS 4	Select a program from 0 to 10
PASS 5	Edit a program
PASS 6	Is not used
...	Are not used
PASS 55	Change hysteresis

To select one of the functions, use the ▲ and ▼ buttons to display the corresponding password number and press the ■ button.

2.1 Edit a program

The following figure shows a profile that will explain in detail how a program is prepared.



Фиг. 5

To edit a program, press the Recipe button, the display will show TYPE 15, hold it for about 5 seconds, then the PASS 0 prompt will appear on the display.

Through the ▲ up and ▼ down buttons save pass pin 5 and press the ■ button In Fig. 5 is a temperature profile of 5 segments.

Each is described independently by its index 1, 2, ..., 5.
Let's look at the first segment of the chart. It consists of the three parameters of each segment with index 1 in the first character.

1 º 300 -

set reach and maintenance temperature for this segment in degrees.

a symbol of Degrees Celcius, suggests that the number refers to temperature.

segment index

Figure 6

1r 20

time to reach the set temperature for this segment in minutes

the symbol 'r' suggests that the number refers to the rise in temperature

Segment index

Figure 7

1h 10

time to maintain the set temperature for this segment in minutes

the symbol 'h' suggests that the number refers to maintaining the temperature

segment index

Figure 8

The values of 1 °, 1h and 1r are entered using the up and down buttons, and in order to move from one parameter to another or to another segment it is necessary to press the Roll button.

NOTE: Trend * is set in minutes. Minimum 1 min maximum 1440 min
The increase in temperature can not be faster than the time constant of the furnace.
The set time serves to calculate the temperature rise trend for every minute.
In the example of segment 1 we have set 10 min and temperature for segment 300 ° C.
The trend will be calculated by subtracting the instantaneous measured temperature from the set temperature and dividing it at the set time.

Exceptions:

If the next segment's temperature is set to the minimum possible, this means that you want to turn off the profile controller to maintain the last set temperature. This way you can transform your profile thermostat into a two, three or four profile thermoregulator.
If the set temperature of the next segment is lower than the temperature of the previous segment (the current temperature), the calculated trend will be negative, and for each elapsed time, the thermoregulator will receive a setpoint temperature down to the set segment temperature.

The maximum trend time (decrease or increase in temperature) may be 2880 minutes. This allows the oven to heat or cool very slowly for 48 hours. If all five segments of the profile regulator are set. After the last time has elapsed, the oven will shut down.

Example:
The furnace is at room temperature 25 ° C.
The trend will be = (300 - 25) / 10 = 27.5.
After starting the profile thermostat, the temperature setpoint will increase by 27.5 ° C to 300 ° C.

After the trend has passed.
In our example (300 ° C), the controller will wait until the set temperature is reached if it is not yet. After reaching the temperature, it will start to run. After this time, the profile thermostat will change the index and begin to perform the next segments.

NOTE: Changing the 1o, 1h, and 1r values for each segment of the current or other program is impossible at the time the current program is running. In order to make such a change, it is necessary to switch with the key to start the process, make the necessary changes (as described in 2.1 program editing), and then make a new switch with the switch. The thermocontroler is programmed so that it first receives the furnace temperature information and then begins to execute its program against the received information, i. E. it is not necessary to run the program from the beginning, that is, it can continue to work from where it has gone before changing the segment values - by continuing to run the program with the already adjusted values of the next segments.

NOTE : If any of the segments enter a value less than 50, "End Pr" will be displayed on the display. As shown in Fig. 9

Figure 9

Other segments will not be read then
message when you press the Roll button another message appears - "Out 15" - which means the end of the program.
If after a while it is necessary to edit the current program so that it complements the other segments, it is necessary to go to the last segment of the program and be given a value greater than 50 by using the ▲ button. After, through the Roll button you can switch to the other segments that need to be adjusted to suit your needs. Once the last parameter of

the last 5th segment is set, press the button, which exits the edit function, and the stored information is saved.

2.2 Choosing the program

To select an already loaded program one of 10 possible or to make a new one first select the desired program number.
Do the following!

Press the Roll button the display will show TYPE 14 or TYPE 15 depending on the output being used, hold it for about 5 seconds, the PASS 0 prompt will appear.

Using the up and down buttons select pass pin 4 and press the button
The display will show
Prn 2

shows which program is active in memory

suggests that you can choose a new program.

2.3 Hysteresis

The chart below shows the regulation law.
Thermal regulator with one control relay or SSR with relay control and control Hysteresis.

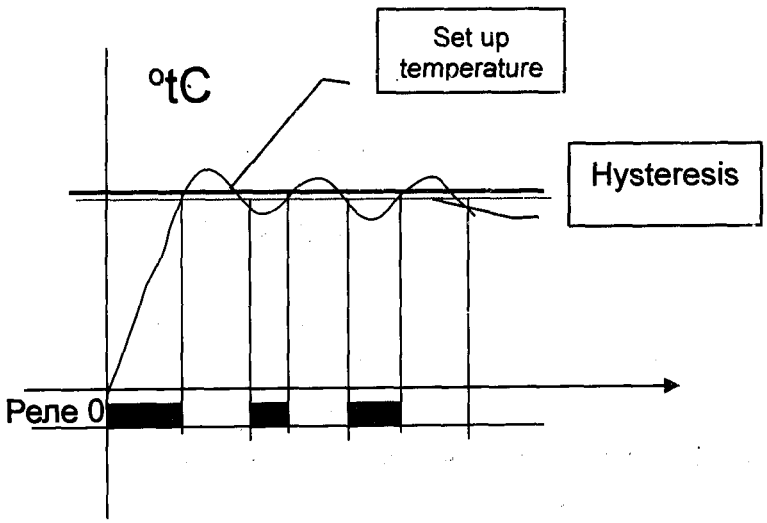


Figure 10

To set the hysteresis of the thermoregulator, proceed as follows.

Press the Roll button the display will show TYPE 15, hold it for about 5 seconds, the PASS 0 prompt will appear on the display.

Using the up and down buttons select pass pin 55 and press the button .

To change the hysteresis display HySt will appear.

Figure 11

Note that the controller will turn off the output when the temperature reaches the set value and will turn it on if the temperature drops below the set minus the set hysteresis.

To change the hysteresis value, use the ▲ up and ▼ down buttons to determine the desired hysteresis.

Once you have set the desired hysteresis, press the Set button to store in the volatile memory and return the controller to control.

NOTE:

If you have set 0 zero profile program. The thermoregulator converts from a profile to an ordinary one that maintains the set temperature.

You can set the temperature at any time you want.

Every time you first click on the Up ▲ or Down ▼ buttons тe the value of the measured temperature will change with the value of the set temperature.

With the Up ▲ or Down ▼ buttons set up your desired temperature.

Once you have set a new preset temperature and it takes a few seconds, the display returns to the measured temperature and the set will be stored in the non-volatile memory.

ADDITIONAL SAFETY INFORMATION

Recycling The tamper-evident receptacle on your product's controller, documentation, or packaging reminds you that all electrical and electronic products, batteries and accumulators must be transferred to a special collection point at the end of their service life. Always return your used electronic products, batteries, and packs to the collection points. Do not dispose of these products as household waste that is not subject to separate collection. This will help prevent uncontrolled waste disposal and help recycle materials.

Small Children Your controller and its accessories are not toys. They may contain small parts. Keep them out of the reach of small children.

WARRANTY

The thermo-controllers manufactured by Aprones Ltd. - Gabrovo are provided to customers with warranty support according to the terms and parameters described in the accompanying warranty card and these warranty terms. Warranty maintenance refers to defects occurring during the normal operation during the warranty period, subject to the manufacturer's instructions. A condition for performing warranty service is the absence of mechanical and thermal deformations of the product, undamaged warranty stickers.

This document certifies the warranty service or replacement and must be retained by the buyer until the warranty period expires. If warranty repairs are required, the warranty card must be provided. The warranty period starts running from the date of sale indicated on the warranty card. Repairs are carried out at the manufacturer's service center, and the transport of the device to the workshop is at the purchaser's expense (unless agreed otherwise).

NOT HONORED IN THE FOLLOWING CASES:

- in the event of damage due to poor transport, inappropriate storage, improper

installation and operation, non-compliance with the instructions in the accompanying documentation, non-grounding, malfunctions or major fluctuations in the electrical network; switching on a faulty or incorrectly connected electrical outlet; chemical, mechanical or other harmful effects; the occurrence of external objects in the product; natural disasters and force majeure, use of poor quality supplies, attempts to remove a defect from unauthorized persons, or other damages beyond the vendor are not subject to warranty service or removed on behalf of the customer.

- For activities intended to be carried out by the consumer (replacement of consumables, burnt fuses);

ТРАНСПОРТ, СЪХРАНЕНИЕ И ИНСТАЛИРАНЕ:

Стоките трябва да се транспортират само в оригиналната опаковка, в закрити превозни средства. Същите трябва да се съхраняват само в оригиналната опаковка, в закрити помещения, при следните условия: температура на въздуха от 0°C до 45°C; относителна влажност до 80% при 45°C; отсъствие на агресивни примеси в околната среда. Устройствата да се инсталират за работа в закрити помещения без агресивни примеси, на разстояние поне 20 см. от стената и 1 м. от отоплителните уреди, при температура на въздуха от 10°C до 45°C и относителна влажност до 80% при 45°C.

DELIVERY ITINERARY

The controller comes in a single package, accompanied by a user guide, a quality certificate, and a warranty card.