



Laboratory Equipment Manufacturer

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Controller

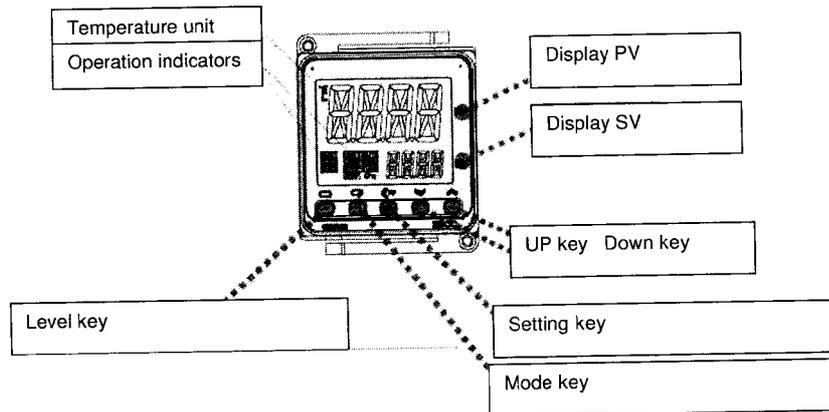
Operation Manual-Short VER. E5CC

PLEASE READ THIS MANUAL CAREFULLY BEFORE OPERATION

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1. Parts of the device and functions of the keys



«PF button: every push of the button changes the digit of the parameter being set

PV display the present temperature in the chamber of furnace or a symbol.

SV display the set temperature, a symbol or value of parameter.

OUT1 indicator shines when the heating elements are heating.

STOP indicator shines when the regulator is stopped.

Level key. This key switches on or off a level of adjustment.

Mode key. This key switches parameters.

Down key. Each pressing of this key reduces value of parameter or changes a symbol.

Up key. Each pressing of this key increases value of parameter or changes a symbol.

2. The control of device

The regulator has two levels of control: operating and adjustment.

Operating level is adjusted automatically at inclusion of device in a network. SV display info-line displays the set temperature, PV display info-line – present temperature in the chamber of furnace.

The level of regulation is used for setting of temperature control parameters.

When the voltage supply is off entered values of parameters remain.

3. Operating level

Parameters are switching by short pressing of parameters key. Values of parameters are adjusted by keys "down" ⏏ and "up" ⏏.

SP-M: displays temperature which should be in the chamber of furnace during set time.

For example: if the temperature in chamber should be 200 °C  displays:
If speed

of heating is switched off at a level of regulation the device does not display this parameter.

PRST: start of the program (status). If with "down" ⏏ or "up" ⏏ keys we will set:  program will be stopped. This is a "reset" status.

If we will set:  regulator will perform the set program and will switch off heating of furnace automatically. When the program is finished, in SV display the note " ENd ". is blinking. The device is required to be set on the "reset" status.

SKLR: displays the time (in minutes) till finish of heating. For example: if up to the end of program there are 5 minutes the device displays SKLR
5 If temperature in the chamber of furnace

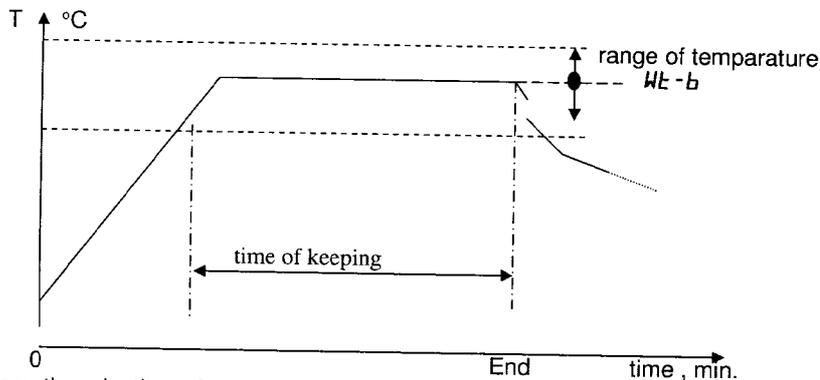
is not in the set range of temperature the certain time, this time is not included to the time of heating.

RS: heating switching on/off. If we will set: R-5
RUN (R-5
RSELE), furnace will heat up with the set speed to the fixed working temperature. Temperature will be constant until regulator will be switched off manually, set to R-5
STOP status. Parameter **RL-2** value

should be equal to furnace maximum temperature

4. Level of adjustment L.AdJ

Level of regulation is switching on/off by short pressing of the level key. Parameters are switching by short pressing of the parameters key. Values of parameters are setting by "down" and "up" keys.



RL: automatic selection of parameters (parameters of PID combination: P , τ , d) of temperature regulation (further in text: AT). If the temperature in the chamber of furnace changes and is unstable it is required to switch on AT. AT can be switched on only when regulator executes the program.

When AT is switched: RL
RL-2 or RL
RL-1 SV No.2 display is blinking. The regulator switches off AT automatically when selects parameters of PID combination. It is recommended to select P , τ , d parameters at operating temperature.

τNS: Movement of value of temperature which is shown on PV No 1display. It should be:

τNS
0.0

τNRE: temperature correction factor (multiplier). Its value must be value of the 1.000

τNRE
1.000

P : parameter of PID combination

τ : parameter of PID combination

d : parameter of PID combination

If parameters of PID combination are known, they can be entered manually or selected automatically (see AT). Parameters of PID combination depend on model of the furnace, operating temperature and loading.

$S\bar{o}Rk$: time of keeping, in minutes (see diagram). For example: if the keeping time is 20 minutes, the device displays: $\boxed{S\bar{o}Rk/20}$.

$Wt-b$: range of temperature, °C. The range of temperature is related to time of heating (see diagram), but not related to accuracy of adjustment of temperature. It is recommended to set a range of temperature on 10 °C $\boxed{Wt-b/10}$. In this case the time of keeping will be considered in

an interval of 10 degrees below and 10 degrees higher than the set temperature. At other values of temperatures the time is not included to the time of heating.

$SPRt$: speed of heating, °C/minute. For example: if the speed of heating is 5 °C/min, the device $\boxed{SPRt/5}$

displays . If the speed of heating is switched off (the device displays $\boxed{SPRt/off}$), furnace is heating up with the fastest speed.

Parameter $SPRt$ must be *SAME*.

$\bar{o}L-H$: the highest used power in percents. It should be 105.0 ($\boxed{\bar{o}L-H/105.0}$).

$\bar{o}L-L$: the lowest used power in percents. It should be - 5.0 ($\boxed{\bar{o}L-L/-5.0}$). If the value of $\bar{o}L-L$ parameter will be positive the furnace will be heated up even at the switched off regulator. $\bar{o}Rt$ parameter value should be 0.0 ($\boxed{\bar{o}Rt/0.0}$).

Notes:

1. If during 30 seconds any button will not be pressed, the device will automatically return to the initial status, it means: PV No.1 display displays present temperature in the furnace chamber, SV No.2 display – the set temperature.
2. Depending on furnace type some parameters could be not.