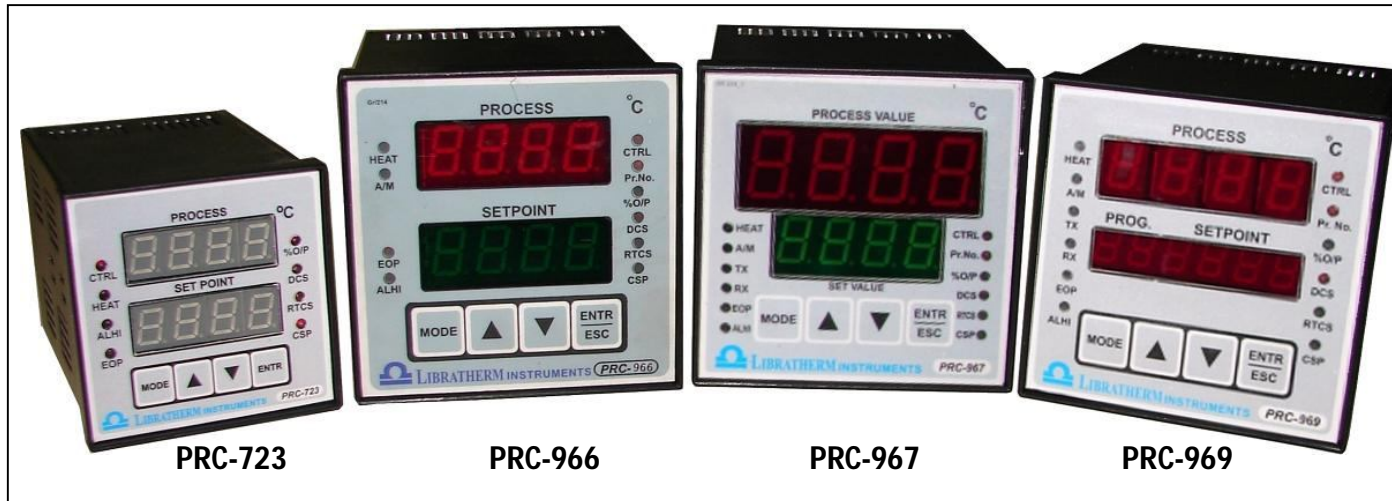


**Programmable Ramp / Soak PID Temperature Controllers**  
**(Microcontroller Based ECO Models)**  
**(Product Code 12.8 To 12.11)**



**Model Wise Descriptions:**

Sr. No	Model	Product Description
12.8	<b>PRC-723</b>	Single input Single Profile of 16 steps Ramp / Soak Programmable PID Temperature Controller (Basic Model)
12.9	<b>PRC-966</b>	Single input Single Profile of 16 steps Ramp / Soak Programmable PID Temperature Controller (0.5" Display size for PV/SV)
12.10	<b>PRC-967</b>	Single input Single Profile of 16 steps Ramp / Soak Programmable PID Temperature Controller (0.8" / 0.5" Display size for PV/SV)
12.11	<b>PRC-969</b>	Single input and 10 Profiles each of 16 steps Ramp / Soak Programmable PID Temperature Controller

**Description:**

Libratherm offers Microcontroller based multiple Ramp / Soak programmable PID temperature controller Models **PRC-723, PRC-966, PRC-967 and PRC-969**, which are designed to improve reliability, accuracy and control for all temperature control applications. It features Ramp and Soak functions (the capability to control the temperature and its rate of change over a predetermined time span). One to ten different patterns each of total sixteen (ramp/soak) steps can be programmed into the memory using the front panel keyboard. Separate displays are provided to monitor simultaneously the Process temperature, Set temperature and the Program number. It can also be used as single set point control when the profile control is not desired. Inputs can be Thermocouple, IR Thermocouple, RTD Temperature Sensors, Voltage, Current Signals and etc. Models with 2 inputs are also available to meet special purpose applications.

All the models offers both switching outputs in the form of SSR or relay to drive external load contactor and continuous control outputs in the form of (4-20)mA or (0-5)volt control signal, which can be used to control heater power through Thyristor power pack (for electrical heating system) or to control the position of a modulating motor valve (for oil or gas fired heating systems). The analog outputs can be directly connected to Libratherm make single phase / three phase SCR phase angle fired power controller which is ideally suitable for both resistive and inductive heating load. Additional 2 relays are also provided for time or temperature dependent event outputs as per the system requirement. The programmed profile and other parameters are retained in the nonvolatile memory in the event of power failure.

To monitor the on line temperature profile of the heating system, serial communication port on either RS232 or RS 485 interface can be optionally provided, the same can be connected to the computer. Libratherm provides the window based software to program the controller and to view the on line behavior of the heating system in both graphical and tabular format.

**Features:**

- ❖ Accepts standard type of thermocouple, RTD, Voltage or Current signal.
- ❖ Control output of Relay / TRAIAC / DC pulse / (4-20)mA / (0-5)Volt.
- ❖ Servo start from the current process temperature.
- ❖ 1 to 16 programmable ramp/soak steps.
- ❖ User programmable 10 different ramp/soak patterns in PRC-969 series.
- ❖ Retention of program in case of power failure.
- ❖ Automatic program resumption.
- ❖ Software password security lock for unauthorized tampering of the set and tune values.

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## Applications:

- ◆ Heat Treatment
- ◆ Wax Burn out furnace used in jewelry making
- ◆ Environmental Chambers
- ◆ Furnace / oven control
- ◆ PWHT cycle

## Technical Specifications:

Model	PRC-723-U PRC-723-F	PRC-966-U PRC-966-F	PRC-967-U PRC-967-F	PRC-969-U PRC-969-F
<b>Input -U (Universal)</b>	RTD(Pt-100) and Thermocouple (type J,K,R,S,B), V and mA (i.e. Maximum 8 user selectable inputs using keyboard and DIP switch on the back panel) in Universal model.			
<b>Input -F (Fixed)</b>	Any one factory set input as per user's requirement. It is not possible to change the type of input on the field.			
<b>Range</b>	Full +ve range of the selected input (please refer to the range selection table)			
<b>Resolution</b>	1 °C for thermocouples and 0.1°C for Pt-100 for V and mA inputs the display resolution is Subject to the required range. For V and mA input the position of the decimal point can be programmed.			
<b>Sampling rate / Display rate</b>	The input is sampled @40mS / the display is updated @1 second. The control loop is also executed @ 40 mS.			
<b>Indicating Accuracy</b>	+/- 1 °C for Thermocouple throughout the range and +/- 0.1°C for Pt-100 for (4-20)mA or (0-10)V - absolute to the linear input signal			
<b>Display (7-segment LED display)</b>	PV:4 digit 0.3" Red SV:4 digit 0.3" Red	PV:4 digit 0.5" Red SV:4 digit 0.5" Green	PV:4 digit 0.8" Red SV:4 digit 0.5" Green	PV:4 digit 0.5" Red SV:6 digit 0.3" Red
<b>Control Algorithm</b>	PID mode for heating control - (reverse action). Dual output available for direct and reverse control action. On/Off mode with programmable hysteresis.			
<b>Tuning</b>	Auto / Manual tuning of PID values.			
<b>PID values</b>	Proportional Band (P)= 0.0 to 100.0% of Span, Integral value (I)= 0.00 to 5.00 resets/minute, Derivative value (D) = 0.00 to 5.00 minutes, Cycle time (CYC) = 2 to 100 seconds and Hysteresis (HYS) = 1 to 99 °C			
<b>Control Outputs [Switching]</b>	Switching Outputs - DC pulse (0 to 10VDC@25mA) for external SSRs. Relay or Triac (AC SSR) (rated for 5A @230VAC) for external contactor.			
<b>Control Outputs [Analog]</b>	Analog Output (4-20)mA (RL max = 250 Ohms) or 0-5VDC (RL min = 10KOhms) with soft start and power limit function (% limit of final control output). <b>[Built in power on soft start (rt) = 1 to 100 seconds. Power Limit to restrict the analog control output = 1 to 100 %.]</b>			
<b>Ramp/Soak Steps</b>	1 to 16 Steps. (No restrictions in programming – a ramp can be followed by a ramp and a soak can be followed by a soak).			
<b>No of Programmers</b>	Single Profile	Single Profile	Single Profile	1 to 10 Profile
<b>Set Temperature</b>	Programmable for each steps in the full range of the specified input			
<b>Time per Step</b>	1 to 540 mins. (9 Hr. per step) or 1 to 99:59 hour min. (To be specified in ordering info.)			
<b>Program Hold Facility</b>	Manual Hold or Auto Hold (Hold back feature for guaranteed Ramp/Soak facility)			
<b>Remote Set point (Optional)</b>	External (4-20)mA input can be used to vary the set point in the range of manual mode. (Local or remote set point is user selectable – remote set point to be enabled for this feature)			
<b>Memory Backup</b>	Retention of PID and Set values in the built in non-volatile memory - in case of power failure and automatic re-execution of control on power resumption.			
<b>Retransmission Output (Analog)</b>	4-20 mA non-isolated, Linearized and proportional to the selected input type and range.			
<b>Alarm Outputs</b>	2 extra Relay Outputs with programmable hysteresis- can be used as High or Low Alarms.			
<b>Serial Communication (Optional)</b>	Optically isolated 2 wire RS485 on Modbus RTU protocol. (in Slave mode with programmable modbus address).			
<b>Supply</b>	90 to 240 VAC ( approx. 5VA), 50/60Hz.			
<b>Sizes ( w x h x d)</b>	72 x 72 x 120 mm		96 x 96 x 120 mm	
<b>Panel cut out</b>	68 x 68 mm +/- 0.5 mm		92 x 92 mm +/- 0.5 mm	
<b>Enclosure</b>	ABS plastic with polycarbonate front graphic.			

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### Input and Range Selection Table:

Code	Input	Range
A1	Universal : J,K,R,S,B,RTD, 4-20mA ,0-10VDC	Subject to input
A2	J type : Fe/Con thermocouple	0 to 760 °C
A3	K type : Cr/Al thermocouple	0 to 1372 °C
A4	R type : Pt/PtRh13% thermocouple	0 to 1768 °C
A5	S type : Pt/PtRh10% - thermocouple	0 to 1768 °C
A6	B type : Pt30%Rh/Pt6%Rh thermocouple	200 to 1820 °C
A7	T type : Cu/Con thermocouple	0 to 350 °C
A8	E type : NiCr/CuNi thermocouple	0 to 900 °C
A9	C type : W5%Re/W26%Re thermocouple	0 to 2300 °C
A10	D type : W3%Re/W25%Re thermocouple	0 to 2300 °C
A11	G type : W/W26%Re thermocouple	0 to 2000 °C
A12	N type : Ni-Cr-Si/Ni-Si-Mg	0 to 1300 °C
A13	Pt-100 (Alpha = 0.00385) DIN 43760	0.0 to 400.0 °C
A14	Pt-100 (Alpha = 0.00385) DIN 43760	-199.0 to 200.0 °C
A15	4-20mA	0 to 3500 unit
A16	4-20mA	-1500 to +2000 unit
A17	0-10VDC	0 to 3500 unit
A18	0 -10VDC	-1500 to +2000 unit

### Ordering Information:

Model	A- Input	B- Control O/P (OUT1)	C- Relay-1 (OUT2)	D- Relay-2 (OUT3)	E - Serial Communication
PRC-723	A1- (Universal Input)	B1- (DC pulse)	C1- (High Alarm)	D1- (High Alarm)	E1 - RS485
PRC-966		B2- (0-5) V	C2- (Low Alarm)	D2- (Low Alarm)	00- (None)
PRC-967	A2 to A18- (Single Fixed input)	B3- (4- 20) mA	00- (None)	D3- (End of Profile)	Optional at extra cost
PRC-969		B4- (DC pulse + 4-20mA) B5- (DC pulse + 0-5V)		00- (None)	

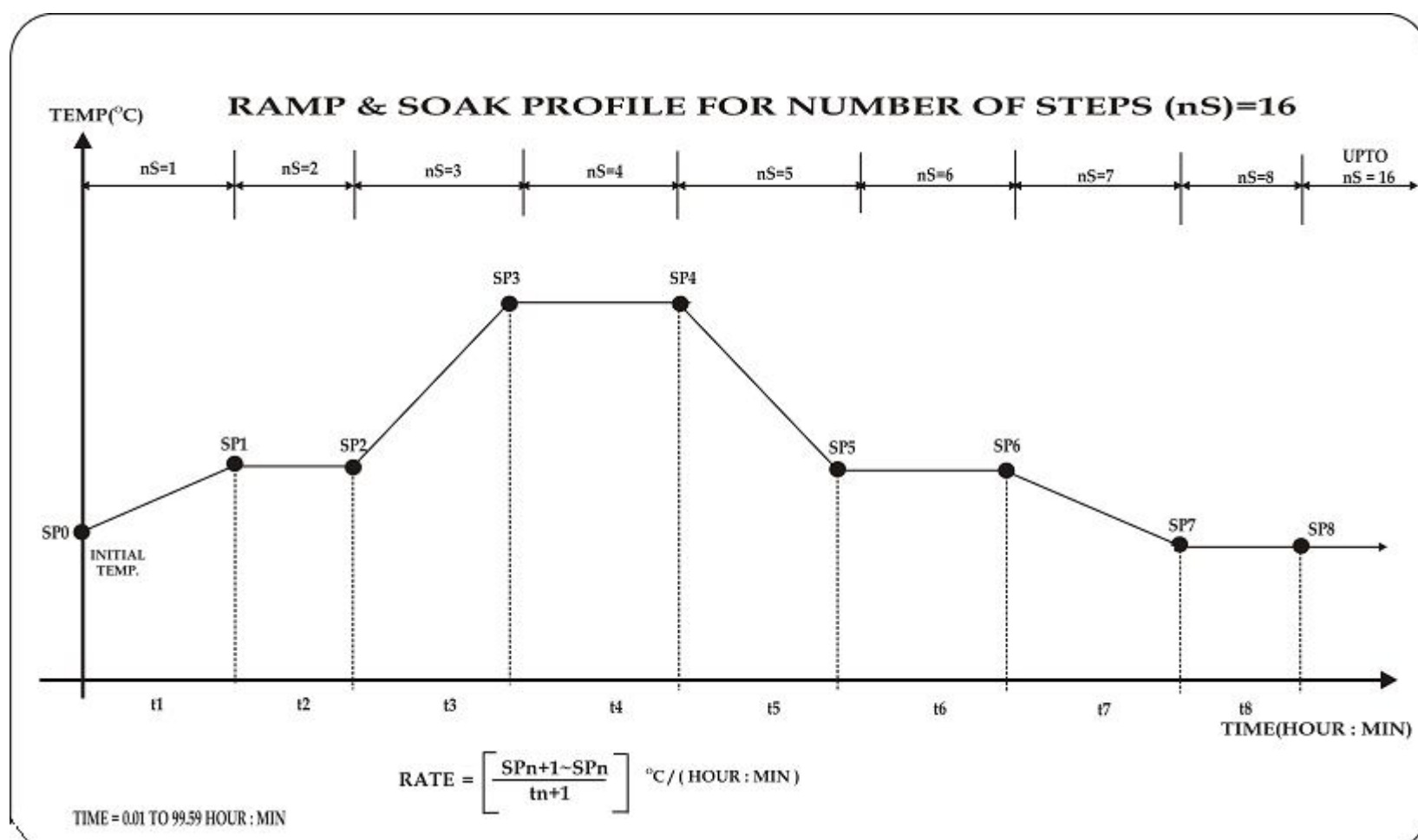
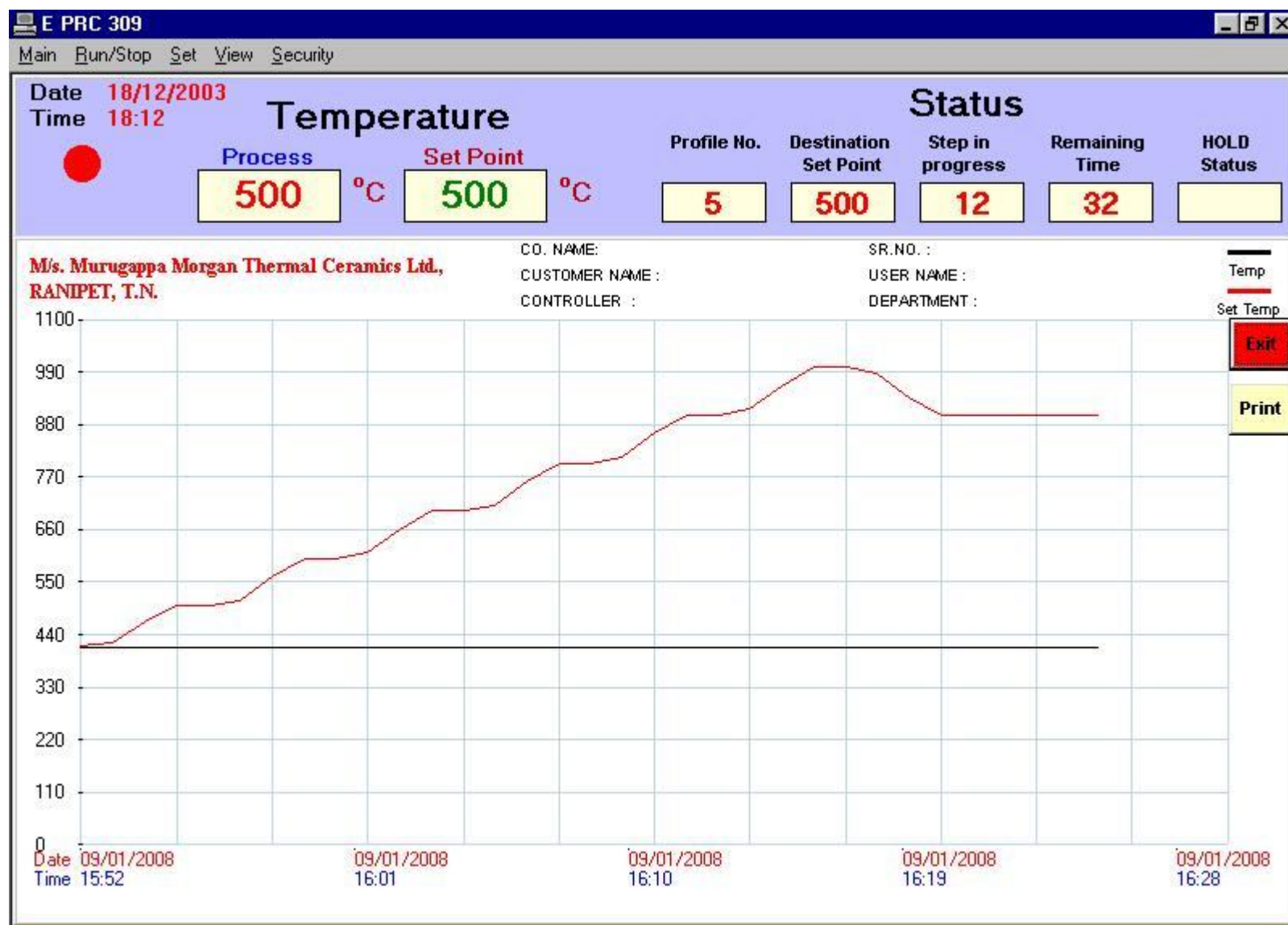
### Example:

Model	A- Input	B- Control O/P (OUT1)	C- Relay-1 (OUT2)	D- Relay-2 (OUT3)	E- Serial Communication
PRC-723	A3	B1	C1	D3	00
PRC-966	A2	B4	C2	D3	E1
PRC-967	A4	B2	C1	D2	00
PRC-969	A6	B5	C1	D3	E1

Example	Ordering Code	Description
1	PRC-723-A3-B1-C1-D3-00	Model PRC-723 with K type thermocouple input, DC pulse output to drive external SSR with High Alarm and End of Profile Relay outputs.
2	PRC-966-A2-B4-C2-D3-E1	Model PRC-966 with J type thermocouple input, dc pulse and 4-20mA current output with Low Alarm and End of Profile Relay outputs and RS485 interface.
3	PRC-967-A4-B2-C1-D2-00	Model PRC-967 with R type thermocouple input, 0-5V voltage output with High and Low Alarms.
4	PRC-969-A6-B5-C1-D3-E1	Model PRC-969 with B type thermocouple input, with dc pulse and (0-5) V output with high Alarm and End of Profile Relay outputs and RS485 interface.

**VARIOUS CONTROL PANELS USING PRC-723, PRC-966, PRC-969 & PRC-967:**

**EPRC-966 software** - designed to interface with our all models of Ramp/Soak controllers **PRC-723/PRC-966/PRC-967/PRC-969** to control the temperature of single heating zones. The software allows user to monitor the on line temp. on the computer screen, user can program the ramp and soak profile, feed the PID, Set Point and Program values or start and stop the profile through the computer keyboard, one can also view the real time values in graphical format which can be zoomed in and out or scaled as per the requirement. Database can be searched with date and time or other user defined fields. Software can be customized to monitor more than one controller on a single screen, selection options are provided to the user.



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