

## (G4) MICROPROCESSOR BASED MULTIZONE (8 ZONE) RAMP / SOAK PROGRAMMABLE PID TEMPERATURE CONTROLLER



### MODEL WISE DESCRIPTIONS :

SR.NO.	MODEL	DESCRIPTION
8.10	PRC-8000/X	Multi input Single or Multiple Ramp / Soak Programmable Profile PID Controller with Digital and /or analog output (X= 2,4,6,8)

#### DESCRIPTION :

Libratherm offers Microprocessor based Eight Zone PID Temperature indicator / Controller (Model PRC-8000) where accurate temperature control of multiple zone during Gradual Heating and Cooling is required. PRC 8000 is ideally suitable and is most economical as it eliminates the need for number of individual PID or ON/OFF Temperature Controllers required per zone. Each zone can be independently programmed for 16 steps of Ramp/Soak profile. Each loop parameters like PID, Hysteresis, Deviation Hold, Facility to skip unused channel etc can be programmed from the user-friendly front panel membrane keyboard. The programmed profile and other parameters are retained in the non-volatile memory in the event of power failure.

PRC 8000 accepts 8 Thermocouples or RTD(Pt-100)3 wire inputs and can provide switching PID or ON/OFF Control output in the form of DC Pulses or SSR or relay to drive external load contactor drivers for heating and cooling. It can simultaneously provide 8 analog PID control outputs in the form of (4-20)mA or (0-5)volt, 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.

Open or Faulty sensor indications for each zone is also displayed with the respective Zone No. It also provides common High and Low alarm relay outputs, which can be used for external temperature dependent, inter locking or audiovisual alarm. The display scan rate is programmable from 1 to 99 seconds, whereas the internal control scanning is at the rate of 100ms. Separate displays are provided to indicate

simultaneously the Process temperature, Set temperature and the channel / zone number. There is a provision to view on demand the on line status of the running program viz., Percentage control output, balance time of the current process, set point of current step, step no. in progress, etc. In case of power failure, the internal non volatile memory back up ensures automatic resumption of control from the last point on power resumption.

PRC-8000 is ideally suited for on line pre and post welding heat treatment cycle. Where the large size jobs are heated by local heating pads. Temperatures are sensed using 6 to 8 K type thermocouples fitted at different points. The common program is run for all inputs and to ensure the uniform heating cycle, the PRC-8000 offers special feature of common or individual deviation hold facility, thereby the guaranteed ramp/soak controlled is achieved. Libratherm offers ready to use panel with input/output and supply connections.

PRC-8000 can also be configured for controlling the average or uniform temperature of the large heating system, with maximum 8 sensors and 8 independent control outputs, following the common ramp/soak profile.

For graphical representation of the actual process in progress, duplex thermocouple can be used which can be connected to a multi point recorder. PRC-8000 is available in standard 1/2 DIN (192 x 96 x 200mm) for 8 zones, 6 zones or 4 zones. It operates on 230 VAC with built in high and low supply voltage trip circuits. It is also protected against industrial RFI/EMI Interference.

The serial interface of RS-485 in Modbus protocol is also available for operating the controller from remote computer, SCADA or DCS system and to monitor the process behavior in both graphical and tabular form along with the supporting. Windows based software.

**FEATURES :**

- ▶ Microcontroller based design.
- ▶ Eight zone - independent, uniform or average control
- ▶ Highly accurate and sturdy in operation.
- ▶ Accuracy better than  $\pm 0.1\%$  of the full scale.
- ▶ Accepts standard type of thermocouple or RTD(Pt-100)/2 or 3-wire input.
- ▶ Control output of Relay or TRAIAC or DC pulse or (4-20)mA or (0-5)Volt or any other.
- ▶ Servo start from the process temperature
- ▶ Deviation hold back facility (common or individual)
- ▶ Copying facility
- ▶ Facility to use as PID and / or ON / Off controller
- ▶ Hardware security lock for unauthorized tempering of the set values.
- ▶ 3 separate displays to display channel no, process temp. & Set temp.  
(Extra 6 digit display for real time clock for PC/Printer interface)
- ▶ Models with 2, 4, 6 & 8 inputs are available.
- ▶ 1 to 16 Ramp / soak steps individually programmable per zone.

**APPLICATION :**

- Heat Treatment
- Large ovens and furnace with multiple sensors
- Environmental Chambers
- Multi zone Stress relieving furnace
- Pre and Post welding heat treatment
- Tunnel furnace
- Normalizing furnace

**TECHNICAL SPECIFICATIONS:**

<b>No. of Input</b>	2, 4, 6, 8
<b>Input</b>	Thermocouple type J,K,R,S,B,C, D or RTD(Pt-100)/2 or 3-wire,(4-20)mA, (0-5)V etc. (each channel/zone can be same or different input type).
<b>Range</b>	Subject to the full range of the specified input.
<b>Resolution</b>	0.1°C for RTD and 1°C for thermocouple.
<b>Accuracy</b>	Better than $\pm 0.1\%$ of the specified range.
<b>Display</b>	2 digit 0.5" Red 7-segment LED display for Zone no. 4 digit 0.5" Red 7-segment LED display for process value 4 digit 0.5" Red 7-segment LED display for set value 6 digit 0.3" Red 7-segment LED display for real time clock and calander, when also interfaced to the computer.
<b>Tuning</b>	Manual tuning of PID values.
<b>Control Action</b>	PID or On/Off .
<b>CJC</b>	Built-in automatic from 0 - 50 °C for thermocouple input.
<b>Open Sensor Indication</b>	Display shows Flt-1 or Flt-2 and relays will be turned OFF.
<b>Settings</b>	Using front panel membrane keyboard to set the various values.
<b>No. Of Profile</b>	Single Program for each zone.
<b>Ramp Soak Steps</b>	1 to 16 Steps per program. (Common OR Independent for all the zones)
<b>Time per Step</b>	1 to 540 mins. (9 Hr. per step). Two or more steps can be combined for longer time duration. 1 to 100 hours per step can also be provided.
<b>Program Hold Facility</b>	Manual Hold or Auto Hold (Hold back feature for guaranteed Ramp/Soak facility).
<b>SSP Control</b>	When Ramp/Soak control is not required, facility for each zone to operate the controller in single set point mode is available.
<b>Copying Facility</b>	This facility allows Copying of Ramp/Soak profiles parameters of the 1 <sup>st</sup> zone to the all other available zones.
<b>Memory Backup</b>	Retention of PID and set values in the non-volatile memory in the event of power failure. On power resumption the program will resume automatically from the last set point.
<b>Alarm Output</b>	2 Extra Relay outputs can be used as High/Low or Deviation Alarms (Relay changeover contacts rated for 5A @ 230VAC)
<b>Control Output</b>	DC pulses to drive external SSR or external Triac card or (4-20)mA or (0-5)VDC with soft start and power limit facility for analog output signal. (Independent for each zone)
<b>Interface</b>	Serial (RS232/RS485) for PC interface with Window based software on Modbus ASCII Protocol
<b>Supply</b>	230VAC / 110 VAC $\pm 10\%$ (10VA), 50/60Hz or 24VDC @ 500mA.
<b>Size</b>	192 x 96 x 200 mm
<b>Panel cut out</b>	188 x 92 mm +/- 0.5 mm.
<b>Enclosure</b>	Metal Powder coated.

MODEL	INPUT (°C) (A)	RANGE (°C) (B)	NO. OF INPUTS (C)	OUTPUT TYPE PER CHANNEL (D)
PRC-8000	J (A1)	0 to 760 °C (B1)	4 Input (C1)	SSR (D1)
	K (A2)	to 1372 °C (B2)	6 Input (C2)	(0-5)VDD (D2)
	E (A3)	0 to 1000 °C (B3)	8 Input (C3)	(4-20)mA (D3)
	T (A4)	0 to 400 °C (B4)		
	S (A5)	0 to 1768 °C (B5)		
	R (A6)	0 to 1768 °C (B6)		
	B (A7)	200to1820°C(B7)		
	PT-100 (A8)	0.0to400.0 °C(B8)		
	Other (A9)	Other (B9)		

ALARM RELAY 1 (E)	ALARM RELAY 2 (F)	COMM. PORT (G)	SUPPLY (H)
High (E1)	High (F1)	RS 232 (G1)	230VAC (H1)
Low (E2)	Low (F2)	RS 485 (G2)	110VAC (H2)
None (E3)	None (F3)	None (G3)	

**EXAMPLE:**

MODEL	A	B	C	D	E	F	G	H
PRC-8000	A 2	B 2	C 4	D 2	E 1	F 2	G 2	H 1

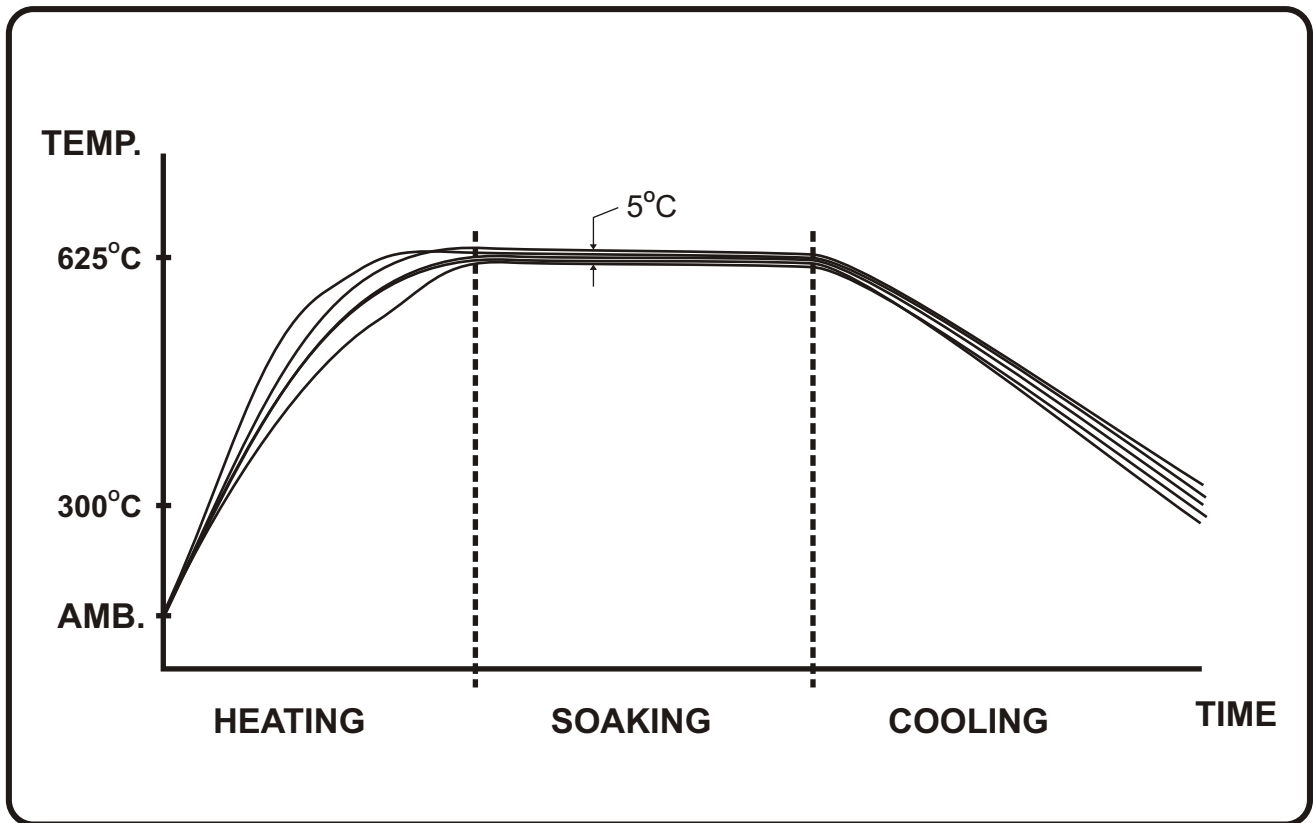
This is 8 Channel / Zone controller Model PRC-8000 with 8-K type thermocouple input having range (0-1372)°C with (0-5)VDC output per channel and High & Low Alarm Relay output with RS485 Communication and Operating on 230VAC supply.

**NOTE:** For different type of inputs please mention the type of inputs required as explained in the example given below.

**EXAMPLE:**

MODEL	A	B	C	D	E	F	G	H
PRC-8000	(1,2,3,4) - A 2 (5,6,7,8) - A 8	B 2 B 8	C 4	D 1	E 1	F 2	G 1	H 1

This is 8 Channel/Zone controller Model PRC-8000 with 4-K type thermocouple input having range (0-1372)°C & 4-RTD(Pt-100) type input having range (0.0-400.0)°C with SSR output per channel and High & Low Alarm Relay output with RS232 Communication and Operating on 230VAC supply.



#### VARIOUS CONTROL PANELS USING PRC-8000 CONTROLLER

