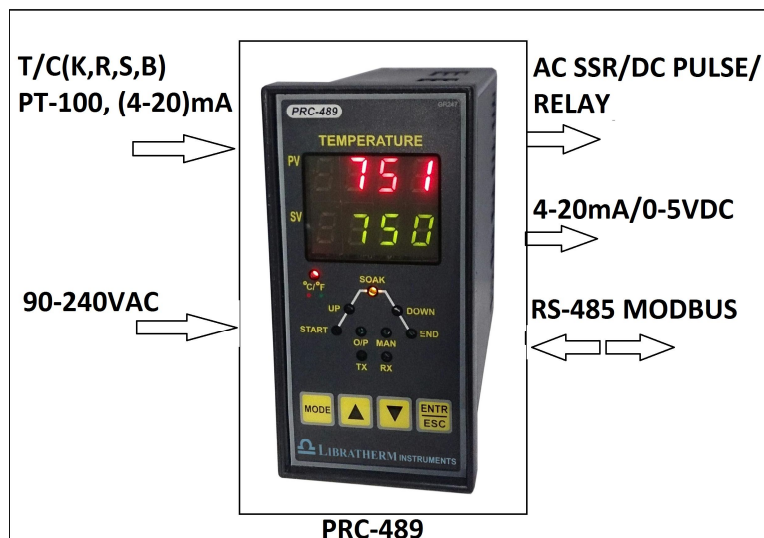


## Programmable Ramp / Soak PID Temperature Controller for PWHT/SR Heating cycle (model PRC-489)



### Model Wise Description:

Model	Description	Size w x h x d (mm.)
PRC-489	Single input, Single profile of 16 steps Ramp / Soak Programmable PID/On-Off Temperature Controller	48 x 96 x 110

### Description:

Libratherm offers Microcontroller based multiple Ramp / Soak programmable PID temperature controller Model **PRC-489** which is 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). Single pattern of total 16 (ramp/soak) steps can be programmed and stored in the memory. It can also be used as single set point control when the ramp/soak profile control is not desired. Inputs can be Thermocouple, IR Thermocouple, RTD Temperature Sensors, Voltage, Current Signals etc.

PRC-489 offers both switching outputs in the form of SSR driver/Triac (AC SSR) for external SSR or external load contactor and analog output in the form of (4-20) mA or (0-5) volt control signal, which can be used to control heater power through Thyristor power regulator (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 or zero cross over fired power controller which is ideally suitable for both resistive and inductive heating loads.

Additional one/two 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. In case of thermocouple break, the control can be transferred to manual mode to continue the heating cycle and user can alter the % of control output. The deviation hold feature assures guaranteed ramp. For quick heating from ambient temperature the hold feature is disabled in the very 1<sup>st</sup> ramp. Front Panel LED indicates start and end of the cycle, the status of heater output, status of heating ramp, soaking or cooling ramp. The unit of temperature measurement can also be selected as °C or °F as desired.

To monitor the on line temperature profile of the heating system, RS 485 serial communication 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 cycle in both graphical and tabular format. **The same RS485 interface is used for Master/Slave programming as shown below.**

### 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 with rate programming facility.
- ❖ Master / Slave concept with 1 master and max. 30 slaves.

### Applications:

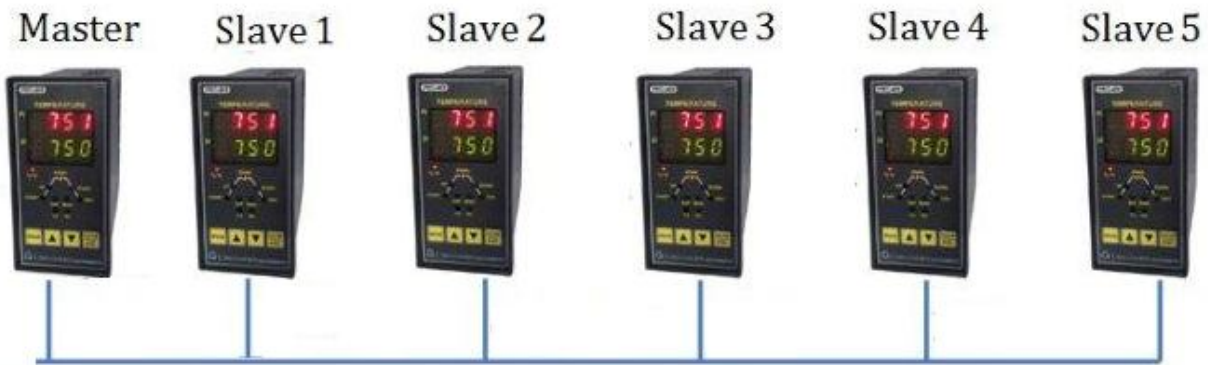
- Furnace / oven control
- PWHT and SR heat treatment cycle

### Technical Specifications:

<b>Input -U (Universal)</b>	J, K, R, S, B type thermocouple, RTD(Pt-100)/3 wire, 4-20mA (User can select any of these inputs through front panel keyboard).
<b>Input -F (Fixed)</b>	Any one factory set input as per user's requirement – as per the input selection table given below.
<b>Range</b>	Full +ve range of the selected input (please refer to the range selection table)
<b>Resolution</b>	1°C/1°F for thermocouples and 0.1°C/ °F for Pt-100 (User selectable unit of measurement °C or °F)
<b>Indicating Accuracy</b>	+/- 1 °C for Thermocouple throughout the range and +/- 0.1°C for Pt-100 for (4-20)mA absolute to the linear input signal
<b>Display</b>	4 digit 0.25" Red 7-segment display for process variable. 4 digit 0.25" Green 7-segment display for set value and PID parameters
<b>Output Indication</b>	Front Panel LED indications for SSR output. % Control Output and for Alarm status and status of heating, cooling and soaking
<b>Control Algorithm</b>	PID or ON/OFF selectable (when specified for switching output).
<b>Open sensor indication</b>	<b>OPEn</b> flashes on the display and control action is turned off – or control can be transferred to manual mode and power can be adjusted through keyboard from 0 to 100%.
<b>Tuning</b>	Manual tuning of PID values.
<b>PID Values</b>	Proportional Band (P)= 0.0 to 100.0% of Span, Integral (I)= 0.00 to 5.00 resets/minute, Derivative (D) = 0.00 to 10.00minutes, Cycle Time = 2 to 100 seconds. Hysterisis = 0 to 100oC, Soft start or Ramp time (rt) = 2 to 99 seconds Power Limit (PL) = 0 to 100%. Deviation Hold (dHLd) = 0 to 50oC (0= no auto hold)
<b>Settings</b>	Using front panel feather touch (tactile) key board to set various parameters.
<b>Control Output</b>	DC pulse to drive external SSR b) Triac(AC switch) 2A @ 250VAC to drive external relay or contactor coil and c) 4-20mA/0-5VDC to drive external thyristor power controller.
<b>Ramp/Soak Steps</b>	1 to 16 Steps
<b>Ramp rate (Pr)</b>	1°C/hour to 1200°C/hour (for K type t/c)
<b>Soak Temperature (PL)</b>	Programmable for each steps in the full range of the specified input

<b>Soaking Time (Pd)</b>	1 minute to 99Hour.59Min.
<b>Program Hold Facility(dHLd)</b>	Manual Hold or Auto Hold (Hold back feature for guaranteed Ramp/Soak facility). dHLd = 0 for 1 <sup>st</sup> ramp.
<b>Alarm Output</b>	Relay Output with programmable hysteresis- can be used as High or Low Alarms or End of Profile relay.
<b>Master / Slave</b>	User programmable as Master or Slave for multi-zone control
<b>Serial Communication (Optional)</b>	Optically isolated 2 wire RS485 -Modbus RTU protocol – for both master and slave (in Slave mode with programmable slave ID)
<b>Supply</b>	(90-250)VAC, 50/60 Hz
<b>Size</b>	48w x 96h x 110d mm.
<b>Panel Cutout</b>	45 x 92 mm. +/- 0.5 mm.
<b>Enclosure</b>	ABS plastic with polycarbonate front graphic.

Note : Technical specifications are subject to change due to continuous product up gradation at the discretion of manufactures.  
For any special requirement please contact us.



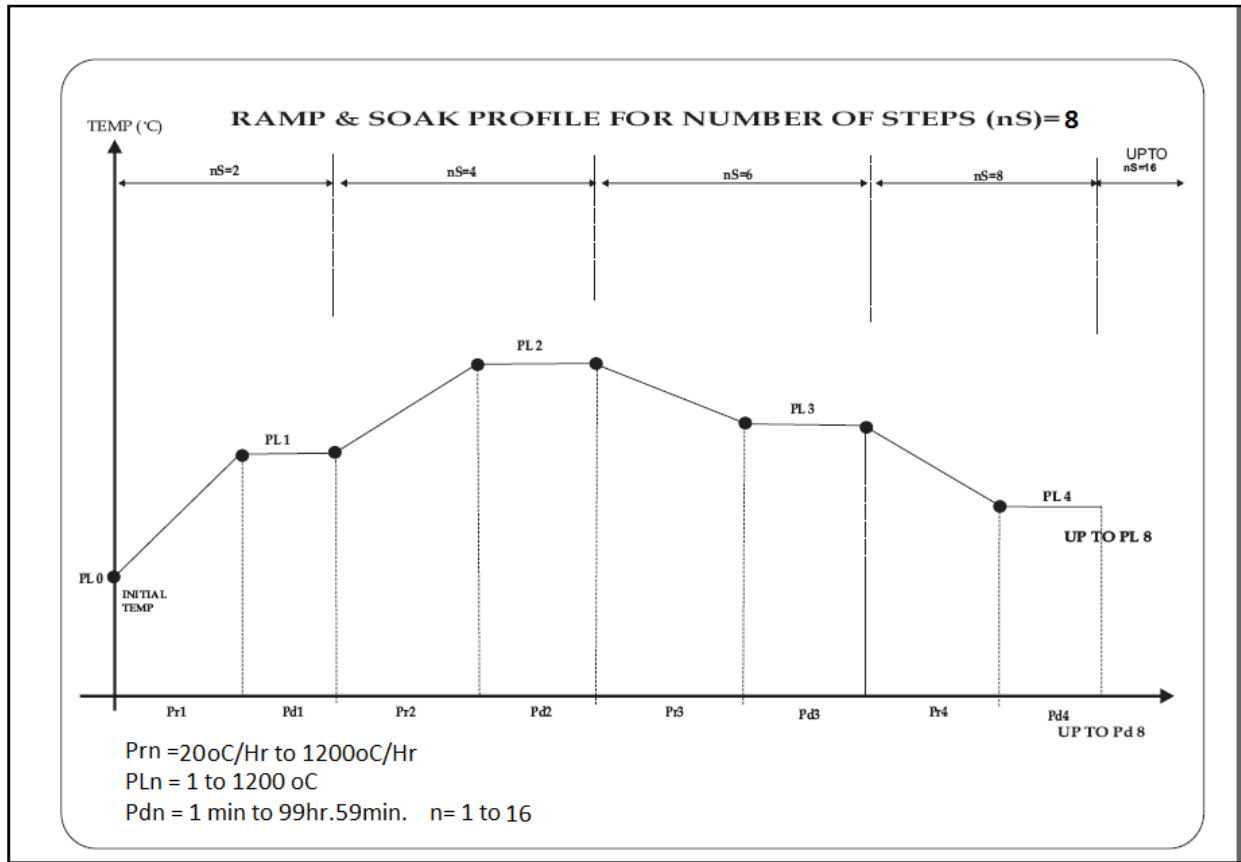
**MASTER / SLAVE ON RS485 BUS**

Master and Slave programming facility allows user to program one of the controller as master and rest all as slaves. The slave controllers will follow the ramp/soak profile programmed in the Master controller. This concept is useful for uniform and synchronized heating of all the zones.

**Input and Range Selection Table:**

Code	Input	Range
A1	Factory set to 4 universal inputs marked (*) below : A2,A3,A4,A5	<b>Subject to input type</b>
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	Pt-100 (Alpha = 0.00385) DIN 43760	0.0 to 400.0 °C
A8	4-20mA	0 to 4000 unit

**Ramp/Soak Profile:**



**Ordering Information:**

Model	A- Input	B- Output	C – Retransmission	D – Alarm Relay	E- Serial Interface
PRC-489-U PRC-489-F	A1- (Factory set to 4 inputs)  A2 to A8- (Any one Single Fixed input)	B1- (DC Pulse) + Triac(*) B2- (4-20 mA) B3- (0-5)VDC B4- (DC Pulse + Triac + (4-20 mA) B5- (DC Pulse + Triac + (0-5V)	C1- (4-20mA) 00- (None)	D1- (High Alarm Relay)  D2- (Low Alarm Relay)  D3- (Com. High / Low Alarm Relay)  D4- End of Profile Relay)	E1- (RS485) 00- (None)  will be provided only if master/slave programming facility is required or if the computer interface is required.

(\*) Triac: Is a solid state AC switch

**Example:**

Model	A- Input	B- Output 1	C – Retrans.	D - Alarm	E- Serial Interface
PRC-489-U	A1	B2	C1	D1	E1
PRC-489-F	A3	B1	00	D4	00

Model	A- Input	B- Output 1	C- Retrans.	D- Alarm	E- Serial
PRC-489-U	A1	B2	C1	D1	E1
PRC-489-F	A3	B1	00	D4	00

Example	Ordering Code	Description
1	PRC-489-U-A1-B2-C1-D1-E1	Model PRC-489-U with Universal Input(A1), 4-20mA PID output , retransmission of (4-20) mA output proportional to input, with High Alarm relay output and RS485 interface
2	PRC-489-F-A3-B1-00-D4-00	Model PRC-489-F with Fixed K type thermocouple input, with DC pulse + Triac output and end of profile relay.

**ON LINE CONTROL USING MASTER/SLAVE PROGRAMMING CONCEPT**



Libratherm offers ready to use 3 to 12 zone handy and customized control panel for PWHT/SR cycle - duly wired with **a)** per zone zero cross over single phase thyristor rated for max. 80A load @ 40 to 240VAC **b)** Auto/Manual control **c)** Thermocouple plug sockets for controller as well as for external recorder **d)** 3 pole MCB **e)** Aux. supply mains cord **f)** Indicating lamps **g)** heavy duty plug socket for heater connection. For techno-commercial information please get in touch with our sales team.