OPERATING MANUAL

FOR

MICROPROCESSOR TEMPERATURE CONTTROLLER
NEWCHROM MODEL - 6800

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INTRODUCTION:

On-off PID controllers are used to efficiency control the temperature of a process. 6800 is a PID four channel temperature controller for "RTD-PT100" type input. 6800 incorporates four heat outputs (SSR). The maximum load permissible on each heater output is 400W, except for channel O-Max. Load can be upto 1000W. 6800 features programmable parameters like set point, hold time, rate of rise, overshoot limit relative to the set point, the proportional band, the integral time parameters are programmable and stored in the nonvolatile memory for retention during power off.

6800 incorporates twenty characters by four line backlighted LCD display. It also features five LED's for indicating the heater output status (On/Off) for the four channels and the alarm led indication.

6800 features calibration of the temperature by the keypad. The temperature range is 000.0 ºC with to 450 ºC with a resolution of 0.1 ºC. The controller incorporates Sixteen keys on the front for start, reset and hold of the profile for channel 1 (0) and for the programming of the parameters and calibration of temperature input.

6800 is ideal for "GC" control function. Channel # 1- "O" of 6800 can be used for nine step profile control. 6800 incorporates a digital input for door switch (Potential free contact). If the door switch is OFF then the control output of channel # 1 is put off. If the door switch input is ON (Door close) then the controller controls the temperature of channel # 1 as per the set point with respect to the cycle programmed in level 1. if the star key is pressed and the temperature input of channel # 1 is within +/- 5.0 ºC /min respectively, or at the end of step 9.

The controller 6800 is housed in a double din Table Top type enclosure operating on mains 230 V AC.

The rear plate of the controller provides the connection for mains input, heater output (in a 16 Pin Connector). The unit has separate fuse holders for the four heater control outputs, separate fuse for the internal electronics. The unit has a 15 Pin "D" Connector for RTD Sensor and door switch inputs, relay output and remote start output.

All the parameters programmed by user are stored in a nonvolatile memory and are not disturbed even in a power off condition. The PID parameters are set, so that the controller can control the actual temperature to the set value within +/- 0.3 ºC. Do not change the PID parameters, this may control of temperature.

The controller is already calibrated for the "RTD-PT100" type input over the range of 000.0 ºC to 450 ºC.

SPECIFICATIONS:

- ✓ Micro controller based intelligent unit.
- ✓ Four Channel PID Temperature Controllers.
- ✓ "RID-PT100" type Sensor input.
- ✓ 000.0 ºC to 450 ºC.
- ✓ Four line by twenty character background LCD display, for actual/set temperature, oven door status, profile cycle status and isotherm ready / not ready status for profile cycle start.
- ✓ Four LED indication for heater output on/off.
- ✓ LED indication for alarm (sensor fail) with inbuilt Buzzer.
- ✓ LED indication for Ready, Not Ready, Run, Oven Cool, Event 1 & Event 2 Output.
- ✓ Resolution ºC.
- ✓ On/Off type PID control with solid state relay output.
- ✓ During sensor open-output off and "So" indication on display.
- ✓ During sensor short-output off and "SS" indication ON display.
- ✓ Overshoot-output off.
- ✓ Control output through solid state relay-230 V AC, 1 AMP, Resitive load for channel I, load for channel I, For and T.
- ✓ Control output for channel O-230V AC, 5 AMP.
- ✓ Control off on overshoot limit –programmable from 0.1 ºC to 99.9 ºC.
- ✓ Programming of parameters-by keys on the front.
- ✓ Start, Hold and Reset key functions for the profile control for channel # 1 "O".
- ✓ Channel # 1 –can be configured for profile control for a max nine steps (Each step has-setpoint, Hold time and rate).
- ✓ Ten different methods can be stored and selected with different set point and profile cycle.
- ✓ Non-volatile memory for parameter storage during power off.
- ✓ Buzzer for sensor fault, start and end of profile cycle indication.
- ✓ Power supply-230 V AC 50Hz, +/- 5%.
- ✓ Mains on-off switch on the Back of the Panel.
- ✓ Dimensions – 200 (W) x 200 (H) x 340 (D) mm.
- ✓ Individual fuses for the heater output (Max 5 A Rating).
- ✓ Separate fuse for the unit 6800 (Rating 7 A).

FRONT PANEL DESCRIPTION:

NINE KEYS:

Menu	**:**	Menu key to enter the program mode for programming the parameters and calibration of temperature inputs (RTD-PT100).
Up	**:**	Up arrow key to increment the different pages during programming / calibration.
Down	**:**	Down arrow key to decrement the different pages during programming /calibration.
Start	**:**	To start the Heating of All Channels.
Stop	**:**	To stop the Heating of All Channels.
DIG Run	**:**	To start the profile control for channel 1 (Oven).
Reset	**:**	To stop the profile cycle manually.
Esc	**:**	To end the programming OR calibration mode and to save the change parameters in the required method.
Enter	**:**	To enter and save the change parameters value.
Numeric Key	**:**	For setting the value of required Temperature, Method, Hold Time and Rate of Heating as per requirement..

LED INDICATIONS: Four LEDS for heater output status of channel "O, I, F and T" to indicate the output on or off.

One LED for alarm –sensor open or short or overshoot.
One LED for Ready Status.
One LED for Not Ready Status.
One LED for Oven Cooling Status.
Two LED for Event1 and Event2 Output.

DISPLAY: Twenty character by four line backlighted, wide angle view LCD display.

First Line : Display for setpoint and actual temperature of channel # 1 (Oven) also display of ready/not ready status for isotherm heating of channel oven.

Second Line : Display for setpoint and actual temperature of channel # 2 (INJ), also display of profile for oven channel starts.

Third Line : Display for setpoint and actual temperature of channel # 3 (FID), also display of method number being used of the ten methods (0-9).

Forth Line : Display for setpoint and actual temperature of channel # 4 (TCD), also display of door status open or closed for oven channel.

CHANNEL NOMEMCLATURE:

Channel # 1 – is called the "OVEN" Channel and is displayed as "O"
Channel # 2 – is called the "INJECTOR" Channel and is displayed as "I"
Channel # 3 – is called the "F.I.D." Channel and is displayed as "F"
Channel # 4 – is called the "T.C.D." Channel and is displayed as "T"

POWER UP STATUS:

The controller when connected to mains supply from the rear side and the switch turned to the on position-then the display of the controller for two seconds reads.

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RAM CHECK: 1 FFF

The controller is checking the RAM.

After two seconds the display reads the set and control and actual temperature for all the four channels "O", "I", "F" and "T". It also reads the oven door status, the method no being used from the ten methods (0-9) and the ready/not ready status for the isotherm heating of channel "O". **This is the main of the controller.** On power on the profile cycle is always in reset (Stop) mode. By pressing Start Key the controller 6800 now starts heating the all four channels by PID action and maintains the temperature of all the four channels as per the set temperature. **For the channel "O" the set temperature used is step 0 set temperature (isotherm heating). If the actual temperature for the channel "O" is within +/- (As per define Ready Temperature limit i.e. +/- 0.1 ^{o}C – 5.0^{o}C) of the step 0 set temperature then the right side of first line of the display reads "Ready". The actual temperature is not within +/- set limit of the temperature (Step 0) then the right side of the first line of display reads "Notrdy".**

If the first line of the display reads "Notrdy", then the profile cycle will not start for the oven channel.

DOOR STATUS OF THE OVEN:

If the door of oven is open-then the right side of the forth line of display reads-**"D-op" for door open.**

If the door is open then the heat output only for channel "O" is stopped.
("O" LED and heat output for channel "O" off). If the profile for the channel oven is on and the door is open then the profile cycle is stopped (Reset) and the heating for channel oven is stopped.

"D-cl" for door close.

If the oven door is close then the controller starts heating control for channel "O" – to the step 0 set temperature (Isotherm).

FAULT INDICATION:

If the RTD-PT100 Sensor input is open then the display for that particular channel reads the temperature 450.0 ºC and the message "So" (Sensor Open). The massage and the temperature value are toggled every one second till the sensor fault exists, and the output is also kept off. On the sensor becoming normal the message of "So" is stopped.

If the RTD-PT100 Sensor input is short then the display for that particular channel reads the temperature -50.0 ºC and the message "SS" (Sensor Short). The message and the temperature value are toggled every one second till the sensor fault exits and the output is also kept of. On the sensor becoming normal the message of "SS" is stopped.

During the sensor fail condition of any of the four channel, or if any channel is in overshoot status (Actual temperature above **Set + Overshoot** temperature limit) the Buzzer is kept on and remains on till sensor fail status exists.

If the sensor input is O.K. and the actual temperature is greater than the sum of the set temperature and the overshoot value then the heater output of that channel is put off till the actual temperature becomes less than the sum of the set temperature and the overshoot value.

START FUNTION FOR PROFILE OPERATION:

6800 – Controller for the channel # 1 (Oven) – incorporates a nine step profile control. On power ON, If before the last power OFF, the controller was in profile cycle then the profile cycle control is reset (Stopped).

When the profile control cycle is not ON, the controller either controls at set temperature programmed at step 0, if the door is close. If the door input switch is off (Door Open) then the heater output for channel # 1 (Oven) is put off. If the door input switch is on (Door Close) then the controller controls the input of channel # 1 to the set temperature of step 0 (0 SP).

Irrespective of the door input, or the start operation, the remaining three channels of the 6800 controller are controlled at their set points respectively as programmed in level 1 of the parameter programming.

If the start key is pressed and the profile cycle control is off, then the controller looks for the foll three conditions before starting the profile cycle. If none of them is satisfied the profile cycle is not started and a message is displayed as per the error type.

a). Check for the door input switch. If ON (Door Close) then cycle can be put ON. Else display reads the message on the display **Door Open.**

b). Check if step 1 setpoint is greater than step 0 setpoint. If yes then start cycle. Else display message on the display **Step Error.**

c). Check if the present process temperature of channel 1 is within +/- 5.0 ºC of the step 0 set temperature. Yes then start cycle. (Ready condition for isotherm heating) else display message ON the display **Not Ready.**

Once the profile control cycle is started it stops if

a). Any time in between the door is opened (Door switch input off). The profile control cycle is stopped.

b). If the next step rate is 00 ºC /min then the profile cycle is stopped.

c). If the **Reset** key is pressed then the profile cycle is stopped.

PROGRAMMING OF THE STEP SET POINT, STEP TIME AND STEP RATE:

For channel No. 1–"O"– 6800 incorporates a nine step profile control. There can be ten such method programmed, numbered from 0-9. Each method can have different set point and profile steps. By pressing the Menu key, user is able to program the parameters for the method No. already selected.

When the profile control is off and door switch input is on (Dorr Close) then the controller controls the temperature of the channel "O" to the set point of step 0.

When the profile cycle is started ON pressing the start key – then the controller controls the temperature of channel "O" by the profile step programmed.

To program the set temperature for channel I,F,T, and the profile step for channel "O":-

LEVEL 1:

STEP NO.	KEY PRESSED	DISPLAY	DESCRIPTION
1.	**MENU**	First Line shows Programme Massage Second Line shows Method No.	Press the key continuously till the display reads. Press **[ENTER]** select Method No.: 0 – 9 by pressing **[NUMERIC KEY]** press **[ENTER]** Press Menu Key Press Up **[↑]** Arrow Key to select the required Option Page and Press **[ENTER]** Key then required Option Page appear on the Screen.
2.	**PAGE NO.: 4**	**PROGRAMME SET POINT** **METHOD NO.: 1** **CHANNEL INJECTOR : 120^{O}C** **SET TEMP.: ^{o}C**	The Upper line reads the Programme Massage second line read Method No., Third line read Channel Name and Low line read the Set Temperature.

Press the Numeric key to program the set temperature value as required in ºC for the channel "I".

3.	**PAGE NO.: 5**	**PROGRAMME SET POINT** **METHOD NO.: 1**	The Upper line reads the Programme Massage second line

		CHANNEL F.I.D. : 110^{O}C **SET TEMP.: ^{o}C**	read Method No., Third line read Channel Name and Low line read the Set Temperature.

Press the Numeric key to program the set temperature value as required in ºC for the channel "F".

4.	**PAGE NO.: 6**	**PROGRAMME SET POINT** **METHOD NO.: 1** **CHANNEL T.C.D. : 150^{O}C** **SET TEMP.: ^{o}C**	The Upper line reads the Programme Massage second line read Method No., Third line read Channel Name and Low line read the Set Temperature.

Press the Numeric key to program the set temperature value as required in ºC for the channel "T".

5.	**PAGE NO.: 7**	**PROGRAMME MASSAGE** **METHOD NO.:1 STEP NO.: 0** **CHANNEL NAME: OVEN** **SET TEMP.: ^{O}C**	The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name OVEN and low line read the Set Temperature.

Note: For channel "O" – when the controller is not in the profile cycle and the door switch is ON (Door Close), then the controller controls the temperature of channel "O" to this set point (Step 0).

To program the step 0 set temperature for the channel "O", press the Numeric keys.

6.	**PAGE NO.: 8**	**PROGRAMME MASSAGE** **METHOD NO.:1 STEP NO.: 0** **CHANNEL NAME: OVEN** **HOLD TIME:**	The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Hold Time.

To program the step 0 hold time for channel "O", press the Numeric keys from 00.0 to 99.9 min.

7.	**PAGE NO.: 9**	**PROGRAMME MASSAGE** **METHOD NO.:1 STEP NO.: 1** **CHANNEL NAME:** **RATE: ^{O}C/MIN.**	The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Rate.

Program the rate for step 1 to the desired value by pressing the Numeric keys from 00 to 60 ºC /min. The rising part of the step 1– is controlled as per the rate programmed. When the current set temperature becomes equal to OR greater than the step 2 set temperature then-step 2 hold time starts. If the rate programmed at this step is 00 ºC /min then the profile cycle ends here.

8.	**PAGE NO.: 10**	**PROGRAMME MASSAGE** **METHOD NO.:1 STEP NO.: 1** **CHANNEL NAME: OVEN** **SET TEMP.: ^{O}C**	The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name OVEN and low line read the Set Temperature.

To program the step 1 set temperature for channel "O", press the Numeric keys.

9.	**PAGE NO.: 11**	**PROGRAMME MASSAGE** **METHOD NO.:1 STEP NO.: 1** **CHANNEL NAME: OVEN** **HOLD TIME:**	The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel

Name and low line read the Hold Time.

To program the step 1 hold time for channel "O", press the Numeric keys from 00.0 to 99.9 min.

10. **PAGE NO.: 12**
PROGRAMME MASSAGE
METHOD NO.:1 STEP NO.: 2
CHANNEL NAME:
RATE: ^{O}C/MIN.

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Rate.

Program the rate for step 2 to the desired value by pressing the Numeric keys from 00 to 60 ºC /min. The rising part of the step 2– is controlled as per the rate programmed. When the current set temperature becomes equal to OR greater than the step 2 set temperature then-step 2 hold time starts. If the rate programmed at this step is 00 ºC /min then the profile cycle ends here.

11. **PAGE NO.: 13**
PROGRAMME MASSAGE
METHOD NO.:1 STEP NO.: 2
CHANNEL NAME: OVEN
SET TEMP.: ^{O}C

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name OVEN and low line read the Set Temperature.

To program the step 2 set temperature for channel "O", press the Numeric keys.

12. **PAGE NO.: 14**
PROGRAMME MASSAGE
METHOD NO.:1 STEP NO.: 2
CHANNEL NAME: OVEN
HOLD TIME:

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Hold Time.

To program the step 2 hold time for channel "O", press the Numeric keys from 00.0 to 99.9 min.

13. **PAGE NO.: 15**
PROGRAMME MASSAGE
METHOD NO.:1 STEP NO.: 3
CHANNEL NAME:
RATE: ^{O}C/MIN.

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Rate.

Program the rate for step 3 to the desired value by pressing the Numeric keys from 00 to 60 ºC /min. The rising part of the step 3– is controlled as per the rate programmed. When the current set temperature becomes equal to OR greater than the step 3 set temperature then-step 3 hold time starts. If the rate programmed at this step is 00 ºC /min then the profile cycle ends here.

14. **PAGE NO.: 16**
PROGRAMME MASSAGE
METHOD NO.:1 STEP NO.: 3
CHANNEL NAME: OVEN
SET TEMP.: ^{O}C

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name OVEN and low line read the Set Temperature.

To program the step 3 set temperature for channel "O", press the Numeric keys.

15. **PAGE NO.: 17**
PROGRAMME MASSAGE
METHOD NO.:1 STEP NO.: 3
CHANNEL NAME: OVEN
HOLD TIME:

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Hold Time.

To program the step 4 hold time for channel "O", press the Numeric keys from 00.0 to 99.9 min.

16. **PAGE NO.: 18** **PROGRAMME MASSAGE**
METHOD NO.:1 STEP NO.: 4
CHANNEL NAME:
RATE: ^{O}C/MIN.

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Rate.

Program the rate for step 4 to the desired value by pressing the Numeric keys from 00 to 60 ºC /min. The rising part of the step 4– is controlled as per the rate programmed. When the current set temperature becomes equal to OR greater than the step 4 set temperature then-step 4 hold time starts. If the rate programmed at this step is 00 ºC /min then the profile cycle ends here.

17. **PAGE NO.: 19** **PROGRAMME MASSAGE**
METHOD NO.:1 STEP NO.: 4
CHANNEL NAME: OVEN
SET TEMP.: ^{O}C

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name OVEN and low line read the Set Temperature.

To program the step 4 set temperature for channel "O", press the Numeric keys.

18. **PAGE NO.: 20** **PROGRAMME MASSAGE**
METHOD NO.:1 STEP NO.: 4
CHANNEL NAME: OVEN
HOLD TIME:

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Hold Time.

To program the step 1 hold time for channel "O", press the Numeric keys from 00.0 to 99.9 min.

19. **PAGE NO.: 21** **PROGRAMME MASSAGE**
METHOD NO.:1 STEP NO.: 5
CHANNEL NAME:
RATE: ^{O}C/MIN.

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Rate.

Program the rate for step 5 to the desired value by pressing the Numeric keys from 00 to 60 ºC /min. The rising part of the step 5– is controlled as per the rate programmed. When the current set temperature becomes equal to OR greater than the step 5 set temperature then-step 5 hold time starts. If the rate programmed at this step is 00 ºC /min then the profile cycle ends here.

20. **PAGE NO.: 22** **PROGRAMME MASSAGE**
METHOD NO.:1 STEP NO.: 5
CHANNEL NAME: OVEN
SET TEMP.: ^{O}C

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name OVEN and low line read the Set Temperature.

To program the step 5 set temperature for channel "O", press the Numeric keys.

21. **PAGE NO.: 23** **PROGRAMME MASSAGE**
METHOD NO.:1 STEP NO.: 5
CHANNEL NAME: OVEN
HOLD TIME:

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Hold Time.

To program the step 5 hold time for channel "O", press the Numeric keys from 00.0 to 99.9 min.

22. **PAGE NO.: 24** **PROGRAMME MASSAGE**
METHOD NO.:1 STEP NO.: 6
CHANNEL NAME:
RATE: ^{O}C/MIN.

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel

Name and low line read the Rate.

Program the rate for step 6 to the desired value by pressing the Numeric keys from 00 to 60 ºC /min. The rising part of the step 6– is controlled as per the rate programmed. When the current set temperature becomes equal to OR greater than the step 6 set temperature then-step 6 hold time starts. If the rate programmed at this step is 00 ºC /min then the profile cycle ends here.

23. **PAGE NO.: 25**
PROGRAMME MASSAGE
METHOD NO.:1 STEP NO.: 6
CHANNEL NAME: OVEN
SET TEMP.: ^{O}C

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name OVEN and low line read the Set Temperature.

To program the step 6 set temperature for channel "O", press the Numeric keys.

24. **PAGE NO.: 26**
PROGRAMME MASSAGE
METHOD NO.:1 STEP NO.: 6
CHANNEL NAME: OVEN
HOLD TIME:

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Hold Time.

To program the step 6 hold time for channel "O", press the Numeric keys from 00.0 to 99.9 min.

25. **PAGE NO.: 27**
PROGRAMME MASSAGE
METHOD NO.:1 STEP NO.: 7
CHANNEL NAME:
RATE: ^{O}C/MIN.

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Rate.

Program the rate for step 7 to the desired value by pressing the keys from 00 to 60 ºC /min. The rising part of the step 7– is controlled as per the rate programmed. When the current set temperature becomes equal to OR greater than the step 7 set temperature then-step 7 hold time starts. If the rate programmed at this step is 00 ºC /min then the profile cycle ends here.

26. **PAGE NO.: 28**
PROGRAMME MASSAGE
METHOD NO.:1 STEP NO.: 7
CHANNEL NAME: OVEN
SET TEMP.: ^{O}C

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name OVEN and low line read the Set Temperature.

To program the step 7 set temperature for channel "O", press the Numeric keys.

27. **PAGE NO.: 29**
PROGRAMME MASSAGE
METHOD NO.:1 STEP NO.: 7
CHANNEL NAME: OVEN
HOLD TIME:

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Hold Time.

To program the step 7 hold time for channel "O", press the Numeric keys from 00.0 to 99.9 min.

28. **PAGE NO.: 30**
PROGRAMME MASSAGE
METHOD NO.:1 STEP NO.: 8
CHANNEL NAME:
RATE: ^{O}C/MIN.

The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Rate.

Program the rate for step 8 to the desired value by pressing the Numeric keys from 00 to 60 ºC /min. The rising part of the step 2– is controlled as per the rate programmed. When the current set temperature becomes equal to OR greater than the step 8 set temperature then-step 8 hold time starts. If

the rate programmed at this step is 00 ºC /min then the profile cycle ends here.

29.	**PAGE NO.: 31**	**PROGRAMME MASSAGE** **METHOD NO.:1 STEP NO.: 8** **CHANNEL NAME: OVEN** **SET TEMP.: ^{O}C**	The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name OVEN and low line read the Set Temperature.

To program the step 8 set temperature for channel "O", press the Numeric keys.

30.	**PAGE NO.: 32**	**PROGRAMME MASSAGE** **METHOD NO.:1 STEP NO.: 8** **CHANNEL NAME: OVEN** **HOLD TIME:**	The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Hold Time.

To program the step 8 hold time for channel "O", press the Numeric keys from 00.0 to 99.9 min.

31.	**PAGE NO.: 33**	**PROGRAMME MASSAGE** **METHOD NO.:1 STEP NO.: 9** **CHANNEL NAME:** **RATE: ^{O}C/MIN.**	The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Rate.

Program the rate for step 9 to the desired value by pressing the Numeric keys from 00 to 60 ºC /min. The rising part of the step 2– is controlled as per the rate programmed. When the current set temperature becomes equal to OR greater than the step 9 set temperature then-step 9 hold time starts. If the rate programmed at this step is 00 ºC /min then the profile cycle ends here.

32.	**PAGE NO.: 34**	**PROGRAMME MASSAGE** **METHOD NO.:1 STEP NO.: 9** **CHANNEL NAME: OVEN** **SET TEMP.: ^{O}C**	The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name OVEN and low line read the Set Temperature.

To program the step 9 set temperature for channel "O", press the Numeric keys.

33.	**PAGE NO.: 35**	**PROGRAMME MASSAGE** **METHOD NO.:1 STEP NO.: 9** **CHANNEL NAME: OVEN** **HOLD TIME:**	The Upper line reads the Programme Massage second line reads the Method No. and Step No. third line read the Channel Name and low line read the Hold Time.

To program the step 9 hold time for channel "O", press the Numeric keys from 00.0 to 99.9 min.

34.	**ENTER**	**PROGRAMME SET POINT** **METHOD NO.: 1** **CHANNEL INJECTOR : 120^{O}C** **SET TEMP.: ^{o}C**	The Upper line reads the Programme Massage second line read Method No., Third line read Channel Name and Low line read the Set Temperature.

By Pressing **[ENTER]** Key the cycle will be complete and system will back on Page No.: 4 Injector Set Point.

Press **[ESC]** the Method Saving Option will appear on the Screen.

Select the Method save Option YES/NO by pressing Up **[↑]** Arrow Key and Press **[ENTER]** key.

The changed Parameters will be save in the given Method file in the RAM.

This complete the level 1 programming – for the set temperature for the channel I, F, T and the step parameters of channel "O".

Note: Anywhere in between the above step if the ESC key is pressed then the controller comes out of the program mode. This condition is true for all the three levels.

Note: In any of the above steps if the rate of rise programmed is 00 then that step is considered as the last step for the profile and the controller ends the program mode for level 1 if set key is pressed.

Programming of PID Parameters and Overshoot:

To program the PID parameter and overshoot limit of the four channels – Do as.

Level 2:
Press Menu Key.
Press Up **[↑]** Arrow Key.
Press Auto Cycle and Press **[ENTER]** Key.

Massage will appear on the Screen
PROFILE CYCLE COUNT: 01
By Pressing Numeric Key set 0-99 Press **[ENTER]** Key.

Next Page will appear on the screen massage repeat Count 01 by pressing numeric key set required value 0 – 99. Press **[ESC]** key to back on Main Page.

Level 3:
For the Setting of PID Parameters and Overshoot Press Menu Key and by pressing Up **[↑]** Arrow key select Page Programme **PID PARAMETERS** Press **[ENTER]** key

Set Lock code 45 Press **[ENTER]** key

Screen will appear:-

35.	**PAGE NO.: 1**	**PROGRAMME MASSAGE** **CHANNEL NAME: OVEN** **OVERSHOOT:**	The Upper line reads the Programme Massage second line read Channel Name and third line reads Overshoot.

Set the Overshoot value by pressing Numeric key and Press **[ENTER]**

36.	**PAGE NO.: 2**	**PROGRAMME MASSAGE** **CHANNEL NAME: OVEN** **PROB BAND: 00.90%**	The Upper line reads the Programme Massage second line read Channel Name and third line reads Prob Band.

Set the Required value by pressing Numeric key and Press **[ENTER]**

36.	**PAGE NO.: 3**	**PROGRAMME MASSAGE** **CHANNEL NAME: OVEN** **INT. TIME:**	The Upper line reads the Programme Massage second line read Channel Name and third line reads Int. Time.

Set the Required value by pressing Numeric key and Press **[ENTER]**

37. **PAGE NO.: 4** **PROGRAMME MASSAGE**
CHANNEL NAME: OVEN
DER TIME: 1.80M
The Upper line reads the Programme Massage second line read Channel Name and third line reads Der Time.

Set the Required value by pressing Numeric key and Press **[ENTER]**

38. **PAGE NO.: 5** **PROGRAMME MASSAGE**
CHANNEL NAME: OVEN
CYC. TIME: 1.80M
The Upper line reads the Programme Massage second line read Channel Name and third line reads Cyc. Time.

Set the Required value by pressing Numeric key and Press **[ENTER]**

39. **PAGE NO.: 6** **PROGRAMME MASSAGE**
CHANNEL NAME: INJ.
OVERSHOOT:
The Upper line reads the Programme Massage second line read Channel Name and third line reads Overshoot.

Set the Overshoot value by pressing Numeric key and Press **[ENTER]**

40. **PAGE NO.: 7** **PROGRAMME MASSAGE**
CHANNEL NAME: INJ.
PROB BAND: 00.90%
The Upper line reads the Programme Massage second line read Channel Name and third line reads Prob Band.

Set the Required value by pressing Numeric key and Press **[ENTER]**

41. **PAGE NO.: 8** **PROGRAMME MASSAGE**
CHANNEL NAME: INJ.
INT. TIME:
The Upper line reads the Programme Massage second line read Channel Name and third line reads Int. Time.

Set the Required value by pressing Numeric key and Press **[ENTER]**

42. **PAGE NO.: 9** **PROGRAMME MASSAGE**
CHANNEL NAME: INJ.
DER TIME: 1.80M
The Upper line reads the Programme Massage second line read Channel Name and third line reads Der Time.

Set the Required value by pressing Numeric key and Press **[ENTER]**

43. **PAGE NO.: 10** **PROGRAMME MASSAGE**
CHANNEL NAME: INJ.
CYC. TIME: 1.80M
The Upper line reads the Programme Massage second line read Channel Name and third line reads Cyc. Time.

Set the Required value by pressing Numeric key and Press **[ENTER]**

44. **PAGE NO.: 11** **PROGRAMME MASSAGE**
CHANNEL NAME: FID
OVERSHOOT:
The Upper line reads the Programme Massage second line read Channel Name and third line reads Overshoot.

Set the Overshoot value by pressing Numeric key and Press **[ENTER]**

45. **PAGE NO.: 12** **PROGRAMME MASSAGE**
CHANNEL NAME: FID
PROB BAND: 00.90%
The Upper line reads the Programme Massage second line read Channel Name and third line reads Prob Band.

Set the Required value by pressing Numeric key and Press **[ENTER]**

46. **PAGE NO.: 13** **PROGRAMME MASSAGE**
CHANNEL NAME: FID
INT. TIME:
The Upper line reads the Programme Massage second line read Channel Name and third line reads Int. Time.

Set the Required value by pressing Numeric key and Press **[ENTER]**

47. **PAGE NO.: 14** **PROGRAMME MASSAGE**
CHANNEL NAME: FID
DER TIME: 1.80M
The Upper line reads the Programme Massage second line read Channel Name and third line reads Der Time.

Set the Required value by pressing Numeric key and Press **[ENTER]**

48. **PAGE NO.: 15** **PROGRAMME MASSAGE**
CHANNEL NAME: FID
CYC. TIME: 1.80M
The Upper line reads the Programme Massage second line read Channel Name and third line reads Cyc. Time.

Set the Required value by pressing Numeric key and Press **[ENTER]**

49. **PAGE NO.: 16** **PROGRAMME MASSAGE**
CHANNEL NAME: TCD
OVERSHOOT:
The Upper line reads the Programme Massage second line read Channel Name and third line reads Overshoot.

Set the Overshoot value by pressing Numeric key and Press **[ENTER]**

50. **PAGE NO.: 17** **PROGRAMME MASSAGE**
CHANNEL NAME: TCD
PROB BAND: 00.90%
The Upper line reads the Programme Massage second line read Channel Name and third line reads Prob Band.

Set the Required value by pressing Numeric key and Press **[ENTER]**

51. **PAGE NO.: 18** **PROGRAMME MASSAGE**
CHANNEL NAME: TCD
INT. TIME:
The Upper line reads the Programme Massage second line read Channel Name and third line reads Int. Time.

Set the Required value by pressing Numeric key and Press **[ENTER]**

52. **PAGE NO.: 19** **PROGRAMME MASSAGE**
CHANNEL NAME: INJ.
DER TIME: 1.80M
The Upper line reads the Programme Massage second line read Channel Name and third line reads Der Time.

Set the Required value by pressing Numeric key and Press **[ENTER]**

53. **PAGE NO.: 20** **PROGRAMME MASSAGE**
CHANNEL NAME: INJ.
CYC. TIME: 1.80M
The Upper line reads the Programme Massage second line read Channel Name and third line reads Cyc. Time.

Set the Required value by pressing Numeric key and Press **[ENTER]**

Level 4:

Press Menu key and Select General Parameter Page by pressing Up **[↑]** Arrow key press **[ENTER]** key.

The system Required Lock Code 55 then enter.

The following Screen will be appear.

54. **PAGE NO.: 1** **PROGRAMME MASSAGE**
EV1 ON DET.: 01.0 S
The Upper line reads the Programme Massage second line read Event 1 ON Det.

Set the Required Event time by pressing Numeric key and Press **[ENTER]**

55. **PAGE NO.: 2** **PROGRAMME MASSAGE**
EV1 ON DUR.: 0
The Upper line reads the Programme Massage second line read Event 1 ON Dur.

Set the Required Event time by pressing Numeric key and Press **[ENTER]**

56.	**PAGE NO.: 3**	**PROGRAMME MASSAGE** **EV2 ON DET.: 01.0 S**	The Upper line reads the Programme Massage second line read Event 2 ON Det.

Set the Required Event time by pressing Numeric key and Press **[ENTER]**

57.	**PAGE NO.: 4**	**PROGRAMME MASSAGE** **EV2 ON DUR.: 0**	The Upper line reads the Programme Massage second line read Event 2 ON Dur.

Set the Required Event time by pressing Numeric key and Press **[ENTER]**

GENERAL PARAMETERS

By pressing Up **[↑]** Arrow key or Reset key Select the required Option and Press **[ENTER]** key.

58.	**PAGE NO.: 1**	**GENERAL PARAMETERS** **TCD: OFF/ON**	The Upper line reads the General Parameters and second line reads TCD.

Set the Required option by pressing Numeric key and Press **[ENTER]**

The Next Screen will appear.

59.	**PAGE NO.: 2**	**GENERAL PARAMETER** **COOL BAND: 3.0 ^{o}C**	The upper line reads the General Parameters and second line read Cool Band.

Set the Required value by pressing Numeric key and Press **[ENTER]**

60.	**PAGE NO.: 3**	**GENERAL PARAMETER** **STAB. TIME: 3.0 M**	The upper line reads the General Parameters and second line read Stab. Time.

Set the Required Time by pressing Numeric key and Press **[ENTER]**

61.	**PAGE NO.: 4**	**GENERAL PARAMETER** **STAB. TIME: 3.0 M**	The upper line reads the General Parameters and second line read Stab. Time.

Set the Required Time by pressing Numeric key and Press **[ENTER]**

62.	**PAGE NO.: 5**	**GENERAL PARAMETER** **READY TEMP BAND** **OVEN: 1.0 ^{o}C**	The upper line reads the General Parameters and second line read Ready Temperature Band and Third line reads Oven.

Set the Required Temperature by pressing Numeric key and Press **[ENTER]**

63.	**PAGE NO.: 6**	**GENERAL PARAMETER** **READY TEMP BAND** **INJECTOR:**	The upper line reads the General Parameters and second line read Ready Temperature Band and Third line reads Injector.

Set the Required Temperature by pressing Numeric key and Press **[ENTER]**

64.	**PAGE NO.: 7**	**GENERAL PARAMETER** **READY TEMP BAND** **FID:**	The upper line reads the General Parameters and second line read Ready Temperature Band and Third line reads FID.

Set the Required Temperature by pressing Numeric key and Press **[ENTER]**

65.	**PAGE NO.: 8**	**GENERAL PARAMETER** **READY TEMP BAND** **TCD:**	The upper line reads the General Parameters and second line read Ready Temperature Band and Third line reads TCD.

Set the Required Temperature by pressing Numeric key and Press **[ENTER]**

66.	**PAGE NO.: 9**	**GENERAL PARAMETERS** **OVEN CORR EC OUT**	The Upper line reads the General Parameters and second line reads TCD.

Set the Required Percentage (%) by pressing Numeric key and Press **[ENTER]**

59.	**PAGE NO.: 10**	**GENERAL PARAMETER** **COOL BAND: 3.0 °C**	The upper line reads the General Parameters and second line read Cool Band.

Note: The PID values are not to be changed without proper knowledge.

CALIBRATION OF THE ANALOG INPUT CHANNELS (TEMPERATURE):

The calibration of the four PT-100 channels is done by the front keypad. To calibrate – the user must have a resistor box of calibrated 0.1 percentage resistors OR a RTD-PT100 calibrator. Each channel needs to be calibrated at two points –one point (Low) near the room temperature OR 0.0 ºC and other (High) point at input above 100.0 ºC.

Note: The low point OR the High point calibration should not be done at NEG temperature input.

Level 3:

STEP NO.	**KEY PRESSED**	**DISPLAY**	**DESCRIPTION**

In any of the steps above in level 2 press the set key and do not release.

35.	**SET**	**PROGRAM MENU** **CHAN : O** **OVERSHOOT: 10.0 C**	The upper line reads the program menu message. The second line reads the channel no. The forth line reads the message overshoot and its value.
34.	**RELEASE SET KEY**	**CALIBRATION MENU** **CHAN : O LOW** **TEMP.: 030.0 C**	The upper line reads the calibration menu message. The third line reads the channel no. and the point of calibration (low). The forth line reads the temperature value.

Now to calibrate the low point of channel 1 – connect the RT-PT100 calibrator on channel one on the rear side of the controller. From the calibrator generate a known resistance output for a known temperature near the room temperature OR equal to 0.0 ºC but not a negative temperature. Now if the desired room temperature is not read on the display then press the Up and Down arrow keys to set the actual temperature as per the input resistance applied from the RT-PT100 calibrator box. If the temperature is read as negative then by pressing the Up arrow key make it 000.0 ºC.

If the temperature read is O.K. then just do not press the Up OR the Down arrow keys. This completes the low point calibration of the channel 1.

35.	**SET**	**CALIBRATION MENU**	The upper line reads the

	CHAN : O HIGH **TEMP.: 030.0 C**	calibration menu message. The third line reads the channel no. and the point of calibration (High). The forth line reads the temperature value.

Now to calibrate the high point of channel 1 – connect the RT-PT100 calibrator to the two inputs of the channel one on the rear side of the controller. Apply a known resistance for the known temperature to the input from the RTD-PT100 calibrator box. Now if the display does not read the temperature as required then press the Up and Down arrow keys to the temperature.

If the temperature read is O.K. then just do not press the Up OR the Down arrow keys. This completes the high point calibration of the channel 1.

36.	**SET**	**CALIBRATION MENU** **CHAN : I LOW** **TEMP.: 030.0 C**	The upper line reads the calibration menu message. The third line reads the channel no. and the point of calibration (low). The forth line reads the temperature value.

Now to calibrate the low point of channel # 2 – connect the RT-PT100 calibrator on channel one on the rear side of the controller. From the calibrator generate a known resistance output for a known temperature near the room temperature OR equal to 0.0 ºC but not a negative temperature. Now if the desired room temperature is not read on the display then press the Up and Down arrow keys to set the actual temperature as per the input resistance applied from the RT-PT100 calibrator box. If the temperature is read as negative then by pressing the Up arrow key make it 000.0 ºC.

If the temperature read is O.K. then just do not press the Up OR the Down arrow keys. This completes the high point calibration of the channel # 2.

37.	**SET**	**CALIBRATION MENU** **CHAN : I HIGH** **TEMP.: 030.0 C**	The upper line reads the calibration menu message. The third line reads the channel no. and the point of calibration (High). The forth line reads the temperature value.

Now to calibrate the high point of channel # 2 – connect the RT-PT100 calibrator to the two inputs of the channel one on the rear side of the controller. Apply a known resistance for the known temperature to the input from the RTD-PT100 calibrator box. Now if the display does not read the temperature as required then press the Up and Down arrow keys to the temperature.

If the temperature read is O.K. then just do not press the Up OR the Down arrow keys. This completes the high point calibration of the channel # 2.

38.	**SET**	**CALIBRATION MENU** **CHAN : F LOW** **TEMP.: 030.0 C**	The upper line reads the calibration menu message. The third line reads the channel no. and the point of calibration (low). The forth line reads the

temperature value.

Now to calibrate the low point of channel # 3 – connect the RT-PT100 calibrator on channel one on the rear side of the controller. From the calibrator generate a known resistance output for a known temperature near the room temperature OR equal to 0.0 ºC but not a negative temperature. Now if the desired room temperature is not read on the display then press the Up and Down arrow keys to set the actual temperature as per the input resistance applied from the RT-PT100 calibrator box. If the temperature is read as negative then by pressing the Up arrow key make it 000.0 ºC.

If the temperature read is O.K. then just do not press the Up OR the Down arrow keys. This completes the high point calibration of the channel # 3.

39.	**SET**	**CALIBRATION MENU** **CHAN : F HIGH** **TEMP.: 030.0 C**	The upper line reads the calibration menu message. The third line reads the channel no. and the point of calibration (High). The forth line reads the temperature value.

Now to calibrate the high point of channel # 3 – connect the RT-PT100 calibrator to the two inputs of the channel one on the rear side of the controller. Apply a known resistance for the known temperature to the input from the RTD-PT100 calibrator box. Now if the display does not read the temperature as required then press the Up and Down arrow keys to the temperature.

If the temperature read is O.K. then just do not press the Up OR the Down arrow keys. This completes the high point calibration of the channel # 3.

40.	**SET**	**CALIBRATION MENU** **CHAN : T LOW** **TEMP.: 030.0 C**	The upper line reads the calibration menu message. The third line reads the channel no. and the point of calibration (low). The forth line reads the temperature value.

Now to calibrate the low point of channel # 4 – connect the RT-PT100 calibrator on channel one on the rear side of the controller. From the calibrator generate a known resistance output for a known temperature near the room temperature OR equal to 0.0 ºC but not a negative temperature. Now if the desired room temperature is not read on the display then press the Up and Down arrow keys to set the actual temperature as per the input resistance applied from the RT-PT100 calibrator box. If the temperature is read as negative then by pressing the Up arrow key make it 000.0 ºC.

If the temperature read is O.K. then just do not press the Up OR the Down arrow keys. This completes the high point calibration of the channel # 4.

41.		**CALIBRATION MENU** **CHAN : T HIGH** **TEMP.: 030.0 C**	The upper line reads the calibration menu message. The third line reads the channel no. and the point of calibration (High). The forth line reads the temperature value.

Now to calibrate the high point of channel # 4 – connect the RT-PT100 calibrator to the two inputs of the channel one on the rear side of the controller. Apply a known resistance for the known temperature to the input from the RTD-PT100 calibrator box. Now if the display does not read the temperature as required then press the Up and Down arrow keys to the temperature.

If the temperature read is O.K. then just do not press the Up OR the Down arrow keys. This completes the high point calibration of the channel # 4.

57.	**SET**	**CALIBRATION MENU** **CHAN : T LOW** **TEMP.: 030.0 C**	The upper line reads the calibration menu message. The third line reads the channel no. and the point of calibration (low). The forth line reads the temperature value. Message 'Lc' Low point calibration.

We are back to step 57 level 3 above.

42.	**ESC**	**0 120.0 030.0 Notrdy** **I 150.0 149.8** **F 150.0 149.9 Meth 1** **T 140.0 139.9 D-op**	Press the ESC key and release. Controller returns to main menu.

This completes the level 3 calibration – for four channels.

Note: The calibration of the controller should be checked –every month –using a standard RTPT-100 calibrator. The controller if should not be disturbed and should not be played with similarly the PID parameter once set for the channel should not be changed till the same heater is used. If there is a charge in the heater capacity then the PID parameters to be compound again.