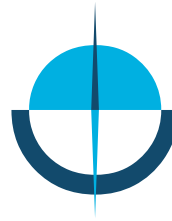


OmniX BTC

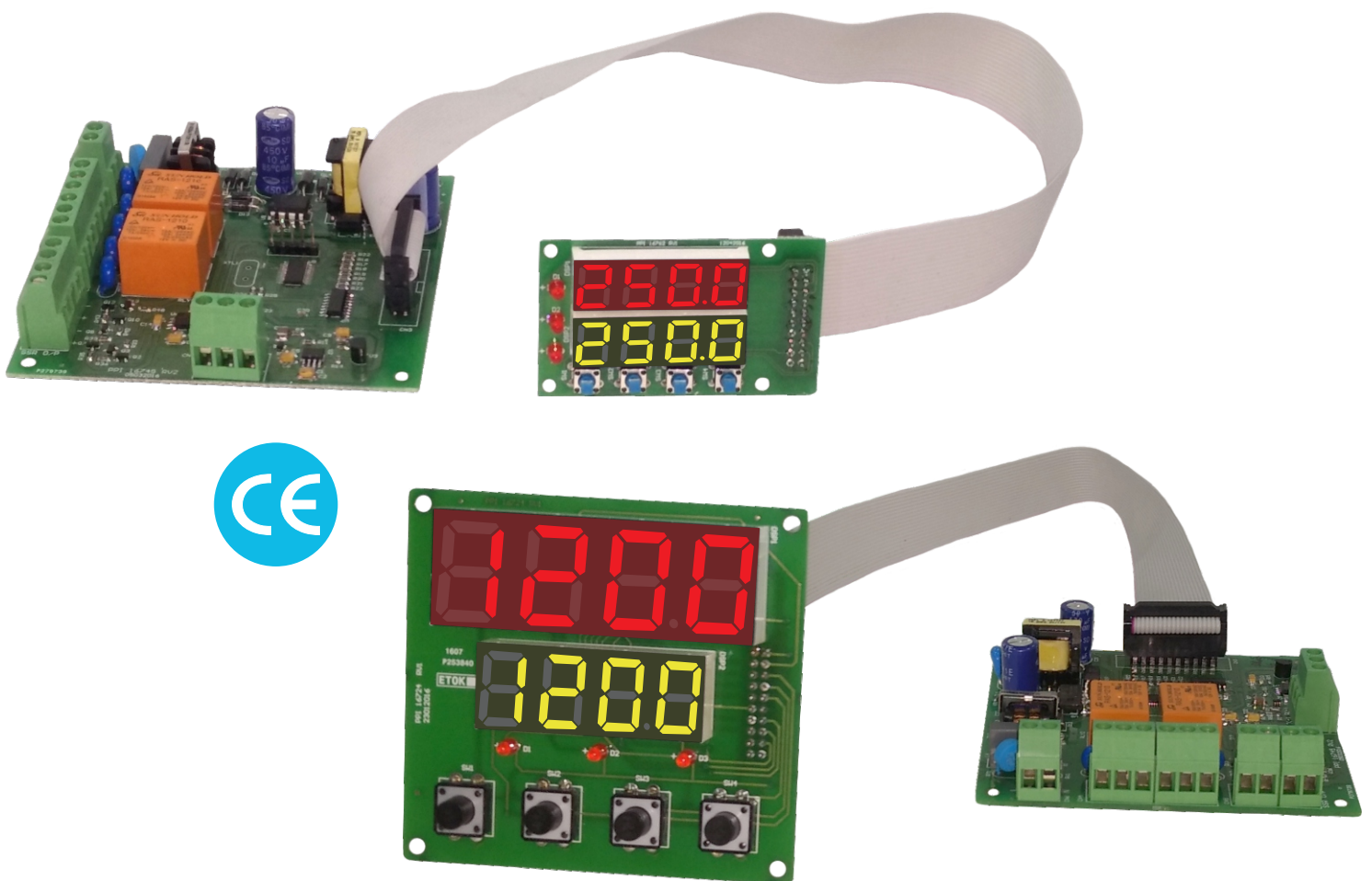


PPI

The Perfection Experts

Board Type Controller (BTC)

Open Frame Dual Setpoint Temperature Controller
with Programmable Input / Output & TIMER



User Manual

CONTENTS

1. PANEL MOUNTING & ELECTRICAL CONNECTIONS	1
2. FRONT PANEL : LAYOUT AND OPERATION	4
3. SET UP MODE : ACCESS AND OPERATION	7
4. INPUT/OUTPUT CONFIGURATION PARAMETERS : PAGE-12	9
5. OUTPUT 2 FUNCTION PARAMETERS : PAGE-11	11
6. CONTROL PARAMETERS : PAGE-10	13
7. SUPERVISORY PARAMETERS : PAGE-13	15
8. OPERATOR PARAMETER : PAGE-0	16
9. SOAK TIMER PARAMETERS : PAGE-15	18

Section 1 MOUNTING AND ELECTRICAL CONNECTIONS



WARNING
MISHANDLING / NEGLIGENCE CAN
RESULT IN PERSONAL DEATH OR
SERIOUS INJURY.

MOUNTING DETAILS

Figure 1.1 : Display Boards

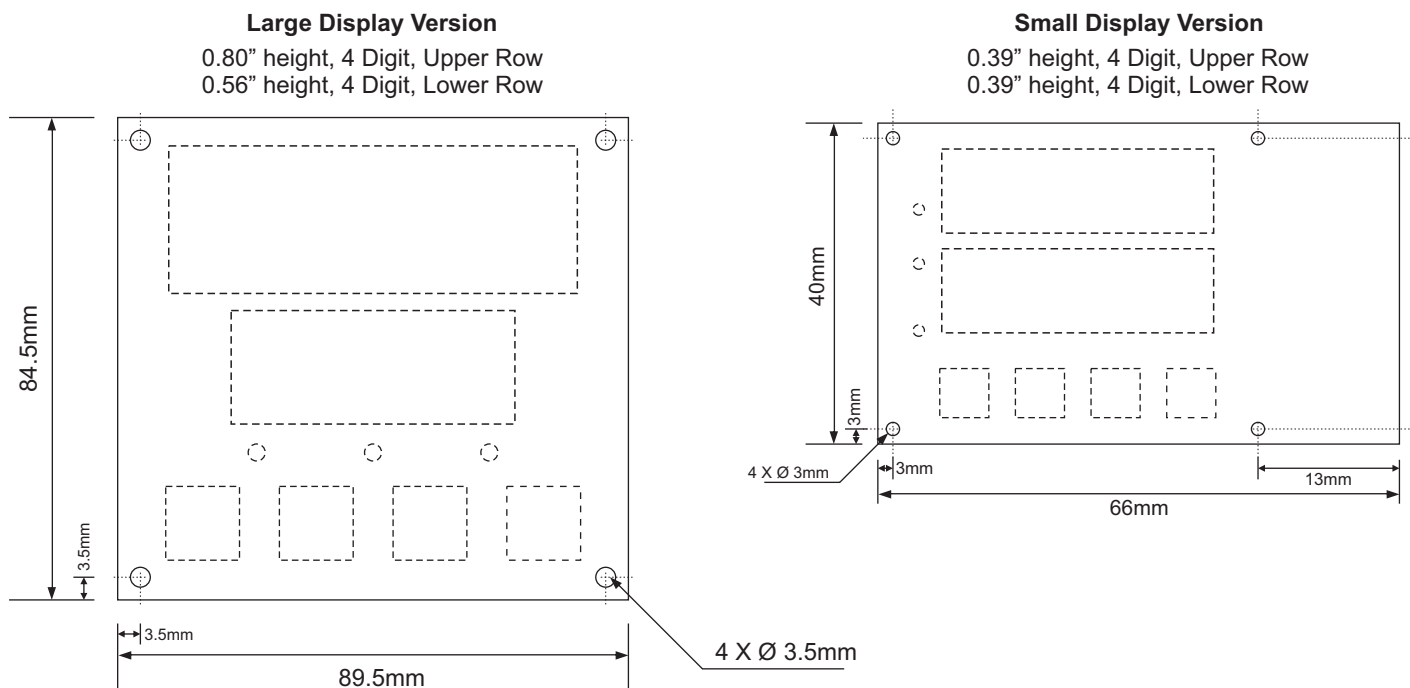


Figure 1.2 : Control Board

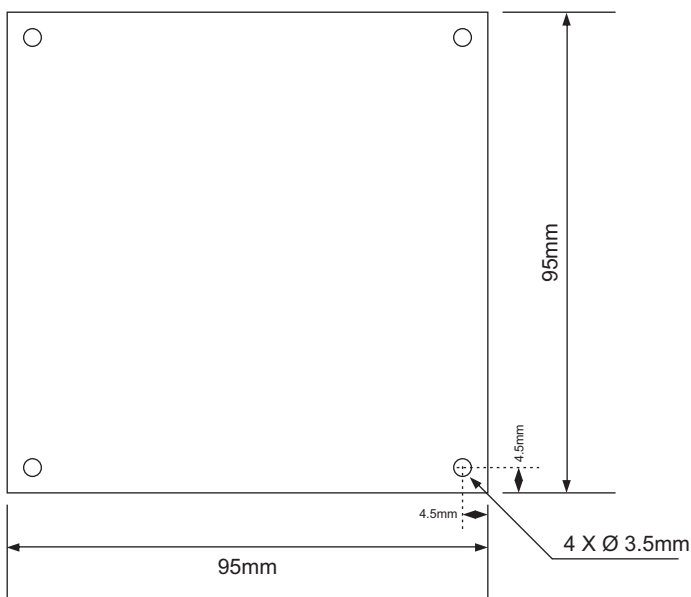
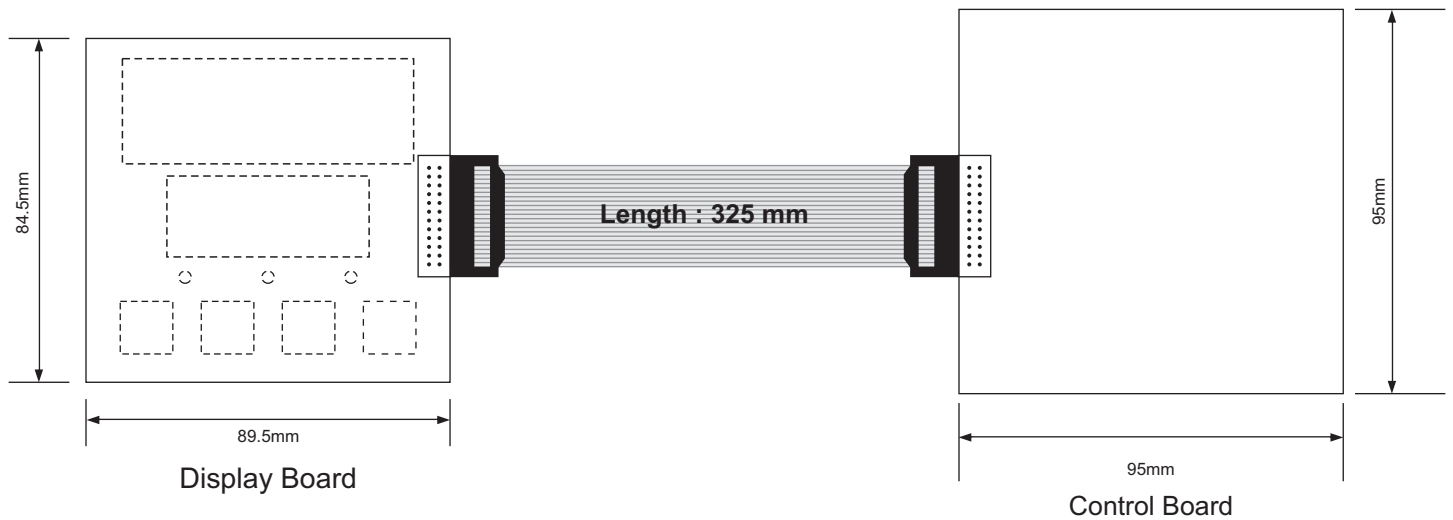


Figure 1.3 : Layout



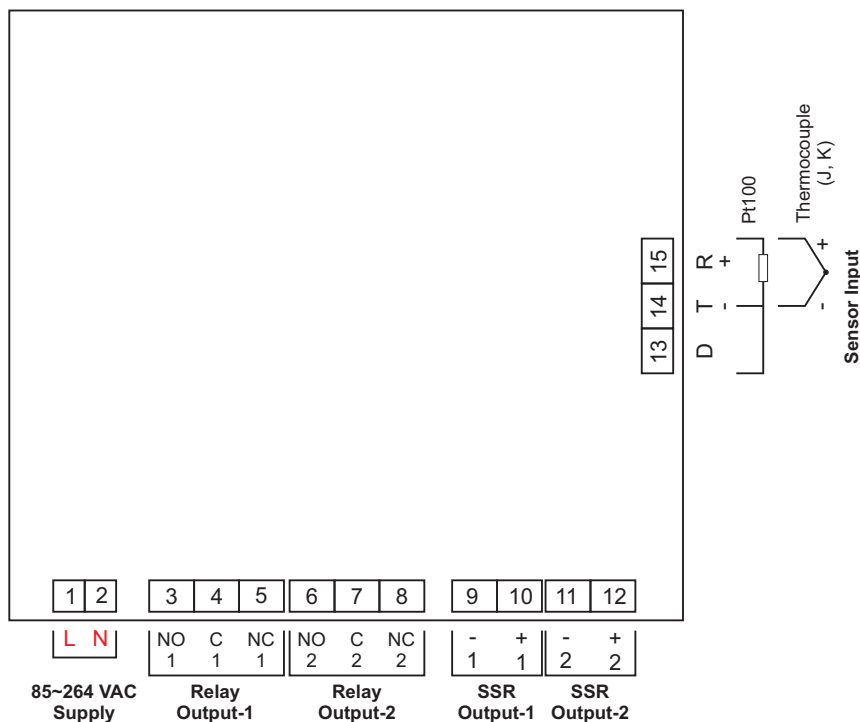
ELECTRICAL CONNECTIONS

Observe the followings while making electrical connections.

1. Run power supply cables separated from Thermocouple / RTD cables.
2. Use appropriate fuses and switches, wherever necessary, for driving the high voltage loads.
3. Do not over-tighten the terminal screws while making connections.
4. Switch-off the controller supply while making / removing any connections .

The Control Board provides fixed screw type terminal blocks for making electrical connections as shown in figure 1.4 below.

Figure 1.4



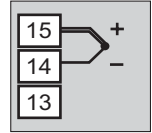
SENSOR INPUT

The controller accepts Thermocouples (J or K Type) and RTD Pt100 Sensor. Connect Thermocouple or RTD Pt100 as described below.

Thermocouple

Connect Thermocouple Positive (+) to terminal 15 and Negative (-) to terminal 14 as shown in Figure 1.5 (a). Use correct type of extension lead wires or compensating cable. Avoid joints in the cable.

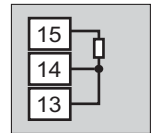
Figure 1.5(a)



RTD Pt100, 3-wire

Connect single leaded end of RTD bulb to terminal 15 and the double leaded ends to terminals 13 and 14 (interchangeable) as shown in Figure 1.5 (b). Use copper conductor leads of very low resistance. Ensure that all 3 leads are of the same gauge and length. Avoid joints in the cable.

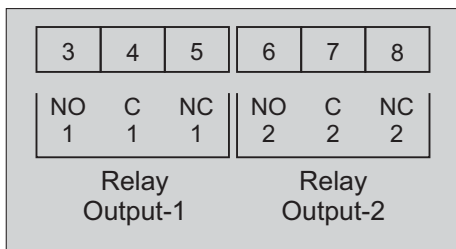
Figure 1.5(b)



OUTPUT-1 & OUTPUT-2

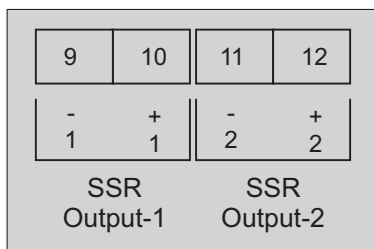
The Output-1 & Output-2 are user configurable as Relay contacts or SSR Drive Voltage. Note that Relay and SSR Outputs for both output-1 & output-2 are simultaneously provided on separate terminals. Refer figure 1.6(a) & 1.6(b) below.

Figure 1.6(a) : Relay Output-1 & Relay Output-2



N/O (Normally Open), C (Common), N/C (Normally Closed) contacts are potential-free and are rated 7A/250 VAC (resistive load).

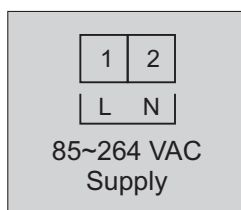
Figure 1.6(b) : SSR Output-1 & SSR Output-2



Controller outputs 12 VDC @ 40mA pulses for driving external SSR. Connect Terminal marked (+) to positive SSR Terminal and Terminal marked (-) to negative SSR Terminal.

POWER SUPPLY

Figure 1.7



The controller accepts single phase, 50/60 Hz Line Voltage ranging from 85 to 264 VAC. Use well-insulated copper conductor wire of the size not smaller than 0.5 mm² for power supply connections. Connect Line Voltage as shown in Figure 1.7.

Section 2
DISPLAY BOARDS : LAYOUT AND OPERATION

Figure 2.1(a) : Small Display Board

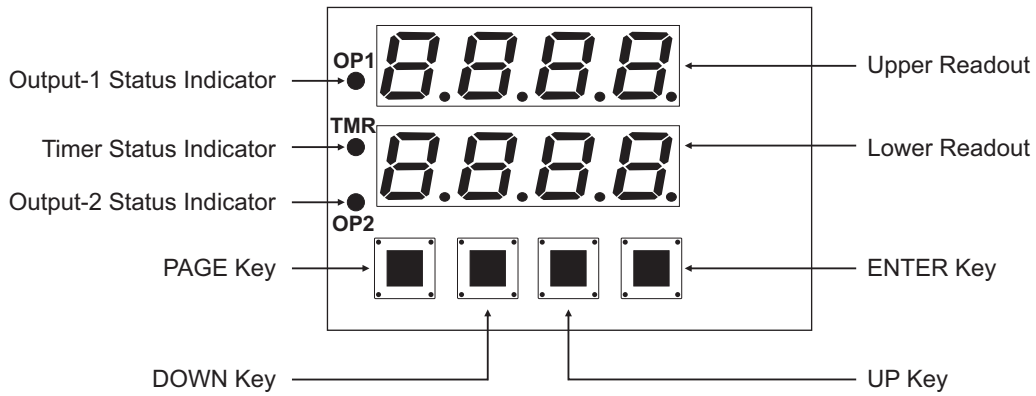
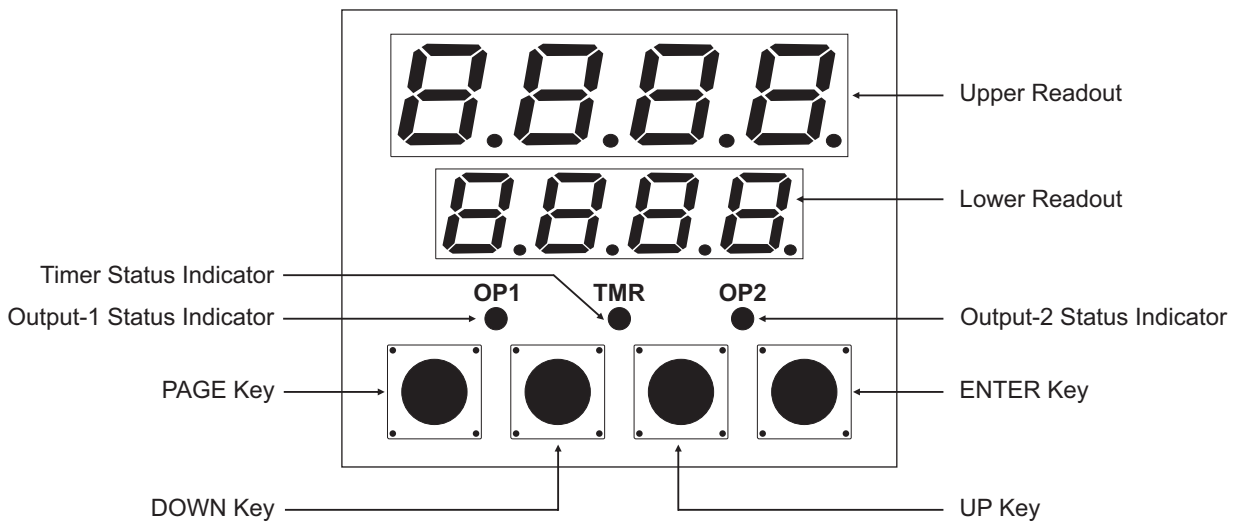


Figure 2.1(b) : Large Display Board



READOUTS

The Upper Readout is a 4 digit, 7-segment bright red LED display and usually displays the Measured Temperature. In Set-up Mode, the Upper Readout displays parameter values/options.

The Lower Readout is a 4 digit, 7-segment bright green LED display and usually displays SP (Control Setpoint) or % Output Power. In Set-up Mode, the Lower Readout displays prompts for the parameters.

INDICATOR

The Table 2.1 below lists the three front panel indicators (identified by the Front panel legend) and the associated status.





Table 2.1

Indicator	Function
OP1	Indicates Output-1 ON/OFF status.
OP2	<ul style="list-style-type: none"> Flashes if OP-2 is configured as Alarm and if alarm is active. Indicates ON/OFF status if OP-2 is configured as Auxiliary Control.
TMR	<ul style="list-style-type: none"> Flashes while the Soak Timer is counting down. Glow steadily while the Soak Timer is outside the Timer Start Band or Hold Band (that is, HOLD state).

KEYS

There are four tactile keys provided on the front panel for configuring the controller and setting-up the parameter values. The Table 2.2 lists each key (identified by the front panel symbol) and the associated function.

Table 2.2

Symbol	Key	Function
	PAGE	Press to enter / exit Set-up mode.
	DOWN	Press to decrease the parameter value. Pressing once decreases the value by one count; holding the key pressed speeds up the change.
	UP	Press to increase the parameter value. Pressing once increases the value by one count; holding the key pressed speeds up the change.
	ENTER	Press to store the set parameter value and to scroll to the next parameter.

POWER UP

Upon switching on the power to the controller, all displays and indicators are lit on for approximately 3 seconds. This is followed by the indication of the model name $\overline{0000}$ on the Lower Readout and \overline{PPI} on Upper Readout.

MAIN DISPLAY

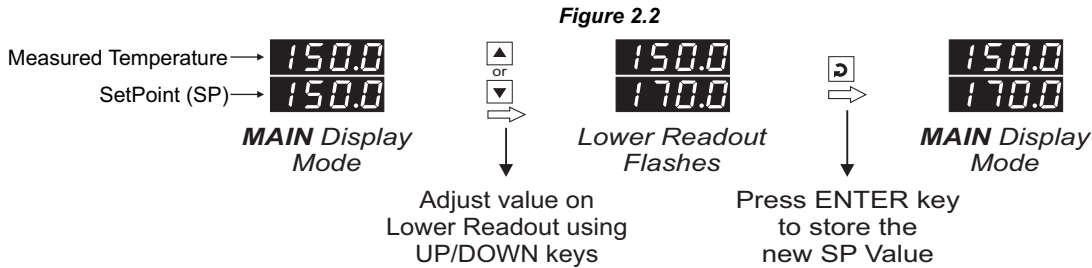
After the Power-up display sequence, the controller enters MAIN Display Mode. The Upper Readout shows the measured Temperature Process Value and the Lower Readout displays the SP (Control Setpoint). The MAIN Display Mode is the one that shall be used most often.

If the controller is configured to operate in PID Control Mode; the Lower Readout can be toggled to indicate either SP or % Output Power using the ENTER Key. The default Lower Readout upon Power-up is SP. While indicating % Power, the left most digit indicates P and remaining digits indicate power value.

ADJUSTING SP

The SP value can be directly adjusted on the Lower Readout while the controller is in the MAIN Display Mode and the Lower readout is showing SP value. Step through the following sequence to adjust the SP value:

1. Press and release UP/DOWN key once. The Lower Readout starts flashing.
2. Use UP/DOWN keys to adjust the SP value.
3. Press and release ENTER key. The Lower Readout stops flashing and the set value is registered and stored in the controller's non-volatile memory.



Timer (Soak) Mode Indication

If the soak timer is enabled, the Start command can be issued by either setting the parameter “Start” on page 0 to ‘Yes’ or by pressing the Enter key for approximately for 3 seconds while in Main Mode.

Upon issuing Start command the lower readout immediately Starts showing Balance Soak Time. Use Enter key to toggle the lower readout to show either Setpoint or % output power or Balance Soak Time.

TEMPERATURE ERROR INDICATION

In case the Temperature falls below the Minimum Range or rises above the Maximum Range specified for the selected ‘Input Type’ or in case the input sensor is open / broken; the Upper Readout flashes the error messages listed in Table 2.3 below. The Figure 2.3 illustrates an open sensor condition.

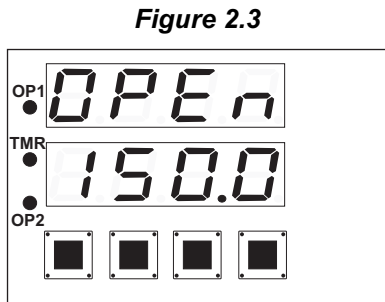
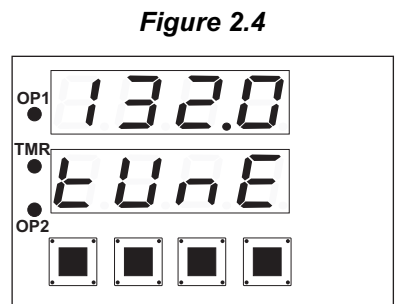


Table 2.3

Message	PV Error Type
Or	Over-range (Temperature above Max. Range)
Ur	Under-range (Temperature below Min. Range)
OPEN	Open (Sensor open / broken)

TUNE INDICATION (Applicable for PID Control Only)

Upon issuing ‘Self Tune Command’, the controller starts tuning itself to the process under control. While the controller is busy in Tuning itself to the process, the Lower Readout flashes the message “Tune”, as shown in figure 2.4 below. The user is advised not to disturb the process or alter any parameter values while the “Tune” message is being flashed. The “Tune” message automatically disappears upon completion of Tuning procedure and the controller reverts to MAIN Display Mode.



Section 3

SET-UP MODE : ACCESS AND OPERATION

The controller requires various user settings that determine how the controller will function or operate. These settings are called Parameters.

For the convenience and ease of operation, the various parameters have been grouped separately depending upon the functions they define. Each such group is called a PAGE. Each PAGE is assigned a unique number, called PAGE NUMBER, for its access. The parameters contained in a PAGE are presented in a fixed sequence to the user for setting. The user can access a desired PAGE by entering its PAGE NUMBER and can select and set the desired parameter values.

PARAMETER PROMPTS

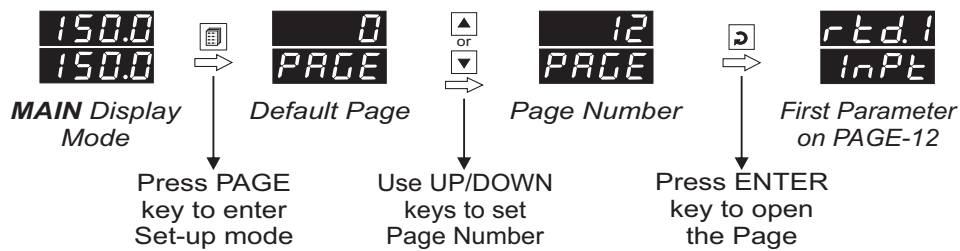
Each parameter has an identifying tag, called the Parameter Prompt. While setting parameter values in a PAGE, the parameter prompt is always displayed on the Lower Readout and its current value is displayed on the Upper Readout.

ACCESSING A PAGE

Each PAGE is accessible only from the MAIN Display Mode. That is, from the current PAGE, the user must return to the MAIN Display Mode before the other PAGE can be accessed.

Figure 3.1 illustrates access to the desired PAGE from MAIN Display Mode.

Figure 3.1

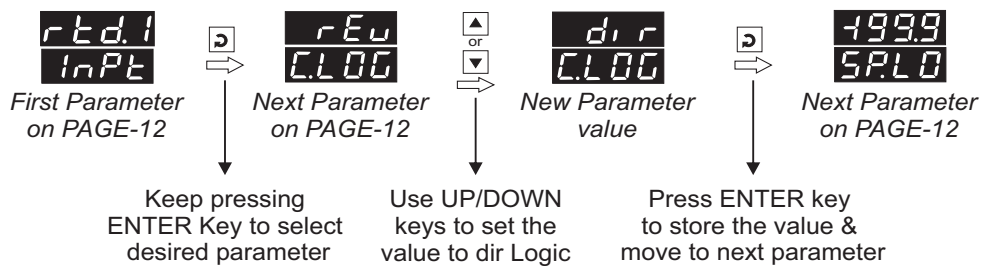


ADJUSTING PARAMETER VALUES

For accessing and adjusting the parameter, one must first open the PAGE containing the parameter.

Figure 3.2 illustrates how to access the desired parameter(s) and adjust the corresponding value(s). The example shows accessing the parameter 'Control Logic' and changing its value from 'Reverse' to 'Direct'. Press PAGE key to revert to MAIN Mode.

Figure 3.2



PARAMETER LOCKING

For protecting the parameter values from unauthorized / accidental alterations, the parameter adjustments can be Locked. The Operator Page is not affected by locking.

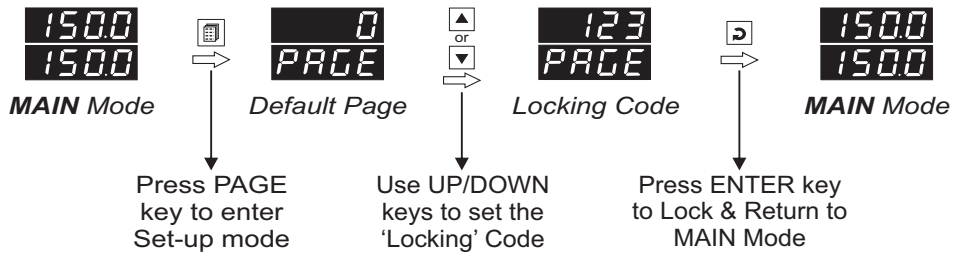
Locking

Follow the steps below to apply Locking when the controller is unlocked.

1. Press and release PAGE key while the controller is in the MAIN Display Mode. The Lower Readout shows PAGE and the Upper Readout shows 0.
2. Use UP / DOWN keys to set the Page Number to 123 on the Upper Readout.
3. Press and release ENTER key. The controller returns to the MAIN Display Mode with the Lock enabled.

The Figure 3.3 illustrates the steps for Locking.

Figure 3.3



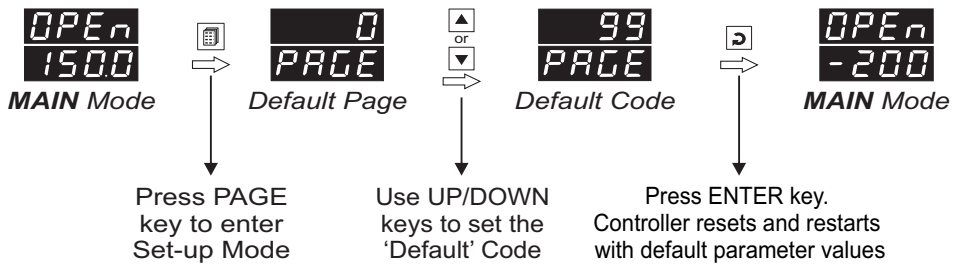
Un-Locking

For Un-Locking, repeat the sequence of steps shown in figure 3.3 twice.

SETTING DEFAULT VALUES

The controller is shipped from the factory with all the parameters set to their default values. Refer Figure 3.4 above for regaining the factory default values.

Figure 3.4



Section 4

INPUT / OUTPUT CONFIGURATION PARAMETERS : PAGE-12

Refer Table 4.1 for the parameter descriptions and settings.

Table 4.1

Parameter Description	Settings (Default Value)
INPUT TYPE InPt Select Input type in accordance with the type of sensor (Thermocouple or RTD) connected for temperature measurement.	Refer Table 4.2 for various available 'Input Types' along with their respective Ranges and Resolutions. (Default : Type K)
CONTROL LOGIC CL00 <u>Reverse</u> Heating Control (Output Power <i>decreases</i> with increase in Temperature). <u>Direct</u> Cooling Control (Output Power <i>increases</i> with increase in Temperature).	rEu Reverse dir Direct (Default : Reverse)
SETPOINT LOW SPLO Sets minimum permissible control setpoint value.	Min. Range to Setpoint High for the selected Input type (Default : Min. Range for the Selected Input Type)
SETPOINT HIGH SPHI Sets maximum permissible control setpoint value.	Setpoint Low to Max. Range for the selected Input type (Default : Max. Range for the Selected Input Type)
OFFSET FOR MEASURED TEMPERATURE OFSt This value is algebraically added to the measured Temperature to derive the final temperature that is displayed and compared for alarm / control. Final Temperature = Measured Temperature + Offset	-1999 to 9999 or -199.9 to 999.9 (Default : 0)
DIGITAL FILTER FILT This value determines the averaging rate of measured temperature and thus helps removing undesired fast changes in the measured temperature. The higher the value the better the averaging but the slower the response to actual changes. The default value, 1.0 Second, is appropriate in most cases.	0.5 to 25.0 Seconds (in steps of 0.5 Seconds) (Default : 1.0)

Parameter Description	Settings (Default Value)
<p>CONTROL OUTPUT TYPE C.OP</p> <p>The output-1 is simultaneously available as Relay & SSR. Select the output type in accordance with the control output used.</p>	<p>rLY Relay</p> <p>SSr SSR</p> <p>(Default : Relay)</p>
<p>OUTPUT-2 FUNCTION SELECTION OP2F</p> <p>This parameter configures Output (OP2) as;</p> <p><u>None</u> Disables Output-2, that is, keeps Off.</p> <p><u>Alarm</u> Output-2 activates in accordance to Alarm settings.</p> <p><u>Control</u> Output-2 activates in accordance to Auxiliary Control settings.</p> <p><u>Blower</u> Output-2 activates in accordance to Blower / Compressor Control settings.</p> <p><u>Soak Time Output</u> Output-2 remains energized during Soak Time execution, if Soak Timer function is enabled.</p>	<p>nonE None</p> <p>ALrñ Alarm</p> <p>Ctrl Control</p> <p>bLDr Blower</p> <p>S.S.OP Soak Time Output</p> <p>(Default : None)</p>
<p>OUTPUT-2 TYPE OP2E</p> <p>The output-2 is simultaneously available as Relay & SSR. Select the output type in accordance with the output used.</p>	<p>rLY Relay</p> <p>SSr SSR</p> <p>(Default : Relay)</p>

Table 4.2

Option	What it means	Range (Min to Max)	Resolution
tc_J	Type J Thermocouple	0 to +960°C	1°C
tc_K	Type K Thermocouple	-200 to +1375°C	1°C
rtd	3-wire, RTD Pt100	-199 to +600°C	1°C
rtd.1	3-wire, RTD Pt100	-199.9 to +600.0°C	0.1°C

Section 5
OUTPUT-2 FUNCTION PARAMETERS : PAGE-11

Refer Table 5.1 for the parameter descriptions and settings.

Table 5.1

OP2 Function : Alarm	
Parameter Description	Settings (Default value)
<p>ALARM TYPE ALrñ</p> <p>Sets the Alarm type;</p> <p><u>Process Low</u> The alarm activates for Temperature less than or equal to Alarm Setpoint.</p> <p><u>Process High</u> The alarm activates for Temperature greater than or equal to Alarm Setpoint.</p> <p><u>Deviation Band</u> The alarm activates if the Temperature deviation from SP is greater than the set positive or negative 'Deviation Band' value.</p> <p><u>Window Band</u> The alarm activates if the Temperature deviation from SP is greater than the set 'Window Band' value in either direction.</p> <p><u>End Of Soak</u> The OP2 Relay / SSR is switched ON for the time duration set for the parameter 'Alarm Timer'.</p>	<div style="display: flex; flex-direction: column; align-items: flex-start;"> <div style="margin-bottom: 5px;">P_Lo Process Low</div> <div style="margin-bottom: 5px;">P_Hi Process High</div> <div style="margin-bottom: 5px;">dEu Deviation Band</div> <div style="margin-bottom: 5px;">bAnd Window Band</div> <div style="margin-bottom: 5px;">EoS End of Soak</div> </div> <p style="text-align: center;">(Default : Process Low)</p>
<p>ALARM INHIBIT ALiH</p> <p><u>No</u> Alarm is not suppressed for start-up condition.</p> <p><u>Yes</u> The Alarm activation is inhibited (suppressed) until the Temperature is found within alarm limits from the time the controller is switched ON.</p>	<div style="display: flex; flex-direction: column; align-items: flex-start;"> <div style="margin-bottom: 5px;">YES Yes</div> <div style="margin-bottom: 5px;">no No</div> </div> <p style="text-align: center;">(Default : Yes)</p>
<p>ALARM LOGIC ALLG</p> <p><u>Normal</u> The Alarm output (Relay/SSR) remains ON under alarm condition; OFF otherwise. Useful for Audio / Visual Alarm.</p> <p><u>Reverse</u> The Alarm output (Relay / SSR) remains OFF under alarm condition; ON otherwise. Useful for Tripping the system under control.</p>	<div style="display: flex; flex-direction: column; align-items: flex-start;"> <div style="margin-bottom: 5px;">norñ Normal</div> <div style="margin-bottom: 5px;">rEu Reverse</div> </div> <p style="text-align: center;">(Default : Normal)</p>
<p>ALARM TIMER ALtñ</p> <p>Available for End of Soak Alarm. Sets time duration in seconds for which the alarm shall activate upon End of Soak Timer.</p>	<p style="text-align: center;">5 to 250 (Default : 10)</p>

OP2 Function : Control	
Parameter Description	Settings (Default value)
<p>HYSTERESIS HYS.2</p> <p>This parameter value sets a differential (dead) band between the ON and OFF control states. Keep it large enough to avoid frequent switching of the load without losing the desired control accuracy.</p>	<p>1 to 999 or 0.1 to 99.9 (Default : 2 or 0.2)</p>
<p>CONTROL LOGIC LOG.2</p> <p><u>Normal</u> The Output remains ON for Temperature <i>below</i> Setpoint and OFF otherwise.</p> <p><u>Reverse</u> The Output remains ON for Temperature <i>above</i> Setpoint and OFF otherwise.</p>	<p>norñ Normal rEu Reverse (Default : Normal)</p>
OP2 Function : Blower	
<p>BLOWER / COMPRESSOR HYSTERESIS BLHY</p> <p>This parameter value sets a differential (dead) band between the blower ON and OFF states. Keep it large enough to avoid frequent switching of the load without losing the desired control accuracy.</p>	<p>1 to 250 or 0.1 to 25.0 (Default : 2 or 0.2)</p>
<p>BLOWER / COMPRESSOR TIME DELAY LDLY</p> <p>This parameter is mainly used for Compressor Load. For compressor switching it is desired that once the compressor is switched OFF, there must be some time delay before it is switched ON again. The switching ON of the compressor should therefore take place only if both the conditions, that is; the time delayed is elapsed and PV is above the Setpoint, must be satisfied.</p> <p>The 'Time Delay' parameter allows the user to set the optimum time delay that ensures both, the enhanced compressor life and the desired control accuracy.</p> <p>Set this parameter value to zero if no time delay is required.</p>	<p>0 to 600 Sec. (in steps of 0.5 Sec.) (Default : 0)</p>



Section 6
CONTROL PARAMETERS : PAGE-10

Refer Table 6.1 for the parameter descriptions and settings.

Table 6.1

Parameter Description	Settings (Default Value)
<p>CONTROL MODE Ctrl</p> <p>Select appropriate Control Algorithm suited for process requirement.</p> <p><u>On-Off</u> The control algorithm tends to maintain the Temperature at SP by either switching the output fully OFF or fully ON. The On and Off switching is differentiated by the user settable 'Hysteresis'.</p> <p><u>PID</u> The control algorithm uses a 2nd order equation to compute the '% Output Power' required to maintain the Temperature at SP. The constants P, I, D are automatically set by the controller by issuing Self-Tune command.</p>	<p>On,Off On-Off</p> <p>PId PID</p> <p>(Default : PID)</p>
<p>HYSTERESIS (For On-Off Control only) Hyst</p> <p>Sets differential (dead) band between On-Off switching of the control output (Relay/SSR).</p>	<p>1 to 999 or 0.1 to 99.9 (Default : 2 or 0.2)</p>
<p>COMPRESSOR TIME DELAY (For On-Off Control only) dLy</p> <p>This parameter is mainly used for Compressor Load. For compressor switching it is desired that once the compressor is switched OFF, there must be some time delay before it is switched ON again. The switching ON of the compressor should therefore take place only if both the conditions, that is; the time delay is elapsed and PV is above the Setpoint, are satisfied.</p> <p>Set this parameter value to zero if no time delay is required.</p>	<p>0 to 600 Sec. (in steps of 0.5 Sec.) (Default : 0)</p>
<p>CYCLE TIME (For PID Control only) Ct</p> <p>For time-proportionating PID control, the output power is implemented by adjusting the ratio of ON : OFF time of a fixed time interval, called 'Cycle Time'.</p> <p>Larger Cycle Time ensures longer Relay/SSR life but may result in poor control accuracy and vice-a-versa. <i>The recommended Cycle Time values are; 20 sec. for Relay and 1 sec. for SSR.</i></p>	<p>0.5 to 120.0 Seconds (in steps of 0.5 Seconds) (Default : 20.0 Sec)</p>

Parameter Description	Settings (Default Value)
<p>PROPORTIONAL BAND (For PID Control only) <i>Pb</i></p> <p>The Proportional Band is defined in terms of process value deviation from the setpoint (also known as process error). Within the band the output power is varied from maximum (100%) at maximum deviation to minimum (0%) at minimum deviation. The process value thus tends to stabilize at a point within the band where the power input equals losses. Larger Band results in better stability but larger deviation.</p> <p>The Proportional Band value is automatically calculated by controller's Self-Tune feature and seldom requires any manual adjustments.</p>	<p>0.1 to 999.9 (Default : 10.0)</p>
<p>INTEGRAL TIME (For PID Control only) <i>It</i></p> <p>The application of proportional band alone results in process value stability within the band but away from the setpoint. This is called steady state Offset Error. The integral action is incorporated for automatic removal of offset error with minimum oscillations.</p> <p>The Integral Time value is automatically calculated by controller's Self-Tune feature and seldom requires any manual adjustments.</p> <p>Setting the value 0 cuts-off Integral action.</p>	<p>0 to 1000 Seconds (Default : 100 Sec)</p>
<p>DERIVATIVE TIME (For PID Control only) <i>dt</i></p> <p>It is desired that the controller should respond to any dynamic changes in the process conditions (like variations in load, power supply fluctuations, etc.) fast enough so as to retain the process value near the setpoint. The Derivative Time determines how strong the output power will change in response to the rate of change of measured PV.</p> <p>The Derivative Time value is automatically calculated by controller's Self-Tune feature and seldom requires any manual adjustments.</p> <p>Setting the value 0 cuts-off Derivative action.</p>	<p>0 to 250 Seconds (Default : 25 Sec)</p>



Section 7
SUPERVISORY PARAMETERS : PAGE-13

Refer Table 7.1 for the parameter descriptions and settings.

Table 7.1










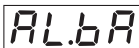
Parameter Description	Settings (Default Value)
<p>SELF-TUNE COMMAND TUNE</p> <p>Set this parameter to YES to activate 'Tuning' operation.</p> <p>Select as NO if, for any reason, the 'Tuning' operation in progress is to be aborted.</p>	<p>no No YES Yes (Default : No)</p>
<p>OVERSHOOT INHIBIT ENABLE / DISABLE OS.H</p> <p>Set this parameter to 'Enable' if the process exhibits unacceptable overshoot upon start-up or a step change in SP. If Enabled, the controller monitors and controls the rate of change of Temperature in order to minimize or eliminate overshoot.</p>	<p>d5bL Disable EnbL Enable (Default : Disable)</p>
<p>OVERSHOOT INHIBIT FACTOR 0.1.F</p> <p>This parameter is available only if 'Overshoot Inhibit' is enabled. Adjust this parameter value to improve the effectiveness of the controller's Overshoot Inhibit feature. Increase the value if the overshoot is curbed but the Temperature takes too long to reach the SP. Decrease the value if the overshoot persists.</p>	<p style="text-align: center;">1.0 to 2.0 (Default : 1.2)</p>
<p>OP2 SETPOINT EDITING PERMISSION ON OPERATOR PAGE SP.OP</p> <p>The OP2 Setpoint is available on operator page (PAGE 0) for view and adjustment. The adjustment, can be locked by setting this parameter value to 'Disable'. Locking protects the SP from any inadvertent changes.</p>	<p>d5bL Disable EnbL Enable (Default : Enable)</p>
<p>SOAK ABORT COMMAND ON OPERATOR PAGE SOAK</p> <p>This parameter allows the user to enable (permit) or disable (restrict) the issuance of 'Abort' command from operator page to Abort (Stop) the running Soak Timer.</p>	<p>d5bL Disable EnbL Enable (Default : Enable)</p>
<p>SOAK TIME ADJUSTMENT ON OPERATOR PAGE SOAK</p> <p>This parameter allows the user to enable (permit) or disable (restrict) the adjustment of the 'Soak Time Duration' on operator Page.</p>	<p>d5bL Disable EnbL Enable (Default : Enable)</p>

Section 8

OPERATOR PARAMETER : PAGE-0

Refer Table 8.1 for the parameter descriptions and settings.

Table 8.1

Parameter Description	Settings (Default value)
SOAK START COMMAND  (Available only if Soak Timer is enabled) Set to 'Yes' to start soak timer. Not available if timer already running.	 No  Yes (Default : No)
SOAK ABORT COMMAND  (Available only if Soak Timer is enabled) Set to 'Yes' to abort a running timer. Available if timer is running.	 No  Yes (Default : No)
SOAK TIME  (Available only if Soak Timer is enabled) The set time value for the soak timer in the selected time units.	00.05 to 60.00 MM:SS or 00.05 to 99.55 HH:MM or 1 to 999 Hours (Default : 3 or 0.3)
ALARM SETPOINT  (Available if OP-2 function is Alarm) Available <i>only if</i> selected 'Alarm Type' is either 'Process High' or 'Process Low'. This parameter value sets the Upper (Process High) or Lower (Process Low) Alarm Limit.	Minimum to Maximum Range specified for the selected Input Type (Default : 0)
ALARM DEVIATION  (Available if OP-2 function is Alarm) Available <i>only if</i> selected 'Alarm Type' is 'Deviation Band'. This parameter value can be set as Negative (-) or Positive (+) and gets added to the Control Setpoint (SP) to define either Process Low (negative deviation band) or Process High (positive deviation band) Alarm Limit.	-1999 to 9999 or -199.9 to 999.9 (Default : 3 or 0.3)
ALARM BAND  (Available if OP-2 function is Alarm) Available <i>only if</i> selected 'Alarm Type' is 'Window Band'. This parameter value gets subtracted from the Control Setpoint (SP) to define Process Low and added to the Control Setpoint (SP) to define the Process High Alarm Limit.	3 to 999 or 0.3 to 99.9 (Default : 3 or 0.3)

Parameter Description	Settings (Default value)
<p>AUXILIARY CONTROL SETPOINT SP.2</p> <p>(Available if OP-2 function is Control)</p> <p>This parameter value sets an offset to the Control Setpoint (SP) to define another (Auxiliary) setpoint either above (positive value) or below (negative value) the SP.</p>	<p>(Min. Range - SP) to (Max. Range - SP) (Default : 0)</p>
<p>BLOWER CONTROL SETPOINT BL.SP</p> <p>(Available if OP-2 function is Blower)</p> <p>This parameter value sets a positive (+) offset to the SP to define the 'Blower / Compressor Setpoint'.</p>	<p>0.0 to 25.0 (Default : 0)</p>
<p>SETPOINT LOCKING S.LOC</p> <p>This parameter allows locking the adjustment of the SP on Lower Readout in Main Display Mode. For Locking, set the parameter value to 'Yes'. This allows the operator to protect the SP from any unauthorized changes.</p>	<p>YES Yes no No (Default : No)</p>



Section 9
SOAK TIMER PARAMETERS : PAGE-15

Refer Table 9.1 for the parameter descriptions and settings.

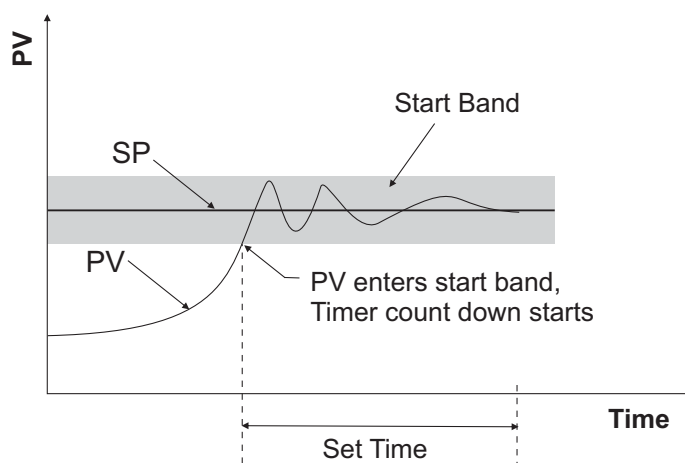
Table 9.1

Parameter Description	Settings Default Value
<p>TIMER ENABLE 5.Enb</p> <p><u>Yes</u> Soak Timer function is enabled.</p> <p><u>No</u> Soak Timer function is disabled.</p>	<p>no No</p> <p>YES Yes</p> <p>(Default : No)</p>
<p>TIME UNITS Un It</p> <p>Select the time units for Soak Time Duration.</p>	<p>nn.ss Min:Sec</p> <p>HH.nn Hours:Min</p> <p>Hour Hours</p> <p>(Default : Min: Sec)</p>
<p>TIME DURATION SoP.t</p> <p>The preset time value in selected units for the Soak Timer.</p>	<p>00.05 to 60:00 Min:Sec 00.05 to 99:55 Hrs:Min 1 to 999 Hours</p> <p>(Default : 00.10 Min:Sec)</p>
<p>TIMER-START BAND 5.bnd</p> <p>After issuance of start command, the timer starts counting down once the Temperature enters the band around SP defined by this parameter value.</p>	<p>0 to 9999 or 0.0 to 999.9</p> <p>(Default : 5 or 0.5)</p>
<p>HOLDBACK STRATEGY HOLd</p> <p><u>None</u> Temperature based timer pause is not required.</p> <p><u>Up</u> Timer is paused if Temperature is outside holdband <i>above</i> SP.</p> <p><u>Down</u> Timer is paused if Temperature is outside holdband <i>below</i> SP.</p> <p><u>Both</u> Timer is paused if Temperature is outside holdband either <i>above</i> or <i>below</i> SP.</p>	<p>none None</p> <p>UP Up</p> <p>dn Down</p> <p>both Both</p> <p>(Default : None)</p>
<p>HOLD BAND H.bnd</p> <p>Sets the temperature limit(s) with respect to the SP for the timer to pause. The timer stops counting down so long as the Temperature is outside this band value.</p>	<p>1 to 9999 or 0.1 to 999.9</p> <p>(Default : 5 or 0.5)</p>

Parameter Description	Settings Default Value
<p>CONTROL OUTPUT OFF AT TIMER END OP.OF</p> <p><u>Yes</u> The control output (OP1) is forced off upon completion of timer.</p> <p><u>No</u> The control output state is not forced.</p>	<p>no No</p> <p>YES Yes</p> <p>(Default : No)</p>
<p>POWER-FAIL RECOVERY METHOD Pr.FL</p> <p><u>Continue</u> The Soak Timer resumes operation for the balance time.</p> <p><u>Start</u> The timer re-runs the complete soak time.</p> <p><u>Abort</u> The timer operation is suspended until a new start command is issued.</p>	<p>Cont Continue</p> <p>Start (Re)Start</p> <p>Abt Abort</p> <p>(Default : Continue)</p>

Figure 9.1

SOAK TIMER OPERATION

**Basic Operation**

The Soak Timer is essentially a *preset timer* that can be configured to run as :

- (a) A Free Running Timer by setting timer 'Start Band' to 0. That is, the timer starts counting down immediately upon issuance of Start Command by the user and continues until set time is elapsed.
- (b) A Setpoint Dependent Timer. That is, after issuance of Start Command, the count down starts only after the PV reaches within timer 'Start Band'. The timer start band is a symmetrical band centered around the SP. For example, for a start band of 2°C and SP value of 100°C, the count down begins once the PV reaches a value within 98°C (SP - Start Band) to 102°C (SP + Start Band). Note that, once the PV enters 'Start Band', the timer continues to run regardless of whether the PV remains within or outside the 'Start Band'.

Hold Band Operation

The timer is also provided with a 'Hold Band' that can be enabled to make sure that the timer counts down *only while* the PV is within the 'Hold Band'. That is, the timer pauses (holds counting down) whenever the PV is outside the 'Hold Band'. The 'Hold Band' is set with respect to the SP and can be set above or below or above and below the SP. For example, a 5 °C Hold Band below the SP (say, 100°C) will force the timer in pause state whenever the PV is equal or less than 95°C (SP - Hold Band).

Power-fail Recovery Modes

The timer facilitates 3 different power-fail recovery modes, viz., *Continue*, *Re-start* and *Abort*. In *Continue* mode, the timer resumes to execute the balance soak time once the PV is detected within Hold Band. In *Re-start* mode, the timer executes the complete set time all over again. In *Abort* mode, the timer stops execution until a start command is issued.

End-of-Soak Events

The output Relay/SSR modules, OP2 and/or OP3, can be configured as End-of-Soak Alarm with a settable alarm duration. That is, upon completion of Soak Time execution, the Relay energizes (say, to activate a buzzer) for the set alarm duration.

Additionally, the controller provides 'Output-Off' strategy that can be enabled to force the control output OP1 off upon End-of-Soak. The output becomes active again after issuance of Start Command for the execution of a new Soak Time Cycle.





PPI
The Perfection Experts

Process Precision Instruments

101, Diamond Industrial Estate, Navghar, Vasai Road (E),
Dist. Palghar - 401 210. Maharashtra, India



Sales : 8208199048 / 8208141446

Support : 07498799226 / 08767395333



sales@ppiindia.net, support@ppiindia.net