

PR502

Profile Controller

OPERATING INSTRUCTIONS

Operating/0812/PR502/Version4, OP105-V04

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Operating/0811/PR502/Version4,OP105-V04

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48 x 48



SALIENT FEATURES

- ◆ **Universal Input**
17 user selectable types including signal inputs.
- ◆ **Selectable lower display**
User selectable lower display option enables quick setting of different parameters such as Set points, Alarms, PID values, Tuning etc.
- ◆ **Outputs**
In signal output models output is selectable as control output or retransmission output.
- ◆ **Profile control**
10 programs each of 16 steps
- ◆ **Special Modes**
User selectable special modes
-Heat-Cool PID
-Auto/Manual
-Single point ramp/soak.
-Soft start.

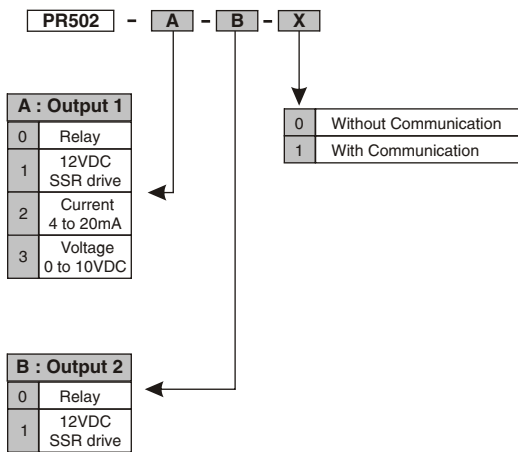
Others

- ▶ 1/16 DIN
- ▶ Dual 4 digit display
- ▶ Digital filtering
- ▶ Sensor break indication
- ▶ Sensor error compensation
- ▶ Programmable parameter lockouts
- ▶ 85 to 270 VAC/DAC supply.
- ▶ Compliance - CE & RoHS

Optional Features

- ▶ Linear DC outputs (0 to 10V, 0 to 5V, 4 to 20mA)
- ▶ RS-485 MODBUS communication
- ▶ 12VDC output to drive SSR.
- ▶ 24 VAC/DC supply voltage models

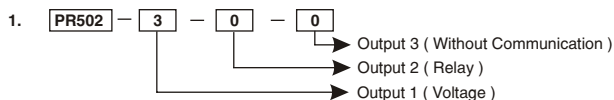
2. ORDERING CODE -



ORDERING EXAMPLE

Note: Input is user selectable.

Only output needs to be specified in the ordering code.



1. TECHNICAL SPECIFICATIONS

1. DISPLAY

Display	Dual 4 digit 7- segment LED Upper display : 10mm high Red (process value) 7mm high Green (selectable)
LED Status Annunciators	Main output (1) Alarm output (2) Manual mode (M) Tune (T)

2. INPUT

Input	Thermocouple: J,K,T,R,S,C,E,B,N,L,U,W,Platinel II RTD: PT100 Signal inputs: -5 to 56 mV, 0 to 10 VDC, 0 to 20 mA DC (Programmable scale type)
Sampling time	250ms
Resolution	1/0.1° for TC/RTD 1/0.1/0.01/0.001 for Analog input. (Decimal point position)
Indication accuracy	±0.25% of span or 1° whichever is greater.
Digital filtering	OFF, 1 to 99 sec.

3. OUTPUT

3.1. Control Output

Relay contact output	Rating: 5A @250 VAC or 30 VDC Life expectancy: 100000 cycles at maximum load rating
SSR drive voltage output (optional)	12 VDC
Current output (Optional)	Range: 4-20 mA DC Action: Control. Update rate: Cycle time. Maximum output load resistance: 500E.
Voltage output (Optional)	Range: 0-10 VDC Action: Control Update rate: Cycle time Minimum output load resistance: 10K

3.2. Alarm Output

Relay contact output (Relay 2)	Rating: 5A @ 250 VAC or 30 VDC Life expectancy: 100000 cycles at maximum load rating
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3.3. Retransmission Output (optional)

Current output	Range: 4-20 mA Action: Retransmission Update rate: 100 ms Maximum output load resistance: 500E
Voltage output	Range: 0-10 V Action: Retransmission Update rate: 100 ms Minimum output load resistance: 10K

3. FUNCTION

Main control	Control: PID or ON/OFF Output: Time proportioning or Linear DC Proportional band: 0 to 400° Integral time: 0 to 3600 sec Derivative time: 0 to 200 sec Cycle time: 0.1 to 100.0 sec Auto tune Programmable % output
Heat-cool PID mode	Control: PID or ON/OFF Output: Time proportioning Proportional gain: 0 to 400 Cycle time: 0.1 to 100.0 sec Heat/Cool dead band overlap: Programmable
Alarms	Modes: Deviation high, Deviation low, Band, Full scale high, Full scale low, Sensor break. Operation: Absolute or Deviation mode Hysteresis: Programmable Hold/Standby mode: Programmable Annunciator: Programmable Reset action: Programmable - Automatic or latched Probe break action: Upscale
Profile	Number of profile programs: 10 Number of steps in each program: 16 Other profile parameters: Link profiles, Programmable repeat cycles, Power down resume/restart options, Deviation hold, Alarm at each step with settable alarm duration.

4.3. Serial communication

Interface standard	RS 485.
Communication address	1 99, maximum of 32 units per line.
Transmission mode	Half duplex.
Transmission protocol	MODBUS RTU.
Transmission distance	500 m maximum.
Transmission speed	9600, 4800, 2400, 1200, 600, 300 bits/sec.
Parity	None, Odd, Even, Mark, Space.
Stop bits	1 or 2
Response time	100ms (max and independent of baud rate).

5. ENVIRONMENTAL CONDITIONS

Operating range	0 50°C
Storage range	-20 75°C.
Storage humidity	85% max. RH (non condensing) from 0 to 50°C


6. POWER SUPPLY

Power supply	85 270VAC/DC. (Optional 24VAC/DC)
Frequency	50/60Hz.
Power consumption	5 VA max.

7. ISOLATION BREAKDOWN RATINGS.

AC line w.r.t. all inputs and outputs	2000 volts.
All other inputs and outputs w.r.t. Relay contacts	2000 VAC.

8. SAFETY AND EMC STANDARDS.

Compliance	CE & 
LVD	As per BS EN 61010.
EMC	As per BS EN 61326.
Panel sealing	IP66.

9. WEIGHT : 195 gms

10. INPUT SENSOR RANGES (for 1°C resolution):

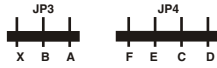
Sensor type	Range	Sensor type	Range
J	- 200 to 750°C	E	- 200 to 750°C
K	- 200 to 1350°C	B	+149 to 1820°C
T	- 200 to 400°C	N	- 200 to 1300°C
R	0 to 1750°C	L	- 200 to 600°C
S	0 to 1750°C	U	- 200 to 900°C
C	0 to 2300°C	W	0 to 2300°C
Platinel II	0 to 1390°C	PT100	- 100 to 850°C

Signal inputs (scalable)

Input type	Range
Linear mV	-5 to 56mV
Voltage	0 to 10 VDC
Current	0 to 20mA

11. INPUT SELECTION JUMPER ASSIGNMENTS:

Short respective pins of JP3 & JP4 as per the table given below for hardware selection of input sensor types:



Input type	JP3	JP4
TC / RTD / LIN (mV)	(XB)	(FE)
0 - 10V	(XA)	(FC)
4 - 20 mA	(BA)	(ED)

NOTE : Sensor selection to be done in Level 0 of programming also.

1. SAFETY INFORMATION

SAFETY SUMMARY

This manual is meant for the personnel involved in wiring, installation, operation, and routine maintenance of the equipment. All safety related codifications; symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating personnel as well as the instrument.

If the equipment is not handled in a manner specified by the manufacturer it might impair the protection provided by the equipment.

- CAUTION: Read complete instructions prior to installation and operation of the unit.
- CAUTION: Risk of electric shock.

INSTALLATION INSTRUCTIONS

- CAUTION:
 - 1.This equipment, being built-in-type, normally becomes a part of the main control panel and in such case the terminals do not remain accessible to the end user after installation and internal wiring.
 - 2.Conductors must not come in contact with the internal circuitry of the equipment or else it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.
 - 3.Circuit breaker or mains switch must be installed between power source and supply terminals to facilitate power 'ON' or 'OFF' function. However this switch or breaker must be installed in a convenient position normally accessible to an operator.
- CAUTION:
 - 1.The equipment shall not be installed in environmental conditions other than those specified in this manual.
 - 2.Fuse Protection - The equipment does not contain built-in fuse. Installation of external fuse for electrical circuitry is highly recommended. Recommended rating of such fuse shall be 275VAC/1Amp.
 - 3.Since this is a built-in type equipment (finds place in main control panel), its output terminals get connected to host equipment. Such equipment shall also comply with basic EMI/EMC and safety requirements like BS EN 61326-1 and BS EN 61010 respectively.
 - 4.Thermal dissipation of equipment is met through ventilation holes provided on chassis of equipment. Such ventilation holes shall not be obstructed else it can lead to a safety hazard.
 - 5.The output terminals shall be strictly loaded to the manufacturer specified values/range.

WIRING INSTRUCTIONS

CAUTION:

- 1.To prevent the risk of electric shock power supply to the equipment must be kept OFF while doing the wiring arrangement.
- 2.Terminals and electrically charged parts must not be touched when the power is ON.
- 3.Wiring shall be done strictly according to the terminal layout with shortest connections. Confirm that all connections are correct.
- 4.Use lugged terminals to meet M3.5 screws.
- 5.To eliminate electromagnetic interference use of short wire with adequate ratings and twists of the same in equal size shall be made.
- 6.Cable used for connection to power source, must have a cross section of 1 or greater. These wires shall have insulation capacity made of at least 1.5KV.

ELECTRICAL PRECAUTIONS DURING USE

Electrical noise generated by switching of inductive loads can create momentary disruption, erratic display, latch up, data loss or permanent damage to the Instrument. to reduce noise:

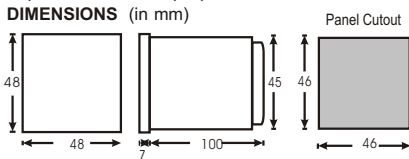
- A) Use of MOV across supply of temperature controller & snubber circuits across loads are recommended. Part numbers are as follows:
 1. MOV: AP-MOV-03 2. Snubber: APRC-01.
- B) Use separate shielded wires for inputs.
- C) The unit should preferably be shielded from the contactor.

INSTALLATION GUIDELINES

Mechanical Installation:

For installing the controller

- 1.Prepare the panel cutout with proper dimensions as shown.



- 2.Remove the clamp from the controller.
- 3.Push the controller into the panel cutout. Secure the controller in its place by pushing the clamp from the rear side.

CAUTION:

The equipment in its installed state must not come in close proximity to any heating sources, caustic vapors, oils, steam, or other unwanted process by-products.

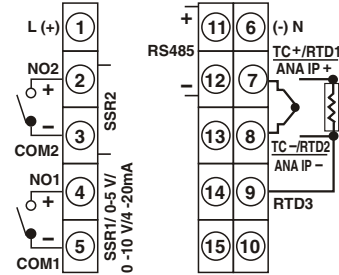
EMC Guidelines:

- 1.Use proper input power cables with shortest connections and twisted type.
- 2.Layout of connecting cables shall be away from any internal EMI source.

MAINTENANCE

- 1.The equipment should be cleaned regularly to avoid blockage of ventilating parts.
- 2.Use soft cloth for cleaning. Do not use isopropyl alcohol or any other organic cleaning agent.

2. TERMINAL CONNECTIONS

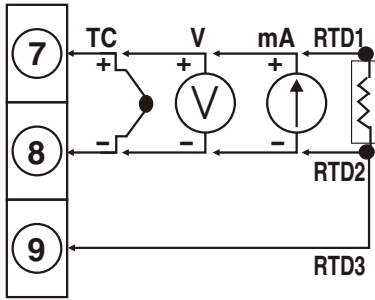


NOTE: Terminals 11 to 15 are optional

TERMINAL DESCRIPTIONS	
1	LIVE (SUPPLY)
2	NO of relay 2
3	COM of relay 2
4	NO of relay 1
5	COM of relay 1
6	NEUTRAL (SUPPLY)
7	Positive of thermocouple or RTD1 (Pt100) or Analog input +ve
8	Negative of thermocouple or RTD2 (Pt100) or Analog input -ve
9	3rd wire of RTD (Pt-100)
11	Positive of RS485
12	Negative of RS485

Optional

3. SENSOR INPUT WIRING



TC - Thermocouple (J, K, T, R, S, C, E, B, N, L, U, W, Platineel II).

V - Voltage Input (0 to 10 V DC).

mA - Current Input (0 to 20mA DC)

RTD - PT100.

- *NOTE :**
- 1) Refer input type selection in level 0.
 - 2) Refer input jumper selection as in point no. 11 in specifications.
 - 3) For 2 wire RTD short terminals 8 & 9 .

4. CONTROL OUTPUT WIRING

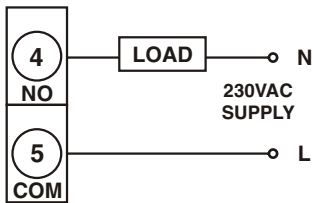


Fig1. Output 1 relay to drive load (resistive load less than 1A).

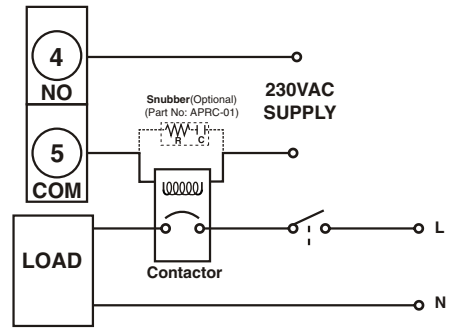


Fig2. Output 1 relay or SSR to drive contactor (For single phase).

NOTE: Use snubber as shown above to increase life of internal relay of temperature controller.

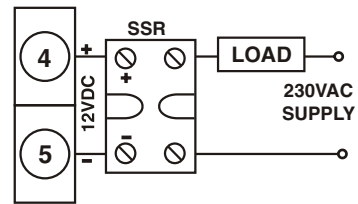


Fig3. Output 1 pulsed voltage to drive SSR.

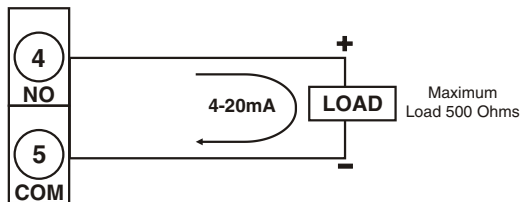


Fig4. Output 1 linear current.

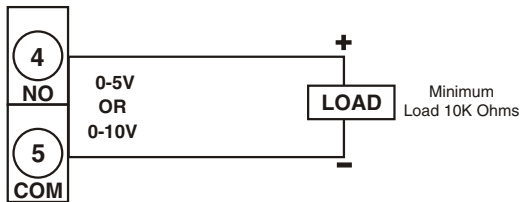


Fig5. Output 1 linear voltage.

NOTE:

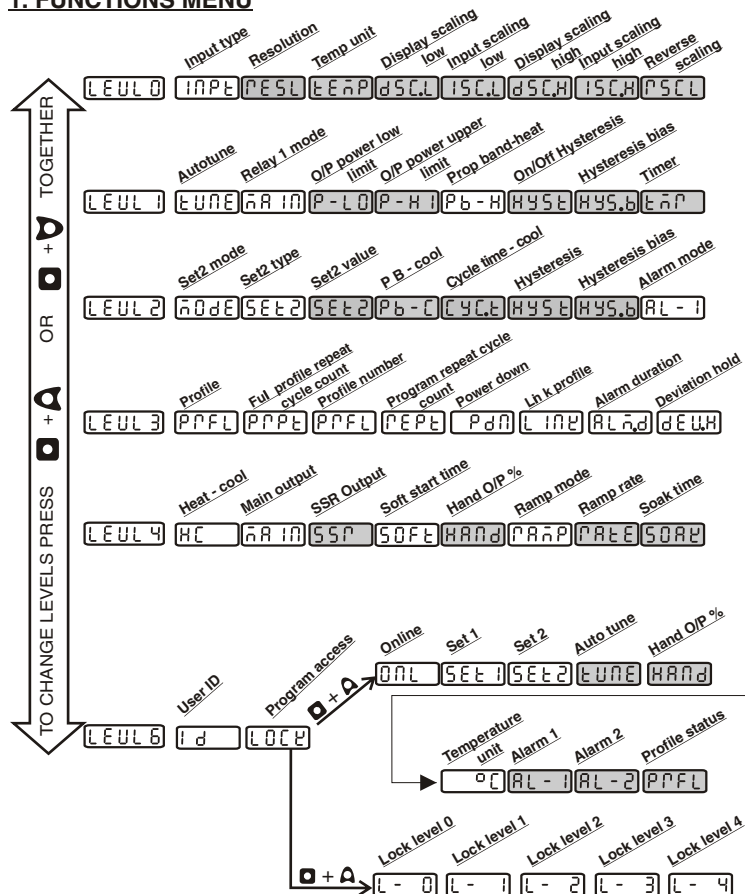
For output 2

1) Configuration is same.

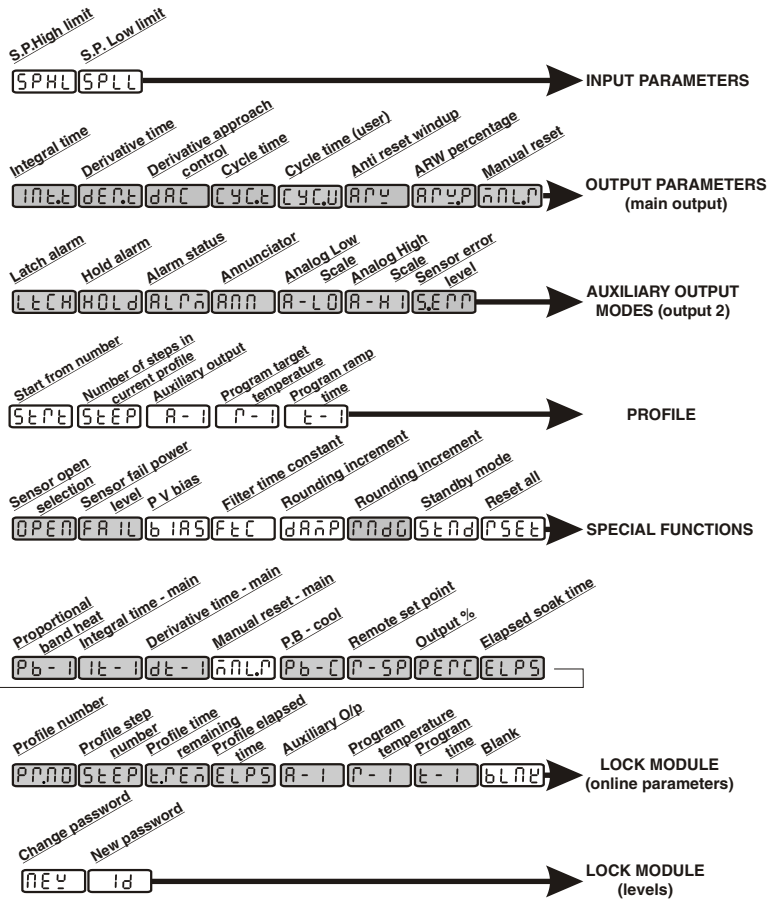
2) Terminal nos -

Output 2 : 2 - 3.

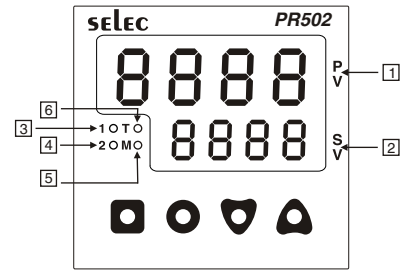
1. FUNCTIONS MENU



☞ Appearance of all shaded menus dependent on selection of other parameters.



NOTE:- LEVEL 5- Communications Module.



2. KEYS DESCRIPTION

Functions	Key press
To enter or exit program mode	▲ + ▼ together for 3 seconds
To change levels	▲ or ▼ till Level is displayed. ◻ + ▲ / ▼ to increase or decrease the level number.
To view function on the same level and to display the current option.	▲ or ▼ key once to view the next/previous function.
To increase or decrease the value of a particular function.	◻ + ▲ to increase and ◻ + ▼ to decrease the function value.
To view and change parameters online	○ key to view the parameter and ◻ + ▲ / ▼ to change the parameter value.

NOTE: The unit will autoexit program mode after 60 seconds of inactivity.

INDICATIONS AND DISPLAY

1	Process-value (PV)	Display the process temperature value.
2	Set-value (SV)	Display various set value and parameter
3	Relay 1	Indicates the status of relay 1.
4	Relay 2	Indicates the status of relay 2.
5	M	Indication for manual output
6	T	Indication for tune in progress.

PROGRAMMING OF LEVELS

3. LEVEL 0 - INPUT PARAMETERS

Display	Name & Description	Range	Display condition	Default value	
INPE	<u>Input type</u> Select input type as Thermocouples: J,K,T,R,S,C,E, B,N,L,U,W. PlatineI II. RTD: Pt100 Signal Inputs: Linear mV (-5 to 56mV), Voltage (0 to 10V), Current (4 to 20mA). Refer table on page 6 for input ranges.	J / E / E / P / S / E / E / B / R / L / U / U / P / R / L / P / 0 0 / R / I 0 0 / 2 0 R	—	—	J
RESL	<u>Resolution</u>	TC * / RTD: 1 / 0.1 Analog input: 1 / 0.1 / 0.01 / 0.001	Not prompted for R, S, and B type thermocouple	1	
TEEP	<u>Temperature unit</u>	°C / °F	TC/RTD inputs.	°C	
DSCL	<u>Display value scaling point1</u> #1 Feed the value of the display required at the low value of analog input	-9999 to Display value scaling point2	Analog input.	0	
ISCL	<u>Input value scaling point1</u> Feed the lower value of the analog input signal.	0.0 mA / - 5.0 mV / 0.0 Vto Input value scaling point2	Analog input.	As per input type selected.	
DSCH	<u>Display value scaling point2</u> #1 Feed the value of display required at the high value of analog input	Display value scaling point1 to 9999	Analog input.	9999	

* - Fixed 1°C resolution for R, S, B type thermocouple.

Display	Name & Description	Range	Display condition	Default value
ISCH	<u>Input value scaling point2</u> Feed the higher value of the analog input signal.	Input value scaling point1 to 2000 mA / 56 mV / 10.00 V	Analog input.	As per input type selected.
PSCL	<u>Reverse scaling</u> Display scaling points can be reversed.	00 / 995	Analog input.	00
SPHL	<u>Set point high limit</u> #1	Set point low limit to max. sensor range value. Set point low limit to 9999 for analog input.	—	750
SPLL	<u>Set point low limit</u> #1	Min. range of sensor to Set point high limit. - 1999 to Set point high limit for analog input.	—	- 200

Note: 1. Whenever resolution is changed from 1 to 0.1 SPLL and SPHL is limited to -199 and 999 respectively.
2. #1 - Display is with fixed 1° resolution for TC/RTD and as per decimal point selected for analog input.

PARAMETER EXPLANATIONS :

● **TEMPERATURE UNIT:**

The temperature unit is selectable between °C and °F. When temperature unit is changed, the temperature ranges will also be changed according to the present selection of unit. If changed, be sure to check all parameters.

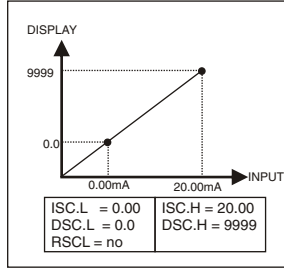
● **RESOLUTION:**

The resolution is selectable between 1 and 0.1 for TC and RTD inputs whereas it is selectable between 1, 0.1, 0.01, 0.001 for analog inputs. If changed, be sure to check all parameters.

PARAMETER EXPLANATIONS: (contd...)

• **SCALING FOR ANALOG INPUT:**

To scale the controller, two scaling points are necessary. Each scaling point has a coordinate pair of Display Values and Input Values. It is recommended that the two scaling points be at the low and high ends of the input signal being measured. Process value scaling will be linear between and continue past the entered points to the limits of the input range. (Factory settings example will display 0.0 at 0 mA input and display 9999 at 20.00 mA input.)



Reverse acting indication can be accomplished by setting reverse scaling parameter as YES. In this case the parameter values will be as follows:

ISC.L = 0.00	ISC.H = 20.00
DSC.L = 9999	DSC.H = 0.0
RSCL = yes	

• **SET POINT LIMIT VALUES:**

The controller has programmable high and low set point limit values to restrict the setting range of the set point. Set the limit values so that the temperature set point value cannot be set outside the safe operating area of the process.

4. LEVEL 1 - OUTPUT PARAMETERS

Display	Name & Description	Range	Display condition	Default value
SEt	Set Mode	ALL/ZONE	Zone PID = YES.	ALL

If Set Mode = All and Zone PID = NO the following parameters will be prompted.

Display	Name & Description	Range	Display condition	Default value
ETUNE	Auto tune	OFF/ON	PID control	OFF
ETUNE	Tune percentage	P. AU 75 to 100	Tune = ON	PAU
RAIN	Relay1 Mode	PE/Fd	Heat-cool = NO.	PE

4. LEVEL 1 - OUTPUT PARAMETERS

Display	Name & Description	Range	Display condition	Default value
P-L0	Output power lower limit	0 % to O/P power upper limit; +100 % to output power upper limit (in heat-cool mode)	PID control	0
P-H1	Output power upper limit	O/P power low limit to 100%; -100% to output power upper limit (in heat-cool mode)	PID control	100
Pb-1	Proportional band- heat	0 to 400.0°	—	10
HYSL	ON-OFF control hysteresis	0.1 to 99.9	ON-OFF control*	1.0
HYSb	Hysteresis bias	TC/RTD: -9.9 to 9.9° Analog input: -9.9 to 9.9 as per decimal point selected	ON-OFF control*	0.0
ETOP	Timer	0.0 to 99.9 minutes	Relay mode is Fd and control is ON-OFF.	0.0
IT-1	Integral time	0 to 3600 sec.	PID control	120

* Note : For operating in ON-OFF mode make proportional band=0

Display	Name & Description	Range	Display condition	Default value
dE-1	Derivative time	0 to 200 seconds	PID control	30
dAC	Derivative approach control	0.5 to 5.0 (x band)	PID control	1.0
CYCLt	Cycle time	USEP / USEP / R 15.0	PID control	USEP
CYCU	Cycle time-user	0.1 to 100.0	Cycle time = USEr	15.0
ARW	Anti-reset windup	ARUt0 / ARAnL	PID control	ARUt0
ARW.P	Anti-reset windup %	20.0 to 200.0 %	ARW = MAnL	100.0
MANLn	Manual Reset	-99.9 to 99.9 (for 0.1°C resolution) 99 to 99°C (for 1°C) -999 to 999 (for analog input)	Proportional control (Pb-H>0 & Int.t=0)	0

If Set Mode = Zone and Zone PID = YES, the following parameters will be prompted.

Programming Menu for PID Zones

Display	Name & Description	Range	Display condition	Default value
2-n0	Zone number	1 to 4	Zone PID= YES(in level4)	1
2.5P.n	Zone set point	SPLL to SPHL	_____	0
Pb-n*	Proportional band	0 to 400.0°	_____	10
It-n*	Integral time	0 to 3600 sec.	Pb - n > 0	120
dE-n*	Derivative time	0 to 200 sec.	Pb - n > 0	30

*NOTE: For Proportional band, Integral time and Derivative time n = 1 to 4 20

PARAMETER EXPLANATIONS :

● AUTO TUNING:

Auto tuning is a function whereby the controller learns the process characteristics by itself and automatically sets the required P,I and D values. The new P,I,D parameters will be stored in non-volatile memory automatically. TUNE ON is indicated by a blinking decimal point in the upper display.(for detailed explanations of PID parameters refer USER GUIDE).

● OUTPUT POWER LIMITS:

These parameters are used to limit the minimum and maximum controller output power. The output power lower limit will ensure that a minimum percentage of output (as per requirement) is available in case any process disturbances or setpoint changes occur. The output power high limit ensures that in case any process disturbance or set point changes occur, the maximum value of output is limited to a value as per requirement.

● TIMER:

TIMER is main output restart time. In this main output once turned OFF will turn ON only after set time even if the temperature has increased and is more than the set temperature. This is needed to prevent the compressor from restarting in a short time(less than the set time).

● CYCLE TIME:

USER: User can program the cycle time. The value will be altered when put to autotune. Ustr.F: User can fix the cycle time. This has the highest priority. AutO: This is recommended. The cycle time value is calculated automatically during autotune.

● ANTIRESET WINDUP:

The anti-reset windup (ARW) inhibits the integral action until the PV is within the proportional band thus reducing overshoot on start-up. If the selection is - 1. AutO: The value will be calculated automatically during autotune (Recommended). 2. ManL: The value can be fed manually by the user.

5. LEVEL 2 - AUXILIARY OUTPUT MODES

Display	Name & Description	Range	Display condition	Default value
n0dE	Set 2 Mode *	ALPn / NONE /Fd /rEV	Not for Heat-cool mode.	ALPn
SEt2	Set 2 Type	AbS /dEV	Set2 mode = Fd / rEV.	dEV
SEt2	Set 2 Value	SPLL to SPHL	Not prompted if Set2 mode = alarm & alarm mode = S. Brk.	0
Pb-C	Proportional band-Cool	0.0 to 400.0	Heat-cool mode	0.0
CYCLt	Cycle time-Cool	0.1 to 100.0 sec	Pb-C>0	15.0

NOTE: * - If set2 mode = none, no other parameters will be prompted.

Display	Name & Description	Range	Display condition	Default value
HYSL	Hysteresis	0.1 to 99.9 °C	Set2 mode=Fd/rEV/ALrM (not sensor break); Heat cool (Pb-C=0)	1.0
HYSB	Hysteresis bias	TC/RTD: -9.9 to 9.9 °C Analog input: -99 to 99 as per resolution selected.	Set2 mode=Fd/rEV/ALrM (not sensor break); Heat-cool (Pb-C=0)	0.0
AL-1	Alarm1 mode	OFF/dUHI/dUd/BSNd/F5H:/F5L/5.6P	Set2 mode=ALrM	dUHI
LATCH	Alarm latch	OFF/ON	These parameters are not prompted if Alarm1 mode is OFF.	OFF
HOLD	Hold Alarm	OFF/ON		OFF
ALrN	Relay status for Alarm1	EN/dEN		EN
ANN	Alarm Annunciator	OFF/ON		OFF
A-LO	Analog low scaling	+999 to 9999	For Analog retransmission if Main output = Relay2 in level 4	0
A-HI	Analog high scaling	+999 to 9999	For Analog output if Main output = Relay2	1000

Display	Name & Description	Range	Display condition	Default value
S.ERR	Sensor error level Incase of sensor failure the output can be set to high or low value of range.	HIGH/LOW	For Analog output if Main output = Relay2	HIGH

NOTE:

In HC mode only the following parameter will be prompted :-

1. Set 2 value - this parameter will be prompted as db (dead band)
2. Proportional band - cool (Pb-C)
3. Cycle time - cool (cyc.t)

In case of analog retransmission only the following parameters will be prompted:

1. A-LO : Analog low scaling.
2. A-HI : Analog high scaling.
3. S.ERR : Sensor error level.

Display is with fixed 1° resolution for TC/RTD and as per decimal point selected for analog input.

PARAMETER EXPLANATIONS :

● **SET 2 MODE:**

ALrM: Set2 can be programmed as alarm.

NonE: If set2 is not required it can be programmed as none.

Fd: Set2 programmed in cooling mode.(output ON when above the setpoint).

rE: Set2 programmed in heating mode.(output ON when below the setpoint)

● **SET 2 TYPE:**

AbS: Absolute alarm is a self-existent alarm independent of the main set point.

DEV: The alarm is activated at an error on the main set point.

● **ALARM MODES:**

(Refer **USER GUIDE** for detailed explanation).

● **ALARM LATCH:**

When Latch is ON, the alarm once activated remains activated even when the error is removed. To deactivate the alarm, it has to be acknowledged by selecting AL-NO from the front online options and pressing **□ + ▲**.

● **HOLD ALARM:**

When HOLD is ON, in any alarm mode, it prevents an alarm signal on power-up. The alarm is enabled only if the process temperature is within the alarm range.

● **ALARM ANNUNCIATOR:**

When alarm annunciator is ON, during alarm condition, visual annunciation is given by the upper display altering between AL-NO and process temperature where NO is the alarm number. The annunciator may be disabled by selecting function ANN as OFF.

6. LEVEL 3 - PROFILE CONTROL

Display	Name & Description	Range	Display condition	Default value
PPFL	Profile	OFF/ON		OFF
PPPE	Full profile repeat cycle count	0 to 99	PPFL=ON	1
PPFL	Profile number	1 to 10	PPFL=ON	1
PEPE	Current profile repeat cycle count	0 to 99	PPFL=ON	1
PdN	Power down resume status	RPSE/STOP/RESU	PPFL=ON	RPSE
LINK	Link Profile	NO/I to 10	PPFL=ON	NO
ALAD	Alarm duration	1 to 99 sec	PPFL=ON	3
DEUH	Deviation hold	d5/EN	PPFL=ON	d5
STEP	Start from step number	1 to 16	PPFL=ON	5-1
SEEP	number of steps in current profile	1 to (17 - start step number)	PPFL=ON	16
A-I	Auxillary output	ON/OFF/ON/ALAN	PPFL=ON	ON
T-I	Program target temperature	SPHL to SPLL	PPFL=ON	0
T-I	Program ramp time (Hr. Min)	00.00 to 99.99	PPFL=ON	0.01

To Make Profile

1. Program the ramp temperature, time etc for each step.
2. Note Full profile Repeat and program repeat to be set 1 if profile is not to be repeated. By programming Repeat profile=0, the profile is repeated indefinitely
3. Current Profile Repeat is the no. of times the current profile is to be repeated.
4. Full profile repeat is the no. of times full profile is to be repeated. This is advantageous in cases when a profile is linked with another profile.

PARAMETER EXPLANATIONS: For parameter explanations refer USER GUIDE.

7. LEVEL 4 - SPECIAL FUNCTIONS

Display	Name & Description	Range	Display condition	Default value
HC	Heat-cool mode The controller can be operated in heat-cool mode if this selection is YES.	NO / YES		NO
ZONE	Zone PID	NO / YES		NO
MAIN	Main Output	(PLY I / ROUT) / PLY2		PLY I / ROUT
SSR	SSR Output	NO / YES	SSR output model	NO
SOFT	Soft start time	OFF, 000 to 999 minutes.	PID control	OFF
HAND	Hand output percentage	OFF, O/P power low limit to O/P power high limit.	PID control	OFF
RAMP	Ramp mode	OFF/HOLD/ON		OFF
RATE	Ramp rate	000 1 to 9999 degree/hour.	Ramp mode =ON/HOLD.	100
SOAK	Soak time	0 to 1440 minutes	Ramp mode =ON/HOLD.	0
OPEN	Sensor open condition	RUET0/ANAL	PID control	RUET0
FAIL	Sensor fail power level	0 to 100 %; -100 to 100 % in case of heat-cool mode.	Sensor open condition = MANL.	0
BIAS	PV bias (Display Offset)	-99.9 to +99.9 for TC (RTD) & -99.9 to +99.9 for AIN models decimal point as per selected.		0.0

Display	Name & Description	Range	Display condition	Default value
F t C	Filter time constant	0FF,1 to 99 seconds	—	1
R n d 0	Rounding increment	0.1 to 10.0 for TC/RTD Display as per resolution for analog input.	TC / RTD with resolution = 1°C or Analog input.	1.0
S t n d	Standby mode	n0 / y e 5	—	n0
R S E E	Reset all	n0 / y e 5	—	n0

PARAMETER EXPLANATIONS :

● **MAIN OUTPUT:**

The main output is selectable between relay1 and relay2 in case of relay output models. For analog retransmission the main output will be Aout and retransmission output will be relay2.

● **SOFT START TIME:**

Soft start time can be programmed in situations where full output is not required at power ON. The time duration for the output to rise from 0% to 100% is programmed as soft start time.

● **HAND OUTPUT PERCENTAGE:**

This parameter can be used when a fixed percentage of output is desired. For example: If 4-20mA analog output is being used and the desired output is 12mA, the hand percentage can be programmed as 50%. This will ensure that the analog output available is fixed 12mA i.e. 50%. Similarly, in case of relay output models the hand output percentage will modify the cycle time according to the percentage programmed.

● **RAMP - SOAK:**

The setpoint ramp feature can reduce thermal shock to the process, reduce temperature overshoot on start-up or set point changes, or ramp the process at a controlled rate. The soak feature can be used to hold the process at a preset temperature for a preset time. It is programmable from 0 to 1440 minutes.

Ramp modes:

- Ramp OFF: Controller will be simple PID/ ON-OFF controller with P, I, D settings/hysteresis setting by user or default.
- Ramp HOLD: Suspends the ramp at the last value,
- Ramp ON: Initiates the Ramp. Ramp rate and soak time settings as program by the user or default.

● **SENSOR OPEN CONDITION:**

The sensor open condition is selectable between Auto and Manual. If the sensor open condition is set to Auto, then all the relays remain off at over range or TC reverse condition. If the selection is Manual then the **sensor fail power level** can be programmed as per requirement.

● **PV BIAS: (DISPLAY OFFSET)**

This function is used to adjust the PV value in cases where it is necessary for PV value to agree with another recorder or indicator, or when the sensor cannot be mounted in correct location.

● **FILTER TIME CONSTANT:**

The filter is an adaptive digital filter that discriminates between measurement noise and actual process changes. If the input signal is increasing too greatly due to measurement noise, increase the filter value. If accurate control is desired, increase the filter time constant whereas if the fastest controller response is required, decrease the filter time constant.

● **ROUNDING INCREMENT:**

This feature can be used if the process is inherently jittery to round off the display to a higher value than "1". Rounding selections other than 1 cause the process value to round to the nearest rounding increment selected. For example, a rounding increment value of 5 causes 122 to round to 120 and 123 to round to 125. This parameter is not applicable when the resolution is 0.1(for TC/RTD). Set point values, Set point limits, Alarm values, Input Scaling values, and Analog Scaling values are not affected by rounding. The rounding increment is for controller's display only and does not affect (improve or degrade) the control accuracy of the unit.

● **STANDBY MODE:**

This feature is useful during machine wiring. If standby mode is selected as YES, the following conditions exist:

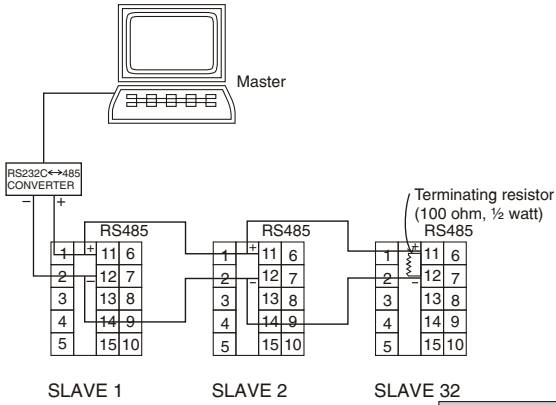
- a. All displays are OFF.
- b. All outputs are OFF i.e. R1, R2, R3 LEDs are OFF.
- c. M LED is ON.
- d. Analog output is limited to the lower range.
- e. All front keys are disabled.
- f. Access to configuration enabled.

The STND status is preserved on Power OFF.

8. LEVEL 5 - COMMUNICATION PARAMETERS (OPTIONAL)

Display	Name & Description	Range	Display condition	Default value
BAUD	Baud Rate	300/600/1200 2400/4800 9600	—	9600
ADDR	Communication station No.	1 to 99	—	1
PARITY	Parity	NONE/EVEN ODD/SPACE	—	NONE
STOP	Stop bit	1/2	—	1

CONNECTION DIAGRAM



Note:
 1. The total cable length should not exceed 500 meters.
 2. Use shielded twisted-pair cables for RS485 connections.
 3. Use terminators having a resistance of 100ohm (1/2 watt).

RS485-RS232 Converter
 Part no.- AC-RS485-RS232-01

9. LEVEL 6 - PROGRAMMABLE PARAMETER LOCKOUT MODULE

Display	Name & Description	Range	Display condition	Default value
ID	User ID	0000 to 9999	—	0000
LOCK	Program access settings #	ONL/LEVL	—	LEVL

If LOCK selection is ONL, the following parameters will be prompted.

Display	Name & Description	Range	Display condition	Default value
SET1	Lock Set 1	UNL/PEAd /LOCY	—	UNL
SET2	Lock Set 2	UNL/PEAd /LOCY	—	UNL
EUNE	Lock tune parameter	UNL/PEAd /LOCY	—	UNL
HAND	Lock Hand parameter	UNL/PEAd /LOCY	—	UNL
Pb-W	Lock proportional band	UNL/PEAd /LOCY	—	UNL
INTE	Lock integral time	UNL/PEAd /LOCY	—	UNL
DERE	Lock derivative time	UNL/PEAd /LOCY	—	UNL
MANR	Lock Manual reset parameter	UNL/PEAd /LOCY	—	UNL
Pb-C	Lock proportional band-cool	UNL/PEAd /LOCY	—	UNL
CHNG	Change password	Id-N/Id-Y	—	Id-N

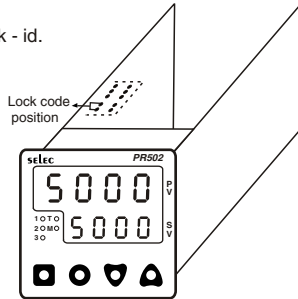
If LOCK selection is LEVEL, the following parameters will be prompted.

Display	Name & Description	Range	Display condition	Default value
L-0	Lock Level 0	UNLK/PERd /LOCK	---	UNLK
L-1	Lock Level 1	UNLK/PERd /LOCK	---	UNLK
L-2	Lock Level 2	UNLK/PERd /LOCK	---	UNLK
L-3	Lock Level 3	UNLK/PERd /LOCK	---	UNLK
L-4	Lock Level 4	UNLK/PERd /LOCK	---	UNLK
CHNG	Change password	Id-A/Id-Y	---	Id-A
NEW	New password	---	NEW = Id-Y	0

NOTE:

UNLK - Full access to the particular level / parameter.
 READ - Particular level / parameter can be read but not edited.
 LOCK - No access to the particular level / parameter.

Insert jumper to reset the lock - id.



ONLINE DISPLAY OPTION

This function allows user to view online display options.

NOTE:

The parameters shown below are not prompted if they are locked in level 6.

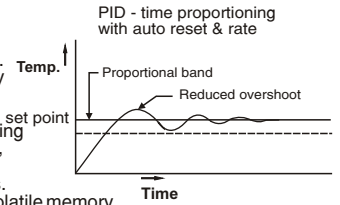
DISPLAY	DESCRIPTION	DISPLAY CONDITION
SEt1	Set point 1	---
SEt2	Set point 2	Online access for Set 2 not valid if Auxillary output = Sensor Break / OFF.
EUNE	Auto tune	Online access for Auto tune is valid only if PB-Heat=0 and HC=no or PB-Cool=0.
HAND	Hand output percentage	This parameter is not prompted if Pb- H = 0
Pb-1	Proportional band - heat	---
It-1	Integral time	Integral time is not prompted if PB = 0
dE-1	Derivative time	Derivative time is not prompted if PB = 0
MANR	Manual reset	Manual reset is prompted only if Integral-main=0 and PB-heat>0.
Pb-C	Proportional band - cool	This parameter is prompted only if HC = yes.
R-SP	Ramp set point	This parameter is prompted only if Ramp is ON / Hold. This parameter is read only and cannot be altered.
PERC	Output percentage	This parameter is read only and cannot be altered.

DISPLAY	DESCRIPTION	DISPLAY CONDITION
ELPS	Elapsed soak time	Note: This parameter is prompted only if Ramp is ON / Hold. This parameter is read only and cannot be altered.
°C / °F	Temperature unit	Note: This parameter is not prompted for 0-10 V / 4-20mA. This parameter is read only and cannot be altered.
AL-1	Alarm acknowledge 1	Note: This parameter is prompted only if Alarm1 is ON and Latch is ON.
PPFL	Profile status	RUN/STOP/HOLD
PPNO	Profile number	Displays the current profile number.
STEP	Profile step number	Displays the current step number of the running profile.
ETERN	Profile time remaining	Displays the time remaining for the current step.
ELPS	Profile elapsed time	Displays the elapsed time for the current step.
A-1	Auxiliary output status	ON / OFF / Not applicable / Alarm
P-1	Program temperature	SPLL to SPHL
t-1	Program ramp time	00.00 to 99.59
Blank	Blank	—

USER GUIDE

• **AUTO TUNING:**

Auto tuning is a function whereby the controller learns the process characteristics by itself and automatically sets the required P,I and D values. The auto-tuning function can be activated at any time during the process after power ON, while temperature is rising or when control has stabilized. Autotune is indicated by T LED blinking. After the auto tuning procedures are completed, the T LED will stop flashing and the unit will revert to PID control by using its new PID values. The PID values obtained are stored in the nonvolatile memory.



The auto-tuning is applied in cases of:

- Initial setup for a new process
- The set point is changed substantially from the previous auto-tuning value.
- The control result in unsatisfactory.

The following controller parameters are automatically adjusted by Auto-tune according to the characteristics of the process:

- Proportional Band (Pb-1)
- Integral Time (It-1)
- Derivative Time (dt-1)
- Input Filter (FtC)

If the control performance by using auto-tuning is still unsatisfactory, the following rules can be applied for further adjustment of PID values:

ADJUST MENT SEQUENCE	SYMPTOM	SOLUTION
(1) Proportional Band (PB)	Slow Response	Decrease PB
	High overshoot or Oscillations	Increase PB
(2) Integral Time (IT)	Slow Response	Decrease IT
	Instability or Oscillations	Increase IT
(3) Derivative Time (TD)	Slow Response or Oscillations	Decrease TD
	High Overshoot	Increase TD

- **MANUAL TUNING:**

In certain applications (very few) using auto-tuning to tune a process may be inadequate for the control requirement, then you can try manual tuning.

Manual tuning procedure

1. Set the proportional band (Pb-1) to 10.0°C.
2. Set the integral time (It-1) and derivative time (dt-1) to 0 sec.
3. Set output cycle time (CYC.t) in output parameter module to on higher than 1/10 of the process time constant (when applicable).
4. Place controller in manual control and set % power to drive the process value to the desired value. Make certain that the controller can drive the process to the setpoint. Allow the process to stabilize after setting the % power.
5. Place controller into Automatic control. If the process will not stabilize and starts to oscillate, set the proportional band 2x higher and go back to step 4.
6. If the process is stable, decrease proportional band setting by 2x and change the setpoint value a small amount to excite the process. Continue with this step until the process oscillates in a continuous nature.
7. Fix the proportional band to 3x the setting that just caused the oscillations.
8. Set the integral time to 2x the period of the oscillations.
9. Set the derivative time to 1/8 (0.125) the integral time.

- **PROPORTIONAL BAND:**

Proportional band is the area around the set point where the controller is actually controlling the process; the output is at some level other than 100% or 0%.

In PR502, proportional band is expressed in terms of degree centigrade.

If the proportional band is too narrow an oscillation around the setpoint will result. If the proportional band is too wide the control will respond in a sluggish manner, could take a long time to settle at set point and may not respond adequately to upsets.

- **MANUAL RESET:**

Virtually no process requires precisely 50% output on single output controls or 0% output on two output controls. The adjustment called manual reset allows the user to redefine the output requirement at the setpoint. A proportioning control without manual or automatic reset will settle out somewhere within the proportioning band but likely not on the setpoint.

- **INTEGRAL TIME:**

Integral time is defined as the time, in seconds, which corrects for any offset (between setpoint and process variable) automatically over time by shifting the proportioning band. Integral action (also known as "automatic reset") changes the output power to bring the process to setpoint. Integral times that are too fast (small times) do not allow the process to respond to the new output value. This causes over-compensation and leads to an unstable process with excessive overshoot. Integral times that are too slow (large times) cause a slow response to steady state errors. Integral action may be disabled by setting the time to zero. If time is set to zero, the previous integral output power value is maintained. If integral action is disabled, manual reset is available by modifying the output power offset ("MNL.r" initially set to zero) to eliminate steady state errors. The controller has the feature to prevent integral action when operating outside the proportional band. This feature is called "antireset wind-up".

- **DERIVATIVE TIME**

Derivative action is used to shorten the process response time and helps to stabilize the process by providing an output based on the rate of change of the process. In effect, derivative action anticipates where the process is headed and changes the output before it actually "arrives". The derivative time is calculated in seconds. Increasing the derivative time helps to stabilize the response, but too much derivative time coupled with noisy signal processes, may cause the output to fluctuate too greatly, yielding poor control. None or too little derivative action usually results in decreased stability with higher overshoots. No derivative action usually requires a wider proportional and slower integral times to maintain the same degree of stability as with derivative action. Derivative action is disabled by setting the time to zero.

- **DERIVATIVE APPROACH CONTROL:**

Derivative approach control (DAC) helps in reducing overshoot at startup. The control output cutoff point is derived as $DAC * Proportional\ band$. Note that the DAC value is automatically calculated and fed after autotuning (if tuning is initiated at startup).

- **AUTO-TUNE OF HEAT/COOL SYSTEMS:**

During Auto-Tune of heat/cool systems, the controller switches the cooling output (O2) ON and OFF in addition to the heat output (O1). The heat/cool overlap deadband parameter (db in Level 2) determines the amount of overlap or deadband between the two outputs during Auto-Tune. For most applications, set this parameter to 0.0 prior to starting Auto-Tune. After the completion of Auto-Tune, this parameter may need to be reset. It is important that external load disturbances be minimized, and if present, other zone controllers idled as these may have an effect on the PID constant determination. Some water cooled processes exhibit an extreme non-linear gain characteristic. That is, the process cooling gain starts very high and flattens out deeper into the cooling region. This effect may result in regular oscillations at setpoint as the controller applies heat to counteract the effect. These processes may benefit from a lower cooling fan setting and/or reduced water flow in the jacket or manifold. The process heat and cool gains should be balanced as much as possible, and the controller gains adjusted to the process.

● **ALARM MODES:**

1. Absolute alarms (Independent Alarm) :

Absolute alarm is a self-existent alarm independent of the main set point. For eg. If the main set point is 100°C and absolute alarm is set as 110°C, the alarm will be activated at 110°C.

There are two absolute alarms in PR502 -

Full scale High Alarm: sets off alarm signal when temperature rises above set point to a pre-set temperature above scale minimum. **Refer Fig: d.**

Full scale Low Alarm: sets off alarm signal when temperature falls below setpoint to a pre-set temperature above scale minimum. **Refer Fig: e.**

2. Deviation alarms (Error alarm):

This alarm is activated at an error on the main set point. For eg. If the main set point is 100°C and deviation alarm is set to +5 °C then the alarm will be activated at 100+5=105 °C. In case of deviation band alarm the alarm will be activated on both sides of set point i.e. At 95 and 105.

There are three deviation alarms in PR502 -

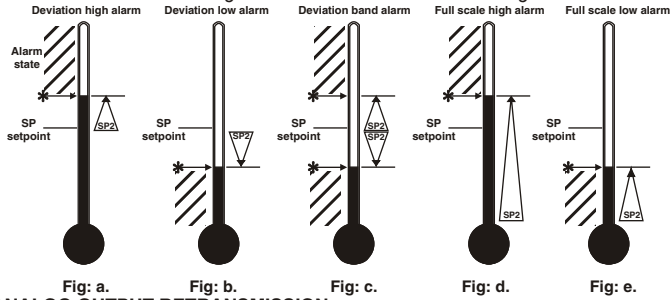
Deviation High Alarm: sets off alarm signal when temperature rises above a pre-set temperature above the set point. **Refer Fig: a.**

Deviation Low Alarm: sets off alarm signal when temperature falls below a pre-set temperature below the set point. **Refer Fig: b.**

Deviation Band Alarm: sets off alarm signal when temperature rises above or falls below a pre-set temperature above or below the set point. **Refer Fig: c.**

3. BREAK ALARM:

Break Alarm: sets off alarm signal when sensor break / under range occurs.



ANALOG OUTPUT-RETRANSMISSION:

1. The analog retransmission output feature allows the retransmission of the control output to an external device.
2. The output is scaled by use of Analog low and high scaling points in level 2 of the programming menu. The analog output will be proportional to PV (derived from Analog Low and High scaling.)
3. A-LO : Displays the value that corresponds to 0V, 0/4mA as selected.
A-HI : Displays the value that correspond to 10V or 20mA as selected.
4. The main output selection in level 4 has to be relay 2.

PROFILE PARAMETERS

Auxiliary output settings: OFF = the auxiliary output will be OFF during the step.

ON = the auxiliary output will be ON during the step. NA = the auxiliary output does not have any interference with the step and that its output will be dependent on the settings done in Level 2. **ALARM** = Alarm can be programmed for specified duration at the end of each step.

1. When entering the time set points, use total elapsed time, not the time differences between steps. i.e. enter the relative time from the start of profile.
2. While linking a profile with another, note that the time is to be started from 0 for the next linked profile. (and not to the relative time from the previous profile).
3. All 10 profiles can be linked resulting in a total of 160 steps. 160 steps can be repeated up to 99 times.

Options of Power down resume:

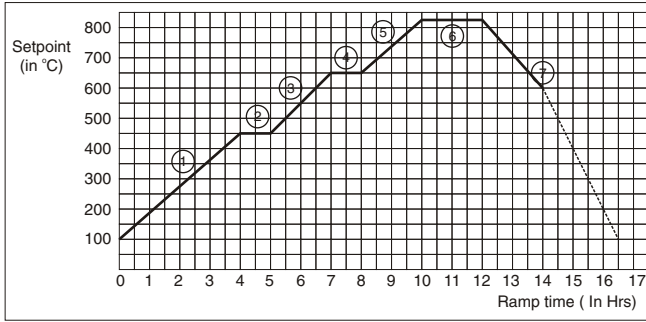
Stop: The profile is in STOP mode at every power ON. To run profile, select RUN command. **Restart:** The selected profile is automatically re-started at power ON (without issuing RUN command) from start. **Resume:** The selected profile is resumed from the same point at power ON that was during power OFF. Note here that if the Process value has dropped to a certain value then the process is in HOLD mode (i.e. Ramp SP and elapsed time is not changed) till the PV reaches the Ramp SP value (the PV value which was at power OFF), Thereafter process resumes.

To Tune the instrument:

1. Make Profile in Level 3 OFF.
2. Set the set point SET1 (from online) at which the instrument is to be tuned. Since there is only one set of PID parameters, set SET1 to a value at which max. optimization in the process is required.
3. Also note that during ramp up/down, PD control is performed. Only during soak time is the full PID operational. Hence it is also advisable to tune at soak temperature.
4. To initiate tuning, set TUNE ON (from online). Tuning is indicated by the Tune LED (T) blinking.
5. Tuning will be terminated if SET1 is less than Ambient (Room temperature).
6. After the tuning is OVER, P, I, D, DAC, Cycle time are calculated internally. One can alter or view these values in Level 1.
7. Make Profile - ON in Level 3,

To run the profile:

1. Ensure Profile in Level 3 is ON with all parameter settings as desired.
2. From online display options, Select Profile No (Pr.NO) to desired value.
3. From online display options, Select Profile (PrFL) as RUN.
4. Once the RUN command is issued, all the profile related online parameters are enabled. One can view / alter any of these online parameters.
5. **To hold a profile,** select Profile (PrFL) = Hold. This will HOLD the Ramp-SP and Elapsed time at the last value.
6. To re-start, select Profile (PrFL) = RUN.
7. **To alter / skip the running step,** select running ramp / time parameters from on-line.
8. One can modify the other steps (if required) in Level 3.
9. Note that the profile related parameters (Repeat, Power down resume, no. of steps, Link) will NOT be re-loaded in running profile if altered while the profile is in RUN / HOLD mode, & from online parameter menu.



Ramp / Soak Profile Example

Prompt	Function	Segment	Value	Prompt	Function	Segment	Value
PPFL	Profile	-	01	R-3	Auxillary output	3	RLPn
PPPE	Full profile repeat cycle count	-	1	P-3	Program target temperature		650
PPFL	Profile number	-	1	E-3	Program ramp time		700
PEPE	Program repeat cycle count	-	1	R-4	Auxillary output	4	RLPn
PdN	Power down resume status	-	RESU	E-4	Program target temperature		650
LINK	Link Profile	-	NO	E-4	Program ramp time		800
RLnd	Alarm duration	-	5	R-5	Auxillary output	5	RLPn
DEUH	Deviation hold	-	EN	P-5	Program target temperature		810
SEPE	Start from step number	-	1	E-5	Program ramp time		1000
SEEP	number of steps in current profile	-	7	R-6	Auxillary output	6	RLPn
R-1	Auxillary output	1	RLPn	P-6	Program target temperature		810
P-1	Program target temperature		450	E-6	Program ramp time		1200
E-1	Program ramp time		400	R-7	Auxillary output	7	RLPn
R-2	Auxillary output	2	RLPn	P-7	Program target temperature		600
P-2	Program target temperature		450	E-7	Program ramp time		1400
E-2	Program ramp time		500				

Draw your ramp/soak profile on the record sheet shown in Figure 4-4 and fill the associated information in the blocks provided. This will give you a permanent record of your program and will assist you entering the Setpoints data.

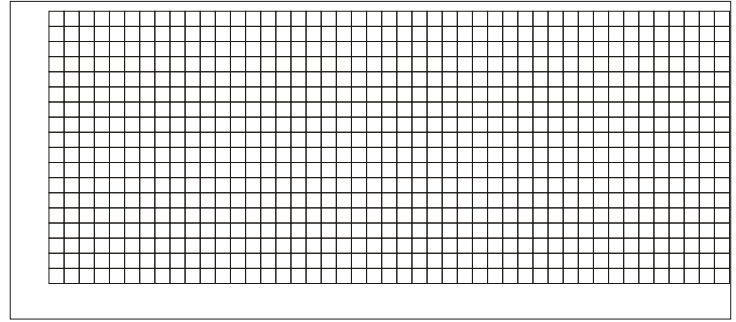


Figure 4-4 Program Record Sheet

Prompt	Function	Value or selection	PROFILE SETTINGS					
PPFL	Profile	_____	R-3	P-3	E-3	R-4	P-4	E-4
PPPE	Full profile repeat cycle count	_____						
PPFL	Profile number	_____	R-5	P-5	E-5	R-6	P-6	E-6
PEPE	Program repeat cycle count	_____						
PdN	Power down resume status	_____	R-7	P-7	E-7	R-8	P-8	E-8
LINK	Link Profile	_____						
RLnd	Alarm duration	_____	R-9	P-9	E-9	R-10	P-10	E-10
DEUH	Deviation hold	_____						
SEPE	Start from step number	_____	R-11	P-11	E-11	R-12	P-12	E-12
SEEP	number of steps in current profile	_____						
PROFILE SETTINGS			R-13	P-13	E-13	R-14	P-14	E-14
R-1	P-1	E-1	R-2	P-2	E-2			
			R-15	P-15	E-15	R-16	P-16	E-16

Configuration Record Sheet

SELEC

Enter the value or selection for each prompt on this sheet so you will have a record of how your controller was configured.

Levels	Function Prompt	Value or Selection	Factory Setting
Input Parametrs	INPE	_____	J
	PESL	_____	I
	EEAP	_____	OC
	DSCL	_____	0
	ISCL	_____	As per input type selected.
	DSCH	_____	9999
	ISCH	_____	As per input type selected.
	PSCCL	_____	NO
	SPHL	_____	750
	SPLL	_____	-200
	Output Parametrs	SEE	_____
EUNE		_____	OFF
EUNE		_____	RAU
ARIN		_____	PE
P-LO		_____	0
P-HI		_____	100
Pb-1		_____	10
HYSL		_____	10
HYSb		_____	0.0
EAAP		_____	0.0
IE-1		_____	120
IE-1		_____	30

Configuration Record Sheet

SELEC

Levels	Function Prompt	Value or Selection	Factory Setting
Output Parametrs	DAC	_____	10
	CYCE	_____	USER
	CYCU	_____	15.0
	APY	_____	AUTO
	APYP	_____	100.0
	ANLN	_____	0
Zone Settings	Z-NO	_____	1
	ZSP1	_____	0
	Pb-1	_____	10
	IE-1	_____	120
	IE-1	_____	30
	ZSP2	_____	0
	Pb-2	_____	10
	IE-2	_____	120
	IE-2	_____	30
	ZSP3	_____	0
	Pb-3	_____	10
	IE-3	_____	120
	IE-3	_____	30
	ZSP4	_____	0
	Pb-4	_____	10

Configuration Record Sheet

SELEC

Levels	Function Prompt	Value or Selection	Factory Setting
Zone Settings	1E-4	_____	120
	dE-4	_____	30
Auxiliary Output Modes	ā0dE	_____	RLPā
	SEEt2	_____	dEU
	SEEt2	_____	0
	Pb-C	_____	0.0
	CYCE	_____	15.0
	HYSL	_____	1.0
	HYS.b	_____	0.0
	AL-1	_____	dUHI
	LECH	_____	OFF
	HOLD	_____	OFF
	ALPā	_____	EN
	AAA	_____	OFF
	A-LO	_____	0
	A-HI	_____	1000
	SEPP	_____	HIGH
	Special Function	HC	_____
ZONE		_____	NO
āRIN		_____	PLY1/ROUTE
SSP		_____	OFF
SOFL		_____	OFF

Configuration Record Sheet

SELEC

Levels	Function Prompt	Value or Selection	Factory Setting
Special Function	HRNd	_____	OFF
	PRāP	_____	OFF
	PREE	_____	100
	SORW	_____	0
	OPEN	_____	AUTO
	FRIL	_____	0
	BIAS	_____	0.0
	FtC	_____	1
	PAdD	_____	1.0
	SEAd	_____	NO
	PSEt	_____	NO
Communication	BRUd	_____	9600
	AdDp	_____	1
	PRPI	_____	NONE
	SEOP	_____	1

Date:

Model No:	Sr. No.:
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Claimed Accuracy: $\pm 0.25\%$ of full scale ± 1 digit (After 20min warmup time)

Sources calibrated against: Hinditron Multimeter Model 86, Sr. No.:1094
Multimeter calibration report no: ERTL(W), Mumbai, INDIA

The calibration of this unit has been verified at the following values:

SENSOR	CALIBRATION TEMP (°C) (0.1 resolution)	DISPLAY VALUE (°C)	SENSOR	CALIBRATION VALUE (0.1 resolution)	DISPLAY VALUE
K	35.0	35.0	Voltage (VDC)	0.0	0.0
	700.0	700.0		10.0	10.0
	1350	1350			
PT100	0.0	0.0	Current (mA)	0.0	0.0
	500.0	500.0		20.0	20.0
	800.0	800.0			

The thermocouple / RTD curves are linearised in this microprocessor based product, and hence the values interpolated between the readings shown above are also equally accurate, at every point in the curve.

Unit is accepted as accuracy is within the specified limit of claimed accuracy and certificate is valid upto one year from the date of issue.

CHECKED BY:
