PROCESS TEMPERATURE CONTROLLER
MULTISPAN PTC- L12A-M1

PV = Process value
SV = Set Value

TECHNICAL SPECIFICATION

INPUT SPECIFICATION:

Input Types	Input	Range
	J	0 to 600°C,
	K	0 to 1200°C,
	PT-100	-99 to 400°C,
	PT.1	-99.9 to 400.0°C,
	0-10V DC	-999 to 9999
	0-20mA DC	-999 to 9999
	4-20mA DC	-999 to 9999
Resolution	J,K,PT-100 = 1°C	
	PT.1 = 0.1°C	
	0-10V DC,0-20mA DC,4-20mA DC = 0.1,0.01,0.001,0001	
Indication Accuracy	±1% of FSD ± 1°C (FSD:- full scale deflection)	

DISPLAY AND KEYS:

Display	128 x 64 Bit Graphical LCD
Keys	SET, INC, DEC, ENT

DIMENSION:

Size	96 (H) x 96 (W) x 52 (D) mm
Panel Cutout	92 (H) x 92 (W) mm

CONTROL METHOD:

Heating	1) PID control with Auto-Tuning 2) ON-OFF control
Cooling	1) BL.TP (Blower Time Proportion) 2) ON-OFF control

OUTPUT SPECIFICATION

Relay Output	
Relay	2 nos.
Relay Type	1 C/O (NO-C)
Rating	5A, 230V AC/30 V DC
Analog Output	
4 to 20 mA DC	
Modbus Output	
Protocol	Modbus RTU Serial
Standard	RS - 485

AUXILIARY SUPPLY

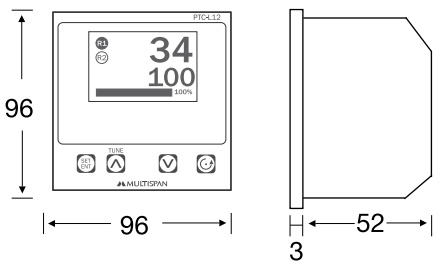
Supply voltage	100 to 250V AC, 50-60Hz
Power consumption (VA RATING)	Approx 7 VA @ 230V AC MAX

ENVIRONMENT CONDITION

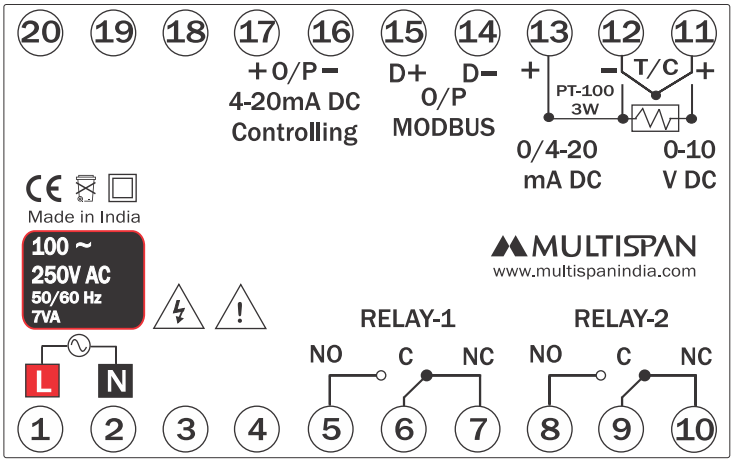
Operating Temp.	0°C to 55°C
Relative Humidity	UP to 95% RH (non-condensing)
Protection Level	IP-65 (Front side) As per IS/IEC 60529 : 2001

MECHANICAL INSTALLATION

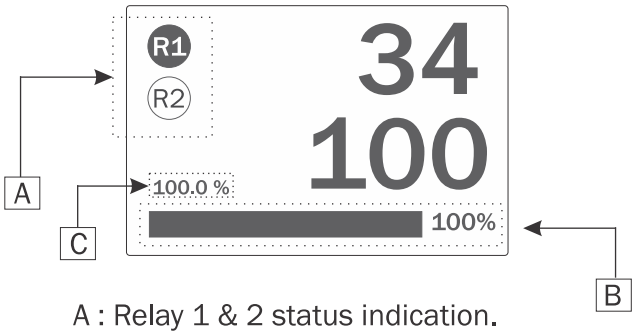
Outline Dimension (mm)	Panel Cutout Dimension (mm)



TERMINAL CONNECTION



DISPLAY INDICATION



A : Relay 1 & 2 status indication.
Blinking, When delay time will count.
B : Analog output indication
C : Analog O/P = Manual % selected
mA will show when Analog O/P =Manual 4-20

: This symbol will indication of alarm or soak time is counting.
Soak end will display when soak time is completed

Tunning start... : When Auto Tune is Running

KEY OPERATION

FUNCTION	PRESS KEY
OPERATOR MODE	
To enter in parameter setting	SET ENT Press for 5 sec
For start/stop PID auto tuning	∧ Press 6 sec
To go in factory setting mode	∧ + ∨ Press 3 sec
To Reset soak process	Long Press
PARAMETER SETTING MODE	
To set parameter value	SET ENT
To increment parameter value.	∧
To decrement parameter value.	∨
Set parameter to be save & exit.	SET ENT

SAFETY PRECAUTION

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

Read complete instructions prior to installation and operation of the unit.

WARNING : Risk of electric shock.

MECHANICAL INSTALLATION GUIDELINES

1. Prepare the panel cutout with proper dimensions as shown above.
2. Fit the unit into the panel with the help of clamp given.
3. The equipment in its installed state must not come in close proximity to any heating source, caustic vapors, oil steam, or other unwanted process byproducts.
4. Use the specified size of crimp terminal (M3.5 screws) to wire the terminal block. Tightening the screws on the terminal block using the tightening torque of the range of 1.2 N.m.
5. Do not connect anything to unused terminals.

MAINTENANCE

1. The equipment should be cleaned regularly to avoid blockage of ventilating parts.
2. Clean the equipment with a clean soft cloth. Do not use isopropyl alcohol or any other cleaning agent.
3. Fusible resistor must not be replaced by operator.

INSTALLATION GUIDELINES

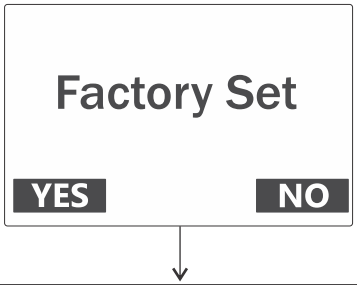
1. This equipment, being built-in-type, normally becomes a part of main control panel and in such case the terminals do not remain accessible to the end user after installation and internal wiring.
2. Do not allow pieces of metal, wire clippings, or fine metallic fillings from installation to enter the product 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 terminal to facilitate power 'ON' or 'OFF' function. However this mains switch or circuit breaker must be installed at convenient place normally accessible to the operator.
4. Use and store the instrument within the specified ambient temperature and humidity ranges as mentioned in this manual.

WARNING GUIDELINES

WARNING : Risk of electric shock.

1. To prevent the risk of electric shock, power supply to the equipment must be kept OFF while doing the wiring arrangement. Do not touch the terminals while power is being supplied.
2. To reduce electro magnetic interference, use wire with adequate rating and twists of the same of equal size shall be made with shortest connection.
3. Cable used for connection to power source, must have a cross section of 1mm or greater. These wires should have insulations capacity made of at least 1.5kV.
4. A better anti-noise effect can be expected by using standard power supply cable for the instrument.

FACTORY SETTING



FACTORY SETTING		
SR.	PARAMETER	VALUES
1	PB	20.0°C
2	IT	300
3	DT	75
4	CT	15 sec
5	MR	0℃
6	OFFSET	0℃
7	HYSTERISIS-1	2℃
8	HYSTERISIS-2	3℃
9	C-PB	4.0℃
10	C-ON	1 Sec
11	C-OFF	48 Sec
12	CRFC	0

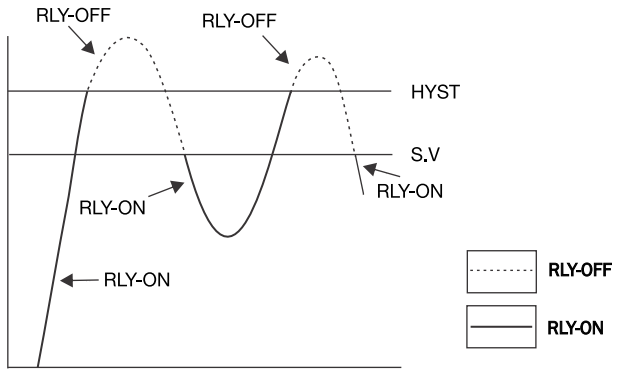
ERROR DISPLAY

When an error has occurred the display indicates error Message as given below.

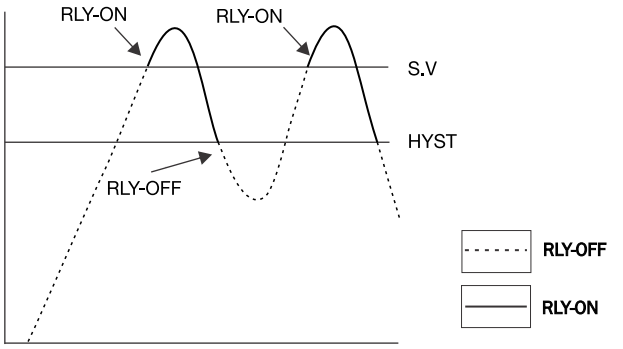
ERROR	MEANING
Sensor Open	Sensor is not connected or Over range condition or sensor break
Sensor Reverse	Sensor connection is reversed
Signal Low Level	When I/P is 4 to 20mA DC is selected, than I/P signal is lower than SLL (0-5mA)

ALARM OPERATION

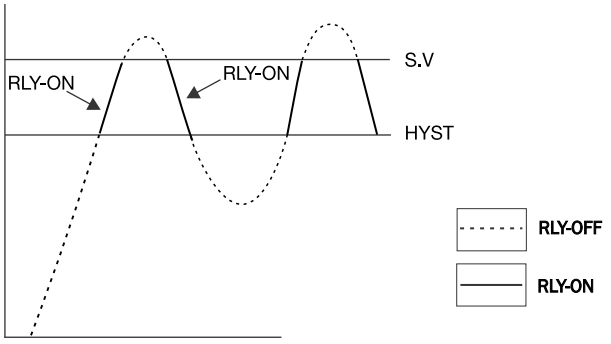
LOW ALARM:



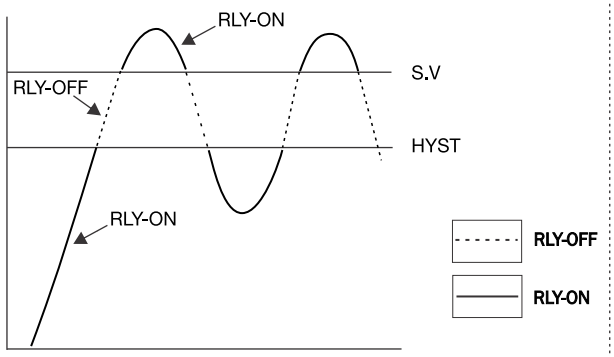
HIGH ALARM:

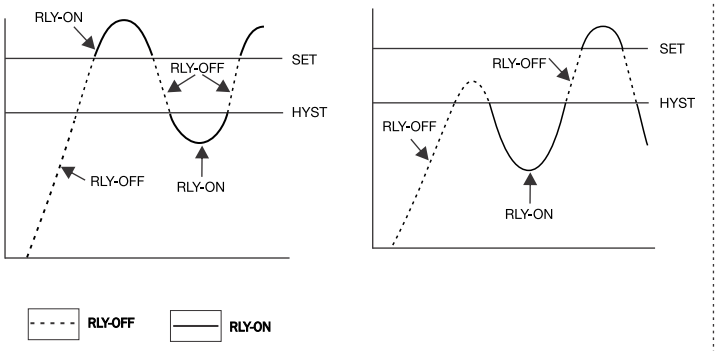


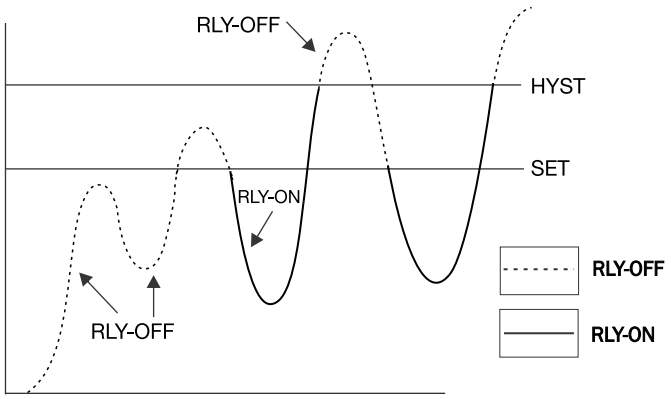
INBAND ALARM



OUTBAND ALARM





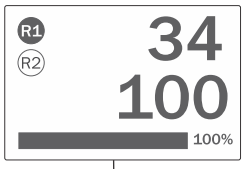


RANGE FOR CONTROL PARAMETER

SR.	PARAMETER	RANGE FOR J,K,PT-100	RANGE FOR PT.1 SENSOR	RANGE FOR ANALOG INPUT	
1	PB	0.0 to 999.9°C	0.0 to 999.9°C	0.0 to 999.9	
2	IT	0 to 9999	0 to 9999	0 to 9999	
3	DT	0 to 9999	0 to 9999	0 to 9999	
4	CT	4 to 99 sec	4 to 99 sec	4 to 99 sec	
5	MR	-9 to 9°C	-9.0 to 9.0°C	DP 3	-0.099 to 0.099
				DP 2	-0.99 to 0.99
				DP 1	-9.9 to 9.9
				DP 0	-99 to 99
6	OFFSET	-20 to 20°C	-20.0 to +20.0°C	DP 3	-0.999 to 0.999
				DP 2	-9.99 to 9.99
				DP 1	-99.9 to 99.9
				DP 0	-999 to 999
7	HYS1	1 to 99°C	1.0 to 99.9°C	DP 3	0.001 to 0.999
				DP 2	0.01 to 9.999
				DP 1	0.1 to 99.99
				DP 0	1 to 99
8	HYS2	1 to 99°C	1.0 to 99.9°C	DP 3	0.001 to 0.999
				DP 2	0.01 to 9.999
				DP 1	0.1 to 99.99
				DP 0	1 to 99
9	C-PB	2.0 to 25.0°C	2.0 to 25.0°C	2.0 to 25.0	
10	C-ON	1 to 20 sec	1 to 20 sec	1 to 20 sec	
11	C-OFF	5 to 200 sec	5 to 200 sec	5 to 200 sec	
12	R1DL	0.0 to 99.59 mm.ss	0.0 to 99.59 mm.ss	0.0 to 99.59 mm.ss	
13	R2DL	0.0 to 99.59 mm.ss	0.0 to 99.59 mm.ss	0.0 to 99.59 mm.ss	
14	ALTM	0 to 99 sec	0 to 99 sec	0 to 99 sec	
15	CRFC	-	-	DP 3	-0.999 to 0.999
				DP 2	-9.99 to 9.99
				DP 1	-99.9 to 99.9
				DP 0	-999 to 999
16	FLTR	-	-	0.1 to 10.0 Sec	
17	Signal Low Limit	-	-	0.0 to 5.0 mA	
18	Soak Time	0 to 999 Hour	0 to 999 Hour	0 to 999 Hour	

PARAMETER SETTING

SETPOINT SETTING



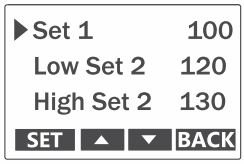
Press SET ENT to Move the Curser From one set point to another set point & Selected Set Point Will Directly Change By or

IF Analog Output ≠ Controlling

OR

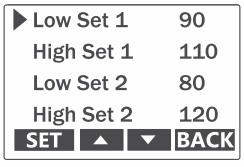
This Display is Show Only When Relay 1 is selected as INBAND/ OUTBAND Or ABOSUTE OUTBAND alarm.

OR



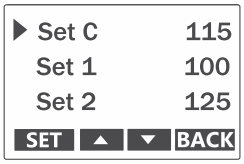
This Display is Show Only When Relay 2 is selected as INBAND/ OUTBAND Or ABOSUTE OUTBAND alarm.

OR



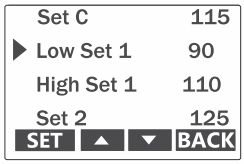
This Display is Show Only When Relay 1 & Relay 2 both are selected as INBAND/OUTBAND Or ABOSUTE OUTBAND alarm.

IF Analog Output = Controlling



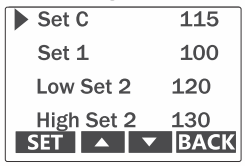
Set C Only Appear when Analog Output is Controlling Selected.

OR



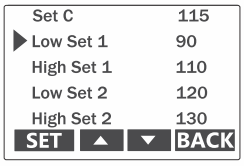
This Display is Show Only When Relay 1 is selected as INBAND/ OUTBAND Or ABOSUTE OUTBAND alarm.

OR



This Display is Show Only When Relay 2 is selected as INBAND/ OUTBAND Or ABOSUTE OUTBAND alarm.

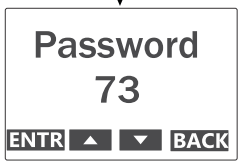
OR



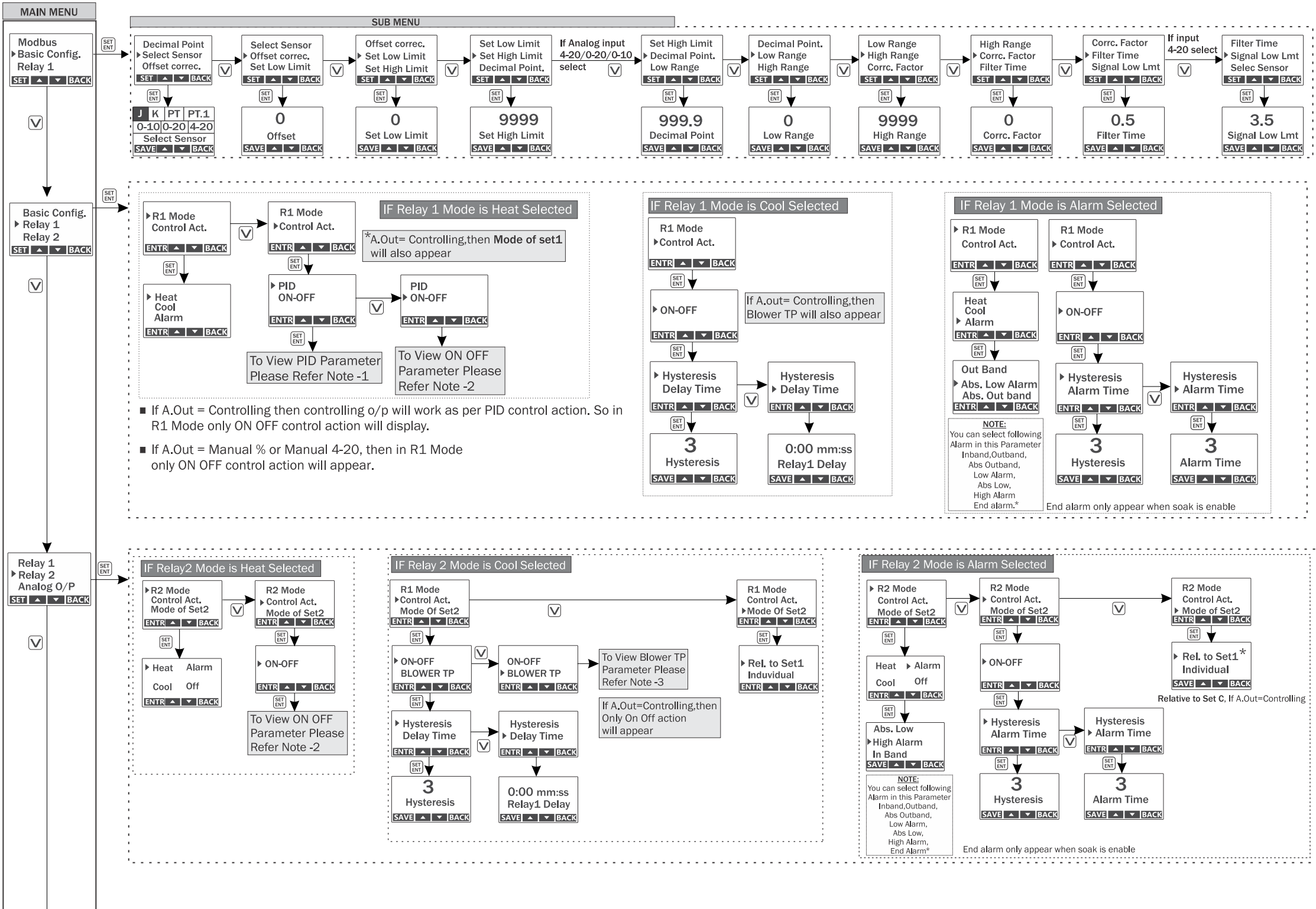
This Display is Show Only When Relay 1 & Relay 2 both are selected as INBAND/OUTBAND Or ABOSUTE OUTBAND alarm.

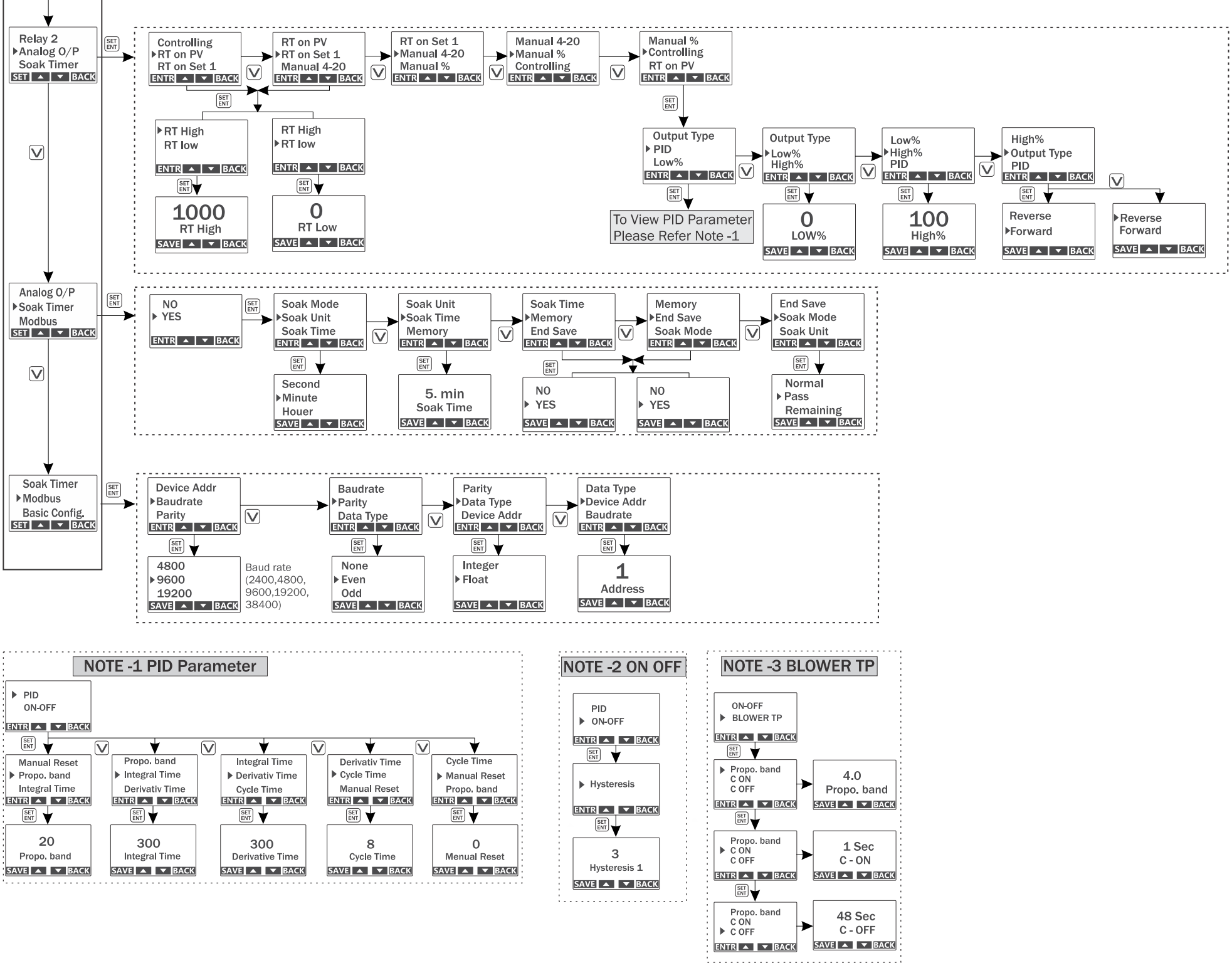
Note: If Relay 1 & Relay 2 both are off, then only SET C will appear

Press SET ENT for 5 sec to Enter in to Password



Enter Password 73


MAIN MENU
SUB MENU
Modbus
Basic Config.
Relay 1
SET BACK
Decimal Point
Select Sensor
Offset correc.
Select Sensor
Offset correc.
Set Low Limit
Offset correc.
Set Low Limit
Set High Limit
Set Low Limit
Set High Limit
Decimal Point.
If Analog input 4-20/0-20/0-10 select
Set High Limit
Decimal Point.
Low Range
Decimal Point.
Low Range
High Range
Low Range
High Range
Corrc. Factor
High Range
Corrc. Factor
Filter Time
Corrc. Factor
Filter Time
Signal Low Lmt
If input 4-20 select
Filter Time
Signal Low Lmt
Selec Sensor
J K PT PT.1
0-10 0-20 4-20
Select Sensor
0
Offset
0
Set Low Limit
9999
Set High Limit
999.9
Decimal Point
0
Low Range
9999
High Range
0
Corrc. Factor
0.5
Filter Time
3.5
Signal Low Lmt
Basic Config.
Relay 1
Relay 2
R1 Mode
Control Act.
Heat
Cool
Alarm
IF Relay 1 Mode is Heat Selected
*A.Out= Controlling,then Mode of set1 will also appear
PID
ON-OFF
To View PID Parameter Please Refer Note -1
To View ON OFF Parameter Please Refer Note -2
IF Relay 1 Mode is Cool Selected
If A.out= Controlling,then Blower TP will also appear
Hysteresis
Delay Time
3
Hysteresis
0:00 mm:ss
Relay1 Delay
IF Relay 1 Mode is Alarm Selected
Out Band
Abs. Low Alarm
Abs. Out band
NOTE:
You can select following Alarm in this Parameter Inband,Outband, Abs Outband, Low Alarm, Abs Low, High Alarm End alarm.*
Alarm Time
End alarm only appear when soak is enable
■ If A.Out = Controlling then controlling o/p will work as per PID control action. So in R1 Mode only ON OFF control action will display.
■ If A.Out = Manual % or Manual 4-20, then in R1 Mode only ON OFF control action will appear.
Relay 1
Relay 2
Analog O/P
IF Relay2 Mode is Heat Selected
R2 Mode
Control Act.
Mode of Set2
Heat
Alarm
Cool
Off
To View ON OFF Parameter Please Refer Note -2
IF Relay 2 Mode is Cool Selected
R1 Mode
Control Act.
Mode Of Set2
ON-OFF
BLOWER TP
To View Blower TP Parameter Please Refer Note -3
If A.Out=Controlling,then Only On Off action will appear
Rel. to Set1
Induvidual
IF Relay 2 Mode is Alarm Selected
Abs. Low
High Alarm
In Band
Rel. to Set1*
Individual
Relative to Set C, If A.Out=Controlling


Relay 2
Analog O/P
Soak Timer
SET BACK
SET ENT
Controlling
RT on PV
RT on Set 1
ENTR BACK
RT on PV
RT on Set 1
Manual 4-20
RT on Set 1
Manual 4-20
Manual %
Manual 4-20
Manual %
Controlling
Manual %
Controlling
RT on PV
RT High
RT low
1000
RT High
SAVE BACK
RT High
RT low
0
RT Low
Output Type
PID
Low%
To View PID Parameter
Please Refer Note -1
Output Type
Low%
High%
0
LOW%
Low%
High%
PID
100
High%
High%
Output Type
PID
Reverse
Forward
Reverse
Forward
Analog O/P
Soak Timer
Modbus
NO
YES
Soak Mode
Soak Unit
Soak Time
Second
Minute
Houer
Soak Unit
Soak Time
Memory
5. min
Soak Time
Soak Time
Memory
End Save
NO
YES
Memory
End Save
Soak Mode
NO
YES
End Save
Soak Mode
Soak Unit
Normal
Pass
Remaining
Soak Timer
Modbus
Basic Config.
Device Addr
Baudrate
Parity
4800
9600
19200
Baud rate
(2400,4800,
9600,19200,
38400)
Baudrate
Parity
Data Type
None
Even
Odd
Parity
Data Type
Device Addr
Integer
Float
Data Type
Device Addr
Baudrate
1
Address
NOTE -1 PID Parameter
PID
ON-OFF
Manual Reset
Propo. band
Integral Time
20
Propo. band
Propo. band
Integral Time
Derivativ Time
300
Integral Time
Integral Time
Derivativ Time
Cycle Time
300
Derivative Time
Derivativ Time
Cycle Time
Manual Reset
8
Cycle Time
Cycle Time
Manual Reset
Propo. band
0
Menual Reset
NOTE -2 ON OFF
PID
ON-OFF
Hysteresis
3
Hysteresis 1
NOTE -3 BLOWER TP
ON-OFF
BLOWER TP
Propo. band
C ON
C OFF
4.0
Propo. band
Propo. band
C ON
C OFF
1 Sec
C - ON
Propo. band
C ON
C OFF
48 Sec
C - OFF

MODBUS

Salve Address :	1 to 127
Baudrate :	2400,4800,9600,19200,38400
Parity :	None,Even,Odd
Datatype :	Sign integer, Float
Read Function Register :	0x03 and 0x04
Write Function Register :	0x06 and 0x10

Note :- When Parameter 32100 = no available
When Process Value 32101 = Initialization Value
When Process Value 32102 = Sensor Open
When Process Value 32103 = Sensor Reverse
When Process Value 32104 = Over Range
When Process Value 32105 = I/P Signal Lower then SLL

Sr.No	Access Type	Parameter	Register Data Type Integer	Register Data Type Float
1	R	Process Value	0	0
2	R	R1 Status Selection: Value On: 1 Off: 0	1	2
3	R	R2 Status Selection: Value On: 1 Off: 0	2	4
4	R	Control Percentage	3	6
5	R	Analog Output Value	4	8
6	R/W	Set1	5	10
7	R/W	Low Set1	6	12
8	R/W	High Set1	7	14
9	R/W	Set2	8	16
10	R/W	Low Set2	9	18
11	R/W	High Set2	10	20
12	R/W	Set3	11	22
13	R/W	Low Set3	12	24
14	R/W	High Set3	13	26
15	R/W	Input Selection: Value J: 0 K: 1 PT-100: 2 PT.1: 3 0 - 10V DC: 4 0 - 20mA DC: 5 0 - 40mA DC: 6	14	28
16	R/W	Out1 Mode Selection: Value Heat: 0 Cool: 1 Alarm: 2 Off Mode: 3	15	30
17	R/W	Control Action1 Selection: Value Pid: 0 On-Off: 1 Blower TP: 2	16	32
18	R/W	Alarm1 Selection: Value End Alarm: 0 Abs Low: 1 High Alarm: 2 In Band: 3 Abs Out Band: 4	17	34
19	R/W	Hys1	18	36
20	R/W	Delay Time1	19	38
21	R/W	Alarm Time1	20	40
22	R/W	Out2 Mode Selection: Value Heat: 0 Cool: 1 Alarm: 2 Off Mode: 3	21	42
23	R/W	Control Action2 Selection: Value Pid: 0 On-Off: 1 Blower TP: 2	22	44
24	R/W	Alarm2 Selection: Value End Alarm: 0 Abs Low: 1 High Alarm: 2 In Band: 3 Abs Out Band: 4	23	46
25	R/W	Hys2	24	48
26	R/W	Delay Time2	25	50
27	R/W	Alarm Time2	26	52
28	R/W	Set2 Mode Selection: Value Individual: 0 Relative: 1	27	54
29	R/W	Out3 Mode Selection: Value Heat: 0 Cool: 1 Alarm: 2 Off Mode: 3	28	56
30	R/W	Control Action3 Selection: Value Pid: 0 On-Off: 1 Blower TP: 2	29	58
31	R/W	Alarm3 Selection: Value End Alarm: 0 Abs Low: 1 High Alarm: 2 In Band: 3 Abs Out Band: 4	30	60
32	R/W	Hys3	31	62
33	R/W	Delay Time3	32	64
34	R/W	Alarm Time3	33	66
35	R/W	Set3 Mode Selection: Value Individual: 0 Relative: 1	34	68
36	R/W	Soak	35	70
37	R/W	Soak Mode Selection: Value Soak Time Normal: 0 Soak Pass: 1 Soak Remaining: 2	36	72
38	R/W	Soak Unit Selection: Value Sec: 0 Min: 1 Hour: 2	37	74
39	R/W	Soak Time	38	76
40	R/W	Memory Selection: Value NO: 0 Yes: 1	39	78
41	R/W	End Save	40	80
42	R	Run Soak Value	41	82
43	R	Soak Status Selection: Value End: 0 Run: 1 Hold: 2	42	84
44	R/W	Set Low Limit	43	86
45	R/W	Set High Limit	44	88
46	R/W	Offset	45	90
47	R/W	DP Process Selection: Value 0000: 0 000.0: 1 00.00: 2 0.000: 3	46	92
48	R/W	Low Range	47	94
49	R/W	High Range	48	96
50	R/W	CRFC	49	98
51	R/W	FLTR Process	50	100
52	R/W	Signal Low Limit	51	102
53	R/W	PB	52	104
54	R/W	IT	53	106
55	R/W	DT	54	108
56	R/W	CT	55	110
57	R/W	MR	56	112
58	N/A	N/A	N/A	N/A
59	N/A	N/A	N/A	N/A
60	R/W	C PB	59	118
61	R/W	C ON	60	120
62	R/W	C OF	61	122
63	R/W	Auto Tune Selection: Value No: 0 Yes: 1	62	124
64	R/W	Address	63	126
65	R/W	Baudrate Selection: Value B 2400: 0 B 4800: 1 B 9600: 2 B 19200: 3 B 38400: 4	64	128
66	R/W	Parity Selection: Value None: 0 Even: 1 Odd: 2	65	130
67	R/W	Data Type Selection: Value Sign Integer: 0 Float: 1	66	132
68	R/W	Analog Output Type	67	134
69	R/W	RT Low Range	68	136
70	R/W	RT High Range	69	138
71	R/W	Control Mode Selection: Value Forward: 1 Reverse: 0	70	140
72	R/W	Low Percentage	71	142
73	R/W	High Percentage	72	144

Data type = Sign Integer show value as per following

Input	Actual Value	DP Selection
J,K,Pt	Value/1	Fix
Pt.1	Value/10	Fix
Where Parameter is 1,6-14,19,25,32,44-46,48,49,57,69,70		
0-10V DC 0-20 mA DC 4-20mA DC	Value/1	0
	Value/10	1
	Value/100	2
	Value/1000	3
Where Parameter is 5 ,20,26,33		
0-10V DC 0-20 mA DC 4-20mA DC	Value/10	Fix
Where Parameter is 4,51-53,72,73		
0-10V DC 0-20 mA DC 4-20mA DC	Value/100	Fix