PROCESS TEMPERATURE CONTROLLER

MULTISPAN **PTC-4202A-M1**

CE

PV = Process value
SV = Set Value

Display Color
Upper : White Or Red
Lower : Green

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	Upper: 4 digit, 7 segment, 0.39” Lower: 4 digit, 7 segment, 0.28”
Keys	SET, INC, DEC, ENT

DIMENSION:

Size	52 (H) x 52 (W) x 111 (D) mm
Panel Cutout	45 (H) x 45 (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	(NO-C)
Rating	5A, 230V AC/30 V DC
Analog Output	
Controlling Output	4 to 20mA DC
Transmitter supply	24V DC

Modbus Output	
Protocol	Modbus RTU Serial
Standard	RS - 485

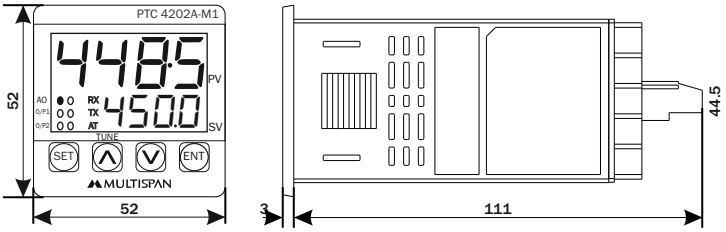
AUXILIARY SUPPLY

Supply voltage	100 to 270V 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**

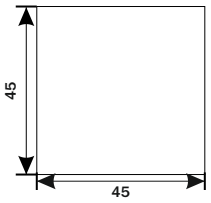
MECHANICAL INSTALLATION



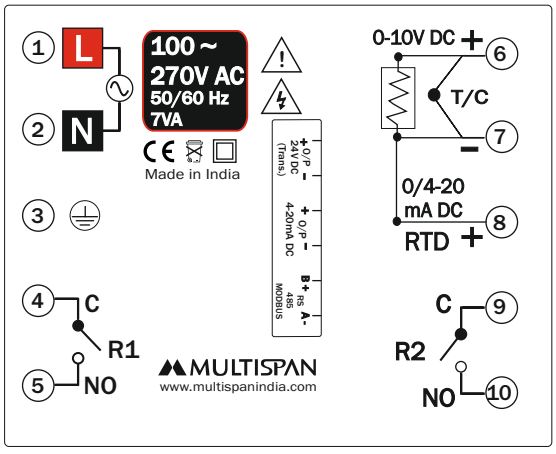
FRONT VIEW
All dimensions are in mm

RIGHT SIDE VIEW

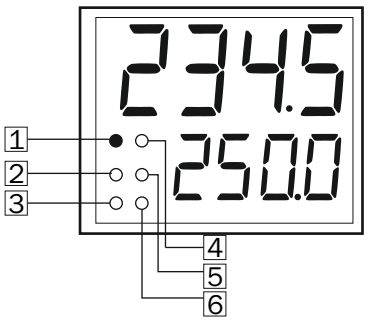
Panel Cutout



TERMINAL CONNECTION



STATUS LED DESCRIPTION



1 - Analog output
2 - Output 1
3 - Output 2
4 - Receive
5 - Transmit
6 - Auto tuning

KEY OPERATION

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

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.

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, oils 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 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.

⚠ 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.

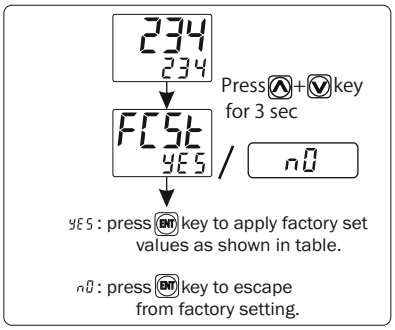
WARNING : Risk of electric shock.

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 $1mm^2$ or greater. These wires should have insulations capacity made of at least 1.5kV.
4. When extending the thermocouple lead wires, always use thermocouple compensation wires for wiring for the RTD type, use a wiring material with a small lead resistance (5Ω max per line) and no resistance differentials among three wires should be present.
5. 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°C
6	OFFSET	0°C
7	HYSTERISIS-1	3°C
8	HYSTERISIS-2	3°C
9	C-PB	4.0° C
10	C-ON	1 Sec
11	C-OFF	48 Sec
12	CRFC	0

Parameter Message Description

C.SEt	Controlling O/P Set Point
SEt 1	Set Point 1 For O/P 1
SEt2	Set Point 2 For O/P 2
LO'1	Low Set Point 1
HIG1	High Set Point 1
LO'2	Low Set Point 2
HIG 2	High Set Point 2
PASS	Password
InPt	Input (Sensor)
SLL	Set Low Limit
SHL	Set High Limit
OFSt	Offset
Pb	Proportional Band For PID Action
It	Integral Time Constant
dt	Derivative Time Constant
Ct	Cycle Time For PID Action
ñr	Manual Reset
C-Pb	Cooling PB
C-On	Cooling On Time
C-OF	Cooling Off Time
HYS 1	Hysterisis 1

Parameter Message Description

HYS2	Hysterisis 2
OUt 1	OutPut 1 Mode
SOAP	Soak Time Select
SPñd	Soak Mode
SPUt	Soak Unit
SPtñ	Soak Time Value
ñEñO	Soak Time Memory
End	Soak Time End
Ctr 1	Control Action 1
OUt2	Output 2 Mode
Ctr2	Control Action 2
ALñ1	Alarm 1
ALñ2	Alarm 2
S2ñd	Set 2 Mode
r 1dL	Relay 1 Delay Time
r2dL	Relay 2 Delay Time
ALtñ	Alarm Time
PId	PID Action
OnOF	ON-OFF Action
bL.tP	Blower TP Action
HIGH	High Alarm
Ab-L	Absolute Low Alarm
In-b	In Band Alarm
Ab-O	Absolute Out Band Alarm
SEC	Second
ñIn	Minute
HOUr	Hour
HEAt	Heating Mode
COOL	Cooling Mode
ALrñ	Alarming Mode
OFF	OFF Mode
YES	Yes
nO	No
SAvE	Save
Indl	Set 2 Individual to Set 1
rLtv	Set 2 Reletive to Set 1
FCSt	Factory Setting
AOUt	Analog Output
bASE	Basic Configuration
ñbUS	Modbus
Pv	Retransmission O/P On PV
Sv	Retransmission O/P On SV
4-20	Manual Selection Of 4-20 mA Analog O/P
PErC	Percentage wise Selection Of 4-20 mA Analog O/P (Manually)
COn	Controlling Output

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	-0.009 to 0.009
				DP 2	-0.09 to 0.09
				DP 1	-0.9 to 0.9
				DP 0	-9 to 9
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 100°C	0.1 to 100.0°C	DP 3	0.001 to 0.999
				DP 2	0.01to 9.99
				DP 1	0.1 to 99.9
				DP 0	1 to 999
8	HYS2	1 to 100°C	0.1 to 100.0°C	DP 3	0.001 to 0.999
				DP 2	0.01 to 9.99
				DP 1	0.1 to 99.9
				DP 0	1 to 999
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	SLL	-	-	0.0 to 5.0 mA	

Parameter Message Description

LOPC	Low percentage
HI PC	High percentage
Fr'd	Forword
rEvr	Reverse
Addr	Address
bAUd	Baud Rate
PrtY	Parity
dAtA	Data Type
SI nt	Intenger
FLOt	Float

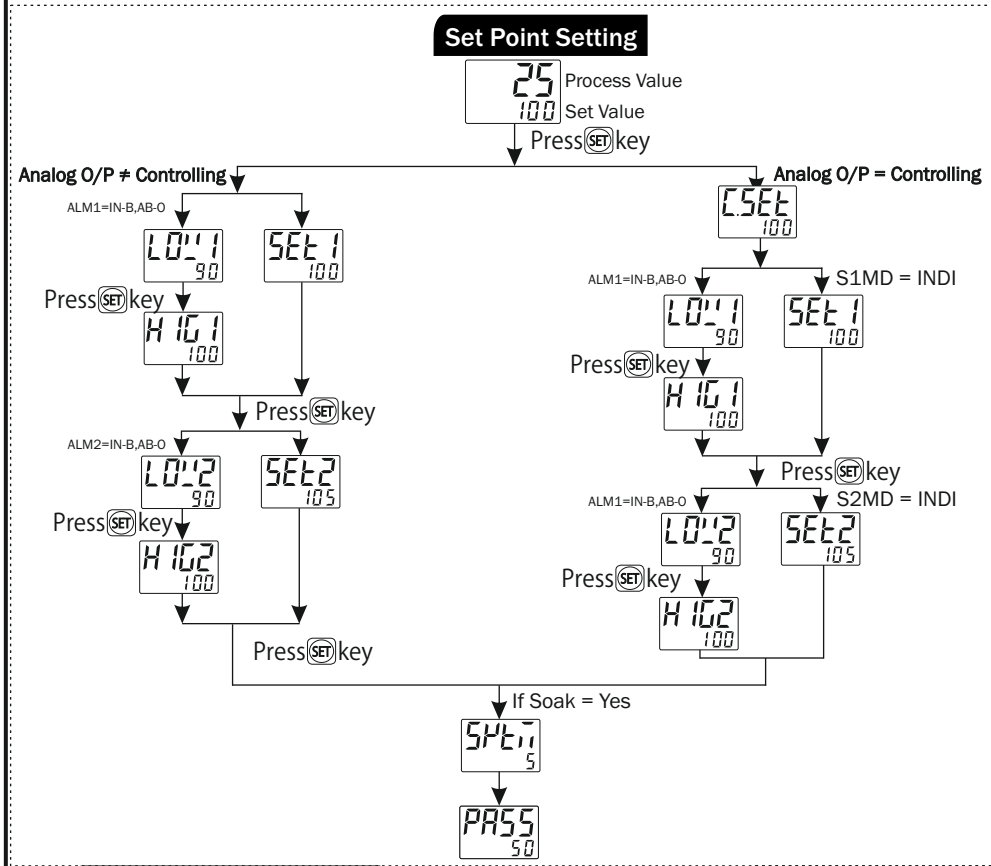
ERROR DISPLAY

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

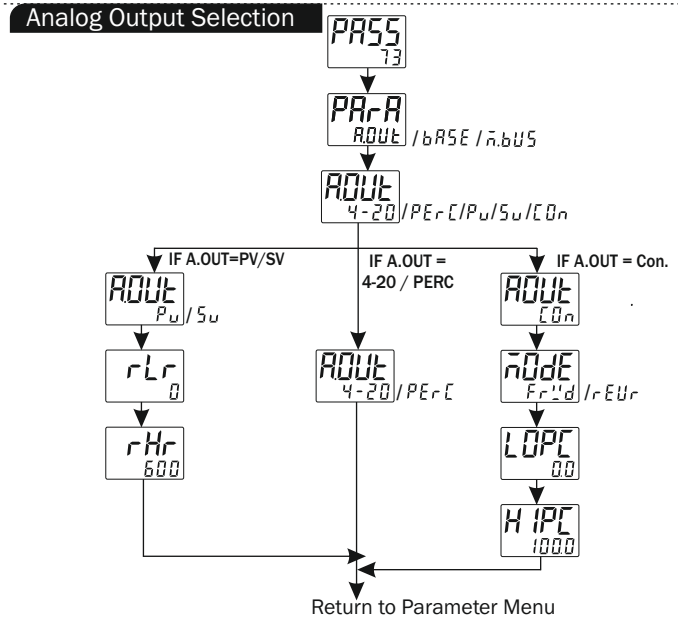
ERROR	MEANING
OPEn	Sensor is not connected Over range condition or sensor break
SrE	Sensor connection is reversed
OUEr	Over range condition For 0 to 10V DC - exceed 10V DC For 4 to 20mA DC -exceed 20mA DC
LOu	When I/P is 4 to 20mA DC is selected, than I/P signal is lower than SLL (0-5mA)

Parameter Setting

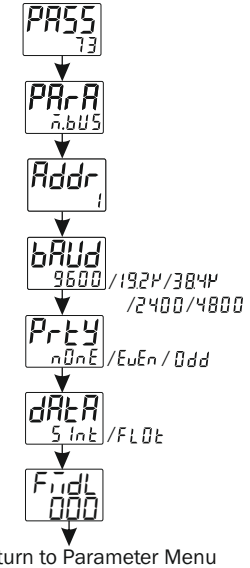
Set Point Setting



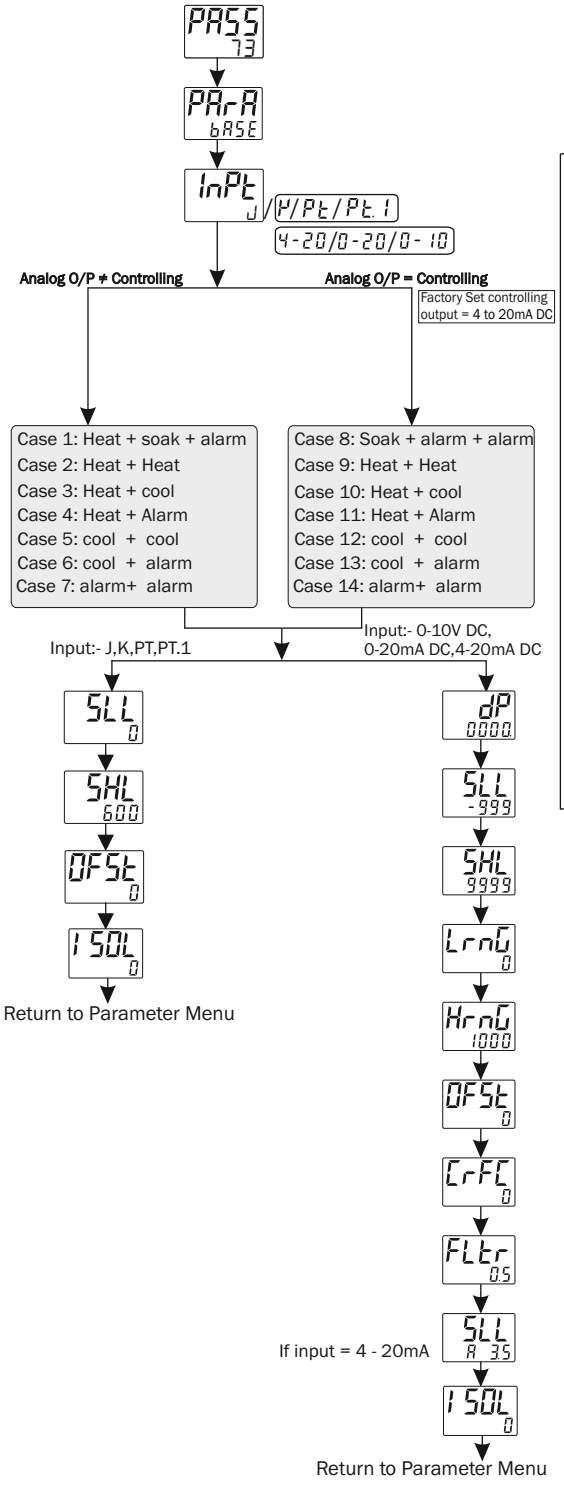
Analog Output Selection



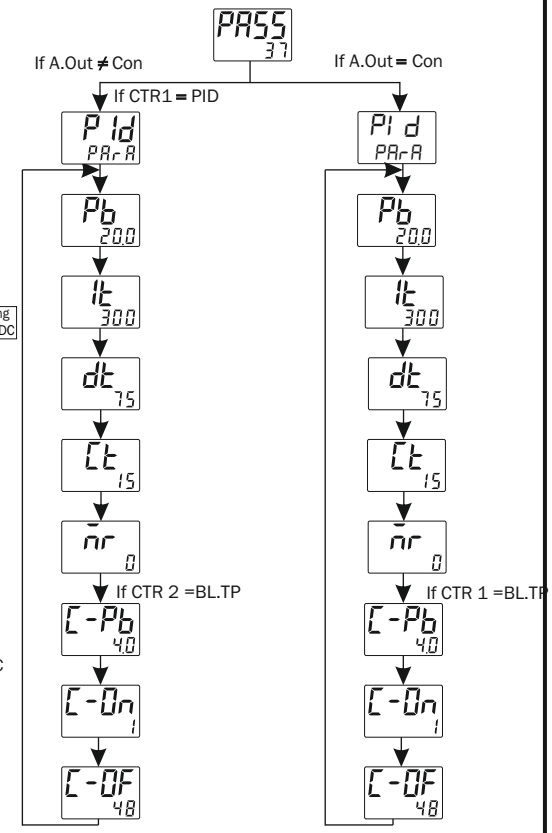
ModBus

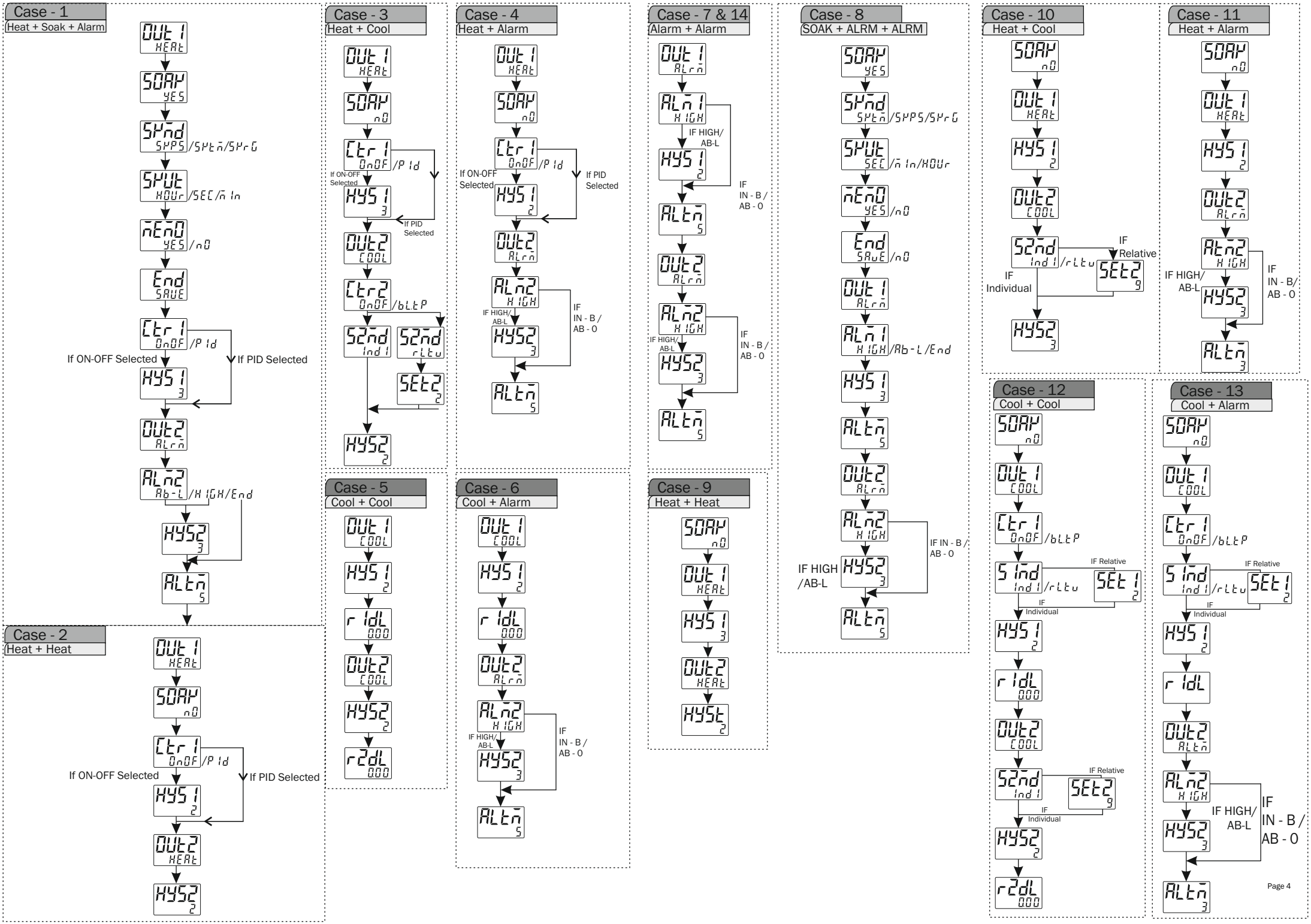


Basic Configuration



Control Parameter Setting




Case - 1
Heat + Soak + Alarm
OUt 1 HEAt
SOAK yES
SPnd SPPS/SPtn/SPrG
SPUt HOUr/SEC/n In
nEnO yES/nO
End SAUE
Ctr 1 OnOF/P Id
If ON-OFF Selected
If PID Selected
HYS1 3
OUt2 ALrn
ALn2 Ab-L/H IGH/End
HYS2 3
ALtn 5
Case - 2
Heat + Heat
OUt 1 HEAt
SOAK nO
Ctr 1 OnOF/P Id
If ON-OFF Selected
If PID Selected
HYS1 2
OUt2 HEAt
HYS2 2
Case - 3
Heat + Cool
OUt 1 HEAt
SOAK nO
Ctr 1 OnOF/P Id
If ON-OFF Selected
If PID Selected
HYS1 3
OUt2 COOL
Ctr2 OnOF/bLtP
S2nd Ind 1
S2nd rLtu
SEt2 2
HYS2 2
Case - 4
Heat + Alarm
OUt 1 HEAt
SOAK nO
Ctr 1 OnOF/P Id
If ON-OFF Selected
If PID Selected
HYS1 2
OUt2 ALrn
ALn2 H IGH
IF HIGH/ AB-L
IF IN - B / AB - 0
HYS2 3
ALtn 5
Case - 5
Cool + Cool
OUt 1 COOL
HYS1 2
r1dL 000
OUt2 COOL
HYS2 2
r2dL 000
Case - 6
Cool + Alarm
OUt 1 COOL
HYS1 2
r1dL 000
OUt2 ALrn
ALn2 H IGH
IF HIGH/ AB-L
IF IN - B / AB - 0
HYS2 3
ALtn 5
Case - 7 & 14
Alarm + Alarm
OUt 1 ALrn
ALn1 H IGH
IF HIGH/ AB-L
IF IN - B / AB - 0
HYS1 2
ALtn 5
OUt2 ALrn
ALn2 H IGH
IF HIGH/ AB-L
IF IN - B / AB - 0
HYS2 3
ALtn 5
Case - 9
Heat + Heat
SOAK nO
OUt 1 HEAt
HYS1 3
OUt2 HEAt
HYSt 2
Case - 8
SOAK + ALRM + ALRM
SOAK yES
SPnd SPtn/SPPS/SPrG
SPUt SEC/n In/HOUr
nEnO yES/nO
End SAUE/nO
OUt 1 ALrn
ALn1 H IGH/Ab-L/End
HYS1 3
ALtn 5
OUt2 ALrn
ALn2 H IGH
IF IN - B / AB - 0
IF HIGH /AB-L
HYS2 3
ALtn 5
Case - 10
Heat + Cool
SOAK nO
OUt 1 HEAt
HYS1 2
OUt2 COOL
S2nd Ind 1/rLtu
IF Relative
SEt2 9
IF Individual
HYS2 3
Case - 11
Heat + Alarm
SOAK nO
OUt 1 HEAt
HYS1 2
OUt2 ALrn
ALn2 H IGH
IF HIGH/ AB-L
IF IN - B/ AB - 0
HYS2 3
ALtn 3
Case - 12
Cool + Cool
SOAK nO
OUt 1 COOL
Ctr 1 OnOF/bLtP
S 1nd Ind 1/rLtu
IF Relative
SEt 1 2
IF Individual
HYS1 2
r1dL 000
OUt2 COOL
S2nd Ind 1
IF Relative
SEt2 9
IF Individual
HYS2 2
r2dL 000
Case - 13
Cool + Alarm
SOAK nO
OUt 1 COOL
Ctr 1 OnOF/bLtP
S 1nd Ind 1/rLtu
IF Relative
SEt 1 2
IF Individual
HYS1 2
r1dL
OUt2 ALtn
ALn2 H IGH
IF HIGH/ AB-L
IF IN - B / AB - 0
HYS2 3
ALtn 3

MODBUS

Slave Address :	1 to 127
Baudrate :	2400,4800,9600,38400bps
Parity :	None,Even,Odd
Datatype :	Sign integer, Float (32 Bit Little Endian Byte Swap)

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; 4 - 20mA 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 Selection: Value; NO: 0; Yes: 1	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 Selection: Value; NO: 0; Yes: 1	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 Selection: Value; Controlling: 0; PV: 1; SV: 2; 4 TO 20: 3; Percentage: 4	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
74	R/W	Frame delay 0-99	82	164
74	R/W	Isolation Selection: Value; OFF: 0; ON: 1	83	166

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