

# PROCESS TEMPERATURE CONTROLLER

## MULTISPAN

### PTC-4201-M1



**Display Color:**  
Upper : White Or Red  
Lower : Green

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	Upper: 4 digit, 7 segment, 0.56"
	Lower: 4 digit, 7 segment, 0.33"
Keys	SET, INC, DEC, ENT

### DIMENSION

Size	52 (H) x 52 (W) x 95 (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) ON-OFF control

### AUXILIARY SUPPLY

Supply voltage	100 to 270V AC, 50-60Hz
Power consumption (VA RATING)	Approx 5 VA @ 230V AC MAX

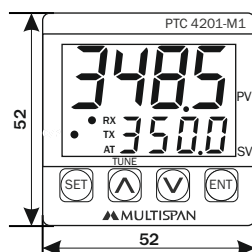
## OUTPUT SPECIFICATION

Relay Output	
Relay	1 nos.
Relay Type	(NO-C)
Rating	5A, 230V AC/30 V DC
Transmitter Supply	
Supply Voltage	24V DC
MODBUS COMMUNICATION	
Output	RS-485

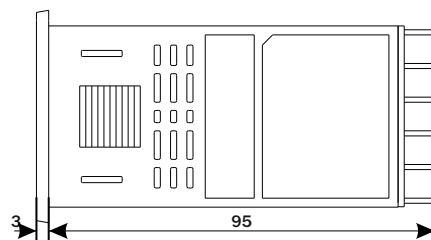
## ENVIRONMENT CONDITION

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

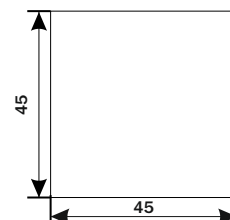
## MECHANICAL INSTALLATION



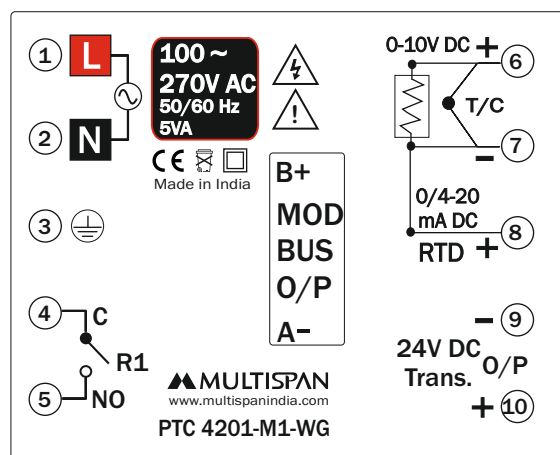
**FRONT VIEW**  
All dimensions are in mm



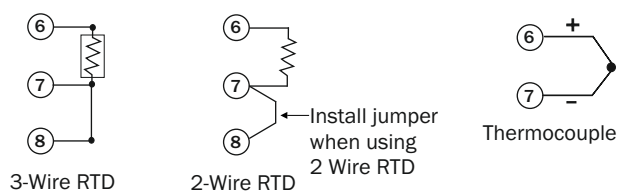
**RIGHT SIDE VIEW**  
Panel Cutout



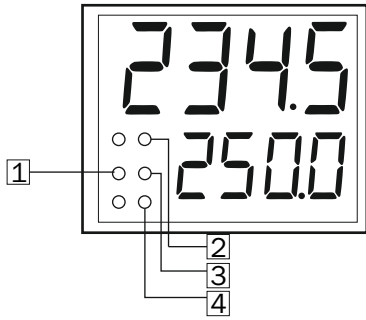
## TERMINAL CONNECTION



## Sensor Input



## STATUS LED DESCRIPTION



1 - Output 1

2 - Receive

3 - Transmit

4- Auto tuning

## KEY OPERATION

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

## 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.

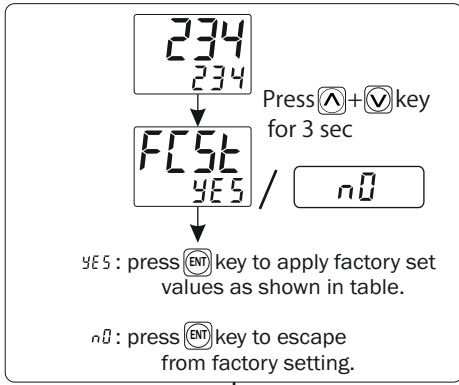
## WARNING GUIDELINES



**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<sup>2</sup> 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	CRFC	0

## PARAMETER MESSAGE DESCRIPTION

SEt 1	Set Point 1 For O/P 1
LOW 1	Low Set Point 1
HIGH 1	High Set Point 1
PASS	Password
INPt	Input ( Sensor )
SLL	Set Low Limit
SHL	Set High Limit
DFSE	Offset
Pb	Proportional Band For PID Action
It	Integral Time Constant
dT	Derivative Time Constant
Ct	Cycle Time For PID Action
nr	Manual Reset
HYS 1	Hysterisis 1
OUT 1	OutPut 1 Mode
SOAK	Soak Time Select
SPnd	Soak Mode
SPUt	Soak Unit
SPnt	Soak Time Value
nrEO	Soak Time Memory
End	Soak Time End
Ctr 1	Control Action 1

## PARAMETER MESSAGE DESCRIPTION

ALn 1	Alarm 1
r IdL	Relay 1 Delay Time
ALt n	Alarm Time
PI d	PID Action
ONOF	ON-OFF Action
HIGH	High Alarm
Ab-L	Absolute Low Alarm
In-b	In Band Alarm
Ab-O	Absolute Out Band Alarm
SEC	Second
min	Minute
HOuR	Hour
HEAt	Heating Mode
COOL	Cooling Mode
ALr n	Alarming Mode
YES	Yes
NO	No
SAVE	Save
FCSE	Factory Setting
bASE	Basic Configuration
mbUS	Modbus
SI nt	Intenger
FLOt	Float
Addr	Address
bAUD	Baud Rate
Prty	Parity
dAtA	Data Type
SPPS	Soak passing
SPt n	Soak time normal
SPr t	Soak time remaining

## ERROR DISPLAY

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

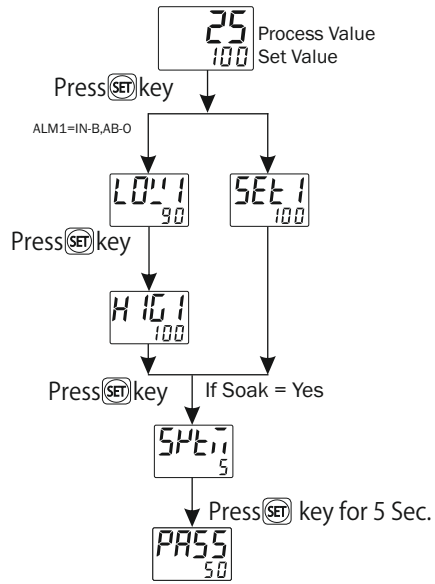
ERROR	MEANING
OPEN	Sensor is not connected or Over range condition or sensor break
SE	Sensor connection is reversed
OVER	Over range condition For 0 to 10V DC - exceed 10V DC For 4 to 20mA DC - exceed 20mA DC
LOW	When I/P is 4 to 20mA DC is selected, than I/P signal is lower than SLL (0-5mA)

## RANGE FOR CONTROL PARAMETER

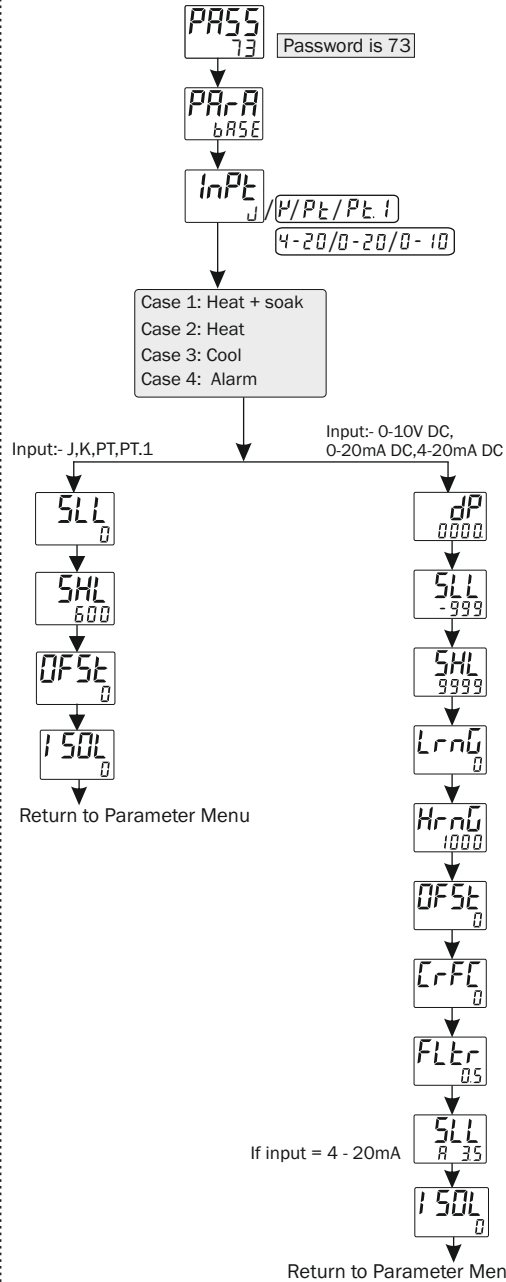
Sr.	Parameter	Range for J,K,PT-100	Range for PT.1 Sensor	Range for Analog Input	
1	PB	0.0 to 999.9 °C	0.0 to 999.9 °C	0.0 to 999.9	
2	IT	0 to 9999	0 to 9999	0 to 9999	
3	DT	0 to 9999	0 to 9999	0 to 9999	
4	CT	4 to 99 sec	4 to 99 sec	4 to 99 sec	
5	MR	-9 to 9 °C	-9.0 to 9.0 °C	DP 3	-0.009 to 0.009
				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	0.01 to 9.99
				DP 1	0.1 to 99.9
				DP 0	1 to 999
8	R1DL	0.0 to 99.59 mm.ss	0.0 to 99.59 mm.ss	0.0 to 99.59 mm.ss	
9	ALTM	0 to 99 sec	0 to 99 sec	0 to 99 sec	
10	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
11	FLTR	-	-	0.1 to 10.0 Sec	
12	SLL	-	-	0.0 to 5.0 mA	

PARAMETER SETTING

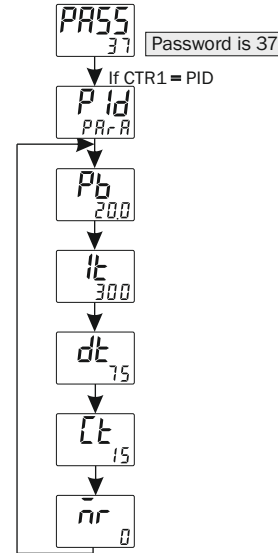
Set Point Setting



BASIC CONFIGURATION

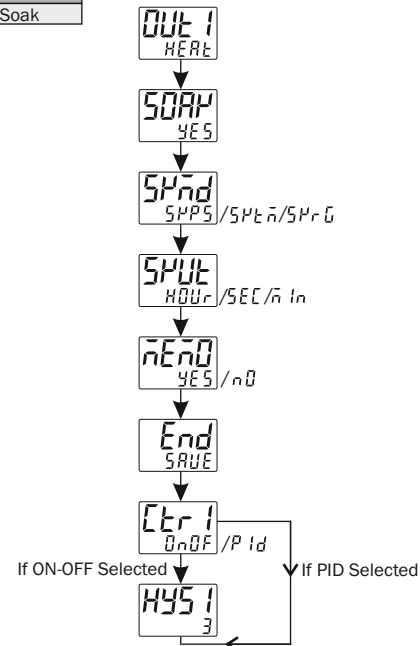


CONTROL PARAMETER SETTING



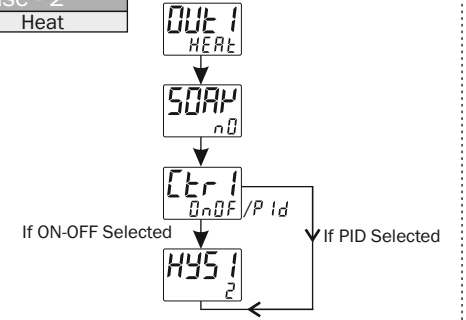
Case - 1

Heat + Soak



Case - 2

Heat



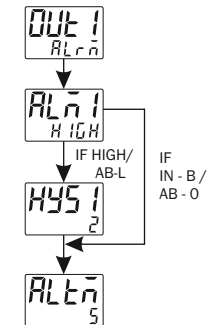
Case - 3

Cool

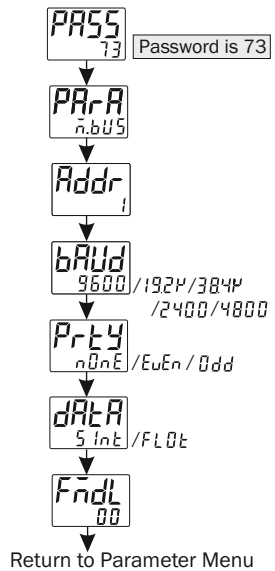


Case - 4

Alarm



ModBus



**MODBUS**

Slave Address :	1 to 127
Baudrate :	2400,4800,9600,38400bps
Parity :	None,Even,Odd
Datatype :	Sign integer, Float

Note :- When Parameter 32100 = no available(N/A)  
 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	Float
1	R	Process Value	0	0	
2	R	R1 Status	1	2	
		Selection			Value
		On			1
	Off	0			
3	—	N/A	2	4	
4	—	N/A	3	6	
5	—	N/A	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	—	N/A	9	18	
11	—	N/A	10	20	
12	—	N/A	11	22	
13	—	N/A	12	24	
14	—	N/A	13	26	
15	R/W	Input	14	28	
		Selection			Value
		J			0
		K			1
		PT-100			2
		PT.1			3
		0 - 10V DC			4
0 - 20mA DC	5				
0 - 40mA DC	6				
16	R/W	Out1 Mode	15	30	
		Selection			Value
		Heat			0
		Cool			1
	Alarm	2			
17	R/W	Control Action1	16	32	
		Selection			Value
		Pid			0
		On-Off			1

Sr.No	Access Type	Parameter	Register		
			Data Type	Integer	Float
18	R/W	Alarm1	17	34	
		Selection			Value
		Abs Low			1
		High Alarm			2
		In Band			3
		Abs Out Band			4
19	R/W	Hys1	18	36	
20	R/W	Delay Time1	19	38	
21	R/W	Alarm Time1	20	40	
22	—	N/A	21	42	
23	—	N/A	22	44	
24	—	N/A	23	46	
25	R/W	Value	24	48	
26	—	N/A	25	50	
27	—	N/A	26	52	
28	—	N/A	27	54	
29	—	N/A	28	56	
30	—	N/A	29	58	
31	—	N/A	30	60	
32	—	N/A	31	62	
33	—	N/A	32	64	
34	—	N/A	33	66	
35	—	N/A	34	68	
36	R/W	Soak	35	70	
37	R/W	Soak Mode	36	72	
		Selection			Value
		Soak Time Normal			0
		Soak Pass			1
	Soak Remaining	2			
38	R/W	Soak Unit	37	74	
		Selection			Value
		Sec			0
		Min			1
	Hour	2			
39	R/W	Soak Time	38	76	
40	R/W	Memory	39	78	
		Selection			Value
		NO			0
	Yes	1			
41	R/W	End Save	40	80	
42	R	Run Soak Value	41	82	
43	R	Soak Status	42	84	
		Selection			Value
		End			0
		Run			1
	Hold	2			
44	R/W	Set Low Limit	43	86	
45	R/W	Set High Limit	44	88	
46	R/W	Offset	45	90	

Sr.No	Access Type	Parameter	Register		
			Data Type	Integer	Float
47	R/W	DP Process	46	92	
		Selection			Value
		0000			0
		000.0			1
		00.00			2
		0.000			3
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	57	114	
59	—	N/A	58	116	
60	—	N/A	59	118	
61	—	N/A	60	120	
62	—	N/A	61	122	
63	R/W	Auto Tune	62	124	
		Selection			Value
		No			0
	Yes	1			
64	R/W	Address	63	126	
65	R/W	Baudrate	64	128	
		Selection			Value
		B 2400			0
		B 4800			1
		B 9600			2
		B 19200			3
	B 38400	4			
66	R/W	Parity	65	130	
		Selection			Value
		None			0
	Even	1			
	Odd	2			
67	R/W	Data Type	66	132	
		Selection			Value
		Sign Integer			0
	Float	1			
68	R/W	Frame delay	0-99	82	164
69	R/W	Isolation	0- ON 1- OFF	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 1,6-8,19,44-46,48,49,57		
0-10V DC	Value/1	0
0-20 mA DC	Value/10	1
4-20mA DC	Value/100	2
	Value/1000	3
Where Parameter is 20		
0-10V DC	Value/10	Fix
0-20 mA DC		
4-20mA DC		
Where Parameter is 51-53		
0-10V DC	Value/100	Fix
0-20 mA DC		
4-20mA DC		