

TEMPERATURE CONTROLLER

MULTISPAN UTC - 1202G+,2202G+,4202G+



TECHNICAL SPECIFICATION

INPUT SPECIFICATION:		
Input	Range (°C)	Range (°F)
J	0 to 600.0°C	32 to 1112°F
J.1	0.0 to 600.0°C	32.0 to 1112.0°F
K	0 to 1200°C	32 to 2192°F
K.1	0.0 to 950.0°C	32.0 to 1742.0°F
PT-100	-200 to 400°C	-328 to 752°F
PT.1	-199.9 to 400.0°C	-199.9 to 752.0°F
R	0 to 1600°C	32 to 2912°F
S	0 to 1800°C	32 to 3272°F
E	0 to 650°C	32 to 1202°F
N	0 to 1250°C	32 to 2282°F
T	0 to 350°C	32 to 662°F
B	150 to 1800°C	302 to 3272°F
Resolution	J,K,PT-100,R,S,E,N,T,B = 1°C	
	J.1,K.1,PT.1 = 0.1°C	
Indication Accuracy	±0.5% Full Scale ± 1 Digit	
DISPLAY AND KEYS :		
Display UTC 1202G+, UTC 2202G+	Upper: 4 digit, 7 segment, 0.70" Lower: 4 digit, 7 segment, 0.43"	
Display UTC 4202G+	Upper: 4 digit, 7 segment, 0.54" Lower: 4 digit, 7 segment, 0.30"	
Keys	SET, ENT, INC, DEC	

WARNING GUIDELINES

- WARNING : Risk of electric shock.**
- 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.
 - To reduce electro magnetic interference, use wire with adequate rating and twists of the same of equal size shall be made with shortest connection.
 - 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.
 - 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.
 - A better anti-noise effect can be expected by using standard power supply cable for the instrument.

INSTALLATION GUIDELINES

- 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.
- 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.
- 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.
- Use and store the instrument within the specified ambient temperature and humidity ranges as mentioned in this manual.

MECHANICAL INSTALLATION GUIDELINES

- Prepare the panel cutout with proper dimensions as shown above.
- Fit the unit into the panel with the help of clamp given.
- 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.
- 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.
- Do not connect anything to unused terminals.

MAINTENANCE

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

CONTROL METHOD:	
Heating	1) PID control with Auto-Tuning 2) (TP) Time Proportional 3) ON-OFF control
Cooling	1) BL.TP (Blower Time Proportional) 2) ON-OFF control
Alarm	High /Low /Absolute Low/ Inband /Absolute Outband/Outband/End Alarm

DIMENSION:	
Size (UTC-1202G+)	101 (H) x 101 (W) x 54 (D) mm
Panel Cutout	92 (H) x 92 (W) mm
Size(UTC-2202G+)	75 (H) x 75 (W) x 85 (D) mm
Panel Cutout	68 (H) x 68 (W) mm
Size(UTC-4202G+)	52 (H) x 52 (W) x 95 (D) mm
Panel Cutout	45 (H) x 45 (W) mm

POWER SUPPLY	
Supply voltage	100 to 270V AC/DC, 50-60Hz
Power consumption (VA RATING)	Approx 4VA @ 230V AC MAX

OUTPUT SPECIFICATION :	
Relay Output	
Relay	2 nos.
Relay Type	1 C/O , (NO-C-NC)
Rating	5A, 230V AC / 28 V DC
SSR Drive Output	
Output Signal	12V DC, 30mA DC (ON-OFF Condition)
Relay 1 Parallel to SSR	

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

ERROR DISPLAY

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

ERROR	MEANING
OPE n	Sensor is not connected or Over range condition or sensor break
SrE	Sensor connection is reversed

CORRECTIVE ACTION:

Check the sensor and the input wiring. If problem still exists, replace the sensor. And still if problem is not solved yet by the user, then please contact company person

FACTORY SETTING

FACTORY SETTING		
SR.	PARAMETER	VALUES
1	PB	20.0 °C
2	IT	300
3	DT	75
4	CT	15.0 sec
5	PB-2	5 °C
6	CT-2	8 Sec
7	MR	0 °C
8	OFFSET	0 °C
9	HYSTERISIS-1	2 °C
10	HYSTERISIS-2	3 °C
11	C-PB	4.0 °C
12	C-ON	1 Sec
13	C-OFF	48 Sec

PARAMETER MESSAGE DESCRIPTION	
SEt 1	Set Point 1 For O/P 1
SEt 2	Set Point 2 For O/P 2
LO' 1	Low Set Point 1
HI 1G1	High Set Point 1
LO' 2	Low Set Point 2
HI 1G2	High Set Point 2
PA55	Password
i nPt	Input (Sensor)
SHPS	Soak Passing
SHrG	Soak Remaining
SHtG	Soak Time Normal
SLl	Set Low Limit
SHL	Set High Limit
OFFt	Offset
Pb	Proportional Band For PID Action
i t	Integral Time Constant
d t	Derivative Time Constant
C t	Cycle Time For PID Action
Pb2	Proportional Band For TP Action
C t2	Cycle Time For TP Action
r	Manual Reset

MECHANICAL INSTALLATION

Outline Dimension (mm)	Panel Cutout Dimension (mm)

Outline Dimension (mm)	Panel Cutout Dimension (mm)

Outline Dimension (mm)	Panel Cutout Dimension (mm)

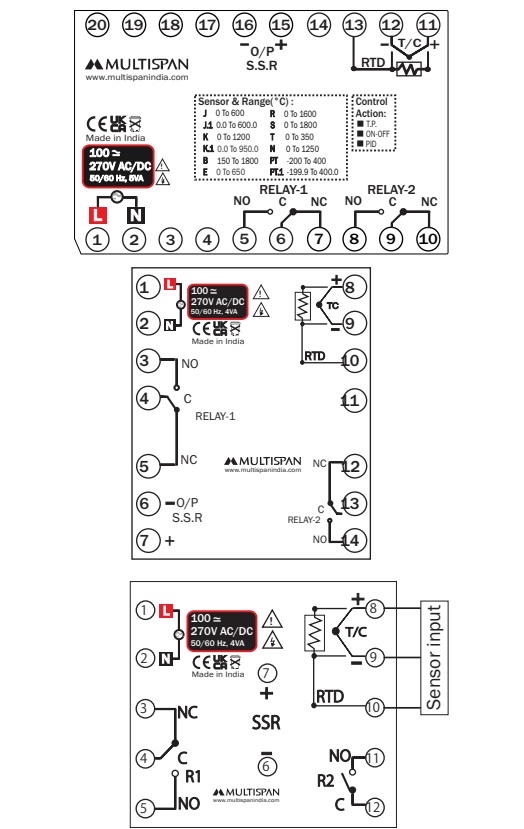
STATUS LED DESCRIPTION

--	--

PARAMETER MESSAGE DESCRIPTION

C-Pb	Cooling PB
C-On	Cooling On Time
C-Of	Cooling Off Time
HYS 1	Hysterisis 1
HYS2	Hysterisis 2
r 1 d	Relay 1 Mode
SOAP	Soak Time Select
SHr d	Soak Mode
SHUt	Soak Unit
SHtG	Soak Time Value
SHtM	Soak Time Memory
End	Soak Time End
Ctr 1	Control Action 1
r 2 d	Relay 2 Mode
Ctr 2	Control Action 2
AL 1	Alarm 1
AL 2	Alarm 2
Set d	Set 2 Mode
r 1 dL	Relay 1 Delay Time
r 2 dL	Relay 2 Delay Time
AL t	Alarm Time
PI d	PID Action
tP	TP Action
OnOff	ON-OFF Action
bl tP	Blower TP Action
H 1G1	High Alarm
Ab-L	Absolute Low Alarm
i n-b	In Band Alarm
Ab-O	Absolute Out Band Alarm
LO'	Low Alarm
Ob-b	Outband Alarm
HEAt	Heating Mode
COOL	Cooling Mode
AL r	Alarming Mode
OFF	OFF Mode
YES	Yes
nD	No
SAvE	Save
i ndl	Set 2 Individual to Set 1
rLtU	Set 2 Reletive to Set 1
SEC	Second
mi n	Minute
HOu r	Hour
FCSE	Factory Setting
POAd	Power On Alarm Delay

TERMINAL CONNECTION



Sensor Input

Thermocouple, 3-Wire RTD, 2-Wire RTD

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.

KEY OPERATION

FUNCTION	PRESS KEY
OPERATOR MODE	
To enter in parameter setting	[SET]
For start/stop PID auto tuning	[ENT] Press 6 sec
To go in factory setting mode	[ENT] + [V] Press 3 sec
To reset process after soak time end	[ENT]
Alarm Reset Press 5 Sec.	[V] Press 5 sec
PARAMETER SETTING MODE	
To set parameter value and move to the next parameter	[SET]
To increment parameter value.	[ENT]
To decrement parameter value.	[V]
Set parameter to be save & exit.	[ENT]

RANGE FOR CONTROL PARAMETER

PARAMETER	RANGE FOR J,K,R,S,E,N,T,B & PT-100	RANGE FOR J.1,K.1,PT.1
PB	0.0 to 999.9 °C	0.0 to 999.9 °C
IT	0 to 9999	0 to 9999
DT	0 to 9999	0 to 9999
CT	4 to 99 sec	4 to 99 sec
Pb2	2 to 20 °C	2.0 to 20.0 °C
Ct2	For Relay/Both:4.0 to 99.0 sec For SSR:0.1 to 99.0 sec	For Relay/Both:4.0 to 99.0 sec For SSR:0.1 to 99.0 sec
MR	-9 to 9 °C	-9.0 to 9.0 °C
OFFSET	-50 to 50 °C	-50.0 to +50.0 °C
HYS1	1 to 100 °C	0.1 to 100.0 °C
HYS2	1 to 100 °C	0.1 to 100.0 °C
C-PB	2.0 to 25.0 °C	2.0 to 25.0 °C
C-ON	1 to 20 sec	1 to 20 sec
C-OFF	5 to 200 sec	5 to 200 sec
R1DL	0.0 to 99.59 (mm.ss)	0.0 to 99.59 (mm.ss)
R2DL	0.0 to 99.59 (mm.ss)	0.0 to 99.59 (mm.ss)
ALTM	0 to 999 sec	0 to 999 sec
SKTM	0 to 9999 Unit As Per Soak Unit Selected	0 to 9999 Unit As Per Soak Unit Selected

PARAMETER SETTING

```

    graph TD
      Start([30  
100  
SV]) -->|If ALM1=IN-B/OT-B/AB-O| L011[LO11  
80]
      Start -->|Press [SET] key| S011[SEL1  
100]
      L011 -->|Press [SET] key| H101[H101  
120]
      S011 --> S012[SEL2  
105]
      S011 -->|If S2MD=INDI & IN-B/OT-B/AB-O| L012[LO12  
90]
      H101 --> L012
      H101 -->|If S2MD=RLTV OR R2MD=OFF| S012
      L012 -->|Press [SET] key| H102[H102  
100]
      S012 --> S013[SEL3  
105]
      H102 --> S013
      S013 -->|Press [SET] key| S014[SEL4  
5]
      S014 -->|If Soak = Yes| S015[SEL5  
5]
      S015 -->|Press [SET] key for 4 sec| PASS[PASS  
50]
  
```

CONTROL PARAMETER SETTING

Press **SET** key for 4 sec
Password is 37

```

    graph TD
      Start([PASS 37]) --> IfCTR1PID{If CTR1 = PID}
      Start --> IfCTR1TP{If CTR1 = TP}
      
      IfCTR1PID --> PID_PId[PId  
PAR R]
      PID_PId --> PID_Pb[Pb  
200]
      PID_Pb --> PID_Ilt[Ilt  
300]
      PID_Ilt --> PID_dIt[dIt  
75]
      PID_dIt --> PID_Clt[Clt  
15]
      PID_Clt --> PID_nr[nr  
0]
      
      IfCTR1TP --> TP_LP[LP  
PAR R]
      TP_LP --> TP_Pb2[Pb2  
5]
      TP_Pb2 --> TP_Clt2[Clt2  
8]
      TP_Clt2 --> TP_nr[nr  
0]
      
      PID_nr --> IfCTR2BLTP{If CTR2 = BL.TP}
      TP_nr --> IfCTR2BLTP
      
      IfCTR2BLTP --> BLTP_C_Pb[C-Pb  
40]
      BLTP_C_Pb --> BLTP_C_On[C-On  
1]
      BLTP_C_On --> BLTP_C_OF[C-Of  
48]
      BLTP_C_OF --> End([Press ENT key to Save & Exit])
  
```

BASIC CONFIGURATION

Press **SET** key for 4 sec

PASS
73 Password is 73

InPt
↓ /d./P/P./Pt/Pt./r/S/E/n/t/b

OPtId
b0tH rLY/SSr

Case 1: Heat + soak + alarm
Case 2: Heat + Heat
Case 3: Heat + cool
Case 4: Heat + Alarm
Case 5: cool + cool
Case 6: cool + alarm
Case 7: alarm+ alarm

SLL
0

SHL
600

DFSt
0

If Select Relay 1 & Relay 2 Alarm

POrAd
0

Un It
↓ /F

Press **SET** key to Save & Exit

```

graph TD
    A["r Ind  
000"] --> B["HYS 1  
3"]
    B --> C["r IdL  
000"]
    C --> D["r 2nd  
000"]
    D --> E["52nd  
r tkw / Ind 1"]
    E --> F["SEt 2  
5"]
    F --> G["HYS 2  
3"]
    G --> H["r 2dL  
000"]
  
```

```

graph TD
    Start([Case - 4  
Heat + Alarm]) --> R1[r lnd  
HERt]
    R1 --> R2[SOAR  
n0]
    R2 --> R3[Ctr 1  
OnOFF / P id / tP]
    R3 --> J1(( ))
    J1 -- "If ON-OFF Selected" --> R4[HYS 1  
3]
    J1 -- "If PID/TP Selected" --> R5[r lnd  
ALrn]
    R4 --> R5
    R5 --> R6[ALrn 2  
H LGH]
    R6 --> J2(( ))
    J2 -- "If IN-B, AB-O, OT-B Select" --> R7[S2nd  
r lkw / lnd i]
    J2 -- "If LOW/HIGH/Ab-L Select" --> R8[S2nd  
r lkw / lnd i]
    R7 --> R9[LO 12  
-10]
    R9 --> R10[H 102  
10]
    R8 --> R11[SEt2  
5]
    R11 --> R12[HYS2  
3]
    R10 --> R13[ALrn 5]
    R12 --> R13
  
```

```

graph TD
    Start([Case - 6  
Cool + Alarm]) --> R1[r 1nd  
COOL]
    R1 --> H1[HYS 1  
3]
    H1 --> R2[r 1dl  
000]
    R2 --> R3[r 2nd  
ALrn]
    R3 --> R4[ALn2  
HIGH]
    R4 --> Select{If IN-B,AB-O,OT-B Select      If LOW/HIGH/Ab-L Select}
    Select --> S1[r 1ku/1nd 1  
52nd]
    Select --> S2[r 1ku/1nd 1  
52nd]
    S1 --> L1[LO 12  
-10]
    S1 --> H1_2[H 102  
10]
    S2 --> S3[SEt2  
5]
    S3 --> H2[HYS2  
3]
    L1 --> R5[ALtn  
5]
    H1_2 --> R5
    S3 --> R5
    H2 --> R5
  
```

```

graph TD
    Start([Case - 1  
Heat + Soak + Alarm]) --> RInd[Ind  
HERE]
    RInd --> SOAK[SOAK  
YES]
    SOAK --> SPnd[SPnd  
SPPS / SPtñ / SPrg]
    SPnd --> SPUL[SPUL  
SEL / ñ In / HOUR]
    SPUL --> nEnd[nEnd  
YES / nO]
    nEnd --> End[End  
SAVE / nO]
    End --> Ltr1[Ltr 1  
OnOFF / P Id / tP]
    Ltr1 -- "If ON-OFF  
Selected" --> HYS1[HYS 1  
3]
    Ltr1 -- "If PID/TP  
Selected" --> HYS1
    HYS1 --> r2nd[r2nd  
ALrñ]
    r2nd --> ALn2[ALn2  
HIGH]
    ALn2 -- "If IN-B, AB-O, OT-B Select" --> S2nd1[S2nd  
r tñw / ind i]
    ALn2 -- "If LOW/HIGH/Ab-L Select" --> S2nd2[S2nd  
r tñw / ind i]
    S2nd1 --> LO12[LO12  
-10]
    S2nd1 --> H102[H102  
10]
    S2nd2 --> SET2[SET2  
5]
    S2nd2 --> HYS2[HYS2  
3]
    LO12 --> ALn2
    H102 --> ALn2
    SET2 --> HYS2
    HYS2 --> ALn2
    ALn2 --> ALn5[ALn5  
5]

```

```

graph TD
    Start([Case - 7  
Alarm + Alarm]) --> R1[r1nd  
ALrn]
    R1 --> R2[ALn1  
HIGH]
    R2 -- "IF HIGH/LOW/AB-L" --> R3[HYS1  
2]
    R2 -- "IF IN-B/OT-B/AB-O" --> R3
    R3 --> R4[ALn5]
    R4 --> R5[r2nd  
ALrn]
    R5 --> R6[ALn2  
HIGH]
    R6 -- "If IN-B,AB-O,OT-B Select" --> R7[S2nd  
r ltu/Ind 1]
    R6 -- "If LOW/HIGH/Ab-L Select" --> R8[S2nd  
r ltu/Ind 1]
    R7 --> R9[L012  
-10]
    R8 --> R10[SEt2  
5]
    R9 --> R11[H102  
10]
    R10 --> R12[HYS2  
3]
    R11 --> R13[ALn5]
    R12 --> R13
  
```

```

graph TD
    subgraph Case_2 [Case - 2  
Heat + Heat]
        r1nd1[r1nd  
HEAt] --> SOAR1[SOAR  
n0]
        SOAR1 --> tr1[tr1  
0nGE/P id/tP]
        tr1 -- "If ON-OFF Selected" --> HY51[HY51  
2]
        tr1 -- "If PID/TP Selected" --> HY51
        HY51 --> r2nd1[r2nd  
HEAt]
        r2nd1 --> 52nd1[52nd  
rltu/Ind i]
        52nd1 --> SET21[SET2  
5]
        SET21 --> HY521[HY52  
3]
    end

    subgraph Case_3 [Case - 3  
Heat + Cool]
        r1nd2[r1nd  
HEAt] --> SOAR2[SOAR  
n0]
        SOAR2 --> tr1_2[tr1  
0nGE/P id/tP]
        tr1_2 -- "If ON-OFF Selected" --> HY51_2[HY51  
3]
        tr1_2 -- "If PID/TP Selected" --> HY51_2
        HY51_2 --> r2nd2[r2nd  
COOL]
        r2nd2 --> tr2[tr2  
0nGE/bltP]
        tr2 --> 52nd2[52nd  
rltu/Ind i]
        52nd2 --> SET22[SET2  
5]
        SET22 -- "If ON-OFF Selected" --> HY522[HY52  
3]
        SET22 --> r2dL[r2dL  
000]
    end
  
```

CONTROL FUNCTION

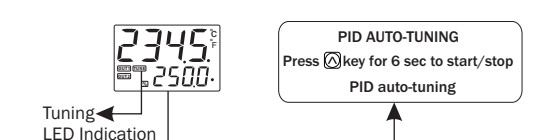
ON - OFF control (Heating)

The graph illustrates the temperature response of a heating system using ON-OFF control with hysteresis. The vertical axis represents Temperature (Temp.) and the horizontal axis represents Time. Two horizontal lines define the control limits: the Setpoint (S.V.) and the Hysteresis (HYST) level. The temperature curve (solid line) rises when the heater is ON and falls when it is OFF. The heater turns ON when the temperature reaches the HYST level and turns OFF when it reaches the S.V. level. This results in a periodic temperature fluctuation between the two levels. The corresponding relay state is shown as a dashed line, which is ON (high) when the heater is ON and OFF (low) when the heater is OFF. A legend indicates that the dashed line represents RLY-OFF and the solid line represents RLY-ON.

ON - OFF control (Cooling)

The graph shows temperature (Temp.) on the vertical axis and time on the horizontal axis. Two horizontal lines represent the setpoint (S.V.) and the hysteresis limit (HYST). The temperature curve starts high, drops below the S.V. line, and then rises back above the HYST line. This cycle repeats. The time intervals between the temperature crossing the S.V. line and the HYST line are labeled 'delay Time'. The control logic is shown at the bottom: the relay is ON when the temperature is below the S.V. line and OFF when it is above the HYST line.

- The Auto-tuning function automatically computes and sets the Proportional band (Pb) , Integral time (It), Derivative time (dt), and cycle time as per process characteristics.
- Tuning LED will turn “ON” during Auto-Tuning
- If the power goes off before auto-tuning is completed, auto-tuning will be restarted at next power ON.



ALARM OPERATION

LOW ALARM:

RLY-OFF

RLY-ON

HYST

S.V.

RLY-ON

RLY-ON

HIGH ALARM:

RLY-ON

RLY-ON

S.V.

HYST

RLY-OFF

The diagram shows a timing sequence for an inband alarm. A solid line represents the RLY-ON signal, which transitions from a low state to a high state. A dashed line represents the RLY-OFF signal, which transitions from a high state to a low state. The signals are shown relative to two horizontal reference lines labeled HIGH and LOW. The RLY-ON signal transitions from low to high, and the RLY-OFF signal transitions from high to low.

The graph shows a fluctuating signal (dashed line) and a solid line representing the alarm state. The signal crosses the S.V. line multiple times. The alarm state is 'OFF' when the signal is below S.V. and 'ON' when it is above S.V. The hysteresis (HYST) level is shown as a horizontal line above S.V. The signal crosses the HYST line once, and the alarm state remains 'ON' until it crosses back below S.V.

ABSOLUTE OUTBAND ALARM

The diagram shows two waveforms over time. The top waveform, labeled 'RLY-ON' at its rising edge and 'RLY-OFF' at its falling edge, transitions between HIGH and LOW states. The bottom waveform, labeled 'RLY-OFF' at its falling edge and 'RLY-ON' at its rising edge, also transitions between HIGH and LOW states. A legend at the bottom indicates that dashed lines represent 'RLY-OFF' and solid lines represent 'RLY-ON'.