

**MULTISPAN** TEMPERATURE CONTROLLER TC - 443



**Display Color:**  
Upper : RED/WHITE  
Lower: Green

PV = Process value  
SV = Set Value

**TECHNICAL SPECIFICATION**

**INPUT SPECIFICATION:**

Input Type	Input	Range
	J	0 to 400 °C
	K	0 to 500 °C
Resolution	1 °C	
Indication Accuracy	±1% of FSD ± 1 °C (FSD:- Full Scale Deflection)	

**DISPLAY AND KEYS:**

Display	Upper: 3 digit, 7 segment, 0.63" Lower: 3 digit, 7 segment, 0.30"
Keys	SET, INC, DEC, ENT

**DIMENSION:**

Size	48 (H) x 48 (W) x 70 (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 Proportional) 2) ON-OFF control
Alarm	Low, High, Absolute Low, Inband, Outband, Absolute Outband

**POWER SUPPLY:**

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

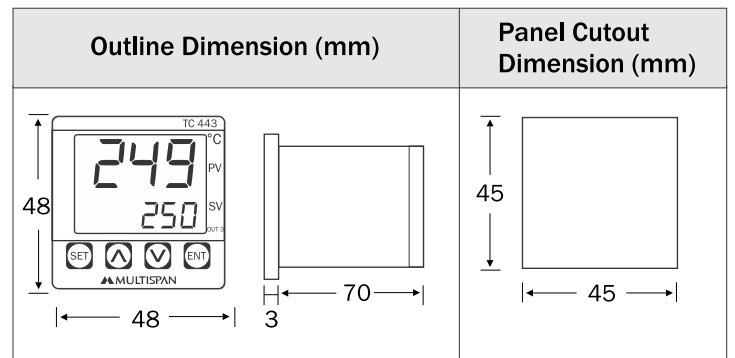
**OUTPUT SPECIFICATION:**

<b>Relay Output</b>	
Relay	3 Nos
Relay Type	1 <sup>st</sup> relay 1C/O (NO-C) 2 <sup>nd</sup> relay (NO-C) 3 <sup>rd</sup> relay (NO-C)
Rating	1 <sup>st</sup> relay 10A, 230V AC / 28V DC 2 <sup>nd</sup> relay 5A, 230V AC 3 <sup>rd</sup> relay 5A, 230V AC
<b>SSR Drive Output</b>	
Output Signal	12V DC, 30mA DC (On-Off condition)
Note: In Output 1 , Software selection is provided to use Relay or SSR output	

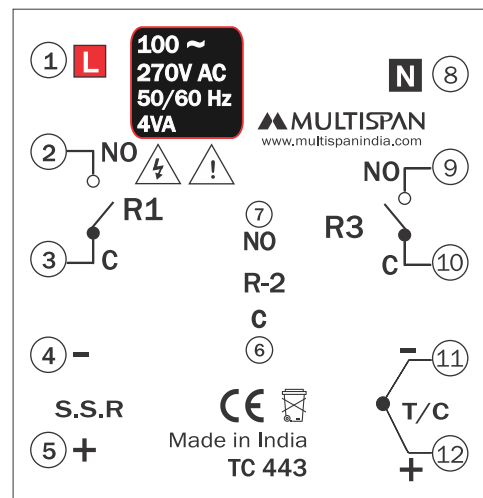
**ENVIRONMENT CONDITION:**

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

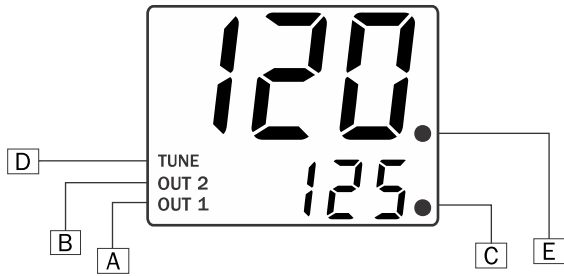
**MECHANICAL INSTALLATION**



**TERMINAL CONNECTION**



## STATUS LED DESCRIPTION



- A - Control output 1 indication
- B - Control output 2 indication
- C - Control Output 3 Indication
- D - Auto tuning "ON" indication
- E - Blinking DP Will Indicate Delay time Count

## 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 and move to the next parameter	
To increment parameter value.	
To decrement parameter value.	
Set parameter to be save & exit.	

## 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.

## 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.

## 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. 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.

## 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, 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.

## ERROR DISPLAY

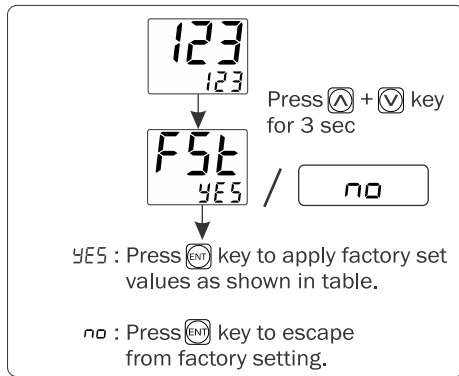
When an error has occurred the display indicates error codes as given below.

ERROR	MEANING
OPn	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

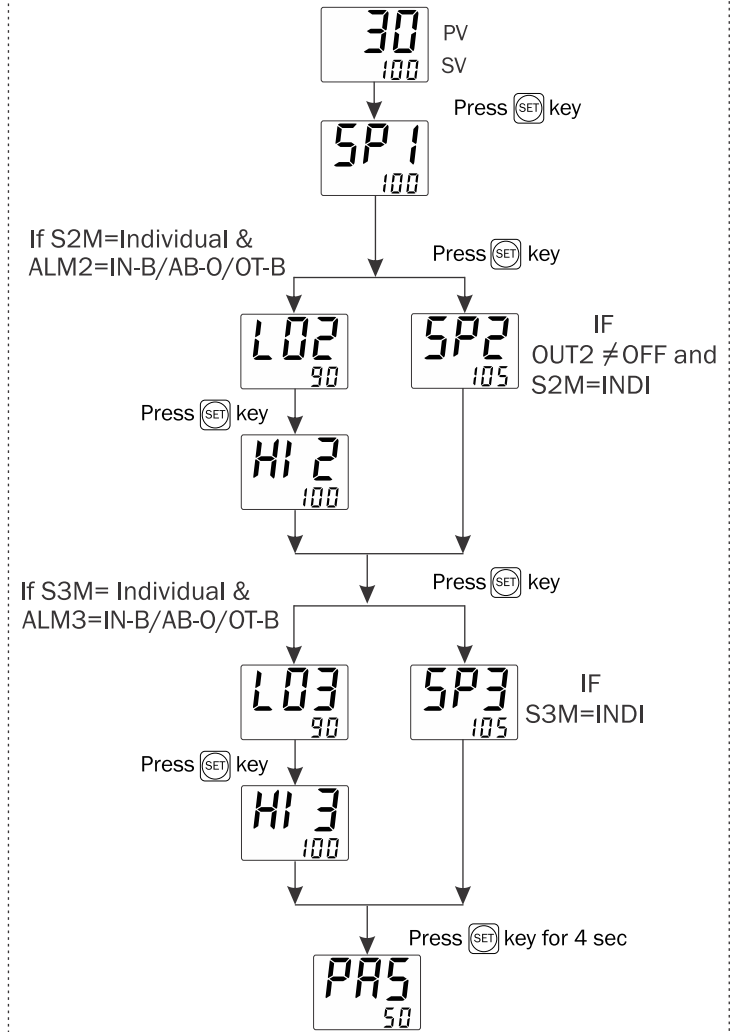
## FACTORY SETTING



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	2 °C
9	HYSTERISIS-3	2 °C
10	C-PB	4.0 °C
11	C-ON	1 Sec
12	C-OFF	48 Sec

## PARAMETER SETTING

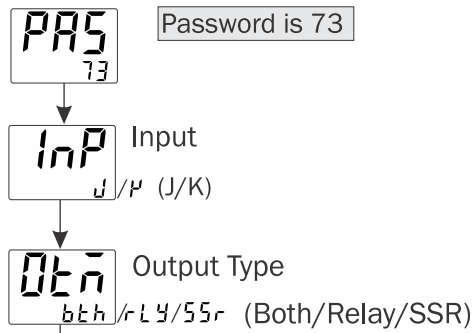
### SET POINT SETTING



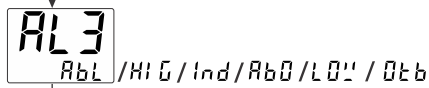
## RANGE FOR CONTROL PARAMETER

Parameter	Range for J
PB	0.0 to 999 °C
IT	0 to 999
DT	0 to 999
CT	Relay/Both:4 to 99 sec SSR :1 to 99 sec
MR	-9 to 9 °C
OFFSET	-50 to 50 °C
HYS1	1 to 100 °C
HYS2	1 to 100 °C
HYS3	1 to 100 °C
C-PB	2.0 to 25.0 °C
C-ON	1 to 20 sec
C-OFF	5 to 200 sec
R1DL	0.0 to 99.59 (mm.ss)
R2DL	0.0 to 99.59 (mm.ss)

## BASIC CONFIGURATION



**Select the Output 1 & 2**  
 Case 1: Heat + cool  
 Case 2: Heat + Alarm  
 Case 3: Cool + Cool  
 Case 4: Cool + Alarm



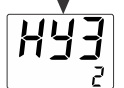
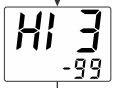
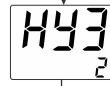
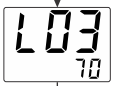
IF  
 IN - B/AB - O/OT-B  
 Select

IF  
 AB-L/HIGH /LOW  
 Select

IF S3M= Relative

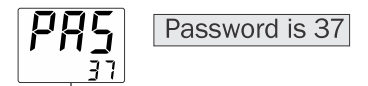
IF S3M= Relative

IF S3M = Relative  
 IF S3M= Individual

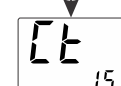
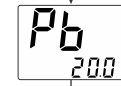


Press **ENT** key to Save & Exit

## CONTROL PARAMETER SETTING



If CTR1 = PID

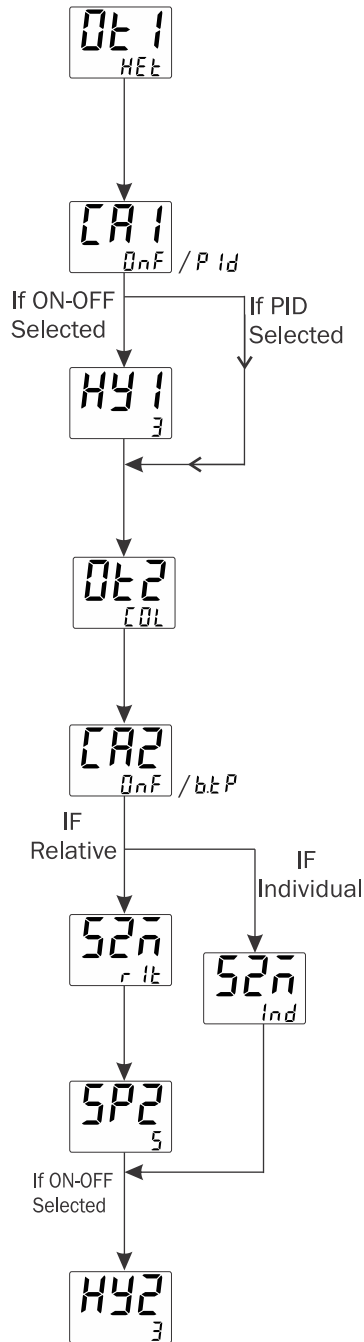


If CTR 2 =B.TP  
 ( BLOWER TP )

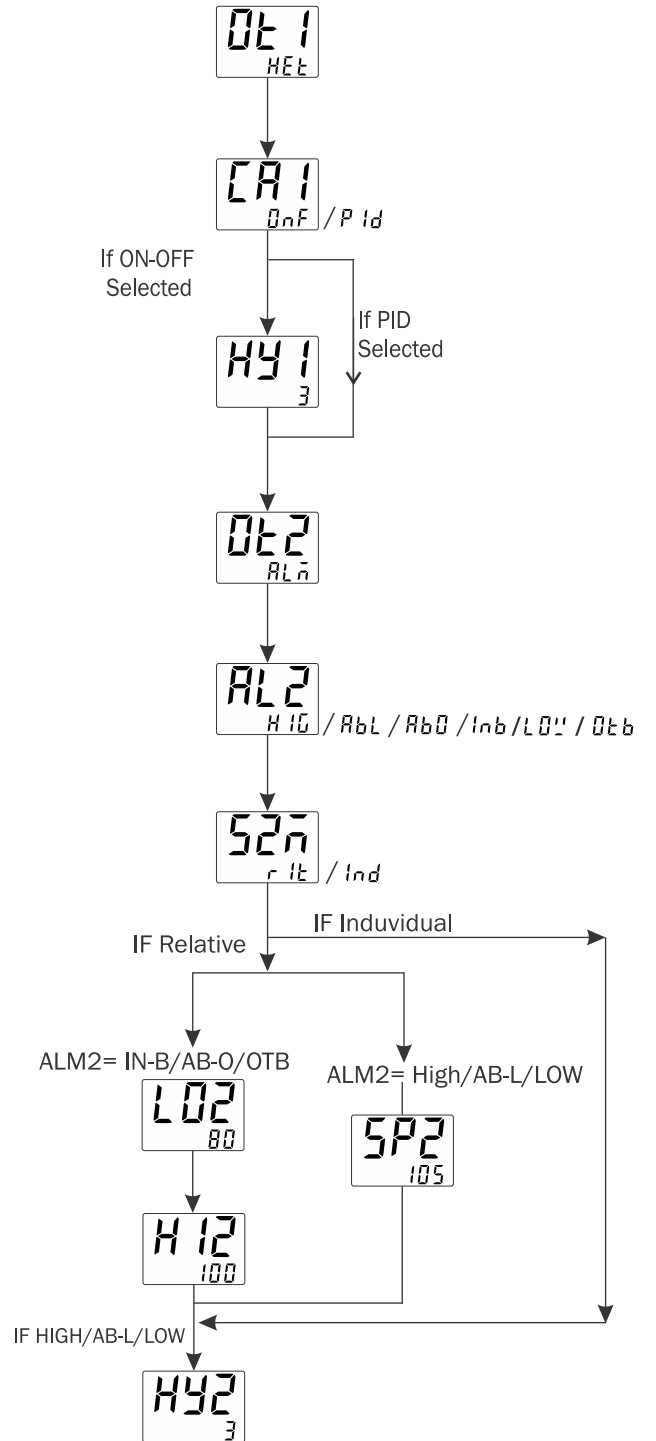


Press **ENT** key to Save & Exit

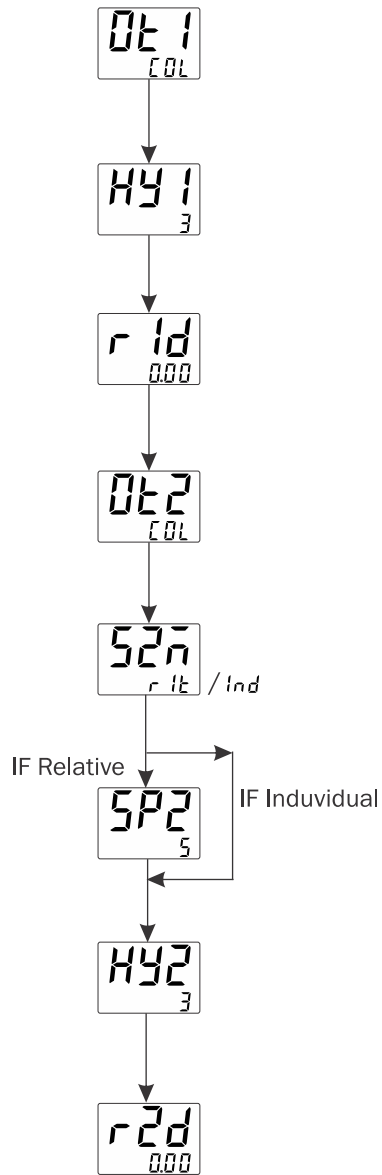
**Case - 1**  
Heat + Cool



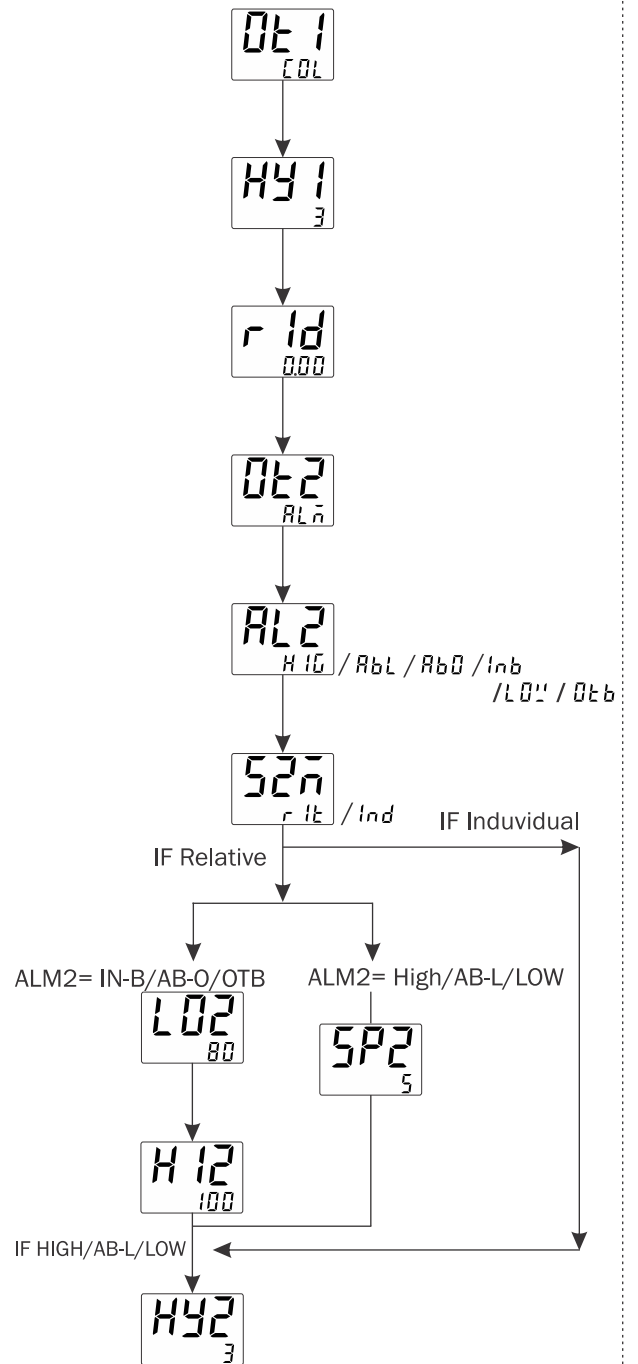
**Case - 2**  
Heat + Alarm



Case - 3  
Cool + Cool



Case - 4  
Cool + Alarm

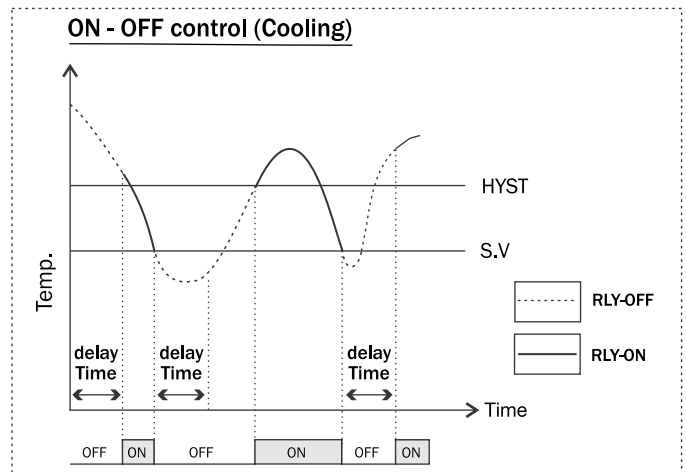
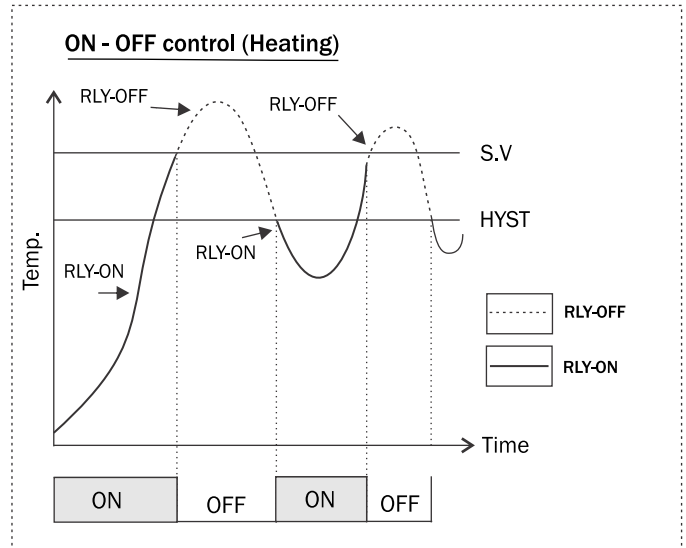


## PARAMETER MESSAGE DESCRIPTION

SP1	Set Point 1 For O/P 1
SP2	Set Point 2 For O/P 2
LO2	Low Set Point 2
HI 2	High Set Point 2
PR5	Password
inp	Input ( Sensor )
SLL	Set Low Limit
SHL	Set High Limit
OFF	Offset
Pb	Proportional Band For PID Action
It	Integral Time Constant
dt	Derivative Time Constant
Ct	Cycle Time For PID Action
nr	Manual Reset
CPb	Cooling PB
CO <sub>n</sub>	Cooling On Time
CO <sub>F</sub>	Cooling Off Time
HY1	Hysterisis 1
HY2	Hysterisis 2
Out 1	Output 1 Mode
CR1	Control Action 1
Out2	Output 2 Mode
CR2	Control Action 2
Alt2	Alarm 2
S2n	Set 2 Mode
r1d	Relay 1 Delay Time
r2d	Relay 2 Delay Time
PId	PID Action
OnF	ON-OFF Action
blP	Blower TP Action
HI G	High Alarm
AbL	Absolute Low Alarm
lnb	In Band Alarm
AbO	Absolute Out Band Alarm
HEt	Heating Mode
CO <sub>L</sub>	Cooling Mode
ALn	Alarming Mode
OFF	OFF Mode
YES	Yes
nO	No
Ind	Set 2 Individual to Set 1
rLt	Set 2 Reletive to Set 1
FFS	Factory Setting
Out3	Output 3 Mode
LO3	Low Set Point 3
HI 3	High Set Point 3
S3n	Set 3 Mode
HY3	Hysterisis 3

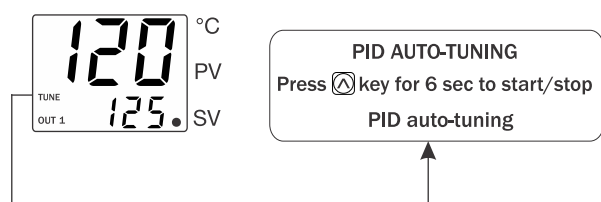
AL3	Alarm 3
Outb	Outband
LO <sub>n</sub>	Low Alarm
S3n	Setpoint 3 Mode

## CONTROL FUNCTION



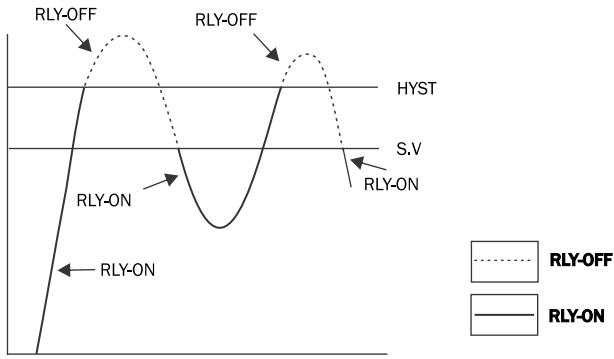
### Auto Tuning:-

- 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.

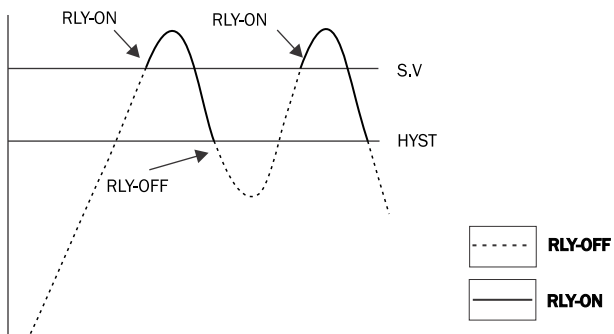


# ALARM OPERATION

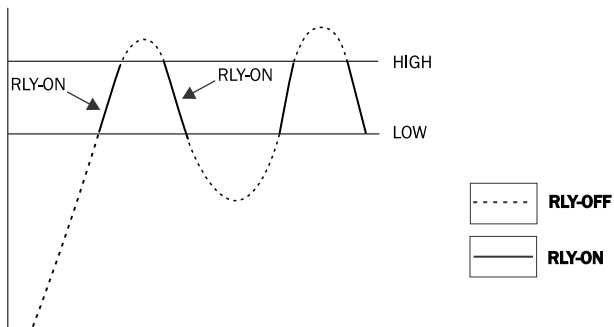
## LOW ALARM:



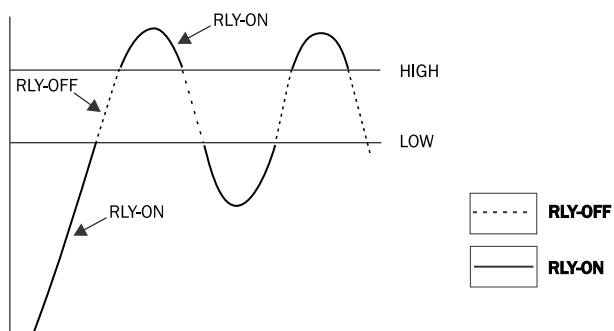
## HIGH ALARM:



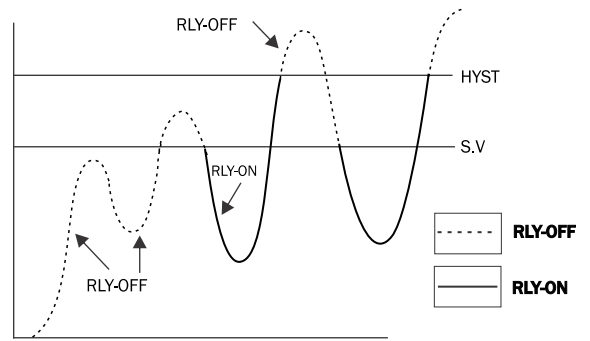
## INBAND ALARM



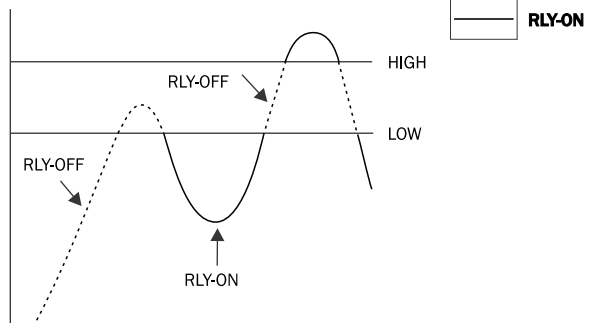
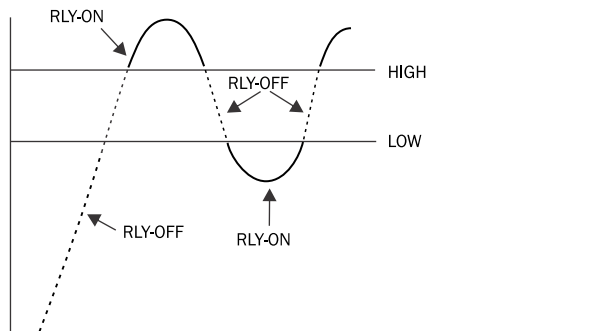
## OUTBAND ALARM



## ABSOLUTE LOW ALARM



## ABSOLUTE OUTBAND ALARM



Specifications are subject to change, since development is a continuous process,  
So for more updated operating information and Support,  
Please contact our Helpline: 9978991482/9978991476/9978991474 or  
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