USER'S OPERATING MANUAL FOR HUMIDITY AND TEMPERATURE CONTROLLER
(Models: RHTC - 400)

RHTC - 400
(48 X 48)

SPECIFICATIONS : -

1. Display Type : 8 - Digit 7 segment LED

Model no.	RHTC-400	Color
Display height (Upper Display)	0.39"	White
Display height (Lower Display)	0.24"	Green

2. Status LED's
   - DH : Dry Heater Output Status
   - WH : Wet Heater Output Status
   - CP : Compressor Output Status
   - TA : Temperature Alarm Status
   - HA : Humidity Alarm Status
   - D : Water Level Error Condition

3. Temperature Input (Selectable)
   - Sensor input : RTD & RTD.1 (Pt-100)
   - Analog Input : 0 - 20mA, 4 - 20mA, 0 - 1VDC, 0~10VDC

4. Humidity Input
   - Analog Input : 0~20mA, 4~20mA, 0~1VDC, 0~3.3VDC, 0~5VDC, 0~10VDC, RH-20, RH-35 (Selectable)

5. Input Specification
   - Sampling Time : 125 msec.
   - Resolution : 1, 0.1, 0.01, 0.001 (Selectable)
   - LWC for Pt-100 : Built in up to 18E max.
   - Excitation Voltage : 5V

6. Serial Communication
   - Port : RS485, 2 Wire, Half Duplex
   - Protocol : Modbus RTU
   - Baud Rate (Selectable) : 9600, 19200, 31250, 38400, 76800
   - Parity (Selectable) : None, Odd, Even
   - Stop Bits (Selectable) : One (1), Two (2)

7. Control Output Function
   - Available Output Type : SSR
   - Control Action : ON-OFF/PID (user selectable)
   - Control Mode : Heat/Cool (user selectable)

8. Relay Output
   - Contact type : N/O, COM
   - Contact Rating : 5A @ 250VAC or 30 VDC
   - Life expectancy : > 5,00,000 operations
   - Isolation : Inherent

9. SSR Drive Output
   - Drive Capacity : 12V @ 30mA.
   - Isolation : Non-Isolated.

10. Environmental
    - Operating Range : 0 ~50°C, 5~90% Rh
    - Storage Humidity : 95% Rh (Non-condensing)

11. POWER SUPPLY
    - Supply Voltage : 90~270VAC, 50/60Hz.
    - Consumption : 4W Maximum.

12. PHYSICAL
    - Housing : ABS Plastic

INSTALLATION GUIDELINES

1. Prepare the cut-out with proper dimension as shown in figure.
2. Remove clamp from Controller.
3. Push the Timer through panel cut-out and secure the Controller in its place by tightening the side clamp.

SAFETY INSTRUCTION

MECHANICAL

❖ Ambient temperature and relative humidity surrounding the Controller must not exceed the maximum specified limits.

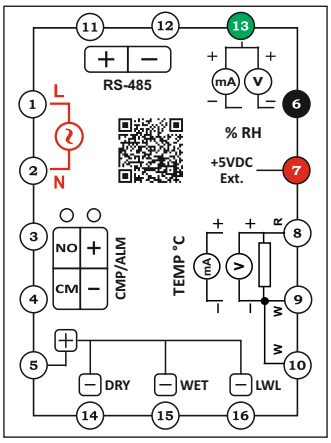
❖ The Controller in its installed state must be protected against excessive electrostatic or electromagnetic interferences.

ELECTRICAL

❖ The Controller must be wired as per wiring diagram & it must comply with local electrical regulation.

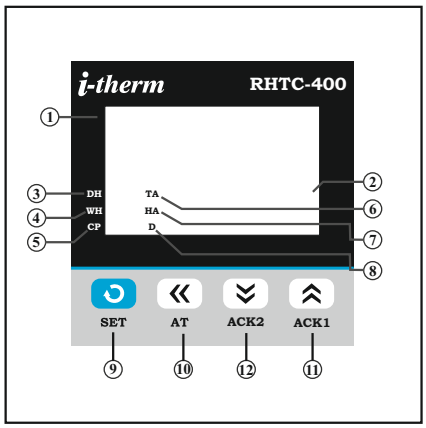
❖ The Electrical noise generated by switching inductive loads might create momentary Fluctuation in display, latch up, data loss or permanent damage to the instrument. To reduce this use snubber circuit across the load.

TERMINAL CONNECTIONS :



RHTC-400

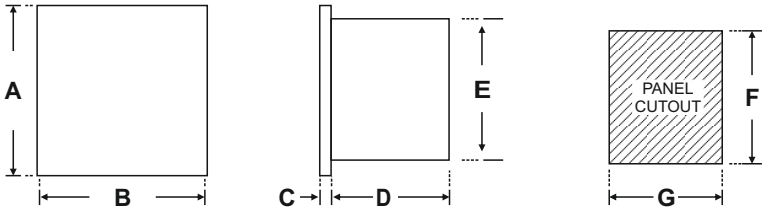
Front panel layout:-



Front panel layout function :-

No.	Names	Functions
1	Upper Display	It will display 1)In Run Mode Present Value of Temperature is displayed. 2) In Config and Control list sub-parameters are displayed.
2	Lower Display	It will display 1) In Run Mode Present Value of Relative humidity is displayed. 2)In Config and Control list the main header list will be displayed.
3	DH	Dry Heater or Heater Output indications.
4	WH	Wet Heater or Humidity Heater output indication.
5	CP	Compressor Output indication.
6	TA	Temperature alarm indication.
7	HA	Humidity Alarm indication.
8	D	Water Level error indication.
9	Set Key	1) To save the parameters and value. 2) Along with UP key to enter the parameters list.
10	Shift Key	1) To shift the digits while changing the parameter values. 2) To enable tuning of temperature and relative humidity. 3) Along with SET key can be used to return to run mode when in parameter list.
11	Up Key	1) To increase value or browse through parameters. 2) Along with SET key to enter the parameters list. 3) To acknowledge Temperature Alarm.
12	Down Key	1) To decrease value or browse through parameters. 2) To acknowledge Humidity Alarm.

Overall Dimensions & Panel Cutout (in mm) :-



Model \ Dim	A	B	C	D	E	F	G
RHTC - 400	50	50	3	70	45	45	45

User List

USER LIST :

(1) To enter in this mode press SET key once.
(2) To change the parameter value press UP or DOWN key.
(3) To save the changes and move on to next parameter press SET key once.

Parameter	Lower Display	Upper Display	Range	Description	Default
Temp. Set Point	t.SP	0	LSPL ~ HSPL	User can change the Temperature Set Point value using UP/ DOWN and SHIFT keys. Holding the key will change the value at a faster rate. Press SET key to store the desired value.	0°C
rH Set Point	rH.SP	0	LSPL ~ HSPL	User can change the Relative Humidity value using UP/ DOWN and SHIFT keys. Holding the key will change the value at a faster rate. Press SET key to store the desired value.	0°C
Temp. Alarm Set Point	t.AL	0	LSPL ~ HSPL -99 to +99°C 2 to 99°C	This parameter is prompted if t.AL is Enable and is configured as (1) Alarm (High/Low) mode. (2) As a deviation alarm mode. (3) As a band alarm.	0°C
rH Alarm Set Point	rH.AL	0	LSPL ~ HSPL -99 to +99°C 2 to 99°C	This parameter is prompted if rH.AL is Enable and is configured as (1) Alarm (High/Low) mode. (2) As a deviation alarm mode. (3) As a band alarm.	0°C

Header Parameter List

HEADER PARAMETER LIST :

(1) To enter in this mode press SET & UP key together for 3 seconds.
(2) To browse through the parameters press UP & DOWN key.
(3) To enter in the sub-parameter list press SET key once.
(4) To come back to the Run mode press SHIFT and SET key together for 3 sec.

Parameter	Lower Display	Upper Display	Description	Default
Lock Code	LOCK	0	Set this parameter to 15 (Default LOCK CODE) to access Header List. User has a choice to set different Lock Code via USER LOCK CODE in Supervisory parameters List.	15
Header List	LIST	t.CFG	**T.CFG :-** By entering this Header List user will be able to access all the Temperature related Configuration parameters listed on Page no. **4**	T.CFG
		H.CFG	**H.CFG :-** By entering this Header List user will be able to access all the Relative Humidity related Configuration parameters listed on Page no. **6**	
		t.Ctr	**T.CTR :-** By entering this Header List user will be able to access all the Temperature related Control parameters listed on Page no. **8**	
		H.Ctr	**H.CTR :-** By entering this Header List user will be able to access all the Relative Humidity related Control parameters listed on Page no. **9**	
		CoMP	**COMP :-** By entering this Header List user will be able to access all the Compressor related Control parameters listed on Page no. **10**	
		t.ALn	**T.ALM :-** By entering this Header List user will be able to access all the Temperature related Alarm parameters listed on Page no. **11**	
		H.ALn	**H.ALM :-** By entering this Header List user will be able to access all the Relative Humidity related Alarm parameters listed on Page no. **12**	
		SUPr	**SUPR :-** By entering this Header List user will be able to access all the Supervisory parameters listed on Page no. **14**	
		d.IP	**d.IP :-** By entering this Header List user will be able to access all the Digital Input related parameters listed on Page no. **13**	
		Conn	**COMM :-** By entering this Header List user will be able to access all the Communication related parameters listed on Page no. **15**	

Temperature Config List (t.CFG)

TEMPERATURE CONFIGURATION LIST :

(1) To browse through the parameters press UP & DOWN key.
(2) To enter in the edit mode press SHIFT key once, blinking of parameter value will indicate edit mode.
(3) To change the parameter value press UP or DOWN once entered in edit mode.
(4) To save the changes press SET key once.
(5) To go back to the main header parameter press SHIFT key for 3 sec.
(6) To come back to the Run mode press SHIFT and SET key together for 3 sec.

Parameter	Lower Display	Upper Dislay	Description	Default
Temp. Input Types	t.inP	rtd rtd.1 0-1 0-20 4-20	**'RTD' :-** If selected, instrument will accept temperature input from PT-100 sensor at rear terminal. Below LSPL it will display 'LLLL' message & above HSPL it will display 'HHHH'. **'RTD.1' :-** If selected, instrument will accept temperature input from PT-100 sensor at rear terminal. Below LSPL it will display 'LLLL' message & above HSPL it will display 'HHHH'. **'0 - 1' :-** If selected, instrument will accept 0 - 1VDC input at rear terminal. Below 0V it will display 'LLLL' message & above 1V it will display 'HHHH'. **'0 - 20' :-** If selected, instrument will accept 0 - 20 mA input at rear terminal. Below 0 mA it will display 'LLLL' message & Above 20 mA it will display 'HHHH'. **'4 - 20' :-** If selected, instrument will accept 4 - 20mA input at rear terminal. Below 3.8mA it will display 'LLLL' message & Above 20mA it will display 'HHHH'. If input is less than 3.2mA it will display 'L.BRK'(Loop Break) message.	RTD.1
Temp. Input Signal Low	t.SCL	0.00	This parameter will only be prompted if Input type is analog signal. The value set over here becomes the minimum value for input analog signal.	0.00
Temp. Input Signal High	t.SCH	20.00	This parameter will only be prompted if Input type is analog signal. The value set over here becomes the maximum value for input analog signal.	20.00
Temp. Range Resolution	r.rES	0 0.0 0.00 0.000	This parameter will only be prompted if Input type is analog signal. By this parameter user can select Range Resolution for analog input, i.e. "0.000, 0.00, 0.0, 0" For range limit as per resolution selected Ref. Table No.2 (Page No. 18).	0
Temp. Analog Input Low Value	t.AIL	0	This parameter will only be prompted if Input type is analog signal. By this parameter user can define Low scale for input signal. Which can be in between '-1999 to Ai.Hi'. For range limit as per resolution selected Ref. Table No.2 (Page No. 18).	0
Temp. Analog Input High Value	t.AIH	1000	This parameter will only be prompted if Input type is analog signal. By this parameter user can define HIGH scale for input signal. Which can be in between 'Ai.Lo to 9999'. For range limit as per resolution selected Ref. Table No.2 (Page No. 18).	1000
Temp. Display Resolution	d.rES	0 0.0 0.00 0.000	This parameter will only be prompted if Input type is analog signal. By this parameter user can select Display resolution which is to be shown on Display i.e. "0.000, 0.00, 0.0, 0". For range limit as per resolution selected Ref. Table No.2 (Page No. 18).	0
Temp. Lower SP Limit	t.LSP	0	This parameter will only be prompted if Input type is RTD or RTD.1. Sets the minimum limit for set point adjustment. It can be set from minimum specified range of selected sensor to HSPL value. For range limit as per sensor selected Ref. Table No.1 (Page No. 18).	0 °C
Temp. Higher SP Limit	t.HSP	400	This parameter will only be prompted if Input type is RTD or RTD.1. Sets the maximum limit for set point adjustment. It can be set from LSPL value to maximum specified range of selected sensor. For range limit as per sensor selected Ref. Table No.1 (Page No. 18).	400 °C

Parameter	Lower Display	Upper Display	Description	Default
Temp. Process Value Offset	t.OFF	0	Function of this parameter is to add/subtract a constant value to the measured PV to obtain Final PV.	**0**
Temp. Input Filter	t.FIL	4	Controller is equipped with an adaptive digital filter which is used to filter out any extraneous pulses on the PV. Filtered PV Value is used for all PV dependent functions. If PV signal is fluctuating due to noise, increase the filter time constant value.	**04**
Temp. User Low Calib-ration	LCAL	0	This parameter will be prompted only if input type is selected as Analog Input. By this parameter user can adjust Lower calibration for Selected Volt type.	**0**
Temp. User High Calib-ration	HCAL	0	This parameter will be prompted only if input type is selected Analog Input. By this parameter user can adjust Higher calibration for Selected Volt type.	**0**
Temp. User Calib-ration Default	dEF	YES ▼ ▲ nO	This parameter will be prompted only if input type is Analog Input. If “Yes" Selected, User Calibration will be replaced with Factory Calibration. If “No" Selected, No change in User Calibration.	**No**

Humidity Config List (H.CFG)

HUMIDITY CONFIGURATION LIST :

(1) To browse through the parameters press UP & DOWN key.
(2) To enter in the edit mode press SHIFT key once, blinking of parameter value will indicate edit mode.
(3) To change the parameter value press UP or DOWN once entered in edit mode.
(4) To save the changes press SET key once.
(5) To go back to the main header parameter press SHIFT key for 3 sec.
(6) To come back to the Run mode press SHIFT and SET key together for 3 sec.

Parameter	Lower Display	Upper Display	Description	Default
Humidity Input Types	H.InP	0-1	**'0 - 1' :-** If selected, instrument will accept 0 - 1VDC input at rear terminal.	0~3.3 Volt
		0-3.3	**'0 - 3.3' :-** If selected, instrument will accept 0 - 3.3VDC input at rear terminal.	
		0-5	**'0 - 5' :-** If selected, instrument will accept 0 - 5VDC input at rear terminal.	
		0-10	**'0 - 10' :-** If selected, instrument will accept 0 - 10VDC input at rear terminal.	
		rH20	**'RH-20' :-** If selected, instrument will accept 1.1 - 3.6VDC input at rear terminal. Ref. Sensor Table on Page No. 7	
		rH35	**'RH-35' :-** If selected, instrument will accept 1.1 - 3.6VDC input at rear terminal. Ref. Sensor Table on Page No. 7	
		0-20	**'0 - 20' :-** If selected, instrument will accept 0 - 20 mA input at rear terminal.	
		4-20	**'4 - 20' :-** If selected, instrument will accept 4 - 20mA input at rear terminal. If input is less than 3.2mA it will display 'L.BRK'(Loop Break) message.	
Humidity Input Signal Low	H.SG.L	0.00	This parameter will only be prompted if Input type is analog signal. The value set over here becomes the minimum value for input analog signal.	0.00
Humidity Input Signal High	H.SG.H	20.00	This parameter will only be prompted if Input type is analog signal. The value set over here becomes the maximum value for input analog signal.	20.00
Humidity Range Resolution	r.rES	0	This parameter will **NOT** be prompted when input type is selected as RTD.	0
		0.0		
		0.00	By this parameter user can select Range Resolution for analog input, i.e. "0.000, 0.00, 0.0, 0" For range limit as per resolution selected Ref. Table No.2 (Page No. 18).	
		0.000		
Humidity Analog Input Low Value	H.A I.L	0	By this parameter user can define Low scale for input signal. Which can be in between '-1999 to Ai.Hi'. For range limit as per resolution selected Ref. Table No.2 (Page No. 18).	0
Humidity Analog Input High Value	H.A I.H	1000	By this parameter user can define HIGH scale for input signal. Which can be in between 'Ai.Lo to 9999'. For range limit as per resolution selected Ref. Table No.2 (Page No. 18).	1000

Parameter	Lower Display	Upper Display	Description	Default
Humidity Display Resolution	d.rES	0 / 0.0 / 0.00 / 0.000	This parameter will **NOT** be prompted when input type is selected as RTD. By this parameter user can select Display resolution which is to be shown on Display i.e. "0.000, 0.00, 0.0, 0". For range limit as per resolution selected Ref. Table No.2 (Page No. 18).	0
Humidity Lower SP Limit	H.LSP	0	This parameter will only be prompted if Input type is RTD or RTD.1. Sets the minimum limit for set point adjustment. It can be set from minimum specified range of selected sensor to HSPL value. For range limit as per sensor selected Ref. Table No.1 (Page No. 18).	0 ℃
Humidity Higher SP Limit	H.HSP	400	This parameter will only be prompted if Input type is RTD or RTD.1. Sets the maximum limit for set point adjustment. It can be set from LSPL value to maximum specified range of selected sensor. For range limit as per sensor selected Ref. Table No.1 (Page No. 18).	400 ℃
Humidity Process Value Offset	H.OFS	0	Function of this parameter is to add/subtract a constant value to the measured PV to obtain Final PV. For range limit as per resolution selected Ref. Table No.2 (Page No. 18).	0
Humidity Input Filter	H.F IL	4	Controller is equipped with an adaptive digital filter which is used to filter out any extraneous pulses on the PV. Filtered PV Value is used for all PV dependent functions. If PV signal is fluctuating due to noise, increase the filter time constant value.	04
Humidity User Low Calib-ration	LCAL	0	This parameter will be prompted only if selected input type is Analog Input. By this parameter user can adjust Lower calibration for Selected Volt type.	0
Humidity User High Calib-ration	HCAL	0	This parameter will be prompted only if selected input type is Analog Input. By this parameter user can adjust Higher calibration for Selected Volt type.	0
Humidity User Calib-ration Default	dEF	YES / nO	This parameter will be prompted only if selected input is Analog Input. If "Yes" Selected, User Calibration will be replaced with Factory Calibration. If "No" Selected, No change in User Calibration.	No

Humidity Sensor Table :

RH (%)	Vout (mV)	
	RH-20	RH-35
10	1325	1235
15	1465	1390
20	1600	1540
25	1735	1685
30	1860	1825
35	1990	1960
40	2110	2090
45	2235	2220
50	2360	2350

RH (%)	Vout (mV)	
	RH-20	RH-35
55	2480	2480
60	2605	2605
65	2730	2730
70	2860	2860
75	2990	2990
80	3125	3125
85	3260	3260
90	3405	3405
95	3555	3555

Temperature Control List (t.Ctr)

TEMPERATURE CONTROL LIST :

(1) To browse through the parameters press UP & DOWN key.
(2) To enter in the edit mode press SHIFT key once, blinking of parameter value will indicate edit mode.
(3) To change the parameter value press UP or DOWN once entered in edit mode.
(4) To save the changes press SET key once.
(5) To go back to the main header parameter press SHIFT key for 3 sec.
(6) To come back to the Run mode press SHIFT and SET key together for 3 sec.

Parameter	Lower Display	Upper Display	Description	Default
Output 1 Type	OP1	rLY	This parameter is a VIEW ONLY parameter. User will come to know the Output type for temperature. Output type as Relay , SSR , mA.	Relay
mA Output Type	t.nA	0-20 ⇕ 4-20	This parameter will be prompted only if factory set control output is “mA”. If “0~20" Selected, Control Output will be 0~20 mA. If “4~20" Selected, Control Output will be 4~20 mA.	4~20 mA
Output 1 User Calib. Low	CL0	16.70	This parameter will be prompted only if selected control action is PID. It sets bandwidth over which the output power is adjusted depending upon the error (SV-PV). The value of this parameter is automatically set by Auto tune function.	16.70
Output 1 User Calib. High	CH0	85.50	This parameter will be prompted only if selected control action is PID. It sets bandwidth over which the output power is adjusted depending upon the error (SV-PV). The value of this parameter is automatically set by Auto tune function.	85.50
mA Default	d.nA	YES ⇕ nO	This parameter will be prompted only if factory set control output is “mA”. If “Yes" Selected, User Calibration will be replaced with Factory Calibration. If “No" Selected, No change in User Calibration.	No
Control Mode	t.nOd	PId ⇕ OnOF	User can select between PID or ON-OFF action algorithm to be adopted for output. If Factory set Control output is “mA” then Control mode as PID Selected & this parameter will be Skipped.	PID
Control Logic For Output 1	OP1.L	HEAt ⇕ COOL	This parameter will be prompted only if selected control mode is ON-OFF. User can select heating logic in which OP1 will remain ON till PV < SP. (PV increases when output is ON.) This parameter will appear only if selected control mode is ON-OFF. User can select cooling logic in which OP1 will remain ON till PV > SP. (PV decreases when output is ON.)	Heat
Proportional Band	t.Pb	5.0	This parameter will be prompted only if selected control action is PID. It sets bandwidth over which the output power is adjusted depending upon the error (SV-PV). The value of this parameter is automatically set by Auto tune function.	5.0°C
Integral Time	t.Int	240	This parameter will be prompted only if selected control action is PID. It sets the time taken by PID algorithm to remove steady state error. Value of this parameter is automatically set by Auto Tune function. If set to ‘0’, this function will be disabled.	240
Derivative Time	t.dt	60	This parameter will be prompted only if selected control action is PID. It defines how strongly the Controller will react to the rate of change of PV. Value of this parameter is automatically set by Auto Tune function. If set to ‘0’, this function will be disabled.	60
Cycle Time	t.Ct	16.0	This parameter will be prompted only if selected control action is PID. User can set this value based on process being controlled & type of Output being selected. For Relay O/P, cycle time should be more 12sec & for SSR O/P, cycle time should be less than 10sec.	16.0 sec
Soft Start Time	t.St.n	50	This parameter will be prompted only if factory set control output is “mA”. The soft start function suppresses the mA to become max. output. It places an upper limit on mA output for a specified amount of time after power on.	50 Sec.
Control Hys. 1	t.HY1	2	This parameter will be prompted only if selected control action is ON-OFF. It sets the dead band between ON & OFF switching of the Output. Larger value of hysterisis minimize the number of ON-OFF operation of load.This increases life of actuators like contactors but also produces large errors (between PV & SV).	2°C
Delay 1	t.dL1	0	This parameter will be prompted only if selected control action is ON-OFF. It sets the main output restart time where O/P once turned OFF will turn ON only after restart time, regardless difference between PV & SP in Heat or Cool mode. If set to '0', O/P will be switched without delay. Also, Delay will be applicable in case of every power ON.	0 Sec.
Output Power Limit	t.PH1	100	This parameter will be prompted only if selected control action is PID. This parameter will decide the maximum output power in % applied to the load.	100 %
Gap 1	t.GP1	0.0	SP (set point) will be consider as (t.SP - t.GP1) for heating.	0 °C

Humidity Control List (H.Ctr)

HUMIDITY CONTROL LIST :

(1) To browse through the parameters press UP & DOWN key.
(2) To enter in the edit mode press SHIFT key once, blinking of parameter value will indicate edit mode.
(3) To change the parameter value press UP or DOWN once entered in edit mode.
(4) To save the changes press SET key once.
(5) To go back to the main header parameter press SHIFT key for 3 sec.
(6) To come back to the Run mode press SHIFT and SET key together for 3 sec.

Parameter	Lower Display	Upper Display	Description	Default
Output 2 Type	OP2	rLY	This parameter is a VIEW ONLY parameter. User will come to know the Output type for Humidity. Output type as Relay , SSR , mA.	Relay
mA Output Type	H.mA	0-20 ⇕ 4-20	This parameter will be prompted only if factory set control output is “mA”. If “0~20" Selected, Control Output will be 0~20 mA. If “4~20" Selected, Control Output will be 4~20 mA.	4~20 mA
Output 2 User Calib. Low	CL0	16.70	This parameter will be prompted only if selected control action is PID. It sets bandwidth over which the output power is adjusted depending upon the error (SV-PV). The value of this parameter is automatically set by Auto tune function.	16.70
Output 2 User Calib. High	CH0	85.50	This parameter will be prompted only if selected control action is PID. It sets bandwidth over which the output power is adjusted depending upon the error (SV-PV). The value of this parameter is automatically set by Auto tune function.	85.50
mA Default	d.mA	YES ⇕ no	This parameter will be prompted only if factory set control output is “mA”. If “Yes" Selected, User Calibration will be replaced with Factory Calibration. If “No" Selected, No change in User Calibration.	No
Control Mode	H.mOd	PId ⇕ OnOF	User can select between PID or ON-OFF action algorithm to be adopted for output. If Factory set Control output is “mA” then Control mode as PID Selected & this parameter will be Skipped.	PID
Control Logic For Output 2	OP2L	HEAt ⇕ COOL	This parameter will be prompted only if selected control mode is ON-OFF. User can select heating logic in which OP1 will remain ON till PV < SP. (PV increases when output is ON.) This parameter will appear only if selected control mode is ON-OFF. User can select cooling logic in which OP1 will remain ON till PV > SP. (PV decreases when output is ON.)	Heat
Proportional Band	H.Pb	5.0	This parameter will be prompted only if selected control action is PID. It sets bandwidth over which the output power is adjusted depending upon the error (SV-PV). The value of this parameter is automatically set by Auto tune function.	5.0°C
Integral Time	H.Int	240	This parameter will be prompted only if selected control action is PID. It sets the time taken by PID algorithm to remove steady state error. Value of this parameter is automatically set by Auto Tune function. If set to ‘0’, this function will be disabled.	240
Derivative Time	H.dt	60	This parameter will be prompted only if selected control action is PID. It defines how strongly the Controller will react to the rate of change of PV. Value of this parameter is automatically set by Auto Tune function. If set to ‘0’, this function will be disabled.	60
Cycle Time	H.Ct	16.0	This parameter will be prompted only if selected control action is PID. User can set this value based on process being controlled & type of Output being selected. For Relay O/P, cycle time should be more 12sec & for SSR O/P, cycle time should be less than 10sec.	16.0 sec
Soft Start Time	H.Stn	50	This parameter will be prompted only if factory set control output is “mA”. The soft start function suppresses the mA to become max. output. It places an upper limit on mA output for a specified amount of time after power on.	50 Sec.
Control Hys. 2	H.HY2	2	This parameter will be prompted only if selected control action is ON-OFF. It sets the dead band between ON & OFF switching of the Output. Larger value of hysterisis minimize the number of ON-OFF operation of load.This increases life of actuators like contactors but also produces large errors (between PV & SV).	2°C
Delay 2	H.dL2	0	This parameter will be prompted only if selected control action is ON-OFF. It sets the main output restart time where O/P once turned OFF will turn ON only after restart time, regardless difference between PV & SP in Heat or Cool mode. If set to '0', O/P will be switched without delay. Also, Delay will be applicable in case of every power ON.	0 Sec.
Output Power Limit	H.PH1	100	This parameter will be prompted only if selected control action is PID. This parameter will decide the maximum output power in % applied to the load.	100 %

Compressor List (COMP)

COMPRESSOR LIST :

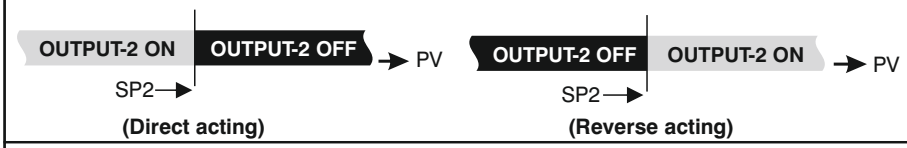
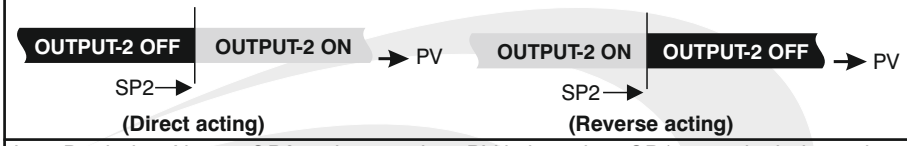
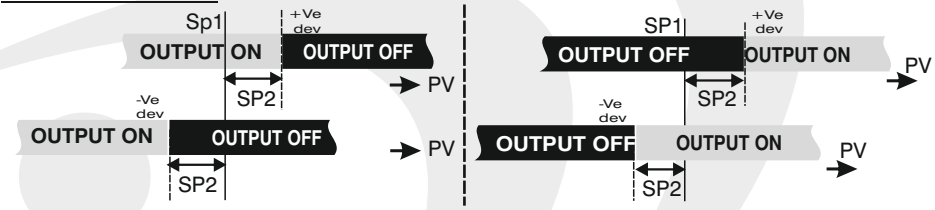
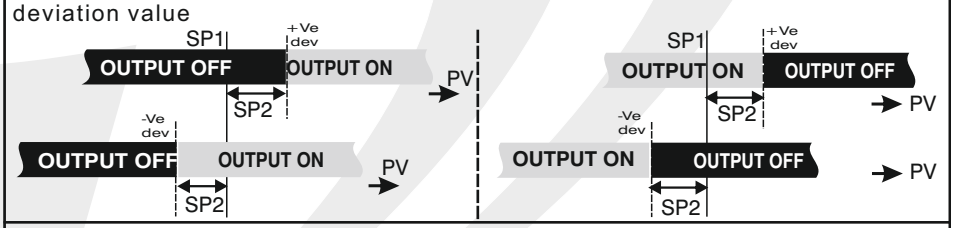
(1) To browse through the parameters press UP & DOWN key.
(2) To enter in the edit mode press SHIFT key once, blinking of parameter value will indicate edit mode.
(3) To change the parameter value press UP or DOWN once entered in edit mode.
(4) To save the changes press SET key once.
(5) To go back to the main header parameter press SHIFT key for 3 sec.
(6) To come back to the Run mode press SHIFT and SET key together for 3 sec.

Parameter	Lower Display	Upper Display	Description	Default
OP 3 Type	OP3	rLY	This parameter is a VIEW ONLY parameter. User will come to know the Output type for Compressor. Output type as Relay , SSR.	Relay
OP 3 Mode	OP3	CoMP	OP 3 will be used for Compressor.	Comp
		ALrM	OP 3 will be used for Alarm.	
Comp. Mode	CP.mO	AUtO	OP 3 will be automatically activated /de-activated w.r.t SP1 & HYS.	Auto
		On	OP 3 will be permanently Activated (ON).	
		OFF	OP 3 will be permanently De-Activated (OFF).	
Comp. Higher Cut-Off Limit	CP.UP	0	Compressor will be continuously OFF above this temperature irrespective of the mode selected.	40 ℃
Comp. Lower Cut-Off Limit	CP.LO	0	Compressor will be continuously OFF below this temperature irrespective of the mode selected.	-20 ℃
Comp. Set Point	CP.SP	0.0	SP (set point) will be consider as (t.SP + CP.SP) for cooling.	0 °C
Comp. Hysterisis	CP.HY	2	It sets the dead band between ON & OFF switching of the Output. Larger value of hysterisis minimize the number of ON-OFF operation of load.This increases life of actuators like contactors but also produces large errors (between PV & SV).This parameter will only be prompted when compressor mode is selected as AUTO.	2°C
Comp. Delay	CP.dL	0	It sets the main output restart time where O/P once turned OFF will turn ON only after restart time, regardless difference between PV & SP in Heat or Cool mode. If set to '0', O/P will be switched without delay. Also, Delay will be applicable in case of every power ON. This parameter will not be displayed when compressor mode is selected as OFF.	90 Sec.

Temperature Alarm List (t.ALM)

TEMPERATURE ALARM LIST :

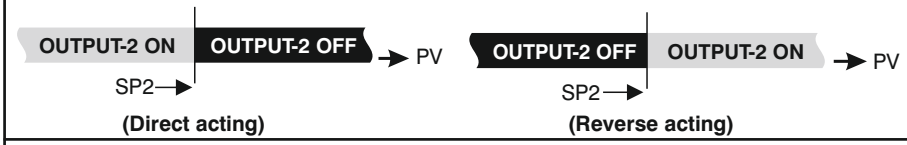
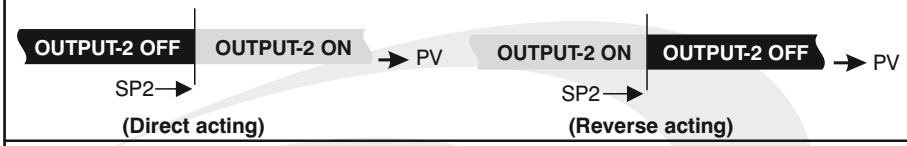
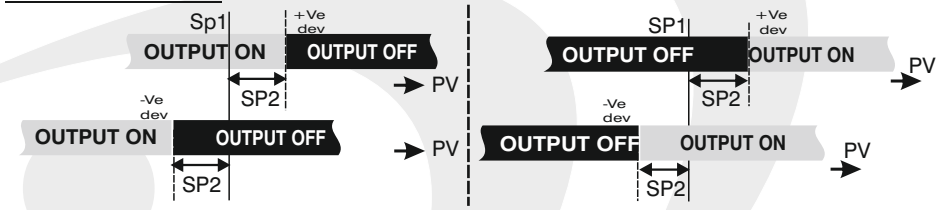
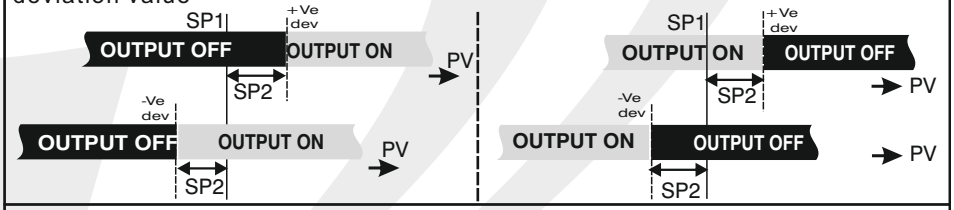
(1) To browse through the parameters press UP & DOWN key.
(2) To enter in the edit mode press SHIFT key once, blinking of parameter value will indicate edit mode.
(3) To change the parameter value press UP or DOWN once entered in edit mode.
(4) To save the changes press SET key once.
(5) To go back to the main header parameter press SHIFT key for 3 sec.
(6) To come back to the Run mode press SHIFT and SET key together for 3 sec.

Parameter	Lower Display	Upper Display	Description	Default
Alarm Type	t.ALY	LOY	Low Alarm : OP2 activates when PV<SP2. 	Deviation
		HIGh	High Alarm : OP2 activates when PV>SP2. 	
		LodU	Low Deviation Alarm : OP2 activates when PV is less than SP1 ± set deviation value 	
		Hi.dU	High Deviation Alarm : OP2 activates when PV is greater than SP1 ± set deviation value 	
		bAnd	Band Alarm : OP2 activates when PV falls outside the band w.r.t. SP1 in either direction. 	
Alarm Logic	t.ALC	dIr	If this parameter is set as 'Direct', Relay/SSR energizes under Alarm condition & remains De-energized otherwise. 'Direct' setting is generally used for Audio/Visual Alarm Output.	Direct
		rEv	If this parameter is set as 'Reverse', Relay/SSR De-energizes under Alarm condition & remains energized otherwise. 'Reverse' setting is generally used for tripping the process under Alarm condition.	
Alarm Inhibit	t.AL.I	YES	This parameter can be used to inhibit (suppress) the Alarm activation upon power-up conditions by setting the parameter value to 'YES". From Power-up, the Alarm system remains disabled until PV is found with in the limits.	No
		nO	If Alarm activation is desired even under Power-up condition, Set this parameter value to 'NO'.	
Alarm Ack.	t.ALY	AUtO	Once Alarm is activated, user has following three options to de-activate it. When PV falls within the programmed limits, Alarm will be de-activated automatically.	Auto
		nAUL	Once Alarm is activated, it remains activated until manually acknowledged by UP key.	
		bOtH	Once Alarm is activated, it can be de-activated either by pressing UP key or when PV falls within the alarm limits.	
Alarm Hysterisis	t.ALH	2	This parameter will be prompted only if selected control action is ON-OFF. It sets the dead band between ON & OFF switching of the Output. Larger value of hysterisis minimize the number of ON-OFF operation of load.This increases life of actuators like contactors but also produces large errors (between PV & SV).	2°C

Humidity Alarm List (H.ALM)

HUMIDITY ALARM LIST :

(1) To browse through the parameters press UP & DOWN key.
(2) To enter in the edit mode press SHIFT key once, blinking of parameter value will indicate edit mode.
(3) To change the parameter value press UP or DOWN once entered in edit mode.
(4) To save the changes press SET key once.
(5) To go back to the main header parameter press SHIFT key for 3 sec.
(6) To come back to the Run mode press SHIFT and SET key together for 3 sec.

Parameter	Lower Display	Upper Display	Description	Default
Alarm Type	H.AL1	LOW	Low Alarm : OP2 activates when PV<SP2. 	Deviation
		HIGH	High Alarm : OP2 activates when PV>SP2. 	
		LodU	Low Deviation Alarm : OP2 activates when PV is less than SP1 ± set deviation value 	
		HidU	High Deviation Alarm : OP2 activates when PV is greater than SP1 ± set deviation value 	
		bAnd	Band Alarm : OP2 activates when PV falls outside the band w.r.t. SP1 in either direction. 	
Alarm Logic	H.ALG	dIr	If this parameter is set as 'Direct', Relay/SSR energizes under Alarm condition & remains De-energized otherwise. 'Direct' setting is generally used for Audio/Visual Alarm Output.	Direct
		rEv	If this parameter is set as 'Reverse', Relay/SSR De-energizes under Alarm condition & remains energized otherwise. 'Reverse' setting is generally used for tripping the process under Alarm condition.	
Alarm Inhibit	H.AL.H	YES	This parameter can be used to inhibit (suppress) the Alarm activation upon power-up conditions by setting the parameter value to 'YES". From Power-up, the Alarm system remains disabled until PV is found with in the limits.	No
		nO	If Alarm activation is desired even under Power-up condition, Set this parameter value to 'NO'.	
Alarm Ack.	H.AL.P	AUtO	Once Alarm is activated, user has following three options to de-activate it. When PV falls within the programmed limits, Alarm will be de-activated automatically.	Auto
		MAUL	Once Alarm is activated, it remains activated until manually acknowledged by DOWN key.	
		bOtH	Once Alarm is activated, it can be de-activated either by pressing UP key or when PV falls within the alarm limits.	
Alarm Hysterisis	H.AL.H	2	This parameter will be prompted only if selected control action is ON-OFF. It sets the dead band between ON & OFF switching of the Output. Larger value of hysterisis minimize the number of ON-OFF operation of load.This increases life of actuators like contactors but also produces large errors (between PV & SV).	2°C

Supervisory parameter List (SUPr)

SUPERVISORY PARAMETER LIST :

(1) To browse through the parameters press UP & DOWN key.
(2) To enter in the edit mode press SHIFT key once, blinking of parameter value will indicate edit mode.
(3) To change the parameter value press UP or DOWN once entered in edit mode.
(4) To save the changes press SET key once.
(5) To go back to the main header parameter press SHIFT key for 3 sec.
(6) To come back to the Run mode press SHIFT and SET key together for 3 sec.

Parameter	Lower Display	Upper Display	Description	Default
Auto Tune	tUnE	EnbL ⇕ dSbL	This parameter will be prompted only if selected control action is PID. If Enabled, this parameter will be prompted if user press Shift key for 3Sec. If Disabled, this parameter will not be prompted if user press Shift key for 3Sec.	Enable
Temp. Set Point	t.SP	EnbL ⇕ dSbL	If Enabled, User can View & edit the Set point (t.SP) in USER list. If disabled, User can not View or edit Set Point (t.SP) in USER list.	Enable
Humidity Set Point	rH.SP	EnbL ⇕ dSbL	If Enabled, User can View & edit the Set point (rH.SP) in USER list. If disabled, User can not View or edit Set Point (rH.SP) in USER list.	Enable
Temp. Alarm Set Point	t.AL	EnbL ⇕ dSbL	If Enabled, User can View & edit the Temp. Alarm (t.AL) Set point in USER list. If disabled, User can not View or edit the Temp. Alarm(t.AL) Set Point in USER list.	Enable
Humidity Alarm Set Point	rH.AL	EnbL ⇕ dSbL	If Enabled, User can View & edit the humidity Alarm (rH.AL) Set point in USER list. If disabled, User can not View or edit the humidity Alarm (rH.AL) Set Point in USER list.	Enable
User Lock Code	U.LOC	15	Default USER LOCK CODE is 15 to access Control & Configuration List. User has a choice to set its own USER LOCK CODE between 1 to 9999, this is to prevent unauthorized access of Control & Configuration List.	15

Digital Input List (d.IP)

DIGITAL INPUT LIST :

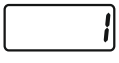
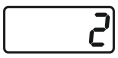
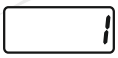
(1) To browse through the parameters press UP & DOWN key.
(2) To enter in the edit mode press SHIFT key once, blinking of parameter value will indicate edit mode.
(3) To change the parameter value press UP or DOWN once entered in edit mode.
(4) To save the changes press SET key once.
(5) To go back to the main header parameter press SHIFT key for 3 sec.
(6) To come back to the Run mode press SHIFT and SET key together for 3 sec.

Parameter	Lower Display	Upper Display	Description	Default
Digital Input 1 Function			This parameter helps in selecting the functionality of Digital Input 1. When NONE is selected Digital Input 1 will be permanently de-activated.	None
			When this parameter is selected Digital Input 1 can be used as Water Level indicator input.	
Water Level Logic			This parameter will only be prompted when Digital Input 1 function is selected as Water Level (WA.LL). This will give alarm when the water level is open.	Open
			This will give alarm when the water level is close.	

Communication parameter List (COMM)

COMMUNICATION PARAMETER LIST :

(1) To browse through the parameters press UP & DOWN key.
(2) To enter in the edit mode press SHIFT key once, blinking of parameter value will indicate edit mode.
(3) To change the parameter value press UP or DOWN once entered in edit mode.
(4) To save the changes press SET key once.
(5) To go back to the main header parameter press SHIFT key for 3 sec.
(6) To come back to the Run mode press SHIFT and SET key together for 3 sec.

Parameter	Lower Display	Upper Display	Description	Default
Device ID Number 1			Set device id for communication. Range:- 1 to 9999 **Note :-** This device id is for Temperature.	1
Device ID Number 2			This is a VIEW ONLY parameter. This device id is for Humidity. The device id for humidity will be the very next id after temperature device id.	2
Baud Rate			By this parameter user can select baud rate for communication purpose.	9600
Parity			By this parameter user can select parity for communication purpose.	0_81
RS-485 response interval			Widen the time interval of receving response (Set value x 20 ms)	1(20ms)

AUTO-TUNING LIST :

(1) To enter in this mode press SHIFT key for 3 sec.
(2) To enter in the edit mode press SHIFT key once, blinking of parameter value will indicate edit mode.
(3) To change the parameter value press UP or DOWN key.
(4) To save the changes press SET key once.

Parameter	Lower Display	Upper Display	Description	Default
Temp. Auto Tuning Mode	t.tUn	YES / nO	This function will be executed only if selected control action is PID. Auto-tuning function is enabled by setting this parameter to 'YES'. The AT 1 led continuously flashes till Auto tuning function is in progress. During Auto-tuning, Controller learns the process characteristics by itself & calculates required P, I & D values. User can cancel or abort this feature by setting this parameter to 'NO'.	No
rH Auto Tuning Mode	H.tUn	YES / nO	This function will be executed only if selected control action is PID. Auto-tuning function is enabled by setting this parameter to 'YES'. The AT 2 led continuously flashes till Auto tuning function is in progress. During Auto-tuning, Controller learns the process characteristics by itself & calculates required P, I & D values. User can cancel or abort this feature by setting this parameter to 'NO'.	No

Table 1 :- Range of Different Sensor Types.

Sensor Type	Range	Resolution	Accuracy
Pt-100 (RTD)	-100 ~ 450°C	1 °C	± 1 °C
Pt-100 (RTD 0.1)	-99.9 ~ 450.0°C	0.1 °C	± 0.3 °C

Table 2 :- Range as per Resolution.

Resolution	Analog Input High / Low	Process Value Offset	Alarm Band	Alarm Hysterisis
0000	-1999 to 9999	-25 to 25	-50 to 50	1 to 25
000.0	-199.9 to 999.9	-25.0 to 25.0	-50.0 to 50.0	0.1 to 25.0
00.00	-19.99 to 99.99	-15.00 to 25.00	-19.00 to 50.00	0.01 to 25.00
0.000	-1.999 to 9.999	-1.500 to 2.500	-1.900 to 5.000	0.001 to 2.500

Error Message:-

Display Message	Selected Input	Descriptions
"OPEN"	RTD or RTD.1	Open Circuit of Control Sensor
"HHHH"	RTD or RTD.1	If input is above HSPL it will display "HHHH" message.
"HHHH"	0~20 / 4~20 / 0~10	If input is above range it will display "HHHH" message.
"LLLL"	RTD or RTD.1	If input is below LSPL it will display "LLLL" message.
"LLLL"	0~20 / 0~10	If input is below '0' it will display "LLLL" message.
"LLLL"	4~20	If input is below "3.8mA" and above "3.2mA" it will display "LLLL" message.
"L.BRK"	4~20	If input is less than "3.2mA" it will display "L.BRK" (Loop Break) message.
"C.E.R.R."	Any Input Selected	The device is out of calibration and need to be sent to factory for re-calibration.

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