

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)
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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
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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

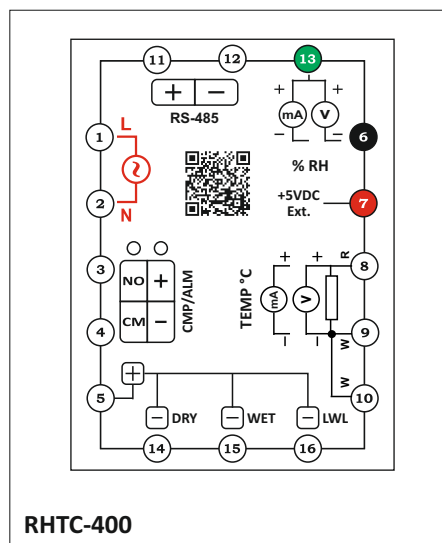
MECHANICAL

- ❖ 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

PROGRAMMING - PARAMETER LIST

Header Parameter List			
Display	Default	Parameter Name	Range
L0CP	15	Lock Code	15
L1St	tCFG	Header List	t.CFG, H.CFG, t.Ctr, H.Ctr, Comp, t.ALM, H.ALM, Supr, d.IP, Comm

1 Temperature Config List (t.CFG)			
Display	Default	Parameter Name	Range
L0CP	15	Lock Code	15
t.InP	rtd	Temp. Input Type	RTD, RTD.1, 0~1, 0~20, 4~20
t.SGL	000	Temp. Input signal Low	Ref Table 1
t.SGH	2000	Temp. Input signal High	Ref Table 1
r.rES	0	Temp. Range Resolution	0000, 000.0, 00.00, 0.000
t.ALL	0	Temp. Analog Input Low Value	Ref Table 2
t.ALH	1000	Temp. Analog Input High Value	Ref Table 2
d.rES	0	Temp. Display Resolution	0000, 000.0, 00.00, 0.000
t.LSP	0	Temp. Lower SP Limit	Ref Table 2
t.HSP	400	Temp. Higher SP Limit	Ref Table 2
t.OFF	0	Temp. Process Value Offset	Ref Table 2
t.FIL	4	Temp. Input Filter	1 ~ 10
t.CAL	0	Temp. User Low Calibration	—
H.CAL	0	Temp. User High Calibration	—
dEF	n0	Temp. User Calibration Default	Yes, No

2 Humidity Config List (H.CFG)			
Display	Default	Parameter Name	Range
H.InP	0-33	Humidity Input Types	0~1, 0~3.3, 0~5, 0~10, rH20, rH35 0~20, 4~20
H.SGL	000	Humidity Input Signal Low	Ref Table 1
H.SGH	2000	Humidity Input Signal High	Ref Table 1
r.rES	0	Humidity Range Resolution	0000, 000.0, 00.00, 0.000
H.ALL	0	Humidity Analog Input Low Value	Ref Table 2
H.ALH	1000	Humidity Analog Input High Value	Ref Table 2
d.rES	0	Humidity Display Resolution	0000, 000.0, 00.00, 0.000

H.LSP	0	Humidity Lower SP Limit	Ref Table 2
H.HSP	400	Humidity Higher SP Limit	Ref Table 2
H.OFS	0	Humidity Process Value Offset	Ref Table 2
H.FIL	4	Humidity Input Filter	1 ~ 10
t.CAL	0	Humidity User Low Calibration	—
H.CAL	1000	Humidity User High Calibration	—
dEF	YES	Humidity User Calibration Default	Yes, No

3 Temperature Control List (t.Ctr)			
Display	Default	Parameter Name	Range
OP1	rLY	Output 1 type	Relay, SSR, mA
t.ARA	4~20	mA Output Type	0 ~ 20, 4 ~ 20
t.LO	16.70	Integral Time	16.70
t.HO	85.50	Derivative Time	85.50
dARA	YES	mA Default	Yes, No
t.AOd	PId	Control Mode	PID, On-OFF
OPIL	HEAt	Control Logic For Output 1	Heat, Cool
t.Pb	50	Proportional Band	0.5 ~ 99.9 °C
t.Int	240	Integral Time	0 ~ 3600 Sec.
t.dE	60	Derivative Time	0 ~ 300 Sec.
t.CE	160	Cycle Time	1.0 ~ 100.0 Sec.
t.StE	50	Soft Start Time	5 ~ 300 Sec.
t.HY1	2	Control Hysteresis 1	Ref Table 2
t.dL1	0	Delay 1	0 ~ 500 Sec.
t.PH1	100	Output Power Limit	0.0 ~ 100%
t.GP1	00	Gap 1	-9.9 ~ 9.9 °C

4 Humidity Control List (H.Ctr)			
Display	Default	Parameter Name	Range
OP2	rLY	Output 2 type	Relay, SSR, mA
H.ARA	4~20	mA Output Type	0 ~ 20, 4 ~ 20
t.LO	16.70	Integral Time	16.70
t.HO	85.50	Derivative Time	85.50

dARA	YES	mA Default	Yes, No
t.AOd	PId	Control Mode	PID, On-OFF
OP2L	HEAt	Control Logic For Output 2	Heat, Cool
t.Pb	50	Proportional Band	0.5 ~ 99.9 °C
t.Int	240	Integral Time	0 ~ 3600 Sec.
t.dE	60	Derivative Time	0 ~ 300 Sec.
t.CE	160	Cycle Time	1.0 ~ 100.0 Sec.
t.StE	50	Soft Start Time	5 ~ 300 Sec.
t.HY2	2	Control Hysteresis 2	Ref Table 2
t.dL2	0	Delay 2	0 ~ 500 Sec.
t.PH1	100	Output Power Limit	0.0 ~ 100%

5 Compressor List (COMP)			
Display	Default	Parameter Name	Range
OP3	rLY	Output 3 type	Relay, SSR
OP3	COAP	OP 3 Mode	COMP, ALRM
t.PAO	Auto	Comp. Mode	Auto, On, Off
t.PUP	0	Comp. Higher Cut-Off Limit	0 ~ 45 °C
t.PLO	YES	Comp. Lower Cut-Off Limit	-20.0 ~ 0.0 °C
t.PSP	00	Comp. Set Point	-9.9 ~ 9.9
t.PHY	2	Comp. Hysteresis	Ref Table 2
t.PdL	0	Comp. Delay	0 ~ 500 Sec.

6 Temperature Alarm List (t.ALM)			
Display	Default	Parameter Name	Range
t.AtY	LOy	Alarm type	Low, High, Lodu, Hi.du, Band
t.ALG	dIr	Alarm Logic	Direct, Reverse
t.ALI	YES	Alarm Inhibit	Yes, No
t.ALP	Auto	Alarm Acknowledge	Auto, Manul, Both
t.ALM	2	Alarm Hysteresis	Ref Table 2

7 Humidity Alarm List (H.ALM)			
Display	Default	Parameter Name	Range
H.AtY	LOy	Alarm type	Low, High, Lodu, Hi.du, Band
H.ALG	dIr	Alarm Logic	Direct, Reverse
H.ALI	YES	Alarm Inhibit	Yes, No
H.ALP	Auto	Alarm Acknowledge	Auto, On, Both
H.ALM	2	Alarm Hysteresis	Ref Table 2

8 Supervisory parameter List (SUPr)			
Display	Default	Parameter Name	Range
t.UoE	EnbL	Auto Tune	Enable, Disable
t.SP	EnbL	Temp. Set Point	Enable, Disable
r.HSP	EnbL	Humidity Set Point	Enable, Disable
t.AL	EnbL	Temp. Alarm Set Point	Enable, Disable
r.HAL	EnbL	Humidity Alarm Set Point	Enable, Disable
ULOC	15	User Lock Code	1 ~ 9999

9 Digital Input List (d.IP)			
Display	Default	Parameter Name	Range
IPF1	nOnE	Digital Input 1 Function	None, WA.LL
YRL	OPEn	Water Level Logic	Open, Close

10 Communication parameter List (COMM)			
Display	Default	Parameter Name	Range
Id-1	1	Device ID Number 1	1 ~ 255
Id-2	2	Device ID Number 2	1 ~ 255
bAUD	9600	Baud Rate	9600, 1920, 3125, 3840, 7680
PAR	n_81	Parity	n_81, n_82, o_81, o_82, E_81, E_82
CRtu	1	RS-485 Response Interval	1 ~ 100 ("20ms)

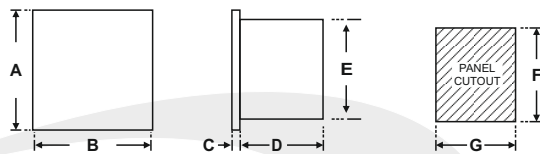
11 Auto Tuning List			
Display	Default	Parameter Name	Range
t.tUn	YES	Temp. Auto Tuning Mode	Yes, No
H.tUn	OPEn	rH Auto Tuning Mode	Yes, No

User List			
Display	Default	Parameter Name	Range
LSPL	0	Temp. Set Point	LSPL ~ HSPL
HSPL	0	rH Set Point	LSPL ~ HSPL
LSAL	0	Temp. Alarm Set Point	LSPL ~ HSPL -99 ~ +99 °C 2 ~ 99 °C
HSAL	0	rH Alarm Set Point	LSPL ~ HSPL -99 ~ +99 °C 2 ~ 99 °C

Table 1 :- Sensor Signal Low & High Range.

Input	t.SG.L / t.SG.H / H.SG.L / H.SG.H
0 ~ 1 V	0.000 ~ 1.000
0 ~ 3.3 V	0.000 ~ 3.3000
0 ~ 5 V	0.000 ~ 5.000
0 ~ 10 V	00.00 ~ 10.00
0 ~ 20 mA	00.00 ~ 20.00
4 ~ 20 mA	04.00 ~ 20.00

Overall Dimensions & Panel Cutout (in mm) :-



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

Table 2 :- Range as per Resolution.

Input	Resolution	Analog Input Low / High Value	LSPL / HSPL	Process Value Offset	Low / High Alarm	Low / High Deviation Alarm	Alarm Band	Hysteresis
RTD	0000	—	-100 ~ 450	-25 to 25	LSPL ~ HSPL	-99 ~ 99	2 ~ 99	1 ~ 25
RTD.1	000.0	—	-99.9 ~ 450.0	-25.0 ~ 25.0		-99.9 ~ 999	0.2 ~ 99.9	0.1 ~ 25.0
0 ~ 1 V, 0 ~ 3.3 V, 0 ~ 5 V, 0 ~ 10 V, 0 ~ 20 mA, 4 ~ 20 mA	0000	-1999 to 9999	AI.LO ~ AI.HI	-25 to 25		-99 ~ 99	-50 ~ 50	1 to 25
	000.0	-199.9 to 999.9		-25.0 to 25.0		-99.9 ~ 999	-50.0 ~ 50.0	0.1 to 25.0
	00.00	-19.99 to 99.99		-19.00 to 25.00		-9.99 ~ 99.99	-19.00 ~ 50.00	0.01 to 25.00
	0.000	-1.999 to 9.999		-1.900 to 2.500		-1.999 ~ 9999	-1.900 ~ 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, RTD.1	If input is above HSPL it will display "HHHH" message.
		If input is above range it will display "HHHH" message.
"LLLL"	0 ~ 1 V, 0 ~ 3.3 V, 0 ~ 5 V, 0 ~ 10 V, 0~20mA, 4~20mA	If input is below LSPL it will display "LLLL" message.
		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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