

MICROCONTROLLER BASED **RH-CUM-TEMPERATURE CONTROLLER**

⇒ Introduction

This microcontroller-based instrument is basically a two channel process controller, which accepts two 4~20mA current inputs and display their corresponding process values of RH and Temperature. It has two individual control set points, one for each channel with a variable hysteresis. In the configuration level, it has a facility for changing a variety of parameters which are listed in table-1. In the normal mode, the user can set the control set point for both channels and their corresponding hysteresis

⇒ Specifications:

1. Input	: 4~20mA inputs, 2 nos. for RH and Temperature
2. Set Points	: individual control set points for RH and Temperature
3. Hysteresis	: Settable from 0~50.0 for both set points
4. Resolution	: Settable by changing the “d-Pt” parameter
5. Range	: Settable individually from 0000 to 4000 counts
6. Control Action	: Settable for Heating/Cooling logic.
7. Set Point Limit	: Settable from 0000 to Range individually
8. Memory	: EEPROM memory with 100 years memory retention
9. Supply	: 230V AC, ± 10%, 50Hz.
10. Cutout Size	: 92mm(W) x 92mm(H)
10. Overall Size	: 96mm(W) x 96mm(H) x 115mm(D)

⇒ Programming Procedure:

Level-1 (user level)

Press **PGM** key for 2-3 secs. to enter this mode in which the first parameter i.e. the set point for RH will be displayed as shown:

r - S P
0 6 0. 0

Note that the leftmost digit will be blinking.

To change the parameter, to say ‘075.0’ follow the steps as given:

- 1) First press the shift key ‘◀’ until the blinking shifts to the hundredth place.
- 2) Press the increment key ‘▲’ till the digit shows 7. the display will now show the following :

r - S P
0 7 0. 0

- 3) Now press the shift key ‘◀’ again to shift the blinking to the tens digit .
- 4) Repeat step 2 to increment the last digit to ‘5’. Now the display will show the required value:

r - S P
0 7 5. 0

- 5) Now, press the **PGM** key to save the current parameter value and the display will show the next parameter i.e the set value for temperature as shown below:

t - S P
0 5 2 . 1

- 6) This parameter can also be changed similar to the above steps and once the required value is displayed, press **PGM** key to save the new value and display will show the next parameter i.e. Hysterisis settings for RH (**r-HY**). This value can also be changed and saved as above. Again display will show the next parameter i.e Hysterisis settings for temperature (**t-Hy**) which can be changed and saved in the same manner. Once all the four parameters are displayed/changed,pressing the **PGM** key will exit the setting mode. Now the unit will go into the standby mode where the upper display will show the process RH and the lower display will show process temperature.

Level-2 (advanced Setting)

Press the '◀' key and '▼' key simultaneously for 7~8 secs. to enter this mode.

The unit will show the following display:

C o d e
1 2 3 4

Now enter the appropriate code to enter this mode and press PGM key to accept. If the entered code is not correct, the unit will come out of the mode and display the process values. If the code is correct, then the display will show the first parameter i.e the Range setting for RH

:

r n - r
3 0 0 . 0

This parameter shows the full scale displayed range (i.e. @20mA Input) of the RH input.

Change the parameter if required similar to the level 1 programming and press **PGM** key

To show the next parameter i.e. the Set Point Limit for RH set point

S L - r
3 0 0 . 0

This parameter shows the maximum value of SP-r that can be set by the user in the level-1 programming .

Change the parameter if required similar to the level 1 programming and press **PGM** key

To show the next parameter i.e. offset setting for RH.

o F - r
0 0 9 . 0

This parameter is the calibration offset of the RH input. The set value is the fixed counts added to the process value over the full range and should be set to 0000 if not required.

Change the parameter if required similar to the level 1 programming and press **PGM** key

To show the next parameter i.e. control logic for RH.

C n - r
0 0 0 0

This parameter determines the control logic of the RH control Relay. Setting it to 0000 will initiate the Humidification Logic and setting it to 0001 will initiate the dehumidification logic for the corresponding RH control relay

Change the parameter if required similar to the level 1 programming and press **PGM** key

To show the next parameter i.e. decimal point for RH.

d P - r
0 0 0 0

This parameter ranges from 0000 to 0003. If set to 0000 then decimal point is given in thousandth place likewise selection of 0001 will give decimal point in hundredth place and 0002 will give decimal point in tens place. No decimal point is displayed if it is set to 0003 .

Change the parameter if required similar to the level 1 programming and press **PGM** key

Now the next three parameters shown are similar to the RH input parameters except they are valid for the second i.e the temperature input

r n - t
2 0 0 0

Change the parameter if required similar to the level 1 programming and press **PGM** key

To show the next parameter i.e. Set point limit for temperature.

S L - t
1 0 0 0

Change the parameter if required similar to the level 1 programming and press **PGM** key to show the

To show the next parameter i.e. off set setting for temperature.

o F - t
- 0 0 0

Change the parameter if required similar to the level 1 programming and press **PGM** key to show the next parameter i.e. control logic for temperature. Set to 0000 for heating logic and 0001 for cooling logic.

C n - t
0 0 0 1

Change the parameter if required similar to the level 1 programming and press **PGM** key to show the next parameter i.e. Decimal point selection for Temperature which ranges from 0000 to 0003. If set to 0000 then decimal point is given in thousandth place likewise selection of 0001 will give decimal point in hundredth place and 0002 will give decimal point in tens place. No decimal point is displayed if it is set to 0003.

d P - t
0 0 0 0

Change the parameter if required similar to the level 1 programming and press **PGM** key to show the last parameter which is the Digital Filter. This parameter is to be changed if the update rate of the process values on the front display has to be changed. To reduce the update increase the value from 1 to 9.

d F
0 0 0 2

After Changing the parameter press **PGM** key to accept and the display will show the first parameter again. To come out of the programming mode, just press and hold the **PGM** key again for 3~4 seconds.

The limits for the parameters are as given below:

Displayed Code	Description	Limits		Description
		Min.	Max.	
r - SP	RH Set Point	0000	S L - r	The upper limit for the RH set point is limited to a value which is entered in the Set Point limit setting for RH in the advanced setting level.
t - SP	Temperature Set Point	0000	S L- t	Similar to the r-SP setting ,the temperature set point is limited to a value specified in the range setting for temperature.
r- H Y	RH Hysterisis	0000	0500	This value is automatically set as a value greater or less than the set point at which the RH control relay should turn ON depending upon the value of the Cn-r parameter
t - H Y	Temperature Hysterisis	0000.	0500	Similar to r-HY, this value is the Hysterisis of the temperature input and depends upon the value of the Cn-t parameter.
r n -r	RH range	0000	4000	Advanced level setting for the full scale range of the RH input. Limited to a maximum of 4000 counts
S L - r	Set Point limit for r-SP	0000	rn-r	The set point limit setting for RH control set point parameter. Limited to a maximum of Range for RH.
o F -r	RH off set	-999	+999	Offset added to the process value. If set to 0000, the process RH will show a value of 0000 at 4mA i/p and rn-r value at 20mA input.
C n - r	RH control logic	0000	0001	Control logic for RH section. Humidification if set to 0 and dehumidification logic if set to 1.
dp -r	Decimal Point for RH	0000	0003	Decimal point selection for RH. Set to 0003 for no decimal point. Note that this setting will reflect on all RH related parameters.
r n -t	Temperature range	0000	4000	Similar to rn-r except this one is for the temperature input.
S L - t	Set Point Limit for t-SP	0000	rn -t	Set Point Limit for Temperature control set point . Limited to a maximum of range setting for temperature (rn-r)
o F -t	Temperature Off set	-999	+999	Similar to oF-r but related to the temperature process value. This value is also factory set to 0000 and should not be changed if not required.
C n -t	Temperature Control logic	0000	0001	Control logic for Temperature section. Cooling logic if set to 0 and Heating logic if set to 1.
d - P t	Decimal point for Temperature	0000	0003	Decimal point selection for RH. Set to 0003 for no decimal point. Note that this setting will reflec on all temperature related parameters.
dF	Digital Filter	0001	0009	Digital Filter setting to be changed if the updation rate of the unit is to be changed

Note:

Any attempt to set the parameters below or above the given limits will result in the value resetting to the lower or higher limit.

The parameters oF-r and oF-t values also contain the negative sign notation. To change the sign of a particular value first enter the programming mode and press PGM key successively until the required parameter is displayed. Then shift the blinking to the most significant digit (MSD) which will be either '-' or '0'. Now just press either '▼' or '▲' key to toggle between the positive('0') or negative('-') sign and press PGM key to accept the value.