Operating and Instruction Manual for Process Controller

⇒ Introduction

This microcontroller-based instrument is basically a process controller, which accepts a 4~20mA input and displays the corresponding process value as per te etting for the full range. It has two individual set points, one for control (**SP**) and the other for alarm (**AL**). It has a facility for changing the resolution of the input process value, control logic, alarm logic and offset calibration in the configuration mode. In the normal user setting mode, the control set point, the alarm set point and their corresponding hysterisis settings can be accessed.

⇒ Specifications:

1.	**Input**	**: 4 ~ 20mA DC current**
2.	**Range**	**: 0000 ~ 4000 counts (programmable)**
3.	**Set Points**	**: One control set point and one Alarm Set point**
4.	**Hysterisis**	**: Settable from 0~40.0 for both Control and Alarm**
5.	**Resolution**	**: programmable from 0.001 counts to 1 count by changing the "d-Pt" parameter**
6.	**Control Action**	**: Settable for Forward/Reverse logic.**
7.	**Alarm Action**	**: Settable for Alarm High/ Alarm Low**
8.	**Delay (Power on)**	**: Settable fom 00 to 99 mins. Individual for set point and Alarm Set points.**
9.	**Memory**	**: EEPROM memory with 100 years memory retention**
10.	**Supply**	**: 230V AC ,± 10%, 50Hz.**
11.	**Cutout Size**	**: 92mm(W) x 92mm(H)**
11.	**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 Control set point will be displayed as shown:

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 :

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:

S P
0 7 5. 0

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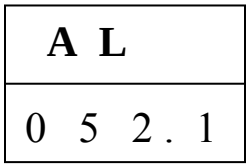
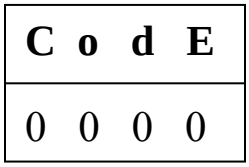
5) Now, press the **PGM** key to save the current parameter value and the display will show the next parameter i.e the Alarm set value for temperature as shown below:



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 Control Set Point(**SP-H**). This value can also be changed and saved as above. Again display will show the next parameter i.e Hysterisis settings for Alarm (**AL-H**) which can be changed and saved in the same manner. The next two Parameters "**SP-d**" and "**AL-d**" are the power on delay times for Set point and Alarm Relays.Once all the six 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 temperature and the lower display will show control set Point.

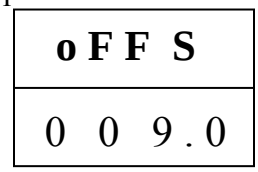
Level-2 (Configuration Level)

Press the '◄' key and '▼' key simultaneously for 7~8 secs. to enter this mode.
The display will show the following and ask the user to enter the lock code



Now enter the correct lock code and press PGM to accept. If the code is correctly entered then the unit will display the first parameter in the configuration setting. If the code entered is wrong, the unit will come out of the programming mode.

This parameter shows the maximum limit for the SP parameter in user level.
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 the process temperature.



This parameter is the calibration offset of the temperature 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 set point logic

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C n - S
F o r

*This parameter determines the control logic of the Control Relay. Setting it to "**For**" will initiate the Forward Logic and setting it to "**reV**" will initiate the reverse logic for the corresponding Control relay. Note that the Hysterisis setting will be automatically adjusted to positive or negative value according to the control logic.*

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

Now the next two parameters shown are similar to the control input parameters except they are used for the Alarm section. The first parameter being the Alarm Set point Limit

A L - L
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. Alarm logic for temperature. Set to "**A-Lo"** for Alarm Low and "**A-HI"** for Alarm High Logic.

C n - A
A – L o

Change the parameter if required similar to the level 1 programming and press **PGM** key to show the next parameter i.e. Digital Filter (**dF**). This parameter determines the updation rate of the process value If set to 1, the updation is the fastest @ 10 rds/sec. and the updation rate will decrease on increasing this value.

d F
0 0 0 3

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. This parameter accepts values between 0000 and 0003. If set to 0000 then the resolution of the process value and all the related settings wil be 0.001 counts and if set to 0001, the resolution will change to 1 count.

d – P t
0 0 0 1

After setting the required decimal point value, press PGM key to accept and the display will show the last parameter to be programmed i.e. the Range setting. This is the full scale value of the process value i.e. the value shown when the input is 20mA.

r A n G
2 0 0 0

After Changing this parameter press **PGM** key to accept and come out of the programming mode

The limits for the parameters are as given below:

Displayed Code	Description	Limits		Comments
		Min.	Max.	
SP	Control Set Point	0000	**SP-L**	The upper limit for the control set point is limited to a value which is entered in the range setting for control in the advanced setting level.
AL	Alarm Set point	0000	**AL-L**	Similar to the SP setting ,the Alarm set point is limited to a value specified in the range setting for Alarm.
SP-H	Control Hysterisis	0000	0400	This value is automatically set as a value greater or less than the set point at which the control relay should turn ON depending upon the value of the Cn-S parameter
AL-H	Alarm Hysterisis	0000.	0400	Similar to SP-H, this value is the Hysterisis of the Alarm Set point and depends upon the value of the Cn-A parameter.
SP-d	Control Set point Delay time	0000	**0099**	This parameter is the delay time (in minutes)after which the relay logic of the control set point will be activated
AL-d	Alarm Set Point Delay Time	0000	**0099**	Similar to the Control Set point delay this parameter sets the power on delay time in minutes before activating the Alarm Set point relay.
SP-L	Control Set Point Limit	0000	**rAnG**	Advanced level setting for the control set point limit. Limited to a maximum value of Range parameter.
oFFS	Offset adjustment	-999	+999	Offset added to the process value. set to 0000 if not required.,
C n - S	Control Logic	**“For”/”Rev”**		Control logic, set to “rev” for reverse logic applicaton and “For” for Forward logic application.
AL-L	Alarm Set Point Limit	0000	**rAnG**	Similar to SP-L except this one is for the Alarm Section.
C n -A	Alarm Logic	**“A-HI”/”A-Lo”**		Alarm Logic, set to “A-Lo” for Alarm Low and “A-Hi” for Alarm High logic
dF	Digital Filter	0001	0009	Digital Filter Selection. Set to 0001 for fastest response (10rds/sec) and 0009 for slow response (1 rds/sec.)
d – P t	Decimal point	0000	0003	Decimal point setting which will reflect on all process and set point parameter values except Cn-S, Cn-A,dF and itself. Factory set to 003. i.e. a resolution of 1 count.
rAnG	Full Scale Range	0000	4000	The full scale range parameter which is the value of the Process value when the input is 20mA.

Table-1

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 parameter oFFS value contains the negative sign notation. To change the sign of the 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.

- The process value for any given input can be found from the following relation:

PV = ((((Inp – 4.00) / 16.00) x Range) + Offset) counts

Where “*Inp*” is the input current in mA, “*Range*” is the “**rAnG**” setting and “*Offset*” is the “**oFFS**” setting.

- The delay parameter will be bypassed if set to 00 mins. for the individual set points.

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