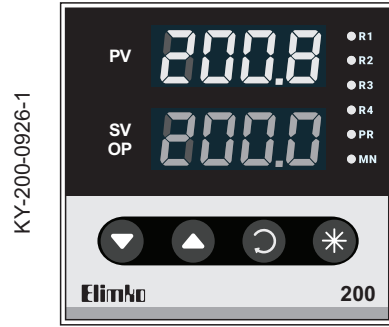


Elimko

E-200 Series Universal Advanced Controllers

User Manual



Manufacturer / Technical Support

Elimko Elektronik İmalat ve Kontrol Ltd. Şti.
ASO 2. OSB Alıcı Mah. 2001. Cad. No:14
Temelli 06909 Ankara / TÜRKİYE
Tel: +90 312 212 64 50 • Faks: +90 312 212 41 43
www.elimko.com.tr • e-posta: elimko@elimko.com.tr

Elimko E-200

E-200 controller is designed for panel mounting and should be used in an industrial environment.

- The package of E-200 controller contains;
Controller, 2 pieces of mounting clamps,
User manual, Guarantee certificate
- After opening the package, please check the contents with the above list. If the delivered product is wrong type, any item is missing or there are visible defects, contact the vendor from which you purchased the product.
- Before installing and operating the controller, please read the user manual thoroughly.
- The installation and configuration of the controller must only be performed by a person qualified in instrumentation.
- Keep the unit away from flammable gases, that could cause explosion.
- Do not use alcohol or other solvents to clean the controller. Use a clean cloth soaked in water tightly squeezed to gently wipe the outer surface of the controller.
- The instrument is not used in medical applications.



EU DIRECTIVE COMPLIANCE

Low Voltage Directive
EN 61010-1
EMC Directive
EN 61326-1



TS EN ISO 9001
Quality Management System Certificate

KY-200-0926-1

E-200 Elimko

Index

• Description.....	2
• Technical Specifications.....	3
• Type Coding.....	4
• Dimensions.....	4
• Panel Mounting.....	5
• Front Panel.....	6 - 7
• Connection Diagrams.....	8 - 9
• Error Messages.....	10
• Input Type and Ranges.....	11
• Alarm Types.....	12
• Auto-Tune.....	13
• Manual Tuning.....	14
• Feedback Valve Control.....	15 - 16
• Open-Loop Valve Control.....	17
• Operator Pages.....	18
• Automatic Mode Operator Page.....	19
• Manual Mode Operator Page.....	20 - 21
• Configuration Pages.....	22 - 23
• PID Tuning Page.....	24
• Set Point Configuration Page.....	25
• Alarm Configuration Page.....	26 - 27
• Control and Output Configuration Page.....	28 - 31
• General Configuration Page.....	32 - 34
• Security Adjustment Page.....	35
• Calibration Page.....	36 - 39
• Communication Data.....	40 - 44
• Tables.....	45 - 49
• Footnotes.....	50

1. Definition

E-200 Series Universal Profile Controllers are designed to use On/Off and PID Control Techniques, by using new generation microcontrollers. The dimensions of the controllers are 96x96 mm confirming IEC/TR 60668 standard.

The controllers have two 4-digit seven segment led displays each capable of displaying numeric values from -1999 to 9999 and 4-character alphanumeric values messages. The universal inputs (T/C, R/T, mV, mA) are configurable and measured with 16-bit resolution.

These electronic units, have high reading accuracy with high measurement sensivity, don't contain any loose mechanical parts, and provide limitless reliability. They are calibrated in order not to be defected by time and exterior factors. High input impedance, protection of the system from loss of signal, E-200 has two separate, 4-digit, display to display process value and set values within the range of -1999 to 9999. For all industrial applications for the measurement and control of; temperature pressure, level speed current-voltage, resistance and other physical features, also for areas such as; Iron-Steel, Cement, Chemistry, Food, Plastic, Petrochemistry, Refineries, Ceramics, Glass and industries this unit is ideal.

2. Technical Specifications

Input Types	Thermocouple (TC) : B, E, J, K, L, N, R, S, T, U Resistance Thermometer (RT) : Pt-100 Current : 0-20 mA, 4-20 mA (Linear) Voltage : 0-50 mV, 0-1 V, 0.2-1 V (Linear)
Control Output	Relay : SPST-NO 250V AC, 5A Current : 0-20 mA, 4-20 mA (Isolated) Voltage : 0-10 V DC (Isolated) Pulse : 24V DC, 25 mA (for SSR)
Alarm Outputs	Röle : SPST-NO 250 VAC, 5A
Display Type	2 x 4 dijiti 14 mm 7 parçalı led gösterge
Accuracy	Thermocouple : (±0.5% of the reading value or ±1 °C) ±1 digit max. Pt-100 : (±0.5% of the reading value or ±1 °C) ±1 digit max. Analog Input : ±0.5% FS ±1 digit max.
Analog Digital Converter	16 bit
Digital Analog Converter	12 bit
Control Type	On/Off, PID
Operating Voltage	85-265 V AC / 85-375 V DC 20-60 V AC / 20-85 V DC
Power Consumption	7 W (10 VA)
Protection Class	Front Panel : IP 66 (NEMA 4X) Rear Case : IP 20
Operating Temperature	-10 °C, +55 °C (+14 °F, +131 °F) (Yoğunlaşma ve Buzlanma olmadan)
Storage Temperature	-25 °C, +65 °C (-13 °F, +149 °F) (with no condensation or icing)
Relay Mechanical Life	10.000.000 operations (The relay life differs according to the usage configuration. When the relays are old, their contacts could melt or burn out.)
Relay Electrical Life	>1.000.000 operations (under 1/10 of load)
Memory	EEPROM (100.000 max. Write-erase)
Weight	430 g

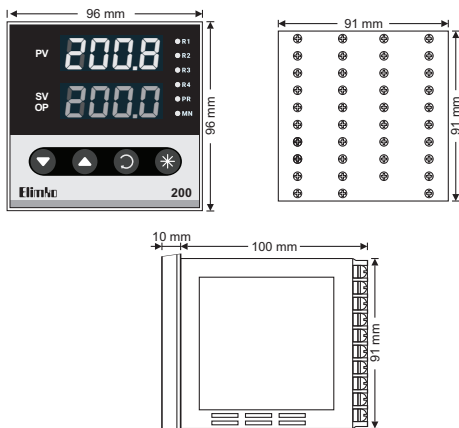
3. Type Coding

E-200-W-X-Y-Z

W	Relay/SSR	X	Analog Output	Y	Communication	Z	Operating Voltage
2	2 Relay	1	1x0-20/4-20 mA	0	None	0	85-265 V AC/85-375 V DC
3	3 Relay	2	2x0-20/4-20 mA	1	RS 485	1	20-60 V AC/20-85 V DC
4	4 Relay	3	1x0-10 V DC				
5	1 Relay, 1 Pulse*	4	2x0-10 V DC				
6	2 Relay, 1 Pulse*						
7	3 Relay, 1 Pulse*						

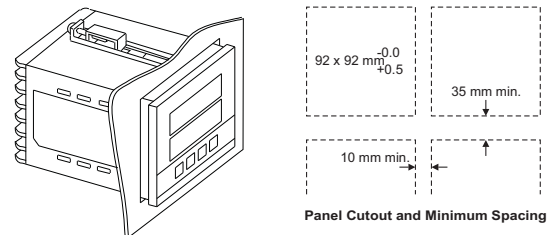
* 24 V DC/20 mA Pulse Voltage to drive SSR

4. Dimensions



5. Panel Mounting

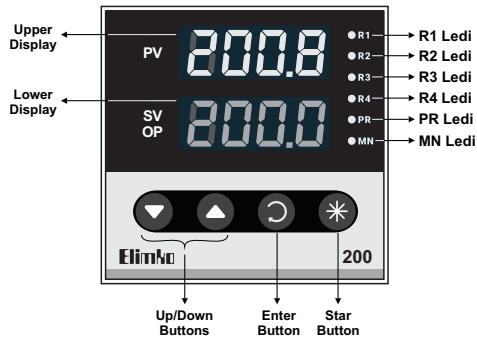
- E-200 controller should be installed inside a suitable grounded metal enclosure (panel). This must prevent the live parts being accessible to human hands and metal tools.
- E-200 controller does not include a power switch. Therefore, the power supply to the controller and power outputs must be wired through the proper fuse or circuit breaker.
- To minimize the pick-up of electrical noise, the wiring of low voltage lines, particularly the sensor input should be routed away from the high-current power cables. If this is not possible use screened cables and apply grounding.
- The cables used for powering the controller and the power outputs must conform to the standards IEC 60245 and IEC 60227.



Panel Cutout and Minimum Spacing

- ❑ Cut a hole in the panel. (See the figure for overall dimensions.)
- ❑ Slide the controller into the cutout from the front of the panel.
- ❑ Fit the mounting clamps to the controller, ensuring the lugs are located in their slots.
- ❑ Fasten the mounting clamps using the retaining screws.

6. Front Panel



- R1 Led** When lit, it indicates that RL1 output is active.
R2 Led When lit, it indicates that RL2 output is active.
R3 Led When lit, it indicates that RL3 output is active.
R4 Led When lit, it indicates that RL4 output is active.
PR Led When lit, it indicates that the controller is in the configuration mode.
MN Led - When lit, it indicates that the controller is in manual mode.
 - MN led will also flash when the auto-tuning is in progress.
Upper Display - While in normal operation, it displays the process value or error message.
 - While in configuration pages, it displays the name of the parameters.

6. Front Panel

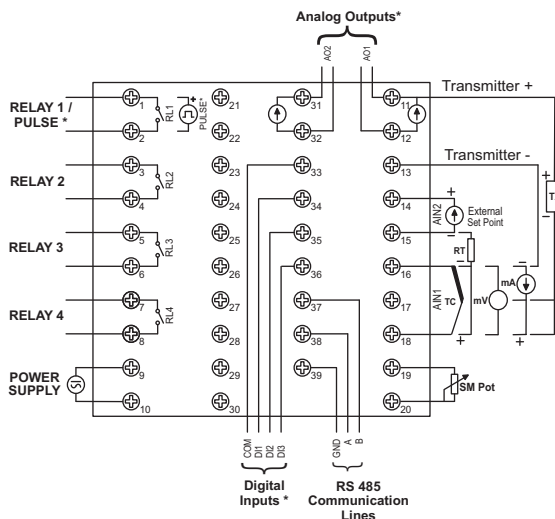
Lower Display - While in normal operation, it displays the control set point (Automatic mode) or manual output (Manual mode).
 - While in configuration pages, it displays the parameter value.

Star Button - When pressed together with  button, password is asked for entering the configuration page.
 - While in configuration pages, pressing this button reverts to normal operation.
 - While in normal operation, pressing this button for duration 3 seconds, toggles between automatic and manual mode. This operation is disabled if the $\tilde{n}nPr$ parameter in page $\alpha L n F$ is set to dSb or if the $LtYP$ parameter in $\alpha L n F$ page is set $nonE$.
 - While in normal operation, pressing this button acknowledges the latched alarms if configured ($RXLt = Enb$).

Enter Button - When pressed together with  button, password is asked for entering the configuration page.
 - While in configuration pages, pressing this button selects the next parameter.
 - While in configuration pages, pressing this button for duration 2 seconds, returns to the top of the page.
 - While in normal operation, pressing this button selects the next parameter in operator page.

Down Up Buttons - While in normal operation, these buttons can be used to edit the control set point (Automatic mode) or manual output (Manual mode).
 - While in configuration, these buttons can be used to select the configuration pages and to edit the parameters.

7. Connection Diagrams



- The labels on the sides of the controller identify the ordering code (Type), serial number and wiring connections.
 □ The controller options are also indicated on the wiring diagram.

7. Connection Diagrams

- The terminals 01 to 10 are electrically live. While the instrument is powered, never touch to these terminals.
- Before operating the controller, ensure that the controller is correctly configured. Incorrect configuration could result in damage to the process being controlled.

***Digital Input Connection**

- DI1** Automatic/Manual mode selection
DI2 and DI3 If $SPSr = dInP$;
 Select the $SEt1$, $SEt2$, $SEt3$ and $SEt4$ parameters in the $SEtP$ page as described in Table 22.

***AO1, AO2 Analog Outputs, Pulse Outputs and Digital Inputs** are not isolated.

8. Error Messages

Message	Meaning	Remedy
$\alpha P E n$	The connection of the sensor is broken.	Check the sensor and the sensor connections.
$U F L$	The process value is below the sensor type-temperature interval.	Check the sensor and the input type specified by the $i n P t$ parameter.
$\alpha F L$	The process value is above the sensor type- temperature interval.	
$n n n n$	The process value is above the value that can be displayed.	Check the analog value on the input terminal and the scalar specified by the $d P$, $z E r o$ and $S P R n$ parameters.
$u u u u$	The process value is below the value that can be displayed.	

9. Input Types and Ranges

TEMPERATURE SENSORS

Sensor Type	Standart	Temperature Range	
		(°C)	(°F)
Type B b	IEC 60584-1	60 , 1820	140 , 3308
Type E E	IEC 60584-1	-200 , 840	-328 , 1544
Type J J	IEC 60584-1	-200 , 1120	-328 , 1562
Type K K	IEC 60584-1	-200 , 1360	-328 , 2480
Type L L	DIN 43710	-200 , 900	-328 , 1652
Type N n	IEC 60584-1	-200 , 1300	-328 , 2372
Type R r	IEC 60584-1	-40 , 1760	104 , 3200
Type S S	IEC 60584-1	-40 , 1760	104 , 3200
Type T t	IEC 60584-1	-200 , 400	-328 , 752
Type U u	DIN 43710	-200 , 600	-328 , 1112
Pt-100 $P t$	IEC 60751	-200 , 840	-328 , 1544

LINEAR INPUTS

Type	Range
Current $\alpha R 2 0$	0-20 mA DC
Current $4 R 2 0$	4-20 mA DC
Voltage $\alpha u 5 0$	0-50 mV DC
Voltage $\alpha u u 1$	0-1 V DC
Voltage $\alpha z u 1$	0.2-1 V DC

10. Alarm Types

$RXtP$	EXPLANATIONS		
	$RX5P > 0$	$RX5P < 0$	
$L o$			Low Alarm (Absolute)
$H i$			High Alarm (Absolute)
$L o d$			Low Deviation (Relative)
$H i d$			High Deviation (Relative)
$L o b$			Band Alarm (In)
$H i b$			Band Alarm (Out)
$\alpha F F$	Alarm function is cancelled when $RXtP$ parameters are $\alpha F F$.		
Shaded areas show the hysteresis. When alarm state is "1" the output (relay) is active.			

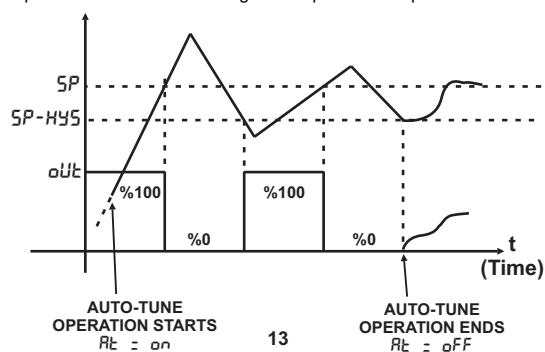
11. Auto-Tune

This parameter ($R t$) initiates or cancel the Auto-Tune process. If αn is selected, auto-tune starts and remains in this state until it is completed. When the Auto-Tune operation is completed, this parameter is automatically set to $\alpha F F$ again. When this parameter is αn , the operator can cancel the auto-tune operation by manually turning it $\alpha F F$.

The control setpoint ($S P$) and $H Y 5$ parameters must be set before starting Auto-Tune. The $S P$ value should be set to the most commonly used operating value of the system. The recommended value for $H Y 5$ parameter is 0.5. For slow changing systems, this value can be set smaller values. For fast changing and noisy system, larger values is more suitable. The $H Y 5$ value should be set larger than the input noise.

The lower display and $M N$ led will flash to indicate that tuning is in progress.

The Auto-Tune procedure is illustrated in the graph below. The completion time varies according to the speed of the process.



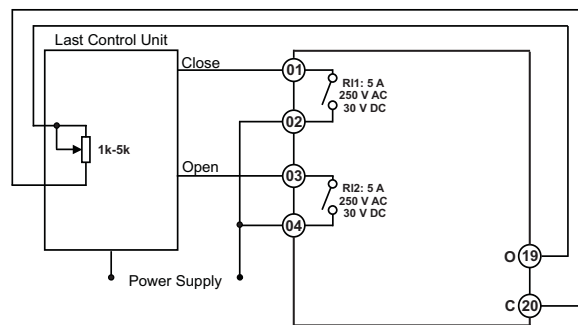
12. Manual Tuning

If for any reason Auto-tuning gives unsatisfactory results, the controller can be tuned manually. There are a number of standard methods for manual tuning. The one described here is the Ziegler-Nichols method. With the process at its normal running temperature:

- 1- Set the $\mathcal{L}tYP$ parameter in $\alpha\mathcal{L}nF$ page as $5\mathcal{L}\alpha$.
- 2- Set the output that control the process to $\mathcal{L}\alpha-1$.
- 3- If the control output is relay, set the $\mathcal{L}Prd$ parameter in $\alpha\mathcal{L}nF$ page as $\mathcal{L}$.
- 4- Set the $i\mathcal{L}$, $d\mathcal{L}$ and $H\mathcal{Y}S$ parameters in $\mathcal{L}UnE$ page as $\mathcal{L}$.
- 5- Ignore the fact that the temperature may not settle precisely at the set point.
- 6- If the temperature is stable, reduce the proportional band Pb so that the temperature just starts to oscillate. If the temperature is already oscillating, increase the proportional band until it just stops oscillating. Allow enough time between each adjustment for the loop to stabilize. Make a note of the proportional band value (B) and the period of oscillation (T).
- 7- Set the Pb , $i\mathcal{L}$ and $d\mathcal{L}$ parameters values according to the calculations given below.

Type of Control	Proportional Band (Pb)	Integral Time ($i\mathcal{L}$)	Derivative Time ($d\mathcal{L}$)
P	$2xB$	0	0
PI	$2.2xB$	$0.8xT$	0
PID	$1.7xB$	$0.5xT$	$0.12xT$

13. Feedback Valve Control



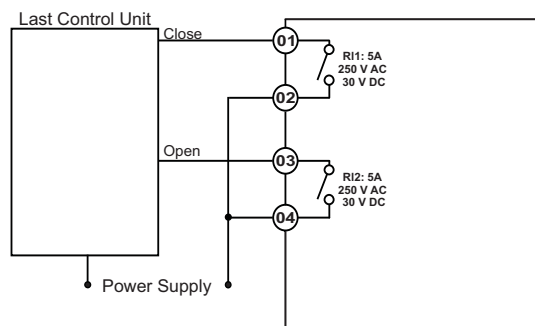
As shown in figure, control of the feedback controlled valve can be made with a servomotor connected to the relays and the 19-20th terminals on E-200, and a potentiometer (1k-5k).

13. Feedback Valve Control

The parameters of this control, are the $\mathcal{L}tYP$, $dbnd$, $ScrL$ and $ScrH$ parameters, in the output configurations page $\alpha\mathcal{L}nF$. These parameters are as follows;

- ☐ The $\mathcal{L}tYP$ parameter should be set to PFb , for this control.
- ☐ The $dbnd$ parameter is used to prevent relays from opening and closing frequently, during the control. Its unit is given as a percentage of the location data. Its value determines the death band value for both to stay open.
- ☐ The $ScrL$ parameter, keeps the location data of the controlled valve in the fully closed state. With this parameter on the display, $\heartsuit$ key starts the action in motor-active direction. In the fully closed state, the value shown on the display can be saved by pressing $\star\heartsuit$ keys.
- ☐ The $ScrH$ parameter, keeps the location data of the controlled valve in the fully open state. With this parameter on the display, $\clubsuit$ key starts the action in the motor-active direction. In the fully active state, the value shown on the display can be saved by pressing $\star\clubsuit$ keys.

14. Open-Loop Valve Control



Using the relays on E-200, an open-loop valve control can be made, as shown in figure. Parameters related with this control, are the $\mathcal{L}tYP$, $dbnd$ ve $\mathcal{L}r\mathcal{L}n$ parameters in the $\alpha\mathcal{L}nF$ page. The explanation for the parameters are;

- ☐ For this control to be made, the $\mathcal{L}tYP$ parameters should be set to bnd .
- ☐ The $dbnd$ parameter is used to prevent the relays from opening and closing frequently, during the control. Its unit is given as percentage of the location data. Its value determines the death band value for both relays to stay open.
- ☐ The $\mathcal{L}r\mathcal{L}n$ parameter is the time, in which the valve switches to full-closed from full-open state, when energized. Its unit is seconds.

15. Operator Pages

- ❑ When the controller power is switched on, it runs through a self-test sequence for about 2 seconds and displays the version number and then enters into normal operation.
- ❑ The controller has two basic modes of operation:
 - Automatic mode in which the output is automatically adjusted to maintain the process value at the control set point.
 - Manual mode in which one can adjust the output independently of the control set point.
- ❑ **MN** led indicates the operation mode of the controller. It lights while controller is in manual mode.
- ❑ While in normal operation, pressing  button for duration 3 seconds, toggles between automatic and manual mode. This operation is disabled if the *anPr* parameter in page *oLnF* is set to *d5b* or if the *LTyP* parameter in *oLnF* page is set *nonE*.
- ❑ In normal operation the process value is displayed in the upper display, the control set point (Automatic mode) or manual output (Manual mode) is displayed in the lower display.
- ❑ The normal operation state and the frequently used parameters are in the operator page. These parameters can be accessed by  button.
- ❑ The parameters in the operator page differ according to the operation mode.

16. Automatic Mode Operation Page

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
P34	Process Value (Normal Operation)	EU			
00	Control Set Point	EU			5PLL - 5PHL ⁽¹⁾
oLt	Manual Output ⁽²⁾	%	LTyP ≠ nonE		
P5P	Progressive Set Point	EU	SPrr ≠ oFF		
R15P	Alarm-1 Set Point	EU	R1LP ≠ oFF		+999 - 9999
R25P	Alarm-2 Set Point	EU	R2LP ≠ oFF		+999 - 9999
R35P	Alarm-3 Set Point	EU	R3LP ≠ oFF		+999 - 9999
R45P	Alarm-4 Set Point	EU	R4LP ≠ oFF		+999 - 9999

17. Manual Mode Operation Page

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
P34	Process Value (Normal Operation)	EU	LTyP = SPrr Single Sided (+) PID Control		
500	Manual Output	%			5oLL - 5oHL
P34	Process Value (Normal Operation)	EU	LTyP = dLo Double Sided (+/-) PID Control		
500	Manual Output	%			doLL - doHL
P34	Process Value (Normal Operation)	EU	LTyP = PFb Feedback Valve Control		
500	Manual Output	%			5oLL - 5oHL
P34	Process Value (Normal Operation)	EU	LTyP = bnd Open-Loop Valve Control		
SP	Valve Direction ⁽³⁾				Valve Close/Valve Open

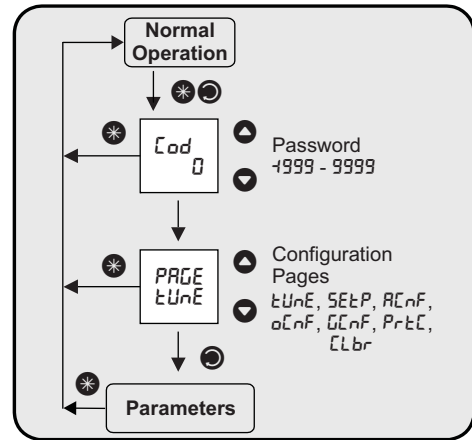
17. Manual Mode Operation Page

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
R15P	Alarm-1 Set Point	EU	R1LP ≠ oFF		+999 - 9999
R25P	Alarm-2 Set Point	EU	R2LP ≠ oFF		+999 - 9999
R35P	Alarm-3 Set Point	EU	R3LP ≠ oFF		+999 - 9999
R45P	Alarm-4 Set Point	EU	R4LP ≠ oFF		+999 - 9999

18. Configuration Pages

- The fundamental characteristics of the controller are specified in configuration pages. These pages:
 - $tUnE$ = PID Tuning Page
 - $SEtP$ = Set Points Configuration Page
 - $ALnF$ = Alarm Configuration Page
 - $oLnF$ = Control and Output Configuration Page
 - $GLnF$ = General Configuration Page
 - $PrtL$ = Security Adjustments Page
 - $CLbr$ = Calibration Page
- In order to access the configuration pages, * and ↻ buttons are pressed simultaneously.
- After this operation PR led lights and LoD message and 0 are displayed in the upper and lower displays respectively.
- ▲ and ▼ buttons are used to adjust the security code in the lower display. When 0 button is pressed $tUnE$ page is accessed.
- The factory setting of the security code is "10".
- The security code is defined by the parameter $SCod$ in $PrtL$ page.
- If the entered security code is correct all the configuration pages can be accessed and all the parameters in the configuration pages can be edited. Otherwise $dPrL$ and $RPrL$ parameters in $PrtL$ page define the access and edit levels of parameters.
- ▲ and ▼ buttons are used to select the configuration pages while $PRGE$ message is displayed in the upper display. ● button select the parameters in a page sequentially. ● button returns to the top of the page if it pressed for duration of 2 seconds, while in configuration pages. * button reverts to normal operation, while in configuration pages.

Input to Configuration Pages

19. PID Tuning Page ($PRGE-tUnE$)

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
Rk	Auto-Tune (*)	Table 7	$tLyp \#$ $nonE$ bnd	●●	Table-7
$Pb-1$	Proportional Band-1 (For "+" Directed Control Outputs)	EU	$tLyp \#$ $nonE$	●●	0.1 - 9999
$Pb-2$	Proportional Band-2 (For "-" Directed Control Outputs)	EU	$tLyp \#$ oLo	●●	0.1 - 9999
Ik	Integral Time (if "oFF", integral is inactive)	s	$tLyp \#$ $nonE$	●●	oFF, 1 - 9999
$2B$	(*) Idk : For Positive Error Signal (HEATING) IdC : For Negative Error Signal (COOLING)	s	$tLyp \#$ $nonE$	●●	oFF, 1 - 2500
dk	Derivative Time (if "oFF", derivative is inactive)	s	$tLyp \#$ $nonE$	●●	oFF, 1 - 2500
HYS	Hysteresis	EU		●●	0.0 - 9999

(*) If the heating and cooling characteristics of the system are not known, these parameters can be taken equal.

20. Set Point Configuration Page ($PRGE-SEtP$)

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
$SP5r$	Set Point Source	Table 13		●●	Table-13
$SPLL$	Set Point Lower Limit	EU		●●	-1999 - 5PHL
$SPHL$	Set Point Upper Limit	EU		●●	5PLL - 9999
$SPrr$	Set Point Ramping Rate (For fastest change, enter "oFF")	EU/min		●●	oFF, 0.1 - 60.0
$SEt1$	1 Multiple Set Point	EU	$SP5r = dInP$	●●	5PLL - 5PHL
$SEt2$	2 Multiple Set Point	EU	$SP5r = dInP$	●●	5PLL - 5PHL
$SEt3$	3 Multiple Set Point	EU	$SP5r = dInP$	●●	5PLL - 5PHL
$SEt4$	4 Multiple Set Point	EU	$SP5r = dInP$	●●	5PLL - 5PHL

21. Alarm Configuration Page (PAGE=RCnF)

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
R1LP oFF	Alarm-1 Type	Table 11		0/0	Table-11
R1HY 05	Alarm-1 Hysteresis	EU	R1LP ≠ oFF	0/0	00 - 9999
R1LT d5b	Alarm-1 Lock (9)	Table 6	R1LP ≠ oFF	0/0	Table-6
R2LP oFF	Alarm-2 Type	Table 11		0/0	Table-11
R2HY 05	Alarm-2 Hysteresis	EU	R2LP ≠ oFF	0/0	00 - 9999
R2LT d5b	Alarm-2 Lock (9)	Table 6	R2LP ≠ oFF	0/0	Table-6

26

(continue on next page)

21. Alarm Configuration Page (PAGE=RCnF)

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
R3LP oFF	Alarm-3 Type	Table 11		0/0	Table-11
R3HY 05	Alarm-3 Hysteresis	EU	R3LP ≠ oFF	0/0	00 - 9999
R3LT d5b	Alarm-3 Lock (9)	Table 6	R3LP ≠ oFF	0/0	Table-6
R4LP oFF	Alarm-4 Type	Table 11		0/0	Table-11
R4HY 05	Alarm-4 Hysteresis	EU	R4LP ≠ oFF	0/0	00 - 9999
R4LT d5b	Alarm-4 Lock (9)	Table 6	R4LP ≠ oFF	0/0	Table-6

27

22. Control and Output Configuration Page (PAGE=oCnF)

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
[tYP 5Lo	Control Type	Table 12		0/0	Table-12
[tYP rEu	Control Form	Table 8	[tYP ≠ nonE	0/0	Table-8
[tYP 2Prd	Control Period	s	[tYP ≠ nonE	0/0	1 - 250
[tYP nnPr d5b	Manual Mode Select	Table 6	[tYP ≠ nonE	0/0	Table-6
[tYP trLn 000	Motor Valve Travel Time	s	[tYP = bnd	0/0	10 - 2500
[tYP dbnd 05	Control Output Death Band	%	[tYP ≠ nonE	0/0	0.1 - 25.0
[tYP SoLL 00	Single Sided (+) Control Output Lower Limit	%	[tYP ≠ nonE [tYP ≠ dCo	0/0	00 - 50nr

28

(continue on next page)

22. Control and Output Configuration Page (PAGE=oCnF)

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
[tYP SoHL 1000	Single Sided (+) Control Output Upper Limit	%	[tYP ≠ nonE [tYP ≠ dCo	0/0	50nr - 1000
[tYP SoHL 500	Single Sided (+) Control Output Manual-Reset Value	%	[tYP ≠ nonE [tYP ≠ dCo	0/0	50LL - 50HL
[tYP doLL +1000	Double Sided (+/-) Control Output Lower Limit	%	[tYP = dCo	0/0	+1000 - donr
[tYP doHL 1000	Double Sided (+/-) Control Output Upper Limit	%	[tYP = dCo	0/0	donr - 1000
[tYP doHL 00	Double Sided (+/-) Control Output Manual-Reset Value	%	[tYP = dCo	0/0	doLL - doHL
[tYP PonC 0	PID Control Power-On Behaviour	Table 20	[tYP ≠ nonE	0/0	Table-20

29

(continue on next page)

22. Control and Output Configuration Page (PAGE=0LnF)

Display	Explanation	Access Unit Conditions	Key	Key Function / Setting Interval
rLId	1. Relay (RL1) Function	Table 10	0/0	Table-10
Lo-1				
rL2d	2. Relay (RL2) Function	Table 10	0/0	Table-10
Lo-2				
rL3d	3. Relay (RL3) Function	Table 10	0/0	Table-10
RL-3				
rL4d	4. Relay (RL4) Function	Table 10	0/0	Table-10
RL-4				
RoId	1. Analog Output (AO1) Function	Table 14	0/0	Table-14
Lo-1				
Ro2d	2. Analog Output (AO2) Function	Table 14	0/0	Table-14
Lo-2				
RoId	1. Analog Output (AO1) Scalar	Table 15	0/0	Table-15
4-20				

30

(continue on next page)

22. Control and Output Configuration Page (PAGE=0LnF)

Display	Explanation	Access Unit Conditions	Key	Key Function / Setting Interval
Ro2r	2. Analog Output (AO2) Scalar	Table 15	0/0	Table-15
4-20				
5rId	Motor-Valve Fully-Closed Position	LTYP = PFb	0/0	Save Position Valve Close / Valve Open
1889				
5rId	Motor-Valve Fully-Open Position	LTYP = PFb	0/0	Save Position Valve Close / Valve Open
3756				

31

23. General Configuration Page (PAGE=0LnF)

Display	Explanation	Access Unit Conditions	Key	Key Function / Setting Interval
InP1	1. Analog Input (AIN1) Type (For Process Value Measurement)	Table 17	0/0	Table-17
1				
InP2	2. Analog Input (AIN2) Type (External Set Point Input)	Table 5	0/0	Table-5
4P20				
dP	Decimal Point (*)		0/0	0 - 3
1				
2Err	Analog Input Scale Lower Value (Linear input types)	EU	0/0	-1999 - 9999
00				
5PRn	Analog Input Scale Upper Value (Linear input types)	EU	0/0	-1999 - 9999
4000				

32

(continue on next page)

23. General Configuration Page (PAGE=0LnF)

Display	Explanation	Access Unit Conditions	Key	Key Function / Setting Interval
LTLL	Retransmission Low Limit	EU	0/0	-1999 - LT-HL
00				
LT-HL	Retransmission High Limit	EU	0/0	LT-LL - 9999
4000				
UnIt	Temperature Unit (*)	LTYP = TC / RT	0/0	Table-9
0C				
aF5t	Temperature Offset Value	LTYP = TC / RT	0/0	-1000 - 1000
00				
FLtr	ANALOG INPUT 1 PV value Filtering Time (*)	EU	0/0	0.1 - 100
0.5				
Snbr	Sensor Broken Behaviour	Table 4	0/0	Table-4
H1				

(*) The sampling time of the PV value is 500 ms. Two samples are taken for each second. PV value can be averaged in order to suppress high frequency noise. FLtr parameter determines averaging time. For example, if this parameter is set to 4 seconds, the last 8 measurements are averaged. It can be set between 1 and 15 (seconds).

33

(continue on next page)

23. General Configuration Page (PRGE=GLnF)

Display	Explanation	Access Unit Conditions	Key	Key Function / Setting Interval
Rdr-5	Communication Address		 	1 - 127
br-EE	Baud Rate	kb/s	 	48 96 192 384
Prr-Ly	Parity	Table-16	 	Table-16

34

24. Security Adjustments Page (PRGE=PrLc)

Display	Explanation	Observation Unit Conditions	Key	Key Function / Setting Interval
5Cod	Password Set Value ⁽⁸⁾		 	1999 - 9999
Rr-Ln	Auto Return Time ⁽⁹⁾ (cancelled if oFF)	s	 	oFF, 5 - 25
dPr-L	Parameter Access Level	Table-18	 	Table-18
RPr-L	Parameter Edit Level	Table-19	 	Table-19
CPrr-L	Calibration Page Access	Table-6	 	Table-6
d5b	Return to Factory Settings ⁽¹⁰⁾	Table-7	 	Approval Table-7

35

25. Calibration Page (PRGE=LLbr)

Display	Explanation	Access Unit Conditions	Key	Key Function / Setting Interval
50nV	1.Analog Input (AIN1) 50mV Calibration		 	Save Calibration Value
00pC	1.Analog Input (AIN1) 0.0°C Calibration (with Type-K T/C)		 	Save Calibration Value
390A	1.Analog Input (AIN1) 390Ω Calibration		 	Save Calibration Value
55V5	1.Analog Input (AIN1) 20mA Calibration		 	Save Calibration Value
20A9	2.Analog Input (AIN2) 20mA Calibration		 	Save Calibration Value

36

(continue on next page)

25. Calibration Page (PRGE=LLbr)

Display	Explanation	Access Unit Conditions	Key	Key Function / Setting Interval
Ra1L	1.Analog Output (AO1) Low Limit Calibration		 	1300 - 3000
Ra1H	1.Analog Output (AO1) High Limit Calibration		 	6500 - 8191
Ra2L	2.Analog Output (AO2) Low Limit Calibration		 	1300 - 3000
Ra2H	2.Analog Output (AO2) High Limit Calibration		 	6500 - 8191

37

 The basic calibration of the controller is highly stable and set in the factory. Any erroneous operation in the CLb page will corrupt the calibration parameter, and measurements will be faulty. The calibration parameters of the controller can be reinstalled in the CLb page. If accurate calibration devices are not available, entering to the CLb page is not advised.

(continue on next page)

25. Calibration Page (PAGE=CLbr)

Analog Input 50 mV Calibration: Set the calibrator as a millivolt source and adjust the calibrator output 50.000 mV. Apply the calibrator output to the input terminals 16(-) and 18(+) of the controller. Select this parameter and press $\odot$ and $\bullet$ buttons simultaneously to store the parameter.

Analog Input 0°C Calibration: Set the calibrator to Type K thermocouple and adjust the calibrator output 0.00 °C. Apply the calibrator output to the input terminals 16(-) and 18(+) of the controller. Select this parameter and press $\odot$ and $\bullet$ buttons simultaneously to store the parameter.

Analog Input 390 Ω Calibration: Set the calibrator as a resistance source and adjust the calibrator output 390.00 Ω . Short circuit the terminals 16 and 18 of the controller. Apply the calibrator output to the input terminals 15 and 16 of the controller. Select this parameter and press $\odot$ and $\bullet$ buttons simultaneously to store the parameter.

Analog Input 20 mA Calibration: Set the calibrator as a milliamp source and adjust the calibrator output 20.00 mA. For 1.Analog Input, short circuit the terminals 17 and 18 of the controller and apply the calibrator output to the input terminals 16(-) and 17(+) of the controller. For 2.Analog Input, apply the calibrator output to the input terminals 14(+) and 15(-) of the controller. Select this parameter and press $\odot$ and $\bullet$ buttons simultaneously to store the parameter.

25. Calibration Page (PAGE=CLbr)

Analog Output Low Limit Calibration: The calibrator is set to milliamp or volt measurement, depending on the analog output type. Connect the output terminals 11(+) and 12(-) (for 1.Analog Output) or 31(+) and 32(-) (for 2.Analog Output) of the controller to the calibrator input. Select this parameter and using $\odot$ and $\bullet$ buttons adjust the parameter until the calibrator reading is equal to 4 mA or 2 V. Press $\odot$ or $\odot$ button to store the parameter.

Analog Output High Limit Calibration: The calibrator is set to milliamp or volt measurement, depending on the analog output type. Connect the output terminals 11(+) and 12(-) (for 1.Analog Output) or 31(+) and 32(-) (for 2.Analog Output) of the controller to the calibrator input. Select this parameter and using $\odot$ and $\bullet$ buttons adjust the parameter until the calibrator reading is equal to 20.00 mA or 10 V. Press $\odot$ or $\odot$ button to store the parameter.

26. Communication Data

Address	In Short	Explanation	Unit	Multiplier	Adjustment Permit	Min.	Max.
0		Status	Table1		No	0	0
1		Reserve			No	0	0
2		Process Value	EU	$10^{DP_{PE}}$	No	0	0
3	PSP	Progressive Set Point	EU	$10^{DP_{PE}}$	No	0	0
4		Reserve			No		
5		Reserve			No		
6		Reserve			No		
7		Reserve			No		
8		Decimal Point (DP) [®]			No	0	0
9	SP5r	Set Point Source	Table13		No	0	0
10	CLyP	Control Type	Table12		No	0	0
11	oJt	Manual Output	%	10	Yes	-1000	1000
12		Control Set Point	EU	$10^{DP_{PE}}$	Yes	-1999	9999
13	Rt	Auto-Tune	Table7		Yes	0	1
14-35		Reserve			Yes		

26. Communication Data

Address	In Short	Explanation	Unit	Multiplier	Adjustment Permit	Min.	Max.
36	Pb-1	Proportional Band-1 (+ Directed Control Output)	EU	$10^{DP_{PE}}$	Yes	1	9999
37	Pb-2	Proportional Band-2 (- Directed Control Output)	EU	$10^{DP_{PE}}$	Yes	1	9999
38	It	Time of Integral (If "0", Integral is inactive)	s		Yes	0	9999
39	dL	Time of Derivative (If "0", Derivative is inactive)	s		Yes	0	2500
40	HJ5	Hysteresis	EU	$10^{DP_{PE}}$	Yes	0	9999
41	SP5r	Set Point Source	Table13		Yes	0	2
42	SPLL	Set Point Lower Limit	EU	$10^{DP_{PE}}$	Yes	-1999	9999
43	SPHL	Set Point Upper Limit	EU	$10^{DP_{PE}}$	Yes	-1999	9999
44	SPrr	Set Point Ramping Rate (For Fastest 0)	EU/min	$10^{DP_{PE}}$	Yes	0	600
45	nSP1	1 Multiple Set Point	EU	$10^{DP_{PE}}$	Yes	-1999	9999
46	nSP2	2 Multiple Set Point	EU	$10^{DP_{PE}}$	Yes	-1999	9999
47	nSP3	3 Multiple Set Point	EU	$10^{DP_{PE}}$	Yes	-1999	9999
48	nSP4	4 Multiple Set Point	EU	$10^{DP_{PE}}$	Yes	-1999	9999
49		Reserve			Yes		

26. Communication Data

Address	In Short	Explanation	Unit	Multiplier	Adjustment Permit	Min.	Max.
50	R1LP	Alarm-1 Type	Table11		Yes	0	6
51	R1HJ	Alarm "1" Hysteresis Value	EU	$10^{DP_{10}}$	Yes	0	9999
52	R1LL	Alarm "1" Lock	Table6		Yes	0	1
53	R1SP	Alarm "1" Set Point	EU	$10^{DP_{10}}$	Yes	-1999	9999
54	R2LP	Alarm "2" Type	Table11		Yes	0	6
55	R2HJ	Alarm "2" Hysteresis Value	EU	$10^{DP_{10}}$	Yes	0	9999
56	R2LL	Alarm "2" Lock	Table6		Yes	0	1
57	R2SP	Alarm "2" Set Point	EU	$10^{DP_{10}}$	Yes	-1999	9999
58	R3LP	Alarm "3" Type	Table11		Yes	0	6
59	R3HJ	Alarm "3" Hysteresis Value	EU	$10^{DP_{10}}$	Yes	0	9999
60	R3LL	Alarm "3" Lock	Table6		Yes	0	1
61	R3SP	Alarm "3" Set Point	EU	$10^{DP_{10}}$	Yes	-1999	9999
62	R4LP	Alarm "4" Type	Table11		Yes	0	6
63	R4HJ	Alarm "4" Hysteresis Value	EU	$10^{DP_{10}}$	Yes	0	9999
64	R4LL	Alarm "4" Lock	Table6		Yes	0	1
65	R4SP	Alarm "4" Set Point	EU	$10^{DP_{10}}$	Yes	-1999	9999

42

(continue on next page)

Address	In Short	Explanation	Unit	Multiplier	Adjustment Permit	Min.	Max.
66	L1JP	Control Type	Table12		Yes	0	4
67	L1Fn	Control Form	Table8		Yes	0	1
68	L1Pd	Control Period	s		Yes	1	250
69	L1Pr	Manual Mode Select	Table6		Yes	0	1
70	L1Ln	Motor Valve Travel Time	s		Yes	10	2500
71	L1dbnd	Control Output Death Band	%	10	Yes	1	250
72	L1SaLL	Single Sided (+) Control Output Lower Limit	%	10	Yes	0	1000
73	L1SaHL	Single Sided (+) Control Output Upper Limit	%	10	Yes	0	1000
74	L1SaRn	Single Sided (+) Control Output Manual-Reset Value	%	10	Yes	0	1000
75	L1daLL	Double Sided (+/-) Control Output Lower Limit	%	10	Yes	-1000	1000
76	L1daHL	Double Sided (+/-) Control Output Upper Limit	%	10	Yes	-1000	1000
77	L1daRn	Double Sided (+/-) Control Output Manual-Reset Value	%	10	Yes	-1000	1000
78	L1PaRn	PID Control Power-On Behaviour	Table20		Yes	0	4
79	L1L1d	1.Relay (RL1) Function	Table10		Yes	0	14
80	L1L2d	2.Relay (RL2) Function	Table10		Yes	0	14
81	L1L3d	3.Relay (RL3) Function	Table10		Yes	0	14

43

(continue on next page)

26.Communication Data

Address	In Short	Explanation	Unit	Multiplier	Adjustment Permit	Min.	Max.
82	L1L4d	4.Relay (RL4) Function	Table10		Yes	0	14
83	L1RaLd	1.Analog Output (AO1) Function	Table14		Yes	0	3
84	L1RaZd	2.Analog Output (AO2) Function	Table14		Yes	0	3
85	L1RaLr	1.Analog Output (AO1) Scalar	Table15		Yes	0	3
86	L1RaZr	2.Analog Output (AO2) Scalar	Table15		Yes	0	3
87	L1nPI	1.Analog Input (AIN1) Type	Table17		Yes	0	15
88	L1nPI2	2.Analog Input (AIN2) Type	Table5		Yes	0	1
89	L1dP	Decimal Point (DP) ⁽¹⁰⁾			Yes	0	3
90	L1ZErG	Analog Input Scalar Lower Value	EU	$10^{DP_{10}}$	Yes	-1999	9999
91	L1SPRn	Analog Input Scalar Upper Value	EU	$10^{DP_{10}}$	Yes	-1999	9999
92	L1rLL	Retransmission Low Limit	EU	$10^{DP_{10}}$	Yes	-1999	9999
93	L1rHL	Retransmission High Limit	EU	$10^{DP_{10}}$	Yes	-1999	9999
94	L1nLr	Temperature Unit	Table9		Yes	0	1
95	L1F5Lr	Temperature Offset Value	EU	$10^{DP_{10}}$	Yes	-1000	1000
96	L1FLr	Measurement Filter Coefficient	EU	$10^{DP_{10}}$	Yes	1	100
97	L1nBr	Sensor Broken Behaviour	Table4		Yes	0	1

44

27. Tables

Table-1

Bit	In short	Status
0		1.Relay (RL1) Active
1		2.Relay (RL2) Active
2		3.Relay (RL3) Active
3		4.Relay (RL4) Active
4	oPEn	Sensor Broken
5	oFL	Sensor Measurement over Scalar
6	uFL	Sensor Measurement below Scalar
7		Manual
8	oPn	Valve Open
9	L1L5	Valve Close
10		Reserve
11		Reserve

Table-3

Ad.	A.Perm	COILCommunication Addresses
0	Yes	Mod (Manual / Automatic)
1	Yes	Valve (Open /Stop)
2	Yes	Valve (Close / Stop)
3	Yes	Reserve
4	Yes	Reserve

Table-4

0	L1o	Lower The Process Value
1	H1i	Higher The Process Value

45

27. Tables

Table-5

0	$\overline{0R20}$	0-20 mA (Linear)
1	$\overline{4R20}$	4-20 mA (Linear)

Table-6

0	$\overline{d5b}$	Disable
1	$\overline{Enb}$	Enable

Table-7

0	$\overline{oFF}$	OFF
1	$\overline{oN}$	ON

Table-8

0	$\overline{dIr}$	Direct
1	$\overline{rEu}$	Reverse

Table-9

0	$\overline{oC}$	°C
1	$\overline{oF}$	°F

Table-10

0	$\overline{Co-1}$	"+" Directed Control Output
1	$\overline{Co-2}$	"-" Directed Control Output
2	$\overline{do-1}$	On / Off Heater Output
3	$\overline{do-2}$	On / Off Cooler Output
4	$\overline{RL-1}$	Alarm-1
5	$\overline{RL-2}$	Alarm-2
6	$\overline{RL-3}$	Alarm-3
7	$\overline{RL-4}$	Alarm-4
8	$\overline{RL-R}$	Reserve
9	$\overline{RL-b}$	Reserve
10	$\overline{RL-C}$	Reserve
11	$\overline{RL-d}$	Reserve
12	$\overline{RL-o}$	Reserve
13	$\overline{RL-H}$	Reserve
14	$\overline{RL-E}$	Reserve

Table-11

0	$\overline{oFF}$	Off
1	$\overline{Lo}$	Low Alarm (Absolute)
2	$\overline{Hi}$	High Alarm (Absolute)
3	$\overline{Lod}$	Low Deviation (Relative)
4	$\overline{Hid}$	High Deviation (Relative)
5	$\overline{Lab}$	Band Alarm (In)
6	$\overline{Hib}$	Band Alarm (Out)

27. Tables

Table-12

0	$\overline{nonE}$	No Control
1	$\overline{SCo}$	Single-Sided (+) PID Control
2	$\overline{dCo}$	Double-Sided (+/-) PID Control
3	$\overline{PFb}$	Feedback Valve Control
4	$\overline{bnd}$	Open-Loop Valve Control

Table-13

0	$\overline{Int}$	Over The Unit or by Communication
1	$\overline{ErT}$	Over The 2.Analog Output (AIN2)
2	$\overline{dInP}$	Multiple with Digital Input (Tablo-22)

Table-14

0	$\overline{Co-1}$	"+" Directed Control Output
1	$\overline{Co-2}$	"-" Directed Control Output
2	$\overline{PvTr}$	Process Value Transmitter
3	$\overline{SPTr}$	Set Point Transmitter

Table-15

0	$\overline{0-20}$	0-20 mA or 0-10 V
1	$\overline{20-0}$	20-0 mA or 10-0 V
2	$\overline{4-20}$	4-20 mA
3	$\overline{20-4}$	20-4 mA

Table-16

0	$\overline{nonE}$	None
1	$\overline{oDD}$	Odd
2	$\overline{EuEn}$	Even

27. Tables

Table-17

0	$\overline{b}$	Type-B (TC)
1	$\overline{E}$	Type-E (TC)
2	$\overline{J}$	Type-J (TC)
3	$\overline{K}$	Type-K (TC)
4	$\overline{L}$	Type-L (TC)
5	$\overline{n}$	Type-N (TC)
6	$\overline{r}$	Type-R (TC)
7	$\overline{S}$	Type-S (TC)
8	$\overline{t}$	Type-T (TC)
9	$\overline{U}$	Type-U (TC)
10	$\overline{Pt}$	Pt-100 (RT)
11	$\overline{0R20}$	0-20mA (Linear)
12	$\overline{4R20}$	4-20mA (Linear)
13	$\overline{0u50}$	0-50mV (Linear)
14	$\overline{0.0u1}$	0.0-1.0V (Linear)
15	$\overline{0.2u1}$	0.2-1.0V (Linear)

Table-18 (Note-1)

0	Only Process Value can be accessed
1	Process and Set Values can be accessed
2	Operation Screen Parameters can be accessed
3	Reserve
4	Reserve
5	$\overline{tUnE}$ Page Parameters can be accessed
6	$\overline{SEtP}$ Page Parameters can be accessed
7	$\overline{RLnF}$ Page Parameters can be accessed
8	$\overline{oLnF}$ Page Parameters can be accessed
9	$\overline{ULnF}$ Page Parameters can be accessed

27. Tables

Table-19 (Note-1)

0	None of the Parameters can be edited
1	Only Set Value can be edited
2	Operation Screen Parameters can be edited
3	Reserve
4	Reserve
5	$\overline{tUnE}$ Page Parameters can be edited
6	$\overline{SEtP}$ Page Parameters can be edited
7	$\overline{RLnF}$ Page Parameters can be edited
8	$\overline{oLnF}$ Page Parameters can be edited
9	$\overline{ULnF}$ Page Parameters can be edited

Note-1: Levels with large numerals in Tables-18 and Tables-19 contains previous levels

Table-20

0	Run with the latest Control Values
1	Switch to Automatic Mode
2	Switch to Automatic Mode and make"int=0"
3	Switch to Manuel Mode
4	Switch to Manuel Mode and make"Out = 0"

Table-22

DI2	DI3	0 / 1 = Open/ Closed
0	0	1.Multiple Set Point ($\overline{SEt1}$)
0	1	2.Multiple Set Point ($\overline{SEt2}$)
1	0	3.Multiple Set Point ($\overline{SEt3}$)
1	1	4.Multiple Set Point ($\overline{SEt4}$)

Footnotes

- (1) If the set point source is external ($SPSr \neq InL$), this adjustment is not valid.
- (2) With the control type as open loop valve control ($CLYP = bnd$), this screen is used for valve direction, instead of manual output value.
(SLP = Valve inactive, $CL5$ = Closing Valve, oPn = Opening Valve)
- (3) SLP = Valve inactive, $CL5$ = Closing Valve, oPn = Opening Valve
- (4) Auto-tune operation is inhibited in manual mode.
- (5) Pressing  button acknowledges the latched alarms if $RXLt$ is Enb while in normal operation.
- (6) Decimal Point is specified by the dP parameter. But if 1. Analog Input Type ($InPt$) is TC or RT and the dP parameter is greater than "1", Decimal Point = 1 assumed. When the dP parameter is edited, all the parameters with EU unit should be readjusted.
- (7) The EU (Engineering Unit) used in tables, thermocouples and resistance thermometer input type units °C or °F, and for linear inputs types, are the controlled measurement unit.
- (8) Factory setting of password is "10".
- (9) The value of $RrLn$ parameter defines the auto return time to normal operation, if there is no button operation. If it is set the oFF , auto return is disabled.
- (10) The factory settings of the parameters are given in "Display" column (except the $CLLb$ page). The parameter values in the $CLLb$ page are the typical.