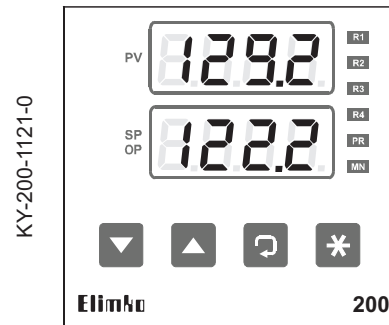




## E-200 Series Universal Advanced Controllers

### User Manual



#### Manufacturer / Technical Support

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## 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-200-1121-0

## E-200 Elimko

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### 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 sensitivity, 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

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

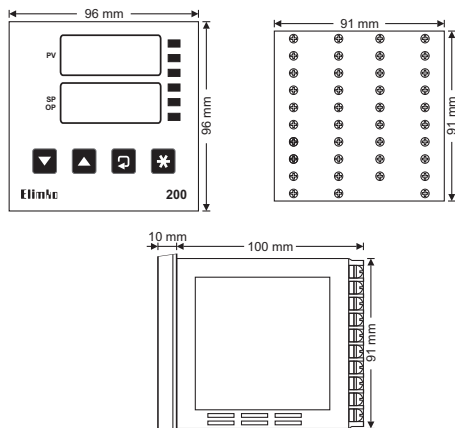
### 3. Type Coding

#### E-200-W-X-Y-Z

| W | Relay / SSR     | X | Analog Output  | Y | Communication | Z | Power Supply            |
|---|-----------------|---|----------------|---|---------------|---|-------------------------|
| 2 | 2 Relay         | 1 | 1x0-20/4-20 mA | 0 | None          | 0 | 85-265 VAC / 85-375 VDC |
| 3 | 3 Relay         | 2 | 2x0-20/4-20 mA | 1 | RS 485        | 1 | 20-60 VAC / 20-85 VDC   |
| 4 | 4 Relay         | 3 | 1x0-10 V DC    |   |               |   |                         |
| 5 | 1 Relay, 1 SSR* | 4 | 2x0-10 V DC    |   |               |   |                         |
| 6 | 2 Relay, 1 SSR* |   |                |   |               |   |                         |
| 7 | 3 Relay, 1 SSR* |   |                |   |               |   |                         |
| 8 | 1 Relay, 2 SSR* |   |                |   |               |   |                         |
| 9 | 2 Relay, 2 SSR* |   |                |   |               |   |                         |

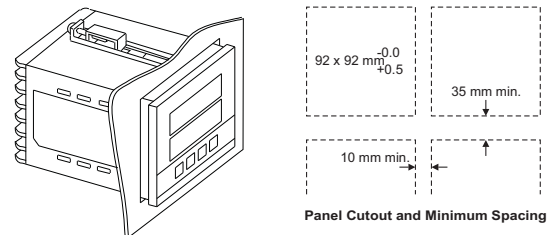
\* 24 V DC/20 mA Pulse Voltage to drive SSR

### 4. Dimensions



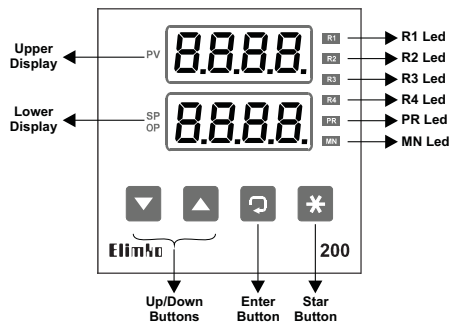
### 5. Panel Mounting

- 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.



- ❑ 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

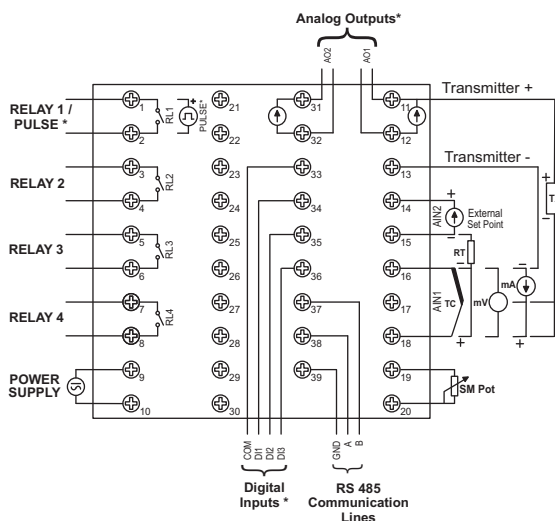
- Lower Display** - While in normal operation, it displays the control set point (Automatic mode) or manual output (Manual mode).  
 - While in configuration pages, it displays the parameter value.

- 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  $oLnF$  is set to  $dSb$  or if the  $LtYP$  parameter in  $oLnF$  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 $0 R 2 0$ | 0-20 mA DC |
| Current $4 R 2 0$ | 4-20 mA DC |
| Voltage $0 u 5 0$ | 0-50 mV DC |
| Voltage $0 0 u 1$ | 0-1 V DC   |
| Voltage $0 2 u 1$ | 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 $\alpha F F$ . |            |                           |
| <div><p>Shaded areas show the hysteresis.</p></div> <div><p>When alarm state is "1" the output (relay) is active.</p></div> |                                                                       |            |                           |

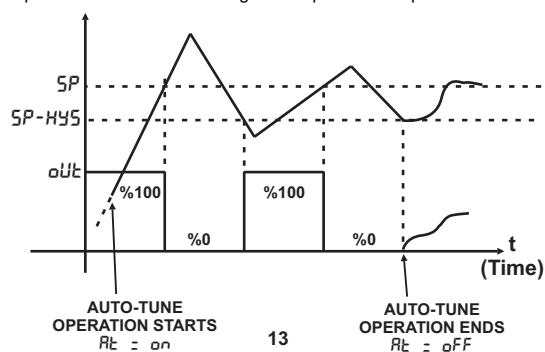
## 11. Auto-Tune

This parameter ( $R t$ ) initiates or cancel the Auto-Tune process. If  $\alpha n$  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  $\alpha n$ , 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.



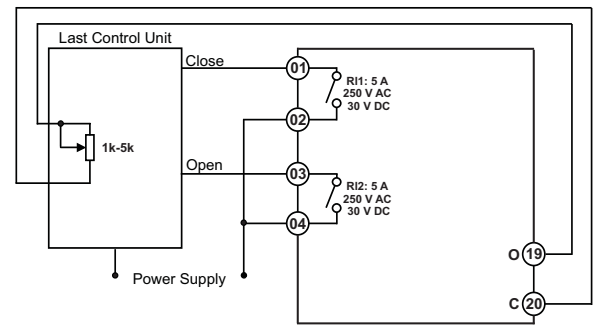
## 12. Manual Tuning

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  $\xi t y P$  parameter in  $\alpha \xi n F$  page as  $5 \xi \alpha$ .
- 2- Set the output that control the process to  $\xi \alpha - I$ .
- 3- If the control output is relay, set the  $\xi P r d$  parameter in  $\alpha \xi n F$  page as  $\xi$ .
- 4- Set the  $i t$ ,  $d t$  and  $M y S$  parameters in  $\xi u n E$  page as  $\xi$ .
- 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  $P b$  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  $P b$ ,  $i t$  and  $d t$  parameters values according to the calculations given below.

| Type of Control | Proportional Band ( $P b$ ) | Integral Time ( $i t$ ) | Derivative Time ( $d t$ ) |
|-----------------|-----------------------------|-------------------------|---------------------------|
| P               | $2 \times B$                | 0                       | 0                         |
| PI              | $2.2 \times B$              | $0.8 \times T$          | 0                         |
| PID             | $1.7 \times B$              | $0.5 \times T$          | $0.12 \times T$           |

## 13. Feedback Valve Control



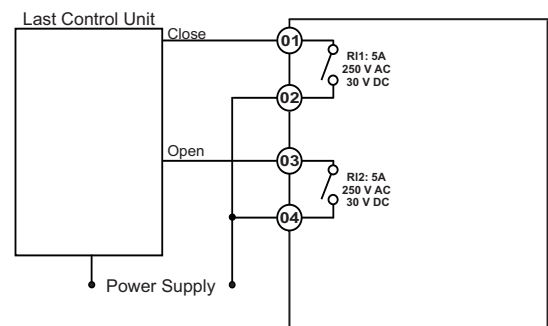
As shown in figure, control of the feedback controlled valve can be made with a servomotor connected to the relays and the 19-20th terminals on E-200, and a potentiometer (1k-5k).

## 13. Feedback Valve Control

The parameters of this control, are the  $\xi t y P$ ,  $d b n d$ ,  $S r u L$  and  $S r u H$  parameters, in the output configurations page  $\alpha \xi n F$ . These parameters are as follows;

- ☐ The  $\xi t y P$  parameter should be set to  $P F b$ , for this control.
- ☐ The  $d b n d$  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  $S r u L$  parameter, keeps the location data of the controlled valve in the fully closed state. With this parameter on the display,  $\blacktriangledown$  key starts the action in motor-active direction. In the fully closed state, the value shown on the display can be saved by pressing  $\boxtimes \blacktriangledown$  keys.
- ☐ The  $S r u H$  parameter, keeps the location data of the controlled valve in the fully open state. With this parameter on the display,  $\blacktriangle$  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  $\boxtimes \blacktriangledown$  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  $\xi t y P$ ,  $d b n d$  ve  $\xi r t n$  parameters in the  $\alpha \xi n F$  page. The explanation for the parameters are;

- ☐ For this control to be made, the  $\xi t y P$  parameters should be set to  $b n d$ .
- ☐ The  $d b n d$  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  $\xi r t n$  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 |
|---------|----------------------------------|------|-------------------|-----------------------------------------------------------------------------------|---------------------------------|
| 234     | Process Value (Normal Operation) | EU   |                   |  |                                 |
| 500     | Control Set Point                | EU   |                   |  | 5PLL - 5PHL <sup>(1)</sup>      |
| oLc     | Manual Output <sup>(2)</sup>     | %    | 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 |
|---------|----------------------------------|------|-------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------|
| 234     | Process Value (Normal Operation) | EU   | LTyP = SPo Single Sided (+) PID Control   |  | 5oLL - 5oHL                     |
| 500     | Manual Output                    | %    |                                           |  |                                 |
| 234     | Process Value (Normal Operation) | EU   | LTyP = dLo Double Sided (+/-) PID Control |  | doLL - doHL                     |
| 500     | Manual Output                    | %    |                                           |  |                                 |
| 234     | Process Value (Normal Operation) | EU   | LTyP = PFb Feedback Valve Control         |  | 5oLL - 5oHL                     |
| 500     | Manual Output                    | %    |                                           |  |                                 |
| 234     | Process Value (Normal Operation) | EU   | LTyP = bnd Open-Loop Valve Control        |  | Valve Close/Valve Open          |
| SP      | Valve Direction <sup>(3)</sup>   |      |                                           |  |                                 |

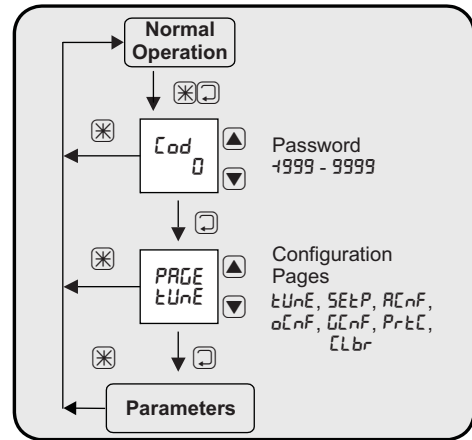
## 17. Manual Mode Operation Page

| 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,  $\otimes$  and  $\square$  buttons are pressed simultaneously.
- After this operation PR led lights and  $LoD$  message and  $\square$  are displayed in the upper and lower displays respectively.
- $\nabla$  and  $\blacktriangle$  buttons are used to adjust the security code in the lower display. When  $\square$  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.
- $\nabla$  and  $\blacktriangle$  buttons are used to select the configuration pages while  $PRGE$  message is displayed in the upper display.  $\square$  button select the parameters in a page sequentially.  $\square$  button returns to the top of the page if it pressed for duration of 2 seconds, while in configuration pages.  $\otimes$  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    | $\nabla/\blacktriangle$ | Table-7                         |
| $Pb-1$  | Proportional Band-1 (For "+" Directed Control Outputs) | EU      | $tLyp \#$ none    | $\nabla/\blacktriangle$ | 01 - 9999                       |
| $Pb-2$  | Proportional Band-2 (For "-" Directed Control Outputs) | EU      | $tLyp \#$ none    | $\nabla/\blacktriangle$ | 01 - 9999                       |
| $Ik$    | Integral Time (if "oFF", integral is inactive)         | s       | $tLyp \#$ none    | $\nabla/\blacktriangle$ | oFF, 1 - 9999                   |
| $dL$    | Derivative Time (if "oFF", derivative is inactive)     | s       | $tLyp \#$ none    | $\nabla/\blacktriangle$ | oFF, 1 - 2500                   |
| $HYS$   | Hysteresis                                             | EU      |                   | $\nabla/\blacktriangle$ | 00 - 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 |                   | $\nabla/\blacktriangle$ | Table-13                        |
| $SPLL$  | Set Point Lower Limit                                    | EU       |                   | $\nabla/\blacktriangle$ | -1999 - 5PHL                    |
| $SPHL$  | Set Point Upper Limit                                    | EU       |                   | $\nabla/\blacktriangle$ | 5PLL - 9999                     |
| $SPrr$  | Set Point Ramping Rate (For fastest change, enter "oFF") | EU/min   |                   | $\nabla/\blacktriangle$ | oFF, 0.1 - 60.0                 |
| $SEt1$  | 1 Multiple Set Point                                     | EU       | $SP5r = dInP$     | $\nabla/\blacktriangle$ | 5PLL - 5PHL                     |
| $SEt2$  | 2 Multiple Set Point                                     | EU       | $SP5r = dInP$     | $\nabla/\blacktriangle$ | 5PLL - 5PHL                     |
| $SEt3$  | 3 Multiple Set Point                                     | EU       | $SP5r = dInP$     | $\nabla/\blacktriangle$ | 5PLL - 5PHL                     |
| $SEt4$  | 4 Multiple Set Point                                     | EU       | $SP5r = dInP$     | $\nabla/\blacktriangle$ | 5PLL - 5PHL                     |

## 21. Alarm Configuration Page (PAGE=RCnF)

| Display     | Explanation                 | Unit     | Access Conditions | Key | Key Function / Setting Interval |
|-------------|-----------------------------|----------|-------------------|-----|---------------------------------|
| R1LP<br>oFF | Alarm-1 Type                | Table 11 |                   | ▼/▲ | Table-11                        |
| R1HY<br>05  | Alarm-1 Hysteresis          | EU       | R1LP #<br>oFF     | ▼/▲ | 00 - 9999                       |
| R1LT<br>d5b | Alarm-1 Lock <sup>(9)</sup> | Table 6  | R1LP #<br>oFF     | ▼/▲ | Table-6                         |
| R2LP<br>oFF | Alarm-2 Type                | Table 11 |                   | ▼/▲ | Table-11                        |
| R2HY<br>05  | Alarm-2 Hysteresis          | EU       | R2LP #<br>oFF     | ▼/▲ | 00 - 9999                       |
| R2LT<br>d5b | Alarm-2 Lock <sup>(9)</sup> | Table 6  | R2LP #<br>oFF     | ▼/▲ | Table-6                         |

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## 21. Alarm Configuration Page (PAGE=RCnF)

| Display     | Explanation                 | Unit     | Access Conditions | Key | Key Function / Setting Interval |
|-------------|-----------------------------|----------|-------------------|-----|---------------------------------|
| R3LP<br>oFF | Alarm-3 Type                | Table 11 |                   | ▼/▲ | Table-11                        |
| R3HY<br>05  | Alarm-3 Hysteresis          | EU       | R3LP #<br>oFF     | ▼/▲ | 00 - 9999                       |
| R3LT<br>d5b | Alarm-3 Lock <sup>(9)</sup> | Table 6  | R3LP #<br>oFF     | ▼/▲ | Table-6                         |
| R4LP<br>oFF | Alarm-4 Type                | Table 11 |                   | ▼/▲ | Table-11                        |
| R4HY<br>05  | Alarm-4 Hysteresis          | EU       | R4LP #<br>oFF     | ▼/▲ | 00 - 9999                       |
| R4LT<br>d5b | Alarm-4 Lock <sup>(9)</sup> | Table 6  | R4LP #<br>oFF     | ▼/▲ | Table-6                         |

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

| Display             | Explanation                                 | Unit     | Access Conditions     | Key | Key Function / Setting Interval |
|---------------------|---------------------------------------------|----------|-----------------------|-----|---------------------------------|
| [tYP<br>5Lo         | Control Type                                | Table 12 |                       | ▼/▲ | Table-12                        |
| [tYP<br>rEu         | Control Form                                | Table 8  | [tYP #<br>nonE        | ▼/▲ | Table-8                         |
| [tYP<br>2           | Control Period                              | s        | [tYP #<br>nonE        | ▼/▲ | 1 - 250                         |
| [tYP<br>nnPr<br>d5b | Manual Mode Select                          | Table 6  | [tYP #<br>nonE        | ▼/▲ | Table-6                         |
| [tYP<br>trLn<br>000 | Motor Valve Travel Time                     | s        | [tYP =<br>bnd         | ▼/▲ | 00 - 2500                       |
| [tYP<br>dbnd<br>05  | Control Output Death Band                   | %        | [tYP #<br>nonE        | ▼/▲ | 0.1 - 25.0                      |
| [tYP<br>SoLL<br>00  | Single Sided (+) Control Output Lower Limit | %        | [tYP #<br>nonE<br>dCo | ▼/▲ | 00 - 5000                       |

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

| Display               | Explanation                                          | Unit     | Access Conditions     | Key | Key Function / Setting Interval |
|-----------------------|------------------------------------------------------|----------|-----------------------|-----|---------------------------------|
| [tYP<br>SoHL<br>1000  | Single Sided (+) Control Output Upper Limit          | %        | [tYP #<br>nonE<br>dCo | ▼/▲ | 5000 - 10000                    |
| [tYP<br>SoHL<br>500   | Single Sided (+) Control Output Manual-Reset Value   | %        | [tYP #<br>nonE<br>dCo | ▼/▲ | 500L - 500H                     |
| [tYP<br>doLL<br>+1000 | Double Sided (+/-) Control Output Lower Limit        | %        | [tYP =<br>dCo         | ▼/▲ | +1000 - doHL                    |
| [tYP<br>doHL<br>1000  | Double Sided (+/-) Control Output Upper Limit        | %        | [tYP =<br>dCo         | ▼/▲ | doHL - 1000                     |
| [tYP<br>doHL<br>00    | Double Sided (+/-) Control Output Manual-Reset Value | %        | [tYP =<br>dCo         | ▼/▲ | doHL - doHL                     |
| [tYP<br>PonC<br>0     | PID Control Power-On Behaviour                       | Table 20 | [tYP #<br>nonE        | ▼/▲ | Table-20                        |

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

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

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

| Display | Explanation                       | Access<br>Unit Conditions | Key | Key Function /<br>Setting Interval           |
|---------|-----------------------------------|---------------------------|-----|----------------------------------------------|
| Ro2r    | 2. Analog Output (AO2) Scalar     | Table 15                  | ▼/▲ | Table-15                                     |
| 4-20    |                                   |                           |     |                                              |
| 5rUL    | Motor-Valve Fully-Closed Position | LTYP = PFB                | ▼/▲ | Save Position<br>Valve Close /<br>Valve Open |
| 1889    |                                   |                           |     |                                              |
| 5rUH    | Motor-Valve Fully-Open Position   | LTYP = PFB                | ▼/▲ | Save Position<br>Valve Close /<br>Valve Open |
| 3756    |                                   |                           |     |                                              |

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## 23. General Configuration Page (PAGE=0CnF)

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

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## 23. General Configuration Page (PAGE=0CnF)

| Display | Explanation                                | Access<br>Unit Conditions | Key | Key Function /<br>Setting Interval |
|---------|--------------------------------------------|---------------------------|-----|------------------------------------|
| trLL    | Retransmission Low Limit                   | EU                        | ▼/▲ | -9999 - trHL                       |
| 00      |                                            |                           |     |                                    |
| trHL    | Retransmission High Limit                  | EU                        | ▼/▲ | trLL - 9999                        |
| 4000    |                                            |                           |     |                                    |
| UnIt    | Temperature Unit (*)                       | Table 9                   | ▼/▲ | Table-9                            |
| oC      |                                            |                           |     |                                    |
| aF5t    | Temperature Offset Value                   | EU                        | ▼/▲ | -1000 - 1000                       |
| 00      |                                            |                           |     |                                    |
| FLtr    | ANALOG INPUT 1 PV value Filtering Time (*) | EU                        | ▼/▲ | 0.1 - 100                          |
| 0.5     |                                            |                           |     |                                    |
| 5nBr    | Sensor Broken Behaviour                    | Table 4                   | ▼/▲ | 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).

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## 23. General Configuration Page (PAGE=GLnF)

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

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## 24. Security Adjustments Page (PAGE=PrLc)

| Display | Explanation                                        | Observation<br>Unit Conditions | Key                                                                                | Key Function /<br>Setting Interval |
|---------|----------------------------------------------------|--------------------------------|------------------------------------------------------------------------------------|------------------------------------|
| 5Cod    | Password Set Value <sup>(8)</sup>                  |                                |  | 1999 - 9999                        |
| Rr-Ln   | Auto Return Time <sup>(9)</sup> (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                           |
| CPr-L   | Calibration Page Access                            | Table-6                        |  | Table-6                            |
| d5b     | Return to Factory Settings <sup>(10)</sup>         | Table-7                        |  | Approval                           |
| FF5E    |                                                    |                                |  | Table-7                            |

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## 25. Calibration Page (PAGE=LLbr)

| Display | Explanation                                               | Access<br>Unit Conditions | Key                                                                                 | Key Function /<br>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             |
| 20AR    | 2.Analog Input (AIN2) 20mA Calibration                    |                           |  | Save Calibration Value             |

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## 25. Calibration Page (PAGE=LLbr)

| Display | Explanation                                  | Access<br>Unit Conditions | Key                                                                                  | Key Function /<br>Setting Interval |
|---------|----------------------------------------------|---------------------------|--------------------------------------------------------------------------------------|------------------------------------|
| Ra-IL   | 1.Analog Output (AO1) Low Limit Calibration  |                           |  | 1300 - 3000                        |
| Ra-IH   | 1.Analog Output (AO1) High Limit Calibration |                           |  | 6500 - 8191                        |
| Ra-2L   | 2.Analog Output (AO2) Low Limit Calibration  |                           |  | 1300 - 3000                        |
| Ra-2H   | 2.Analog Output (AO2) High Limit Calibration |                           |  | 6500 - 8191                        |

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

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## 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  $\otimes$  and  $\nabla$  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  $\otimes$  and  $\nabla$  buttons simultaneously to store the parameter.

**Analog Input 390  $\Omega$  Calibration:** Set the calibrator as a resistance source and adjust the calibrator output 390.00  $\Omega$ . 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  $\otimes$  and  $\nabla$  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  $\otimes$  and  $\nabla$  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  $\nabla$  and  $\blacktriangle$  buttons adjust the parameter until the calibrator reading is equal to 4 mA or 2 V. Press  $\square$  or  $\otimes$  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  $\nabla$  and  $\blacktriangle$  buttons adjust the parameter until the calibrator reading is equal to 20.00 mA or 10 V. Press  $\square$  or  $\otimes$  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) <sup>®</sup> |         |                | No                | 0     | 0    |
| 9       | SP5r     | Set Point Source                | Table13 |                | No                | 0     | 0    |
| 10      | CLyP     | Control Type                    | Table12 |                | No                | 0     | 0    |
| 11      | oLk      | 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      | H5       | 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 |

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| 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   |

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## 26.Communication Data

| Address | In Short | Explanation                        | Unit    | Multiplier     | Adjustment Permit | Min.  | Max. |
|---------|----------|------------------------------------|---------|----------------|-------------------|-------|------|
| 82      | L1L4d    | 4.Relay (RL4) Function             | Table10 |                | Yes               | 0     | 14   |
| 83      | L1RoLd   | 1.Analog Output (AO1) Function     | Table14 |                | Yes               | 0     | 3    |
| 84      | L1RoZd   | 2.Analog Output (AO2) Function     | Table14 |                | Yes               | 0     | 3    |
| 85      | L1RoLr   | 1.Analog Output (AO1) Scalar       | Table15 |                | Yes               | 0     | 3    |
| 86      | L1RoZr   | 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) <sup>(10)</sup> |         |                | 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      | L1oF5Lr  | 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    |

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## 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 | H1  | Higher The Process Value |

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## 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 (  $SP5r \neq InL$  ), this adjustment is not valid.
- (2) With the control type as open loop valve control (  $CL5P = bnd$  ), 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 (  $InP t$  ) 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  $CLb$  page). The parameter values in the  $CLb$  page are the typical.