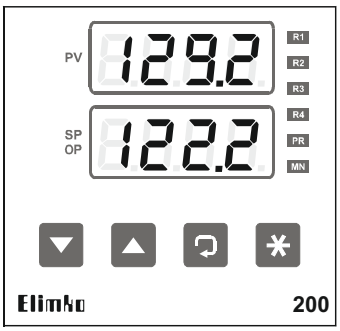
Elimko

E-200 Series
Universal Advanced Controllers

User Manual

KY-200-1121-0



CE

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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 flamable 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

K - Q TSE-ISO-EN 9000
TS EN ISO 9001
Quality Management System Certificate

KY-200-1121-0

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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 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 seperate, 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, Rafineries, 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 V AC, 5 A
Display Type	2 x 4 dijit 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 V A)
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

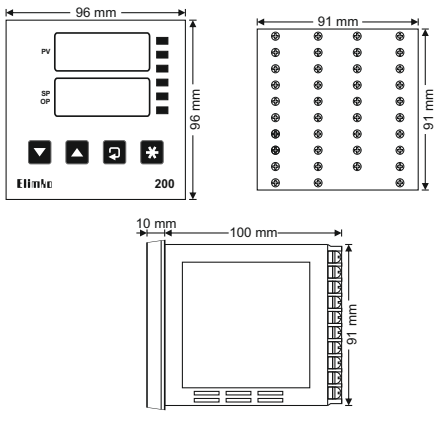
3. Type Coding

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*						

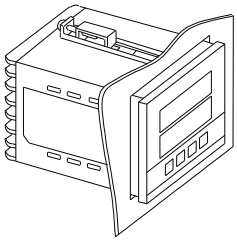
* 24 V DC/20 mA Pulse Voltage to drive SSR

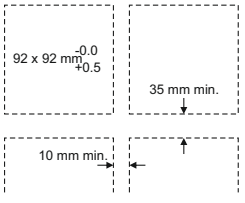
4. Dimensions



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 standarts IEC 60245 and IEC 60227.

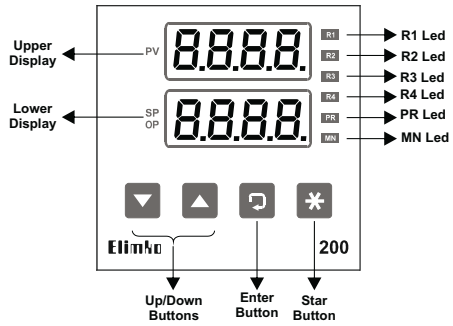




Panel Cutout and Minimum Spacing

- ❑ 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



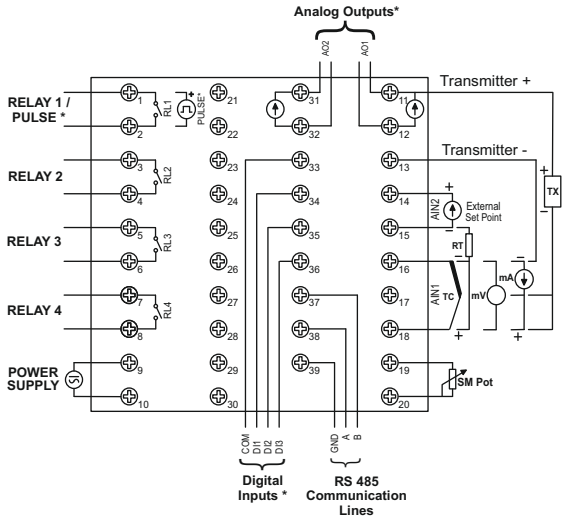
R1 Led	When lit, it indicates that RL1 output is active.
R2 Led	When lit, it indicates that RL2 output is active.
R3 Led	When lit, it indicates that RL3 output is active.
R4 Led	When lit, it indicates that RL4 output is active.
PR Led	When lit, it indicates that the controller is in the configuration 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.

(continue on next page)

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 *AnPr* parameter in page *oCnF* is set to *dSb* or if the *CtYP* parameter in *oCnF* page is set *nonE*. - While in normal operation, pressing this button acknowledges the latched alarms if configured (*AXLt* = *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.

(continue on next page)

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*=*d inP*; Select the *SEt 1*, *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
oPEn	The connection of the sensor is broken.	Check the sensor and the sensor connections.
UFL	The process value is below the sensor type-temperature interval.	Check the sensor and the input type specified by the InPt parameter.
oFL	The process value is above the sensor type- temperature interval.	
nnnn	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 dP, ZEro and SPAn parameters.
uuuu	The process value is below the value that can be displayed.	

9. Input Types and Ranges

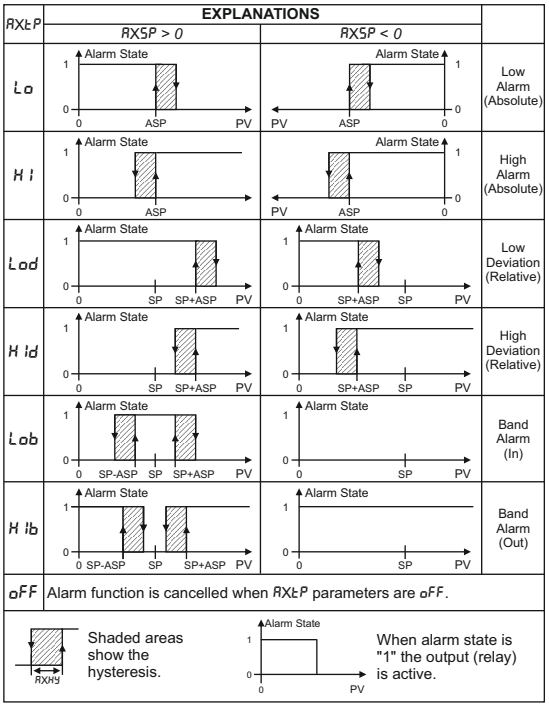
TEMPERATURE SENSORS

Sensor Type		Standart	Temperature Range (°C)	Temperature Range (°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	Pt	IEC 60751	-200 , 840	-328 , 1544

LINEAR INPUTS

Type		Range
Current	0A20	0-20 mA DC
Current	4A20	4-20 mA DC
Voltage	0u50	0-50 mV DC
Voltage	00u1	0-1 V DC
Voltage	02u1	0.2-1 V DC

10. Alarm Types



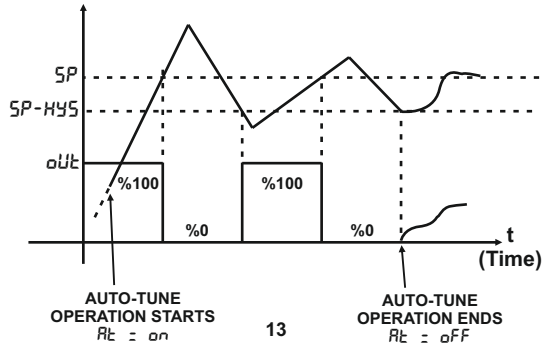
11. Auto-Tune

This parameter (At) initiates or cancel the Auto-Tune process. If on 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 oFF again. When this parameter is on, the operator can cancel the auto-tune operation by manually turning it oFF.

The control setpoint (SP) and HYS parameters must be set before starting Auto-Tune. The SP value should be set to the most commonly used operating value of the system. The recommended value for HYS 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 HYS value should be set larger than the input noise.

The lower display and **MN** 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 CtYP parameter in oCnF page as 5Co.

2- Set the output that control the process to Co-1.

3- If the control output is relay, set the CPrd parameter in oCnF page as 2.

4- Set the it, dt and HY5 parameters in tUnE page as 0.

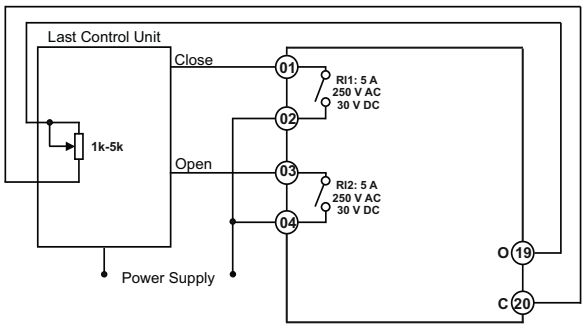
5- Ignore the fact that the temperature may not settle precisely at the set point.

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, it and dt parameters values according to the calculations given below.

Type of Control	Proportional Band (Pb)	Integral Time (it)	Derivative Time (dt)
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 potantiometer (1k-5k).

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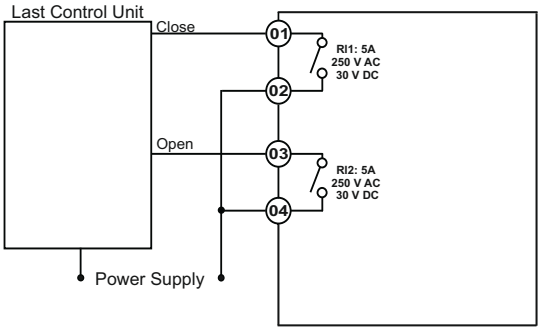
13. Feedback Valve Control

The parameters of this control, are the CtYP, dbnd, 5ruL and 5ruH parameters, in the output configurations page oCnF.These parameters are as follows;

- The CtYP 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 5ruL parameter, keeps the location data of the controlled valve in the fully closed state. With this parameter on the display, ▼ key starts the action in motor-active direction. In the fully closed state, the value shown on the display can be saved by pressing ✱▼ keys.
- The 5ruH parameter, keeps the location data of the controlled valve in the fully open state. With this parameter on the display, ▲ key stats the action in the motor-active direction. In the fully active state, the value shown on the display can be saved by pressing ✱▼ 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 CtYP, dbnd ve trtn parameters in the oCnFpage. The explan ation for the parameters are;

- For this control to be made, the CtYP 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 trtn 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 nnPr parameter in page oCnF is set to dSb or if the CtYP parameter in oCnF 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 00	Process Value **(Normal Operation)**	EU			
	Control Set Point	EU		▼/◀	SPLL - SPHL (1)
oUt 00	Manual Output (2)	%	CtYP nonE		
PSP 00	Progressive Set Point	EU	SPrr oFF		
A1SP 00	Alarm-1 Set Point	EU	A1tP oFF	▼/◀	1999 - 9999
A2SP 00	Alarm-2 Set Point	EU	A2tP oFF	▼/◀	1999 - 9999
A3SP 00	Alarm-3 Set Point	EU	A3tP oFF	▼/◀	1999 - 9999
A4SP 00	Alarm-4 Set Point	EU	A4tP oFF	▼/◀	1999 - 9999

17. Manual Mode Operation Page

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
234 00	Process Value **(Normal Operation)**	EU	CtYP = SCo **Single Sided (+) PID Control**		
500	Manual Output	%		▼/◀	SoLL - SoHL
234 00	Process Value **(Normal Operation)**	EU	CtYP = dCo **Double Sided(+/-) PID Control**		
500	Manual Output	%		▼/◀	doLL - doHL
234 00	Process Value **(Normal Operation)**	EU	CtYP = PFb **Feedback Valve Control**		
500	Manual Output	%		▼/◀	SoLL - SoHL
234 00	Process Value **(Normal Operation)**	EU	CtYP = bnd **Open-Loop Valve Control**		
StP	Valve Direction (3)			▼/◀	Valve Close/ Valve Open

(continue on next page)

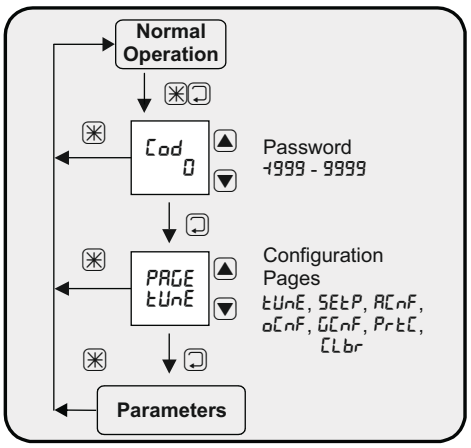
17. Manual Mode Operation Page

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
A1SP 00	Alarm-1 Set Point	EU	A1tP oFF	▼/◀	1999 - 9999
A2SP 00	Alarm-2 Set Point	EU	A2tP oFF	▼/◀	1999 - 9999
A3SP 00	Alarm-3 Set Point	EU	A3tP oFF	▼/◀	1999 - 9999
A4SP 00	Alarm-4 Set Point	EU	A4tP oFF	▼/◀	1999 - 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
  oCnF = Control and Output Configuration Page
  GCnF = General Configuration Page
  PrtC = 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 Cod 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 ↵ 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 PrtC 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 APrL parameters in PrtC page define the access and edit levels of parameters.
- ▼ and ▲ buttons are used to select the configuration pages while PAGE 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 (PAGE:tUnE)

Display	Explanation	Unit	Access Conditons	Key	Key Function / Setting Interval
At oFF	Auto-Tune (4)	Table 7	tYP nonE tYP bnd	▼/▲	Tablo-7
Pb-1 200	Proportional Band-1 (For "+" Directed Control Outputs)	EU	tYP nonE	▼/▲	0.1 - 9999
Pb-2 200	Proportional Band-2 (For "-" Directed Control Outputs)	EU	tYP = dCo	▼/▲	0.1 - 9999
It 28	Integral Time (if "oFF" integral is inactive) (*) itH: For Positive Error Signal (HEATING) itC: For Negative Error Signal (COOLING)	s	tYP nonE	▼/▲	oFF, 1 - 9999
dt 7	Derivative Time (if "oFF" derivative is inactive) (*)dtH: For Positive Error Signal (HEATING) dtC: For Negative Error Signal (COOLING)	s	tYP nonE	▼/▲	oFF, 1 - 2500
HYS 0.1	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 (PAGE:SEtP)

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
SPSr int	Set Point Source	Table 13		▼/▲	Table-13
SPLL -1999	Set Point Lower Limit	EU		▼/▲	-1999 - SPHL
SPHL 9999	Set Point Upper Limit	EU		▼/▲	SPLL - 9999
SPrr 0.0	Set Point Ramping Rate (For fastest change, enter "oFF")	EU/min		▼/▲	oFF, 0.1 - 600
SEt 1 0.0	1.Multiple Set Point	EU	SPSr = d inP	▼/▲	SPLL - SPHL
SEt2 0.0	2.Multiple Set Point	EU	SPSr = d inP	▼/▲	SPLL - SPHL
SEt3 0.0	3.Multiple Set Point	EU	SPSr = d inP	▼/▲	SPLL - SPHL
SEt4 0.0	4.Multiple Set Point	EU	SPSr = d inP	▼/▲	SPLL - SPHL

21. Alarm Configuration Page (PAGE=ACnF)

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
A1tP oFF	Alarm-1 Type	Table 11		▼/▲	Table-11
A1HY 0.5	Alarm-1 Hysteresis	EU	A1tP oFF	▼/▲	0.0 - 999.9
A1Lt dSb	Alarm-1 Lock (5)	Table 6	A1tP oFF	▼/▲	Table-6
A2tP oFF	Alarm-2 Type	Table 11		▼/▲	Table-11
A2HY 0.5	Alarm-2 Hysteresis	EU	A2tP oFF	▼/▲	0.0 - 999.9
A2Lt dSb	Alarm-2 Lock (5)	Table 6	A2tP oFF	▼/▲	Table-6

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21. Alarm Configuration Page (PAGE=ACnF)

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
A3tP oFF	Alarm-3 Type	Table 11		▼/▲	Table-11
A3HY 0.5	Alarm-3 Hysteresis	EU	A3tP oFF	▼/▲	0.0 - 999.9
A3Lt dSb	Alarm-3 Lock (5)	Table 6	A3tP oFF	▼/▲	Table-6
A4tP oFF	Alarm-4 Type	Table 11		▼/▲	Table-11
A4HY 0.5	Alarm-4 Hysteresis	EU	A4tP oFF	▼/▲	0.0 - 999.9
A4Lt dSb	Alarm-4 Lock (5)	Table 6	A4tP oFF	▼/▲	Table-6

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

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
CtYP SCo	Control Type	Table 12		▼/▲	Table-12
CFrm rEU	Control Form	Table 8	CtYP nonE	▼/▲	Table-8
CPrd 2	Control Period	s	CtYP nonE	▼/▲	1 - 250
mnPr dSb	Manual Mode Select	Table 6	CtYP nonE	▼/▲	Table-6
trtm 100	Motor Valve Travel Time	s	CtYP = bnd	▼/▲	10 - 2500
dbnd 0.5	Control Output Death Band	%	CtYP nonE	▼/▲	0.1 - 25.0
SoLL 0.0	Single Sided(+) Control Output Lower Limit	%	CtYP nonE CtYP dCo	▼/▲	0.0 - Somr

(continue on next page)

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

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
SoHL 100.0	Single Sided (+) Control Output Upper Limit	%	CtYP nonE CtYP dCo	▼/▲	Somr - 100.0
Somr 50.0	Single Sided (+) Control Output Manuel-Reset Value	%	CtYP nonE CtYP dCo	▼/▲	SoLL - SoHL
doLL -100.0	Double Sided (+/-) Control Output Lower Limit	%	CtYP = dCo	▼/▲	-100.0 - domr
doHL 100.0	Double Sided (+/-) Control Output Upper Limit	%	CtYP = dCo	▼/▲	domr - 100.0
domr 0.0	Double Sided (+/-) Control Output Manuel-Reset Value	%	CtYP = dCo	▼/▲	doLL - doHL
PonC 0	PID Control Power-On Behaviour	Table 20	CtYP nonE	▼/▲	Table-20

(continue on next page)

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

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
rL1d / Co-1	1.Relay (RL1) Function	Table 10		▼/▲	Table-10
rL2d / Co-2	2.Relay (RL2) Function	Table 10		▼/▲	Table-10
rL3d / RL-3	3.Relay (RL3) Function	Table 10		▼/▲	Table-10
rL4d / RL-4	4.Relay (RL4) Function	Table 10		▼/▲	Table-10
Ao1d / Co-1	1.Analog Output (AO1) Function	Table 14		▼/▲	Table-14
Ao2d / Co-2	2.Analog Output (AO2) Function	Table 14		▼/▲	Table-14
Ao1r / 4-20	1.Analog Output (AO1) Scalar	Table 15		▼/▲	Table-15

(continue on next page)

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

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
Ao2r / 4-20	2.Analog Output (AO2) Scalar	Table 15		▼/▲	Table-15
SruL / 1889	Motor-Valve Fully-Closed Position		CtYP = PFb	✱▼ ▼/▲	Save Position Valve Close / Valve Open
SruH / 3756	Motor-Valve Fully-Open Position		CtYP = PFb	✱▼ ▼/▲	Save Position Valve Close / Valve Open

23. General Configuration Page (PAGE=GCnF)

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
InP1 / t	1.Analog Input (AIN1) Type (For Process Value Measurement)	Table 17		▼/▲	Table-17
InP2 / 4R20	2.Analog Input (AIN2) Type (External Set Point Input)	Table 5		▼/▲	Table-5
dP / 1	Decimal Point (6)			▼/▲	0 - 3
ZEro / 0.0	Analog Input Scale Lower Value (Linear Input types)	EU		▼/▲	-1999 - 9999
SPAn / 400.0	Analog Input Scale Upper Value (Linear Input types)	EU		▼/▲	-1999 - 9999

(continue on next page)

23. General Configuration Page (PAGE=GCnF)

Display	Explanation	Unit	Access Conditons	Key	Key Function / Setting Interval
trLL / 0.0	Retransmission Low Limit	EU		▼/▲	-1999 - trHL
trHL / 400.0	Retransmission High Limit	EU		▼/▲	trLL - 9999
Unit / °C	Temperature Unit (7)	Tablo 9	InP1 = TC / RT	▼/▲	Tablo-9
oFSt / 0.0	Temperature Offset Value	EU	InP1 = TC / RT	▼/▲	-100.0 - 100.0
FLtr / 0.5	ANALOG INPUT 1 PV value Filtering Time (*)	EU		▼/▲	0.1 - 10.0
Snbr / Hi	Sensor Broken Behaviour	Tablo 4		▼/▲	Tablo-4

(*) 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).

(continue on next page)

23. General Configuration Page (PAGE:GCnF)

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
AdrS 1	Communication Address			▼/▲	1 - 127
brtE 4.8	Baud Rate	kb/s		▼/▲	4.8, 9.6, 19.2, 38.4
PrtY EvnE	Parity	Table 16		▼/▲	Table-16

24. Security Adjustments Page (PAGE:PrtC)

Display	Explanation	Unit	Observation Conditions	Key	Key Function / Setting Interval
SCod 10	Password Set Value [8]			▼/▲	-1999 - 9999
Artn oFF	Auto Return Time [9] (cancelled if oFF)	s		▼/▲	oFF, 5 - 25
dPrL 5	Parameter Access Level	Table 18		▼/▲	Table-18
APrL 2	Parameter Edit Level	Table 19		▼/▲	Table-19
CPrL dSb	Calibration Page Access	Table 6		▼/▲	Table-6
FCSt oFF	Return to Factory Settings [10]	Table 7		✱▼ ▼/▲	Approval Table-7

25. Calibration Page (PAGE:CLbr)

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
50.mu 6832	1.Analog Input (AIN1) 50mV Calibration			✱▼	Save Calibration Value
0.0°C 83	1.Analog Input (AIN1) 0.0°C Calibration (with Type-K TC)			✱▼	Save Calibration Value
390.r 6545	1.Analog Input (AIN1) 390 Calibration			✱▼	Save Calibration Value
20.mA 8845	1.Analog Input (AIN1) 20mA Calibration			✱▼	Save Calibration Value
In2H 8784	2.Analog Input (AIN2) 20mA Calibration			✱▼	Save Calibration Value

(continue on next page)

25. Calibration Page (PAGE:CLbr)

Display	Explanation	Unit	Access Conditions	Key	Key Function / Setting Interval
Ao 1L 1600	1.Analog Output (AO1) Low Limit Calibration			▼/▲	1300 - 3000
Ao 1H 7400	1.Analog Output (AO1) High Limit Calibration			▼/▲	6500 - 8191
Ao2L 1600	2.Analog Output (AO2) Low Limit Calibration			▼/▲	1300 - 3000
Ao2H 7400	2.Analog Output (AO2) High Limit Calibration			▼/▲	6500 - 8191

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

(continue on next page)

25. Calibration Page (PAGE=CLbr)

Analog Input 50 mV Calibration: Set the calibrator as a milivolt 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 ✳ and ▼ 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 ✳ and ▼ buttons simultaneously to store the parameter.

Analog Input 390 Calibration: Set the calibrator as a resistance source and adjust the calibrator output 390.00 . 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 ✳ and ▼ buttons simultaneously to store the parameter.

Analog Input 20 mA Calibration: Set the calibrator as a miliamper 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 ✳ and ▼ buttons simultaneously to store the parameter.

(continue on next page)

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 ▼ and ▲ buttons adjust the parameter until the calibrator reading is equal to 4 mA or 2 V. Press ↵ or ✳ 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 ▼ and ▲ buttons adjust the parameter until the calibrator reading is equal to 20.00 mA or 10 V. Press ↵ or ✳ button to store the parameter.

26. Communication Data

OPRT

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	$10^{DP(6)}$	No	0	0
3	PSP	Progressive Set Point	EU	$10^{DP(6)}$	No	0	0
4		Reserve			No		
5		Reserve			No		
6		Reserve			No		
7		Reserve			No		
8		Decimal Point (DP) (6)			No	0	0
9	SPSr	Set Point Source	Table13		No	0	0
10	CtYP	Control Type	Table12		No	0	0
11	oUt	Manual Output	%	10	Yes	-1000	1000
12		Control Set Point	EU	$10^{DP(6)}$	Yes	-1999	9999
13	At	Auto-Tune	Table7		Yes	0	1
14-35		Reserve			Yes		

(continue on next page)

26. Communication Data

TUNE

Address	In Short	Explanation	Unit	Multiplier	Adjustment Permit	Min.	Max.
36	Pb-1	Proportional Band-1 ("+"Directed Control Output)	EU	$10^{DP(6)}$	Yes	1	9999
37	Pb-2	Proportional Band-2 ("-"Directed Control Output)	EU	$10^{DP(6)}$	Yes	1	9999
38	It	Time of Integral (If "0", Integral is inactive)	s		Yes	0	9999
39	dt	Time of Derivative (If"0", Derivative is inactive)	s		Yes	0	2500
40	HYS	Hysteresis	EU	$10^{DP(6)}$	Yes	0	9999

SETP

Address	In Short	Explanation	Unit	Multiplier	Adjustment Permit	Min.	Max.
41	SPSr	Set Point Source	Table13		Yes	0	2
42	SPLL	Set Point Lower Limit	EU	$10^{DP(6)}$	Yes	-1999	9999
43	SPHL	Set Point Upper Limit	EU	$10^{DP(6)}$	Yes	-1999	9999
44	SPrr	Set Point Ramping Rate (For Fastest 0)	EU/min	$10^{DP(6)}$	Yes	0	600
45	nSP 1	1.Multiple Set Point	EU	$10^{DP(6)}$	Yes	-1999	9999
46	nSP2	2.Multiple Set Point	EU	$10^{DP(6)}$	Yes	-1999	9999
47	nSP3	3.Multiple Set Point	EU	$10^{DP(6)}$	Yes	-1999	9999
48	nSP4	4.Multiple Set Point	EU	$10^{DP(6)}$	Yes	-1999	9999
49		Reserve			Yes		

(continue on next page)

26. Communication Data

	Address	In Short	Explanation	Unit	Multiplier	Adjustment Permit	Min.	Max.
ACNF	50	R 1LP	Alarm-1 Type	Table11		Yes	0	6
	51	R 1HY	Alarm "1" Hysteresis Value	EU	$10^{DP(6)}$	Yes	0	9999
	52	R 1LE	Alarm "1" Lock	Table6		Yes	0	1
	53	R 1SP	Alarm "1" Set Point	EU	$10^{DP(6)}$	Yes	-1999	9999
	54	R2LP	Alarm "2" Type	Table11		Yes	0	6
	55	R2HY	Alarm "2" Hysteresis Value	EU	$10^{DP(6)}$	Yes	0	9999
	56	R2LE	Alarm "2" Lock	Table6		Yes	0	1
	57	R2SP	Alarm "2" Set Point	EU	$10^{DP(6)}$	Yes	-1999	9999
	58	R3LP	Alarm "3" Type	Table11		Yes	0	6
	59	R3HY	Alarm "3" Hysteresis Value	EU	$10^{DP(6)}$	Yes	0	9999
	60	R3LE	Alarm "3" Lock	Table6		Yes	0	1
	61	R3SP	Alarm "3" Set Point	EU	$10^{DP(6)}$	Yes	-1999	9999
	62	R4LP	Alarm "4" Type	Table11		Yes	0	6
	63	R4HY	Alarm "4" Hysteresis Value	EU	$10^{DP(6)}$	Yes	0	9999
	64	R4LE	Alarm "4" Lock	Table6		Yes	0	1
	65	R4SP	Alarm "4" Set Point	EU	$10^{DP(6)}$	Yes	-1999	9999

(continue on next page)

	Address	In Short	Explanation	Unit	Multiplier	Adjustment Permit	Min.	Max.
OCNF	66	CtyP	Control Type	Table12		Yes	0	4
	67	CFrn	Control Form	Table8		Yes	0	1
	68	CPrd	Control Period	s		Yes	1	250
	69	mnPr	Manual Mode Select	Table6		Yes	0	1
	70	trtn	Motor Valve Travel Time	s		Yes	10	2500
	71	dbnd	Control Output Death Band	%	10	Yes	1	250
	72	SoLL	Single Sided (+) Control Output Lower Limit	%	10	Yes	0	1000
	73	SoHL	Single Sided (+) Control Output Upper Limit	%	10	Yes	0	1000
	74	Sonr	Single Sided (+) Control Output Manual-Reset Value	%	10	Yes	0	1000
	75	doLL	Double Sided (+/-) Control Output Lower Limit	%	10	Yes	-1000	1000
	76	doHL	Double Sided (+/-) Control Output Upper Limit	%	10	Yes	-1000	1000
	77	donr	Double Sided (+/-) Control Output Manual-Reset Value	%	10	Yes	-1000	1000
	78	PonC	PID Control Power-On Behaviour	Table20		Yes	0	4
	79	rL 1d	1.Relay (RL1) Function	Table10		Yes	0	14
	80	rL2d	2.Relay (RL2) Function	Table10		Yes	0	14
	81	rL3d	3.Relay (RL3) Function	Table10		Yes	0	14

(continue on next page)

26.Communication Data

	Address	In Short	Explanation	Unit	Multiplier	Adjustment Permit	Min.	Max.
OCNF	82	rL4d	4.Relay (RL4) Function	Table10		Yes	0	14
	83	Ao id	1.Analog Output (AO1) Function	Table14		Yes	0	3
	84	Ao2d	2.Analog Output (AO2) Function	Table14		Yes	0	3
	85	Ao ir	1.Analog Output (AO1) Scalar	Table15		Yes	0	3
	86	Ao2r	2.Analog Output (AO2) Scalar	Table15		Yes	0	3
GCNF	87	inP 1	1.Analog Input (AIN1) Type	Table17		Yes	0	15
	88	inP2	2.Analog Input (AIN2) Type	Table5		Yes	0	1
	89	dP	Decimal Point (DP) [6]			Yes	0	3
	90	SEro	Analog Input Scalar Lower Value	EU	$10^{DP(6)}$	Yes	-1999	9999
	91	SPAn	Analog Input Scalar Upper Value	EU	$10^{DP(6)}$	Yes	-1999	9999
	92	trLL	Retransmission Low Limit	EU	$10^{DP(6)}$	Yes	-1999	9999
	93	trHL	Retransmission High Limit	EU	$10^{DP(6)}$	Yes	-1999	9999
	94	Un it	Temperature Unit	Table9		Yes	0	1
	95	oFSt	Temperature Offset Value	EU	$10^{DP(6)}$	Yes	-1000	1000
	96	FLtr	Measurement Filter Coefficient	EU	$10^{DP(6)}$	Yes	1	100
	97	Snbr	Sensor Broken Behaviour	Table4		Yes	0	1

27. Tables

Table-1

Status		
Bit	**In short**	**Explanation (For 1)**
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	CLS	Valve Close
10		Reserve
11		Reserve

Table-3

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

Table-4

0	Lo	Lower The Process Value
1	Hi	Higher The Process Value

27. Tables

Table-5

0	0A20	0-20 mA (Linear)
1	4A20	4-20 mA (Linear)

Table-6

0	dSb	Disable
1	Enb	Enable

Table-7

0	oFF	OFF
1	on	ON

Table-8

0	d ir	Direct
1	rEu	Reverse

Table-9

0	°C	°C
1	°F	°F

Table-10

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

Table-11

0	oFF	Off
1	Lo	Low Alarm (Absolute)
2	H i	High Alarm (Absolute)
3	Lod	Low Deviation (Relative)
4	H id	High Deviation (Relative)
5	Lob	Band Alarm (In)
6	H ib	Band Alarm (Out)

27. Tables

Table-12

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

Table-13

0	int	Over The Unit or by Communication
1	Ert	Over The 2.Analog Output (AIN2)
2	d inP	Multiple with Digital Input (Tablo-22)

Table-14

0	Co- 1	"+"Directed Control Output
1	Co-2	"-" Directed Control Output
2	Putr	Process Value Transmitter
3	SPtr	Set Point Transmitter

Table-15

0	0-20	0-20 mA or 0-10 V
1	20-0	20-0 mA or 10-0 V
2	4-20	4-20 mA
3	20-4	20-4 mA

Table-16

0	nonE	None
1	odd	Odd
2	EuEn	Even

27. Tables

Table-17

0	b	Type-B (TC)
1	E	Type-E (TC)
2	J	Type-J (TC)
3	k	Type-K (TC)
4	L	Type-L (TC)
5	n	Type-N (TC)
6	r	Type-R (TC)
7	S	Type-S (TC)
8	t	Type-T (TC)
9	U	Type-U (TC)
10	Pt	Pt-100 (RT)
11	0A20	0-20mA (Linear)
12	4A20	4-20mA (Linear)
13	0u50	0-50mV (Linear)
14	0.0u 1	0.0-1.0V (Linear)
15	0.2u 1	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	tUnE Page Parameters can be accessed
6	SEtP Page Parameters can be accessed
7	ACnF Page Parameters can be accessed
8	oCnF Page Parameters can be accessed
9	GCnF 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	tUnE Page Parameters can be edited
6	SEtP Page Parameters can be edited
7	ACnF Page Parameters can be edited
8	oCnF Page Parameters can be edited
9	GCnF 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 (SEt 1)
0	1	2.Multiple Set Point (SEt2)
1	0	3.Multiple Set Point (SEt 3)
1	1	4.Multiple Set Point (SEt4)

Footnotes

(1) If the set point source is external (SPSr Int), this adjustment is not valid.

(2) With the control type as open loop valve control (CtyP = bnd), this screen is used for valve direction, instead of manual output value. (StP = Valve inactive, CLS = Closing Valve, oPn = Opening Valve)

(3) StP = Valve inactive, CLS = 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 1) 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 ArtN 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 CALb page). The parameter values in the CALb page are the typical.