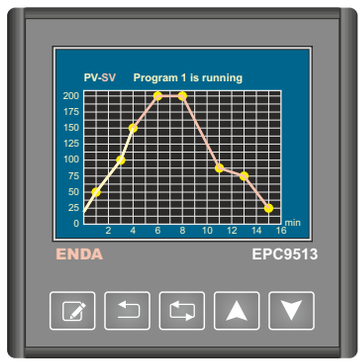
Read this document carefully before using this device. The guarantee will be expired by device damages if you don't attend to the directions in the user manual. Also we don't accept any compensations for personal injury, material damage or capital disadvantages.

ENDA EPC9513 Series Programmable Profile Controller

Thank you for choosing **EPC9513** series programmable profile controller.

* 96x96mm sized.
* 3,5 inches TFT , graphic and 5 digit display.
* Selectable TC, RTD, NTC, R, mA, V or mV inputs.
* Input offset feature.
* 32 point linearization for analog inputs.
* Selectable relay, SSR,motorized valve or analog outputs.
* Selectable , input proportional transmitter output(mA or V).
* 50ms sampling time.
* PID control.
* PID selftune.
* PID auto-tune.

  Selftune automatic PID calculation or manually enter PID parameters if known.
* Soft-Start feature.
* 24Vdc for sensor supply.
* 16 program and 8 step for profile control.
* Selectable Single Setpoint Mode or Profile Control Mode.
* Digital inputs for profile control.
* In case of sensor failure manually , periodical or auto-periodical control can be selected.
* Security levels for menu and configuration pages.
* RS485 ModBus protocol communication feature.(optional)
* CE marked according to Europen Norms.



CE RoHS Compliant

Analog Inputs

Input Type		Range		Accuracy	Input Resist.	Cable Color	Standart
TC	B (Pt30Rh-Pt6Rh)	200,0 ... 1800,0°C	392,0 ... 3272,0°F	% ±0.1 and ±2°C (3,6°F)	Ri > 100kΩ	+ undefined - white	EN 60584
	E (NiCr-Con)	-100,0 ..... 900,0°C	-148,0 ... 1652,0°F	% ±0.1 and ±0,5°C (1°F)		+ purple - white	
	J (Fe-Con)	-100,0 ..... 900,0°C	-148,0 ... 1652,0°F	% ±0.1 and ±0,5°C (1°F)		+ black - white	
	K (NiCr-Ni)	-100,0 ... 1300,0°C	-148,0 ... 2372,0°F	% ±0.1 and ±0,5°C (1°F)		+ green - white	
	L (Fe-Con)	-100,0 ..... 900,0°C	-148,0 ... 1652,0°F	% ±0.1 and ±1.5°C (2.7°F)		+ red - blue	DIN43710
	N (NiCrSi-NiSi)	-200,0 ... 1300,0°C	-328,0 ... 2372,0°F	% ±0.1 and ±0,5°C (1°F)		+ lilac - white	EN 60584
	R (Pt13Rh-Pt)	0,0 ... 1700,0°C	32,0 ... 3092,0°F	% ±0.1 and ±1°C (1.8°F)		+ orange - white	
	S (Pt10Rh-Pt)	0,0 ... 1700,0°C	32,0 ... 3092,0°F	% ±0.1 and ±1°C (1.8°F)		+ orange - white	
	T (Cu-Con)	-250,0 ..... 300,0°C	-418,0 ..... 572,0°F	% ±0.1 and ±0,5°C (1°F)		+ brown - white	
	U (Cu-Con)	-200,0 ..... 400,0°C	-328,0 ..... 752,0°F	% ±0.1 and ±0,5°C (1°F)		+ red - brown	DIN43710
RTD	Pt100	-200,0 ..... 850,0°C -100,00 ... 160,00°C	-328,0 ... 1562,0°F -148,00 .. 320,00°F	% ±0.1 and ±0,5°C (1°F)	Ri > 100kΩ	Sensor current 250µA	EN 60751
NTC	NTC	-60,0 ..... 150,0°C	-76,0 ..... 302,0°F	% ±0.1 and ±0,5°C (1°F)	Ri > 100kΩ		
mA	0 - 20mA 4 - 20mA	-32768 ... 32767 -3276,8 ... 3276,7 -327,68 ... 327,67 -32,768 ... 32,767		% ±0.1 and ±1 digit	Ri = 50Ω		
mV	0 - 150mV			% ±0.1 and ±20µV	Ri > 100kΩ		
V	0 - 5V 1 - 5V 0 - 10V			% ±0.1 and ±1 digit	Ri > 100kΩ		
Ω	0 - 550Ω 0 - 10kΩ			% ±0.2 and ±0.1Ω % ±0.5 and ±10Ω	Ri > 100kΩ	Sensor current 250µA	

DIGITAL INPUTS (In order to use for profile control process)

Start-Stop Input **Pause-Resume Input** **Previous Program Input** **Next Program Input**	5V or 30V pulse , Ri=100kΩ

OUTPUTS

Control/A.3/Valve On	250V AC, 2A . Selectable as NO+NC.10.000.000 switch without load and 200.000 switch under 250V AC 2A (resistive load)
Alarm 1	250V AC, 2A . Selectable as NO+NC.10.000.000 switch without load and 200.000 switch under 250V AC 2A (resistive load)
Alarm 2/Valve Off	250V AC, 2A . Selectable as NO.10.000.000 switch without load and 200.000 switch under 250V AC 2A (resistive load)
SSR	Max. 40mA , 0 - 12Volt , short-circuit protection.
mA	0 - 20mA or 4 - 20mA DC, % ±0,5 (Max. load resistance is 750Ω.)
V	0 - 10V DC, % ±0,5 Max. 30mA (short-circuit protection.)

ELECTRICAL CHARACTERISTICS

Supply	90-250V AC, 50/60Hz
Power consumption	Max. 7VA
Wiring	2.5mm² screw-terminal
EMC	EN 61326-1: 2013
Safety requirements	EN 61010-1: 2010 (Pollution degree 2 , overvoltage category ||)

ENVIRONMENTAL CONDITIONS

Ambient/storage temp.	0 ... +50°C/-25 ... 70°C
Max. Relative humidity	Relative humidity 80% for temperatures up to 31°C , decreasing linearly to 50% relative humidity at 40°C.
Rated pollution degree	According to EN 60529 Front panel : IP65 , Rear panel : IP20
Height	Max. 2000m

Do not use the device in locations subject to corrosive and flammable gases.

HOUSING

Housing type	Suitable for flush-panel mounting.
Dimensions	G96xY96xD81mm
Weight	Approx. 400g.
Enclosure material	Self extinguishing plastics.

While cleaning the device , solvents(thinner,gasoline,acid etc.) or corrosive materials must not be used.

SİSEL MÜHENDİSLİK ELEKTRONİK SAN. VE TİC. A.Ş.
Şerifali Mah. Barbaros Cad. No:18 Y.Dudullu 34775
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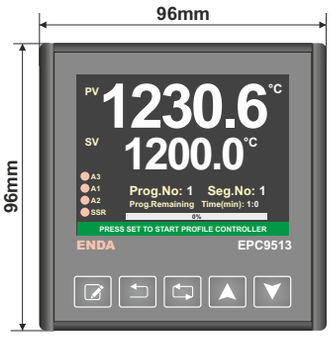
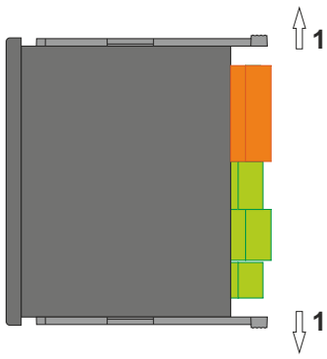
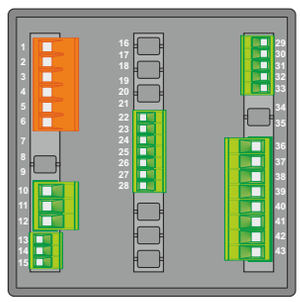
url : www.enda.com.tr

EPC9513-05-EN-190909

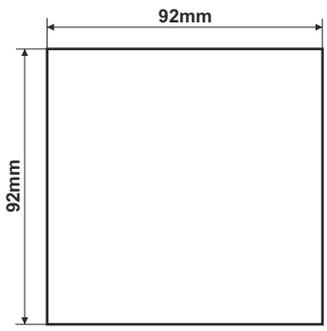
DIMENSIONS

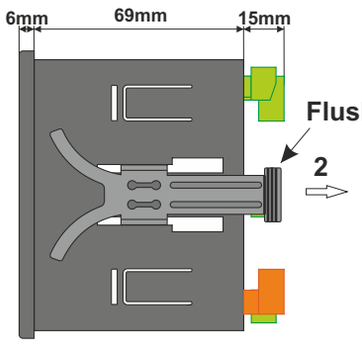






PANEL CUT-OUT





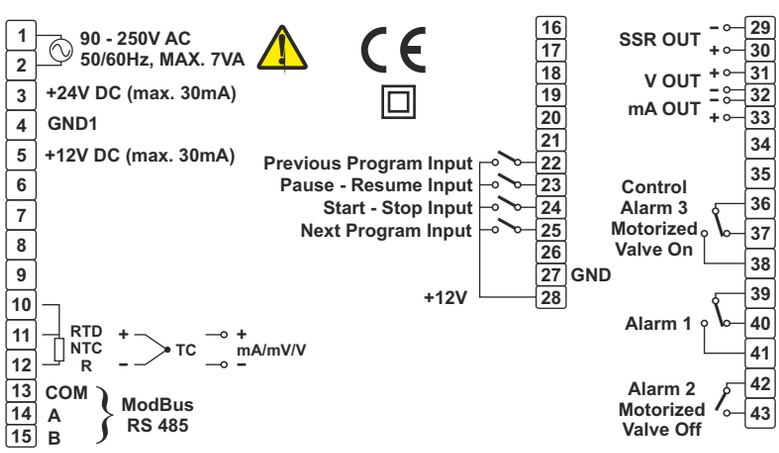
Flush mounting clamp

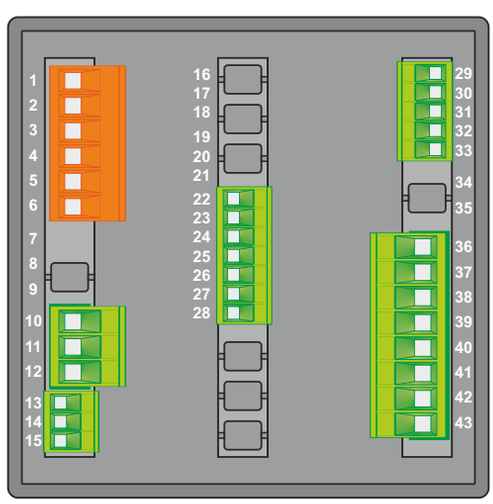
For removing the device from panel :
- While pressing both flush mounting clamps of the device in direction **1** , pull it in direction **2.**

Not :
1) Panel thickness should be maximum 7mm.
2) If there is no 60mm free space at the back side of the device , it would be difficult to remove it from panel.

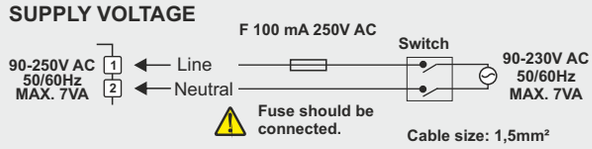
CONNECTION DIAGRAM

ENDA EPC9513 is intended for installation in control panels. Make sure that the device is used only for intended purpose. The electrical connections must carried out by a qualified staff and must be according to the relevant locally applicable regulations. During an installation , all of the cables that are connected to the device must be free of electrical power. The device must be protected against inadmissible humidity , vibrations , severe soiling and make sure that the operation temperature is not exceeded. The cables should not be close to the power cables or components.





SUPPLY VOLTAGE



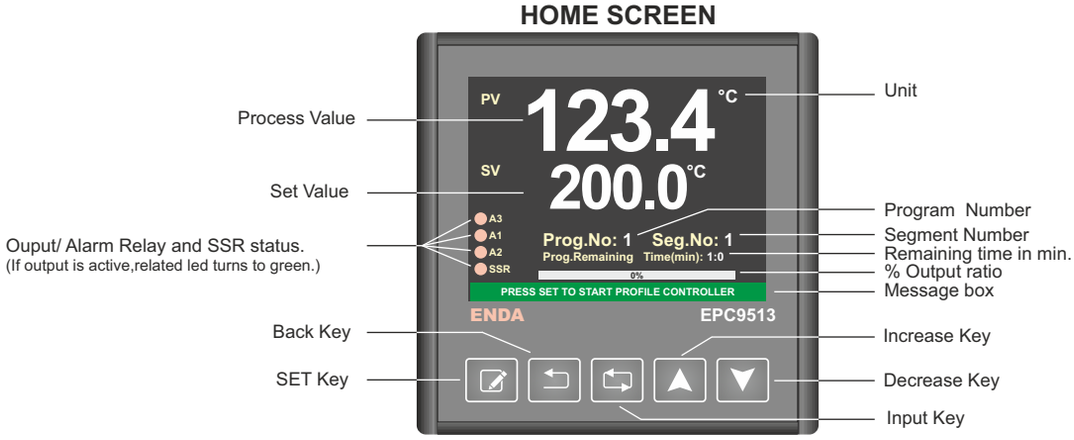
Logic output of the instrument is not electrically insulated from the internal circuits. Therefore , when using grounding thermocouple , do not connect the logic output terminals to the ground.

Not : 1) Main supply cords shall meet the requirements of IEC 60227 or IEC60245.
2)In accordance with safety regulations,the power supply switch shall bring the identification of the relevant instrument and it should be easily accessible by the operator.

Holding screw
0.4-0.5Nm

Equipment is protected throughout by DOUBLE INSULATION.

HOME SCREEN



SET Key : Start/Stop profile controller in “Profile Controller Mode”, Select/Unselect parameter for increase/decrease parameter value in “Programming Mode”. Change SV in “Single Setpoint Mode”.

Back Key : Return previous page in “Programming Mode”.

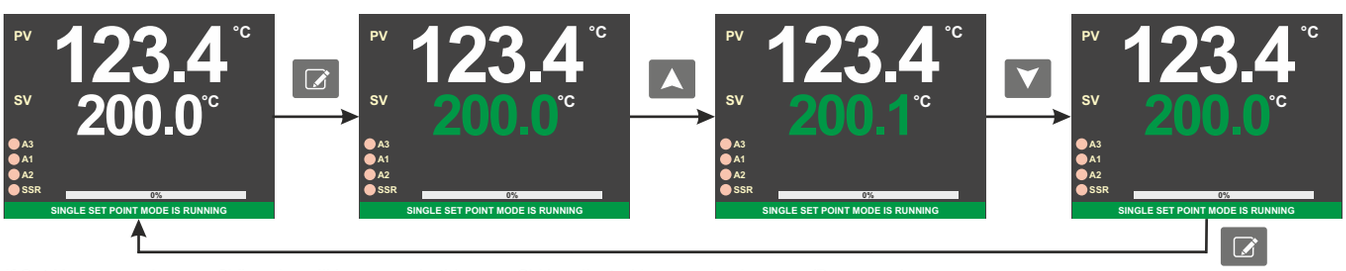
Enter Key : Enter main menu and open sub pages and transition between sub pages in “Programming Mode”. Pause/Resume profile controller in “Profile Controller Mode”.

Increase Key : Transition between parameters (when parameter background is red) and increase selected parameter value (when parameter background is green) in “Programming Mode”.

Decrease Key : Transition between parameters (when parameter background is red) and decrease selected parameter value (when parameter background is green) in “Programming Mode”.

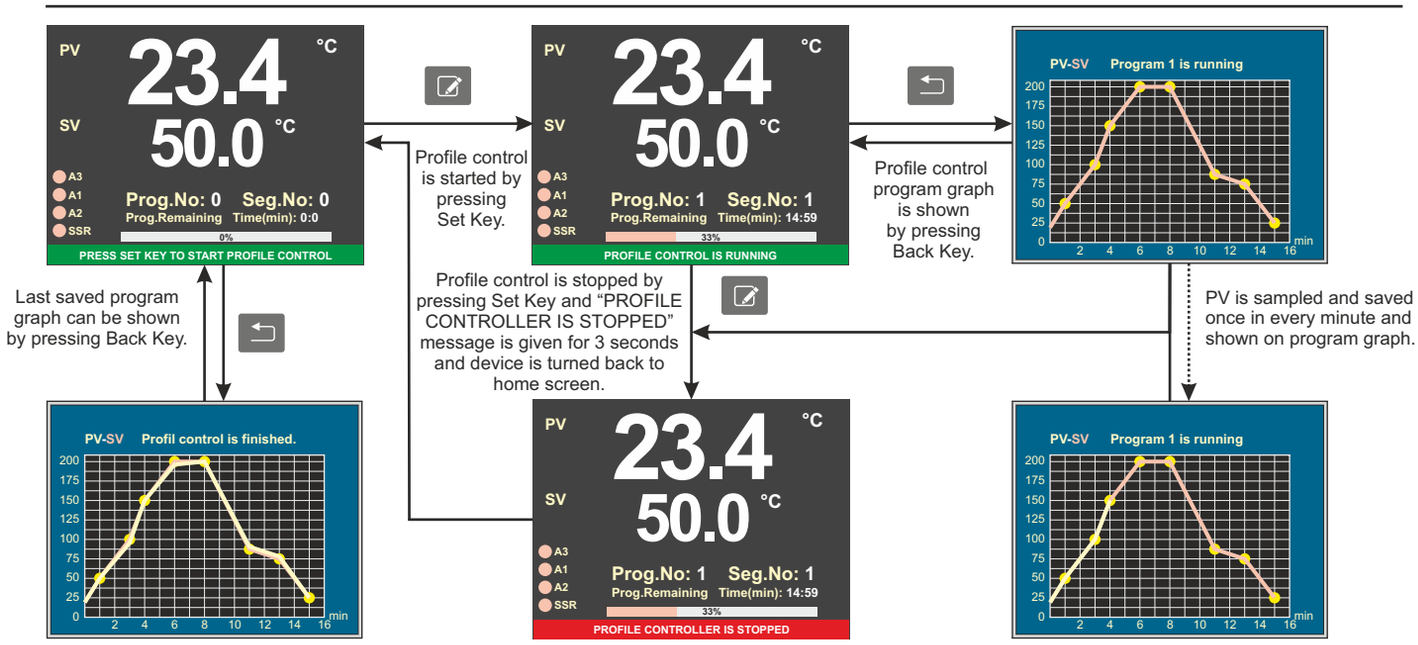
NOTE 1 : Device must be in “Profile Control Mode” in order to start/stop profile control by pressing Set Key.
NOTE 2 : When device in “Single Setpoint Mode”, **Prog.No , Seg.No ve Prog.Remaning Time(min)** informations are not shown on home screen.
NOTE 3 : If Increase Key is held down while the device is powered up , factory parameters will be restored.
NOTE 4 : “Single Setpoint Mode” can be selected under “Profile Controller Configuration Page” sub menu , device make a control related to SV , which can be adjusted on home screen in “Single Setpoint Mode”.

Adjusting Device Set Value in Single Setpoint Mode

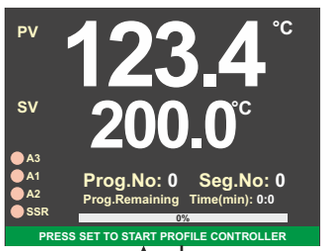


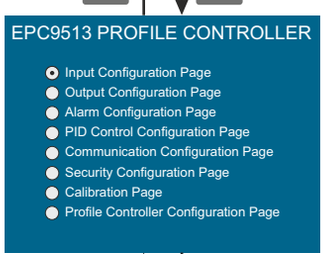
If Set Key pressed once , SV’s color will be green. In this case SV is adjusted by pressing Increase/Decrease keys.
If Set Key pressed again or by waiting 3 seconds , SV’s color will be white on home screen.

Profile Control Mode



Home Screen





Main menu is opened and “Programming Mode” is started by pressing Enter Key for 2 seconds.

Desired sub menu is selected by pressing Increase/Decrease Keys.

Selected sub menu is opened by pressing Enter Key.
Selected sub menu can be opened if permission is given from “Security Configuration Page”.

If Back Key is pressed or by waiting 10 seconds , parameters will be saved and device turns back to home screen.

NOT 5 : *If power failure is occurs while device is programming , parameters won’t be saved.*

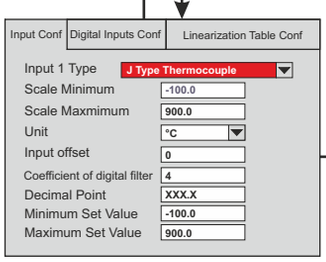
Programming Inputs (Input Configuration Page)

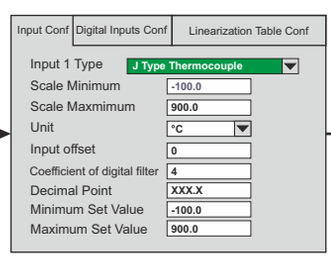
Desired parameter is selected by pressing Increase/Decrease Keys. Background of selected parameter turns red.

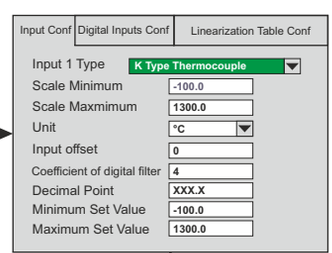
If SET Key is pressed , background of selected parameter turns to green and selected parameter can be adjusted to desired value.

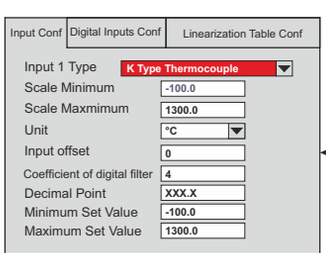
If SET Key is pressed again , background of selected parameter turns to red and exits from parameter adjustment.

If Back Key pressed or by waiting 10 seconds , Input Configuration Page is closed and device turns back to main menu.









Input 1 Type :
B, E, J, K, L, N, R, S, T, U, Pt100, NTC, 0-20mA, 4-20mA, 0-5V, 1-5V, 0-10V, 0-150mV, 0-550Ω, 0-10kΩ

Scale(Scale Min./Max.) :
Adjustable between -32768 ... 32767
(Just for mA, V, mV, Ω, kΩ)

Minimum Set Value :
Adjustable between Scale Minimum and Maximum Set Value.

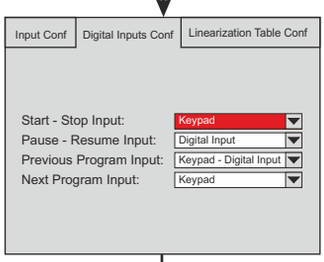
Maximum Set Value :
Adjustable between Scale Maximum and Minimum Set Value.

Unit :
°C, °F, bar, %RH, Hz, mA, A, mV, V, Ohm, kOhm, %, g, kg, cm, m, m/s, m/min, km/h, cm3/s, m3/h, l/s, l/min, l/h
pH,EC
(Just for mA, V, mV, Ω, kΩ)

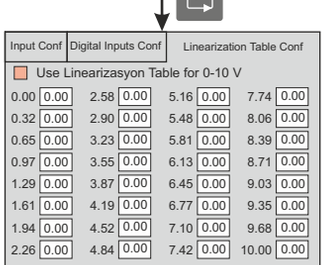
Input offset :
Adjustable between -99 ... 99.

Coefficient of digital filter :
1=200ms and it is device sampling time.
Adjustable between 1 ... 32.
Value of parameter should be increased in interference.

Decimal Point :
According to range table ,
1, 2 and 3 digit can be selected.



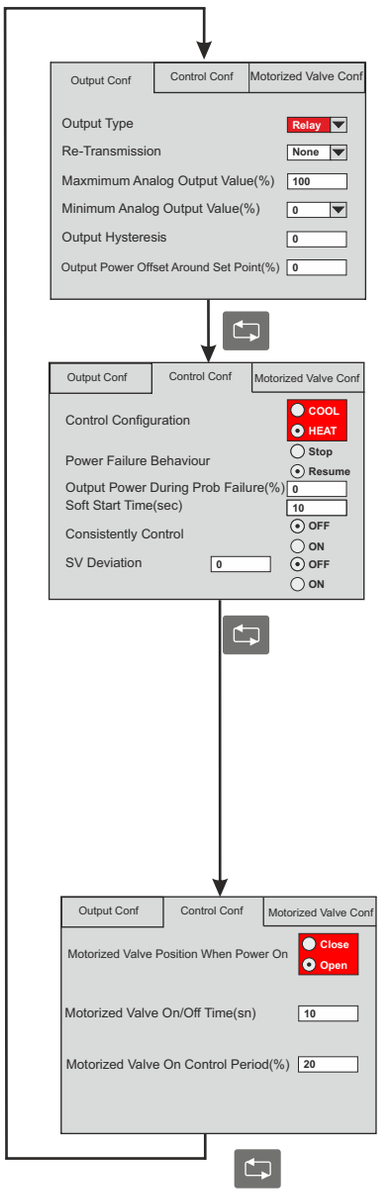
Digital Inputs : Start/Stop , Pause/Resume , Next/Previous Program processes can be made by digital inputs or device keypad.
If process will be performed only by Keypad ,“Keypad” must be selected.
If process will be performed only by Digital Input ,“Digital Input” must be selected.
If process will be performed both by Keypad and Digital Input ,“Keypad and Digital Input” must be selected.
Start/Stop : Start-Stop Input and/or **SET** key.
Pause/Resume : Pause-Resume Input and/or **Back** key.
Previous program : Previous Program Input and/or **Increase** key.
Next program : Next Program Input and/or **Decrease** key.



Linearization Table Conf :
If input type is selected as mA, V, mV, Ω or kΩ, linearizaton can be done at 32 points.

☑ Use Linearization Table for 0-10 V can be activated by pressing keys respectively.

Corresponding values of input signals must be entered to table in order to linearize at 32 points.



Programming Outputs(Output Configuration Page)

Output Type : Relay, SSR,Motorized Valve,0-20mA, 4-20mA or 0-10V. If relay is not selected for output type , relay can be configured as Alarm3 or motorized valve.

Re-Transmission : If output type is selected as relay or SSR , re-transmission can be selected as a 0/4-20mA or 0-10V.
If output type is selected as a 0/4-20mA , re-transmission can be selected as a 0-10V.
If output type is selected as 0-10V , re-transmission can be selected as a 0/4-20mA.

Maximum Analog Output Value : % maximum analog output value.

Minimum Analog Output Value : % minimum analog output value.

Output Hysteresis : Adjustable between 0... 50**. (If Proportional Band selected 0.0 , ON-OFF control and output hysteresis will be active.)**

Output Power Offset Around Set Point : Output power offset around SV according to error. In order to reach to SV fast.
TotalOuput(%) = system output(%)+ (100 / Proportional Band) *error *OutputPowerOffset/100.

Control Configuration : Selectable as Cool/Heat control. **The cooling control is only ON-OFF control (For Cooling control. Proportional Band must be 0.0).**

Power Failure Behaviour : If power failure occurs when profile control is running and device is powered on after power failure:
- If Stop is selected , profile control stops and turns to initial state.
- If Resume is selected , profile control resumes from where it is stopped.

Output Power During Prob Failure(%) : Adjustable between %0 ... %100. Output will continue in case of prob failure.

Soft Start Time(sec) : Adjustable between 0 ... 200 seconds.
If device is in profile control mode , programmed segments of profile control starts according to soft start time.
If device is in “Single Setpoint Mode” , device starts to control according to soft start time after device is powered on.

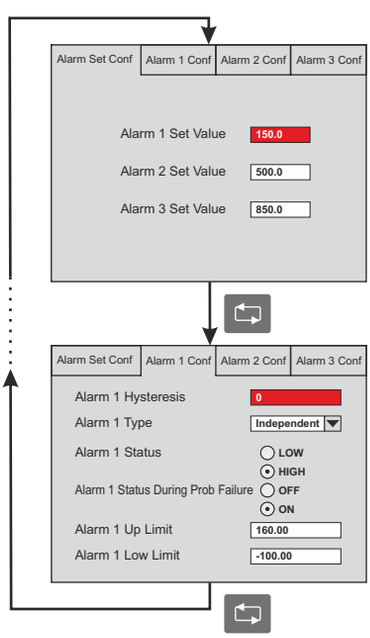
Consistently Control : When profile control is finished ; If OFF is selected , profile control stops and turns to initial state.
If ON is selected , profile control continues to control at last set value.

SV Deviation : End of the every profile control step , If difference between process value and set value is bigger than SV Deviation value (SV - PV > SV Deviation) then time countdown is paused and control remains at last set value until difference between process value and set value is smaller than SV Deviation value (SV - PV < SV Deviation).
SV Deviation process can be enabled/disabled with ON/OFF option.

Motorized Valve Position When Power On: It provides to configuration of location of motorized valve when device power on.

Motorized Valve On/Off Time (sn): It can configuration between 2-300 seconds

Motorized Valve Control Period(%): Motorized valve configurations off time during on/off.This time gets by percent on/off time of motorized valve. If this time is less than 2 seconds,time will be 2 seconds automatically.



Programming Alarms(Alarm Configuration Page)

Alarm 1 Set Value : Adjustable between Alarm 1 Up Limit and Alarm 1 Low Limit.

Alarm 2 Set Value : Adjustable between Alarm 2 Up Limit and Alarm 2 Low Limit.

Alarm 3 Set Value : Adjustable between Alarm 3 Up Limit and Alarm 3 Low Limit.
(In order to use Alarm 3 , **Output Type** parameter must be different from **Relay** otherwise Alarm 3 will be unavailable and Alarm 3 Conf page will be hidden.

Alarm 1 Hysteresis : Adjustable between 0 ... 50.

Alarm 1 Type : Independent alarm, Deviation alarm, Band alarm, Band Alarm with Inhibition or Profil control alarm can be selected. (In order to select Profile control segment alarms , Alarm 1 segments in Alarm Conf sub page of Profile Controller Configuration Page should be selected.

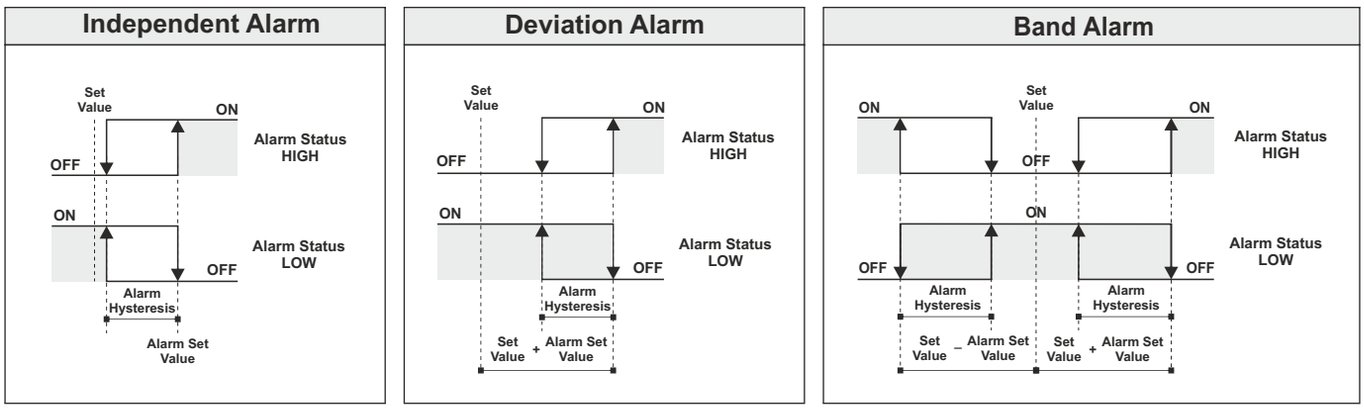
Alarm 1 Status : For the Independent alarm, Band alarm or Band Alarm with Inhibition to be active below the set value LOW must be selected , to be active above the set value HIGH must be selected. If LOW is seleced for Band alarm , alarm will be activated in band. If HIGH is selected , alarm will be activated out of band.

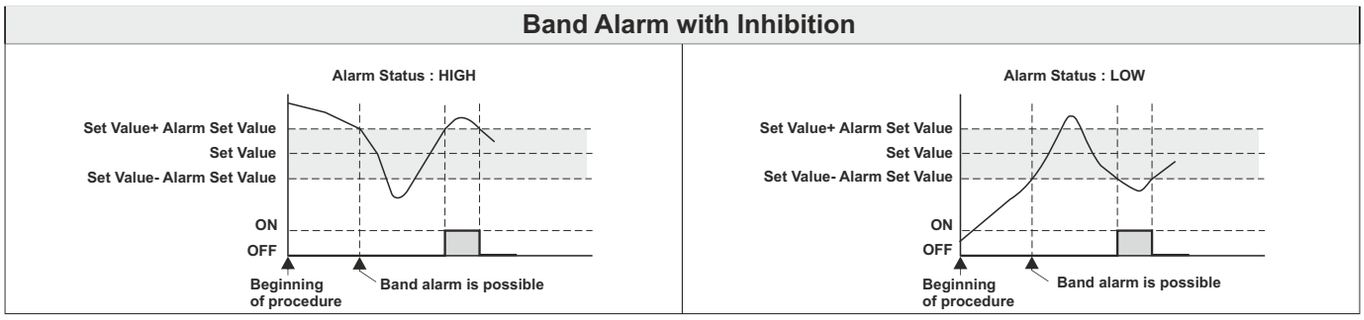
Alarm 1 Status During Probe Failure : For the alarm to be active in case of prob failure ON must be selected. For the alarm to be inactive in case of prob failure OFF must be selected.

Alarm 1 Up Limit : Adjustable between Scale Maximum and Alarm 1 Low Limit.

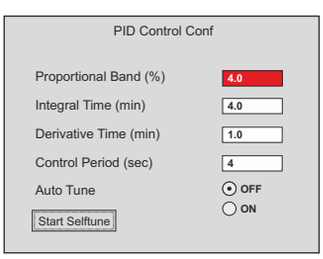
Alarm 1 Low Limit : Adjustable between Scale Minimum and Alarm 1 Up Limit.

Alarm 2 “Alarm 2 Conf” *and* ***Alarm 3 “Alarm 3 Conf”*** *are programmed in the same way.*





Programming



Programming PID Control (PID Control Configuration Page)

Proportional Band (%) : Adjustable between %0.0 ... %100.0.
If proportional band is selected 0.0 , ON-OFF control will be activated.
Integral Time (min) : Adjustable between 0.0 ... 100.0 minute.
Derivate Time (min) : Adjustable between 0.0 ... 25.0 minute.
Control Period (sec) : Adjustable between 0 ... 250 second.
Auto Tune : It allows to improve PID parameters after Self Tune. In normal operation, it provides the best control by automatically changing the PID parameters in case the measured value oscillates. If Auto Tune ⦿ ON is selected, it is active and the display shows AUTO TUNE RUNNING until Auto Tune is completed. Auto Tune ⦿ OFF must be selected to stop the Auto Tune operation.

PID Self Tune :

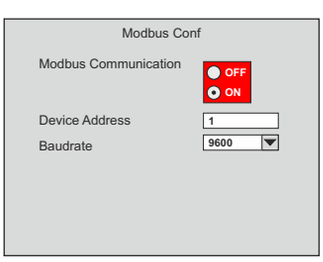
Self Tune is started by selecting Start Selftune with ▲ ▼ keys and pressing by ✎ key. SELF TUNE IS

STARTED and SELF TUNE IS RUNNING messages is shown respectively.

If ⮌ key is pressed, SELF TUNE IS STOPPED message is shown and selftune is stopped and device turns back to home screen.

When Self Tune process is successful:
- SELF TUNE IS FINISHED, PRESS BACK TO EXIT message is shown and waits for user intervention in profile control mode.
- SELF TUNE IS FINISHED, SINGLE SETPOINT IS RUNNING message is shown and continues to control.

In order to start Selftune process PV must be smaller than %60 of SV , otherwise SELF TUNE IS STARTED and SELF TUNE IS STOPPED messages are shown respectively and home screen returned.
User must wait until PV drops under %60 of SV and start selftune again.

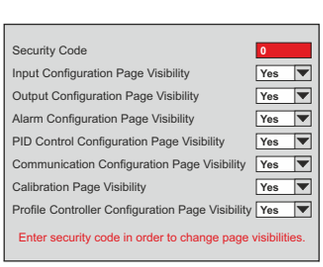


Programming ModBus (Communication Configuration Page)

Modbus Communication : If parameter is selected ON modbus will be active , otherwise will be inactive.

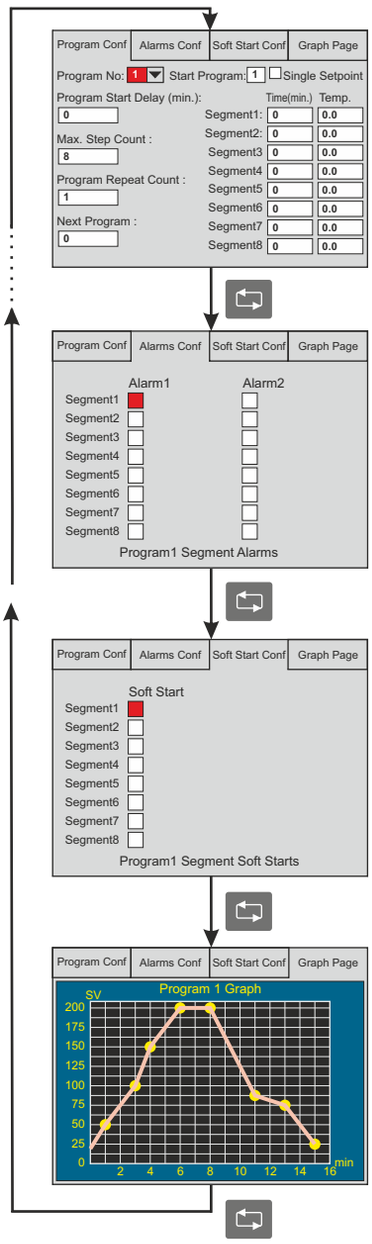
Device Address : Adjustable between 1 ... 247

Baudrate : 4800, 9600, 19200, 38400 or 57600.



Programming Keypad Security Level(Security Configuration Page)

Security Code : In order to change security configuration , Security Code must be entered 123.
Input Configuration Page Visibility : Yes, No or None.
Output Configuration Page Visibility : Yes, No or None.
Alarm Configuration Page Visibility : Yes, No or None.
PID Control Configuration Page Visibility : Yes, No or None.
Communication Configuration Page Visibility : Yes, No or None.
Calibration Page Visibility : Yes or None.
Profile Controller Configuration Page Visibility : Yes, No or None.
No : Page can be opened , parameters can not be changed.
Yes : Page can be opened , parameters can be changed. None : Page can not be opened.



Programming Profile Controller (Profile Controller Configuration Page)

Program No : Adjustable between 1 ... 16.
Start Program : Adjustable 1 ... 16.
Single Setpoint : If checkbox ☑ is selected , single set point will be activated.(In this case profile controller is inactive)
Program Start Delay(min.) : Adjustable between 0 ... 180.
Max. Step Count : Adjustable between 1 ... 8.
Program Repeat Count : Adjustable between 1 ... 8.
Next Program : Adjustable between 0 ... 16. If 0 is selected , control will be stopped at end of the program.
Segment1/Time(min.) : Adjustable between 0 ... 32000 min.
Segment1/Temp : Adjustable between Minimum Set Value and Maximum Set Value parameters.

2, 3 ... 8. Segments are programmed in the same way.

Segment1/Alarm1 : If checkbox ☑ is selected , Alarm1 will be activated.
Segment1/Alarm2 : If checkbox ☑ is selected , Alarm2 will be activated.
2, 3 ... 8. Segments are programmed in the same way.

If **Alarm Type** parameter is selected **profile control alarm** , Alarm1 and Alarm2 can be configured for the profile controller.

Soft Start Conf :

1. Segment Soft Start : If checkbox ☑ is selected , Soft Start will be activated.
Value of **Soft Start Time parameter** will be used as a selected segment's soft start time.
2, 3 ... 8. Segments are programmed in the same way.

Graph Page :

Configuration can be seen from Graph Page.
- Program number,
- Set values of segments
- Segment counts
- Segment lenght

MODBUS ERROR MESSAGES

Modbus protocol has two types error, communication error and operating error. Reason of the communication error is data corruption in transmission. Parity and CRC control should be done to prevent communication error. Receiver side checks parity and CRC of the data. If they are wrong, the message will be ignored. If format of the data is true but function doesn't perform for any reason, operating error occurs. Slave realizes error and sends error message. Most significant bit of function is changed '1' to indicate error in error message by slave. Error code is sent in data section. Master realizes error type via this message.

ModBus Error Codes

Error Code	Name	Meaning
01	ILLEGAL FUNCTION	The function code received in the query is not an allowable action for the slave. If a Poll Program Complete command was issued, this code indicates that no program function preceded it.
02	ILLEGAL DATA ADDRESS	The data address received in the query is not an allowable address for the slave.
03	ILLEGAL DATA VALUE	A value contained in the query data field is not an allowable value for the slave.

Message example;

Structure of command message (Byte Format)

Device Address		**(0A)h**
Function Code		**(01)h**
Beginning address of coils.	**MSB**	**(04)h**
	LSB	**(A1)h**
Number of coils (N)	**MSB**	**(00)h**
	LSB	**(01)h**
CRC DATA	**LSB**	**(AC)h**
	MSB	**(63)h**

Structure of response message (Byte Format)

Device Address		**(0A)h**
Function Code		**(81)h**
Error Code		**(02)h**
CRC DATA	**LSB**	**(B0)h**
	MSB	**(53)h**

Modbus Address Map

Holding Registers

EPC9513 PARAMETER LIST						
PARAMETER	**INFORMATION**	**DATA TYPE**	**REG. ADR.**	**MİN.**	**MAX.**	**DEF.**
Input Type	0 = B type Termokupl 1 = E 2 = J 3 = K 4 = L 5 = N 6 = R 7 = S 8 = T 9 = U 10 = Pt100 11= NTC 12 = 0-20 mA 13 = 4-20 mA 14 = 0-5 V 15 = 1-5 V 16 = 0-10 V 17 = 0-150 mV 18 = 0-550 Ohm 19 = 0-10 kOhm	Word	0	0	19	2
Scale Minimum	Can not be changed for Thermocouple and PT100 . Can be changed for Universal Inputs. Scale Minimum is -100 for PT100 XXX.XX. Low limit for Set Value parameter.	Word	1	-32768	32767	-1000
Scale Maximum	Can not be changed for Thermocouple and PT100 . Can be changed for Universal Inputs. Scale Maximum is 160 for PT100 XXX.XX. Up limit for Set Value parameter.	Word	2	-32768	32767	9000
Unit	0 = °C 1 = °F 2 = Bar 3 = %RH 4 = Hz 5 = A 6 = V .	Word	3	0	6	0
Input Offset	Offset added to Measurement.	Word	4	-99	99	0
Digital Filter Coefficient	1 = Fastest response time 32 = Slowest response time Value of parameter should be increased in interference.	Word	5	1	32	4
Decimal Point	0 = XXX 1 = XXX.X 2 = XXX.XX 3= XXX.XXX . Accırding to Decimal Point parameter , modbus read/write data changed by 1,10,100,1000 linearly.	Word	6	0	3	1
Minimum Set Value	Adjustable between Scale Minimum and Maximum Set Value parameters.	Word	7	0	3	1
Maximum Set Value	Adjustable between Scale Maksimum and Minimum Set Value parameters.	Word	8	0	3	1
Start - Stop Input	0=Disable 1= Enable Profil Control start/stop digital input disable/enable.	Word	9	0	1	0
Pause - Resume Input	0= Disable 1= Enable Profil Control pause/resume digital input disable/enable.	Word	10	0	1	0
Previous Program Input	0= Disable 1= Enable Profil Control previous program digital input disable/enable.	Word	11	0	1	0
Next Program Input	0= Disable 1= Enable Profil Control next program digital input disable/enable.	Word	12	0	1	0
Linearization Table [0-31].Points	Linearization table , value of points from 0 to 31.	Word	[13-44]	-32768	32767	0
Output Type	0 = Relay 1 = SSR 2 = 0-20 mA 3 = 4-20 mA 4 = 0-10 V 5 = Valve	Word	45	0	5	0
Re-Transmission	0 = None 1 = 0-20 mA 2 = 4-20 mA 3 = 0-10 V	Word	46	0	3	0
Maximum Analog Output Value		Word	47	0	100	100
Minimum Analog Output Value		Word	48	0	100	0
Output Hysteresis	Adjustable between 1 and 50.	Word	49	0	50	0
Output Power Offset Around Set Point(%)	Added offset(%) according to error around Set Value.	Word	50	0	100	0
Output Power During Prob Failure(%)	Ajustable between %0 and %100 , output will continue in case of prob failure.	Word	51	0	100	0
Soft Start Time(sec)	Adjustable between 0 and 200 seconds.	Word	52	0	200	10
SV Deviation	If (SV - PV > SV Deviation) at the end of the step and If SV Deviation is enabled , time countdown will be paused and control remains at last set value until (SV - PV < SV Deviation) Please check parameter definition on page 5.	Word	53	0	32767	0
Alarm 1 Set Value		Word	54	-32768	32767	1000
Alarm 2 Set Value		Word	55	-32768	32767	1000
Alarm 3 Set Value		Word	56	-32768	32767	1000
Alarm 1 Hysteresis		Word	57	0	50	0
Alarm 1 Type	0 =Independent 1=Deviation 2=Band alarm 3=Band alarm with inhibitation 4=Profil control alarm	Word	58	0	4	0
Alarm 1 Up Limit		Word	59	-32768	32767	9000
Alarm 1 Low Limit		Word	60	-32768	32767	-1000
Alarm 2 Hysteresis		Word	61	0	50	0
Alarm 2 Type	0 =Independent 1=Deviation 2=Band alarm 3=Band alarm with inhibitation 4=Profil control alarm	Word	62	0	4	0
Alarm 2 Up Limit		Word	63	-32768	32767	9000
Alarm 2 Low Limit		Word	64	-32768	32767	-1000
Alarm 3 Hysteresis		Word	65	0	50	0
Alarm 3 Type	0 =Independent 1=Deviation 2=Band alarm 3=Band alarm with inhibitation	Word	66	0	3	0
Alarm 3 Up Limit		Word	67	-32768	32767	9000
Alarm 3 Low Limit		Word	68	-32768	32767	-1000
Proportional Band (%)	If it is set to %0.0 , ON-OFF control is activated. If it is set to different from %0.0 , PID control is activated. In order to read/write from modbus mutiple/divide with 10. For example ; in order to set %5.5 , 5.5x10=55 must be written to parameter.	Word	69	0	100	4
Integral Time (min)	Adjustable between 0.0 and 100.0. If it is set to 0.0 , PD control is activated. In order to read/write from modbus mutiple/divide with 10. For example ; in order to set %5.5 , 5.5x10=55 must be written to parameter.	Word	70	0	100	4
Derivative Time (min)	Adjustable between 0.0 and 25.0 If it is set to 0.0 , PI control is activated. In order to read/write from modbus mutiple/divide with 10. For example ; in order to set %5.5 , 5.5x10=55 must be written to parameter.	Word	71	0	25	1
Control Period (sec)	Adjustable between 1 and 250 second.	Word	72	1	250	4
Start Program	Profile control's starting program number.	Word	73	1	16	1
Set Value		Word	74	-32768	32767	2000
Motorized Valve Position When Power On	When device is power on, it provides to change to motorized valve position.	Bit	75	0	0	1
Motorized Valve On/Off Time (sn)	It can set between 2-300 seconds.	Word	76	2	300	100
Motorized Valve Control Period(%)	Motorized valve configurations off time during on/off. This time gets by percent on/off time of motorized valve.	Word	77	1	50	25

Related to Decimal Point parameter; **Scale Minimum , Scale Maximum , Linearization Table Points , Alarm 1 Set Value , Alarm 2 Set Value , Alarm 3 Set Value , Alarm 1 Up Limit , Alarm 1 Low Limit , Alarm 2 Up Limit , Alarm 2 Low Limit , Alarm 3 Up Limit , Alarm 3 Low Limit , Program Segment1 Set Value , Program Segment2 Set Value , Program Segment3 Set Value , Program Segment4 Set Value , Program Segment5 Set Value , Program Segment6 Set Value , Program Segment7 Set Value , Program Segment8 Set Value** parameters are read/written linearly with 1,10,100,1000.

For example ; Decimal Point parameter is 1and If Set Value is 155.5 , Set Value will be read 1555 from modbus.

Profil Control Holding Registers

PARAMETER	INFORMATION	DATA TYPE	REG. ADR.	MİN.	MAX.	DEF.
Start Delay(min.)	Delay before programstarting.	Word	1000 + (ProgramNo-1) x 20	0	180	0
Max. Step Count	Number ofsegments.	Word	1000 + (ProgramNo-1) x 20 + 1	1	8	8
Repeat Count	Repeat count ofprogram.	Word	1000 + (ProgramNo-1) x 20 + 2	1	8	1
Next Program	Number ofnext program.	Word	1000 + (ProgramNo-1) x 20 + 3	0	16	0
Program Segment1 Time(min.)	Programsegment1's time	Word	1000 + (ProgramNo-1) x 20 + 4	0	32000	0
Program Segment1 Set Value	Programsegment1's value	Word	1000 + (ProgramNo-1) x 20 + 5	-32000	32000	0
Program Segment2 Time(min.)	Programsegment2's time	Word	1000 + (ProgramNo-1) x 20 + 6	0	32000	0
Program Segment2 Set Value	Programsegment2's value	Word	1000 + (ProgramNo-1) x 20 + 7	-32000	32000	0
Program Segment3 Time(min.)	Programsegment3's time	Word	1000 + (ProgramNo-1) x 20 + 8	0	32000	0
Program Segment3 Set Value	Programsegment3's value	Word	1000 + (ProgramNo-1) x 20 + 9	-32000	32000	0
Program Segment4 Time(min.)	Programsegment4's time	Word	1000 + (ProgramNo-1) x 20 + 10	0	32000	0
Program Segment4 Set Value	Programsegment4's value	Word	1000 + (ProgramNo-1) x 20 + 11	-32000	32000	0
Program Segment5 Time(min.)	Programsegment5's time	Word	1000 + (ProgramNo-1) x 20 + 12	0	32000	0
Program Segment5 Set Value	Programsegment5's value	Word	1000 + (ProgramNo-1) x 20 + 13	-32000	32000	0
Program Segment6 Time(min.)	Programsegment6's time	Word	1000 + (ProgramNo-1) x 20 + 14	0	32000	0
Program Segment6 Set Value	Programsegment6's value	Word	1000 + (ProgramNo-1) x 20 + 15	-32000	32000	0
Program Segment7 Time(min.)	Programsegment7's time	Word	1000 + (ProgramNo-1) x 20 + 16	0	32000	0
Program Segment7 Set Value	Programsegment7's value	Word	1000 + (ProgramNo-1) x 20 + 17	-32000	32000	0
Program Segment8 Time(min.)	Programsegment8's time	Word	1000 + (ProgramNo-1) x 20 + 18	0	32000	0
Program Segment8 Set Value	Programsegment8's value	Word	1000 + (ProgramNo-1) x 20 + 19	-32000	32000	0

Profil control modbus addresses start from 1000.
In order to write/read profile program parameters to/from Modbus base address is 1000 + (ProgramNo-1) x 20.
Related to Decimal Point parameter Profil Control Set parameters are read/written linearly with 1,10,100,1000.
For example;
Program5 Start Delay (min.) Holding Register Address is 1000 + (5-1) x 20 = 1080
Program5 Setment6 Time (min.) Holding Register Address is 1000 + (5-1) x 20 + 14 = 1094

Input Registers

PARAMETER	INFORMATION	DATA TYPE	REG. ADR.	MİN.	MAX.	DEF.
Measured Value	Measured PV , result must be divided by 10. For example; Iftemperature is 32.5 °C , 325 will be read over modbus.	Word	0	NONE	NONE	NONE
Internal NTC Temperature	Measured Internal NTC temperature , result must be divided by 10. For example; Iftemperature is 32.5 °C , 325 will be read over modbus.	Word	1	NONE	NONE	NONE
Analog Output Percentage	Output % for 0-10V , 0-20mA or 4-20mA	Word	2	NONE	NONE	NONE
Current Program number	Running programnumber while profile controller is running.	Word	3	NONE	NONE	NONE
Current segment number	Running segment number while profile controller is running.	Word	4	NONE	NONE	NONE
Control Remaining Time(min)	Remaining time ofrunning program	Word	5	NONE	NONE	NONE

Coil Registers

PARAMETER	INFORMATION	DATA TYPE	REG. ADR.	MİN.	MAX.	DEF.
Use Linearization Table	Disable/Enable Linearization table Can not be used for Thermocouple , PT100 and NTC . Can be used for Universal Inputs.	Bit	0	0	1	0
Control Configuration	0=ON-OFF COOLING 1=ON-OFF HEATING IfProportional Band parameter is %0 , ON-OFF control activated.	Bit	1	0	1	1
Power Failure Behaviour	0= Stop 1= Resume Ifpower failure occurs when profile control is running and device powered on after power failure; Ifstop is selected , profile control will stop and turn to initial state. Ifresume is selected , profile control will resume fromwhere it stopped.	Bit	2	0	1	0
Consistently Control	0 = OFF , profile control stops and turns to initial state. 1 = ON , profile control continue to control at last set value.	Bit	3	0	1	0
Sv Deviation Enable	0 = OFF , 1 = ON	Bit	4	0	1	0
Alarm 1 Status	0= LOW 1= HIGH	Bit	5	0	1	1
Alarm 1 Status During Prob Failure	0=OFF , alarmis inactive in case ofprob failure. 1=ON , alarmis active in case ofprob failure.	Bit	6	0	1	1
Alarm 2 Status	0= LOW 1= HIGH	Bit	7	0	1	1
Alarm 2 Status During Prob Failure	0=OFF , alarmis inactive in case ofprob failure. 1=ON , alarmis active in case ofprob failure.	Bit	8	0	1	1
Alarm 3 Status	0= LOW 1= HIGH	Bit	9	0	1	1
Alarm 3 Status During Prob Failure	0=OFF , alarmis inactive in case ofprob failure. 1=ON , alarmis active in case ofprob failure.	Bit	10	0	1	1
Auto Tune	0 = OFF 1 = ON , Improve PID parameters while selftune is running. IfPV is oscillating while profile control is running , autotune will improve PID parameters in order to best control.	Bit	11	0	1	0
Single Set Point	0 = OFF 1 = ON	Bit	12	0	1	0
Function Coil Start/Stop	Profile control can be started/stopped over modbus. Ifuser write 1 to this coil , profile controller will start/stop.	Bit	100	0	1	0
Function Coil Pause/Resume	Profile control can be paused/resumed over modbus. Ifuser write 1 to this coil , profile controller will pause/resume.	Bit	101	0	1	0
Function Coil Next	Profile control can start next programover modbus. Ifuser write 1 to this coil , profile controller will start to next program.	Bit	102	0	1	0
Function Coil Previous	Profile control can start previous programover modbus. Ifuser write 1 to this coil , profile controller will start to previous program.	Bit	103	0	1	0

Discrete Input Registers

PARAMETER	INFORMATION	DATA TYPE	REG. ADR.	MİN.	MAX.	DEF.
C/A3 Output Status	Control Relay / Alarm3 output state(0 = OFF , 1 = ON)	Bit	0	NONE	NONE	NONE
A1 Output Status	Alarm1 output state(0 = OFF , 1 = ON)	Bit	1	NONE	NONE	NONE
A2 Output Statıs	Alarm2 output state(0 = OFF , 1 = ON)	Bit	2	NONE	NONE	NONE
SSR Output Status	SSR output state(0 = OFF , 1 = ON)	Bit	3	NONE	NONE	NONE
Profile Controller Running Status	Profil controller run state(0 = OFF , 1 = ON)	Bit	4	NONE	NONE	NONE
Profile Controller Pause Status	Profil controller pause state(0 = OFF , 1 = ON)	Bit	5	NONE	NONE	NONE
Prob Failure Status	Prob failure(0 = OFF , 1 = ON)	Bit	6	NONE	NONE	NONE