



Read this document carefully before using this device. The guarantee will be expired by damaging of the device 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 EPC9420 PID PROFILE CONTROLLER

Thank you for choosing ENDA EPC9420 profile controller.

\* 96 x 96mm sized.

\* Selectable sensor type.

\* Automatic calculation of PID parameters (SELF TUNE).



Enter PID parameters of the system if they are known at the beginning. Otherwise, Self-Tune should be activated.

\* Communication via RS-485 ModBus protocol (Optional).

\* Selectable SSR or relay control output.

\* Selectable 0-20mA or 4-20mA analog control output.

\* Relay output can be programmable as second alarm or control output.

\* AL1 output or Timer output or can be used as control AL1 relay output.

\* Selectable Heat/Cool control.

\* Input offset feature.

\* In the case of sensor failure periodical running or relay state can be selected.

\* Until the eight steps to make the profile control.

\* In each step AL1 and AL2 outputs programming.

\* To continue where it left off in power failure feature.

\* For the keypad security levels.

\* Programming by using keypad or Modbus.

\* CE marked according to European Norms.



**CE** **RoHS**  
**Compliant**

## TECHNICAL SPECIFICATIONS

Input type		Temperature range		Accuracy
		°C	°F	
Pt 100 Resistance Thermometer	EN 60751	-200...600 °C	-328... +1112 °F	± 0,2% (of full scale) ± 1 digit
Pt 100 Resistance Thermometer	EN 60751	-99.9...300.0 °C	-99.9...+543.0 °F	± 0,2% (of full scale) ± 1 digit
J (Fe-CuNi) Thermocouple	EN 60584	0... 600 °C	+32... +1112 °F	± 0,2% (of full scale) ± 1 digit
K (NiCr-Ni) Thermocouple	EN 60584	0...1200 °C	+32... +2192 °F	± 0,2% (of full scale) ± 1 digit
T (Cu-CuNi) Thermocouple	EN 60584	0... 400 °C	+32... +752 °F	± 0,2% (of full scale) ± 1 digit
S (Pt/0Rh-Pt) Thermocouple	EN 60584	0...1600 °C	+32... +2912 °F	± 0,2% (of full scale) ± 1 digit
R (Pt13Rh-Pt) Thermocouple	EN 60584	0...1600 °C	+32... +2912 °F	± 0,2% (of full scale) ± 1 digit

### ENVIRONMENTAL CONDITIONS

Ambient/storage temperature	0 ... +50 °C/-25... +70 °C (with no icing)		
Max. Relative humidity	80% up to 31 °C decreasing linearly 50% 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.

### ELECTRICAL CHARACTERISTICS

Supply	230V AC +10% -20%, 50/60Hz or 24V AC ±10%, 50/60Hz.
Power consumption	Max. 7VA
Wiring	2.5mm² screw-terminal connections
Line resistance	For thermocouple max.100ohm, for 3 wired Pt 100 max. 20ohm
Data retention	EEPROM (minimum 10 years)
EMC	EN 61326-1: 2006
Safety requirements	EN 61010-1: 2010 (Pollution degree 2, overvoltage category II)

### OUTPUTS

CONT./AL2	Relay : 250V AC, 2A ( for resistive load), NO/NC. Selectable as Control or Alarm2 output.
AL1	Relay : 250V AC, 2A ( for resistive load), NO/NC selectable. (Alarm1 output).
ANL/SSR	Selectable logic control output. (Max. 12V, 20mA)
Life expectancy for relay	Mechanical 30.000.000 operation; Electrical 300.000 operation

### CONTROL

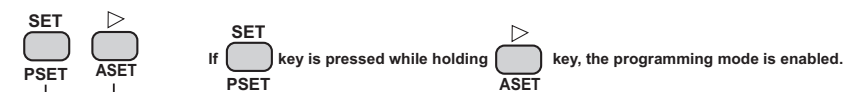
Control type	Single set-point and alarm control
Control algorithm	On-Off / P, PI, PD, PID (selectable)
A/D converter	15 bits
Sampling time	500ms
Proportional band	Adjustable between 0% and 100%. If Pb=0%, On-Off control is selected.
Integral time	Adjustable between 0.0 and 100.0 minutes
Derivative time	Adjustable between 0.00 and 25.00 minutes
Control period	Adjustable between 1 and 250 seconds
Hysteresis	Adjustable between 1 and 50 °C/F
Output power	The ratio of power at a set point can be adjusted between 0% and 100%

### HOUSING

Housing type	Suitable for flush-panel mounting according to DIN 43 700.
Dimensions	W96xH96xD50mm
Weight	Approx. 250g (after packing)
Enclosure material	Self extinguishing plastics.

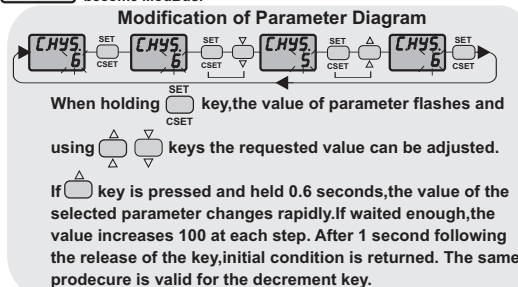
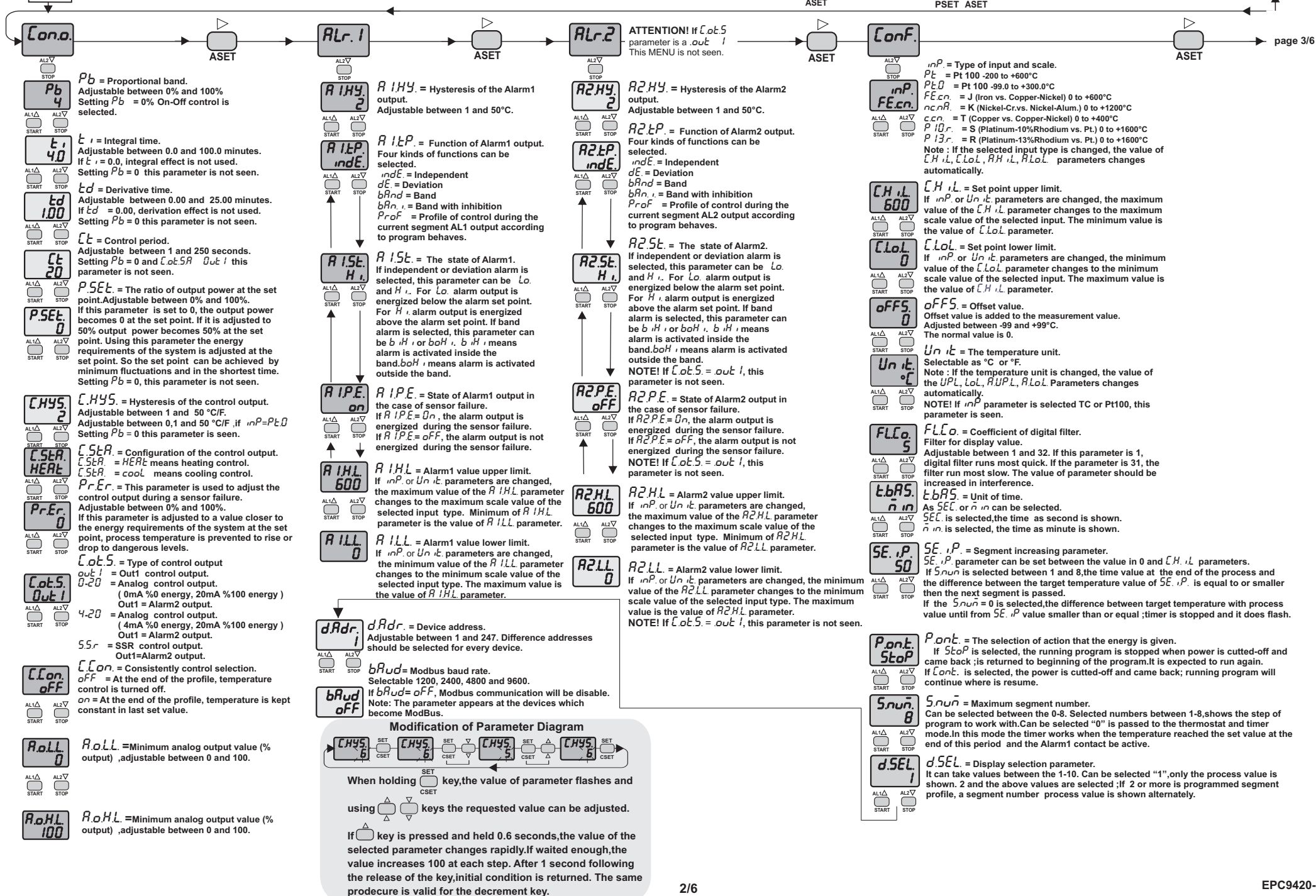


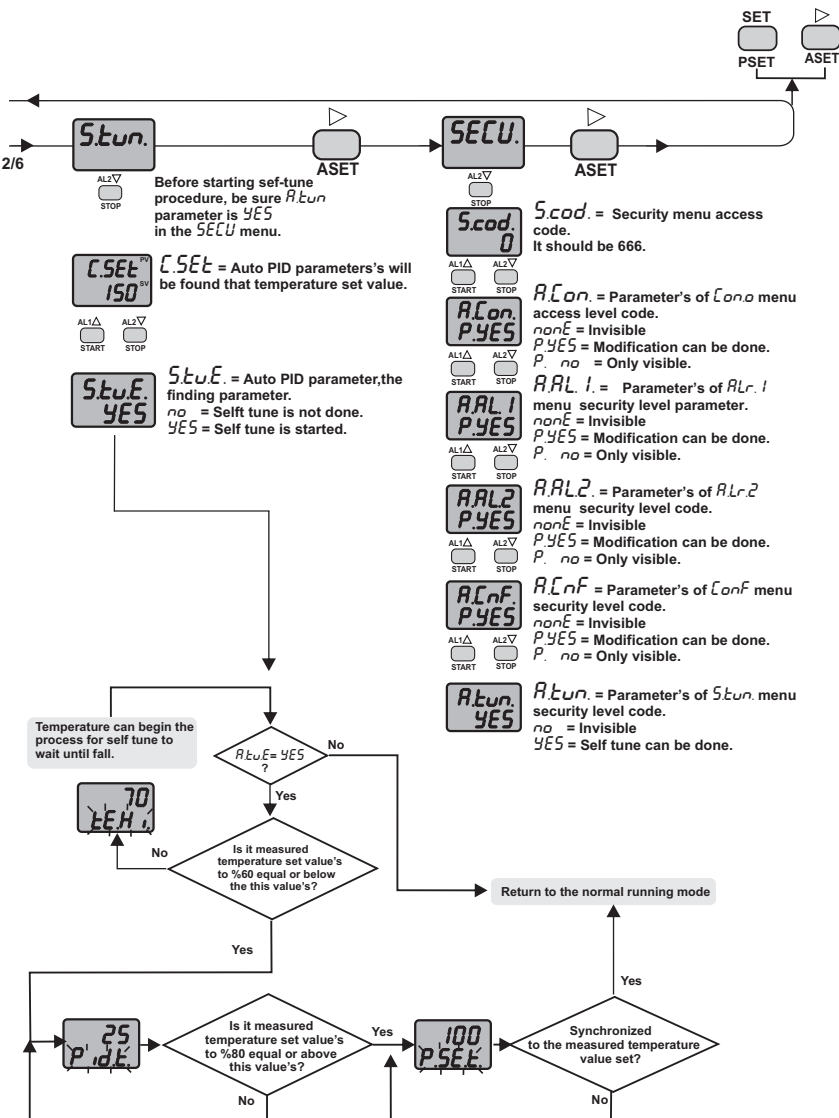
While cleaning the device, solvents (thinner, benzene, acid etc.) or corrosive materials must not be used.



Entering from the programming mode to the run mode:

If no key is pressed within 20 seconds during programming mode, the data is stored automatically and the run mode is entered.  
Alternatively, the same function occurs first pressing **ASET** key and then pressing **SET** **PSET** **ASET** keys together.

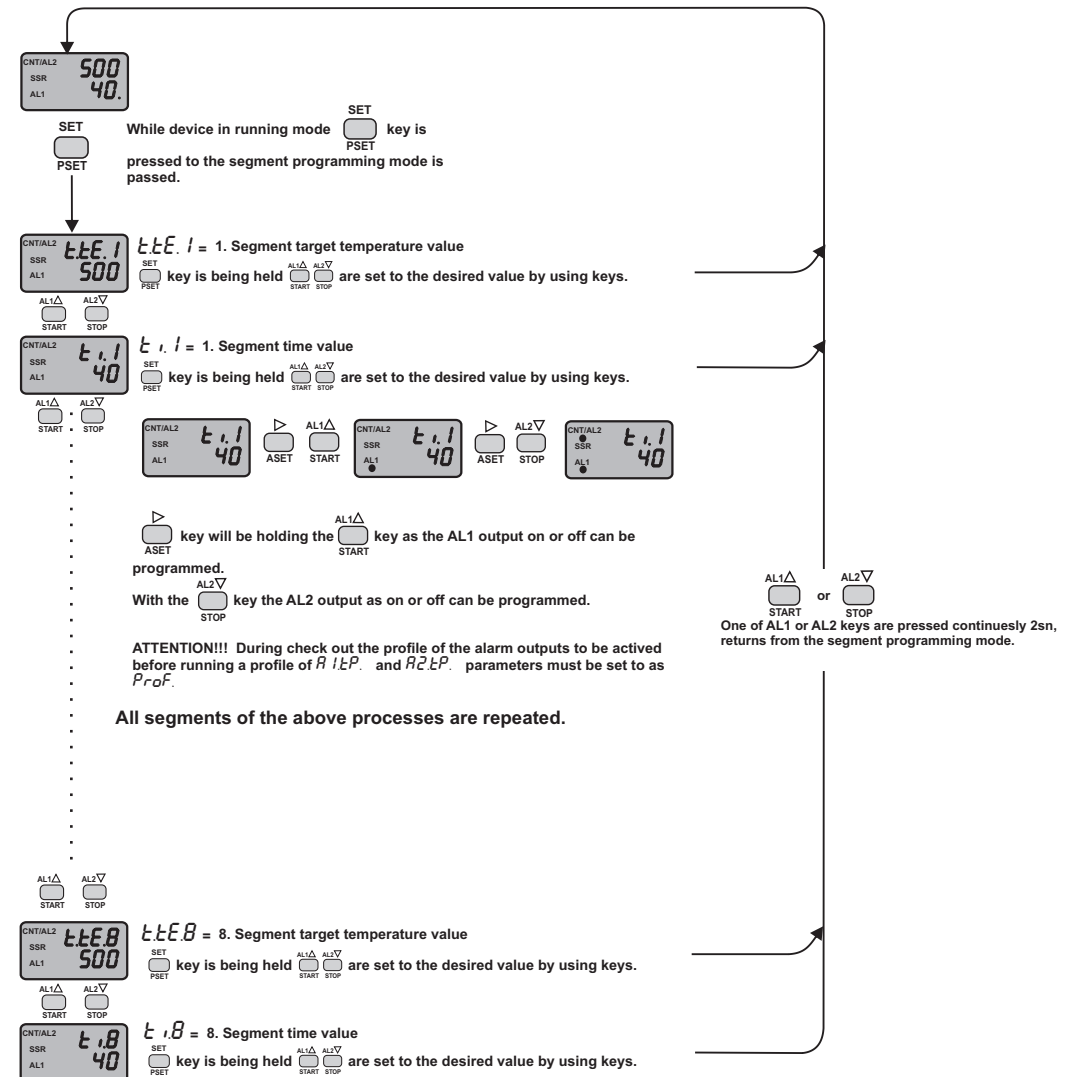




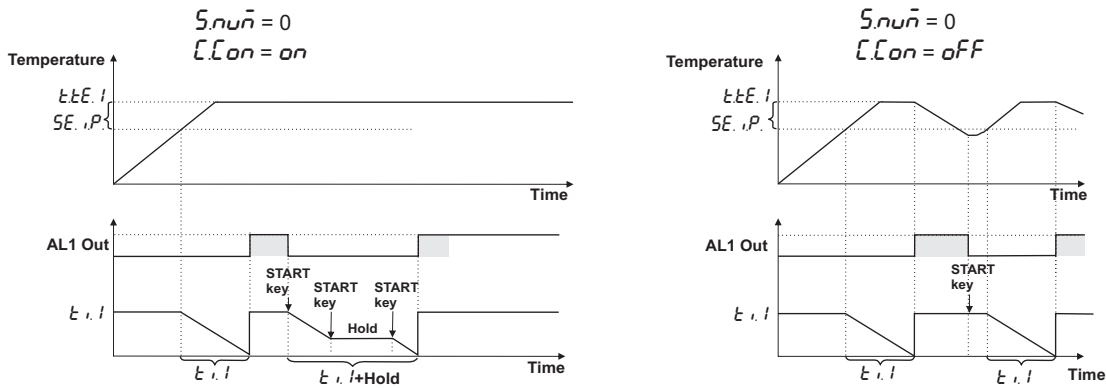
Probe error is not, to the self tune mode is entered. The measured temperature is low enough to make that self tune,  $P_{IDLE}$  message is seen in sub-indicator and the self tune process starts. For the self tune process to begin, measured temperature must be to % 60 equal or under the set value's. If this condition is not right, in the sub-indicator  $LEH$  message flashes and the device can make self tune waits until the temperature falls. When the temperature decreased,  $P_{IDLE}$  message starts to flash in the sub-indicator and self tune process is started and PID parameters can be calculated until possible in the sub-indicator of this message continues to flash. After PID parameters found in the sub-indicator  $P_{SET}$  message starts to flash. In this case, device PID controlled the heating till the set value and finding the required amount of energy for being established on the set level heating; returned quitting the self tune mode and writing the  $P_{SET}$  parameter as %.

If pressed on any keys while the *P d.t.* message flashes on sub-indicator, self tune mode is quitted without accounting display PID parameters.

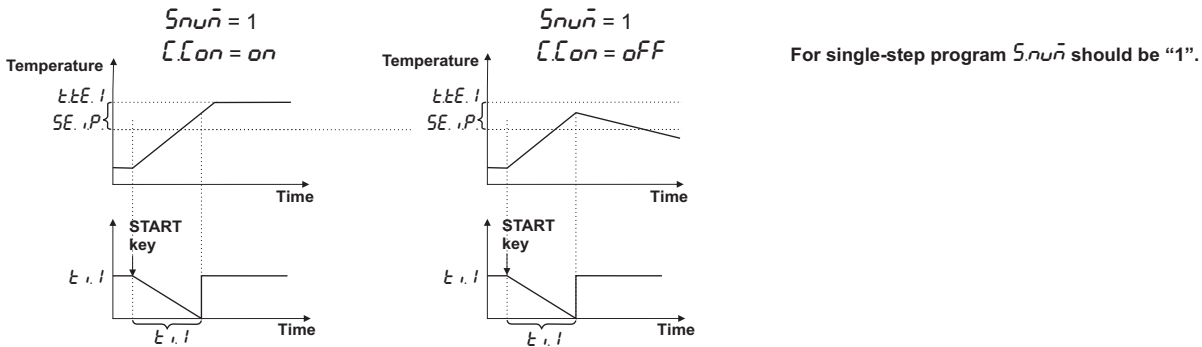
## SEGMENTS OF PROGRAMMING



## TIMER / THERMOSTAT OUTPUT EXAMPLES



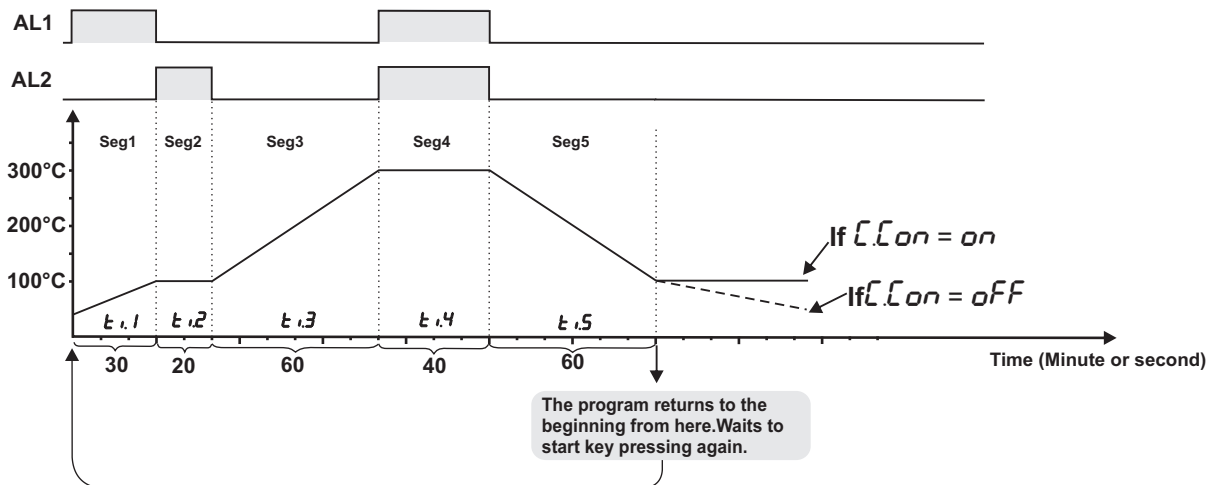
## PROFILE CONTROL OUTPUT EXAMPLES



## MULTI-STEP PROFILE CONTROL OUTPUT EXAMPLES

	Seg1	Seg2	Seg3	Seg4	Seg5
Target Temperature	$TE_{1I} = 100$	$TE_{2I} = 100$	$TE_{3I} = 300$	$TE_{4I} = 300$	$TE_{5I} = 100$
Time	$t_{1I} = 30$	$t_{2I} = 20$	$t_{3I} = 60$	$t_{4I} = 40$	$t_{5I} = 60$
AL1	ON	OFF	OFF	ON	OFF
AL2	OFF	ON	OFF	ON	OFF

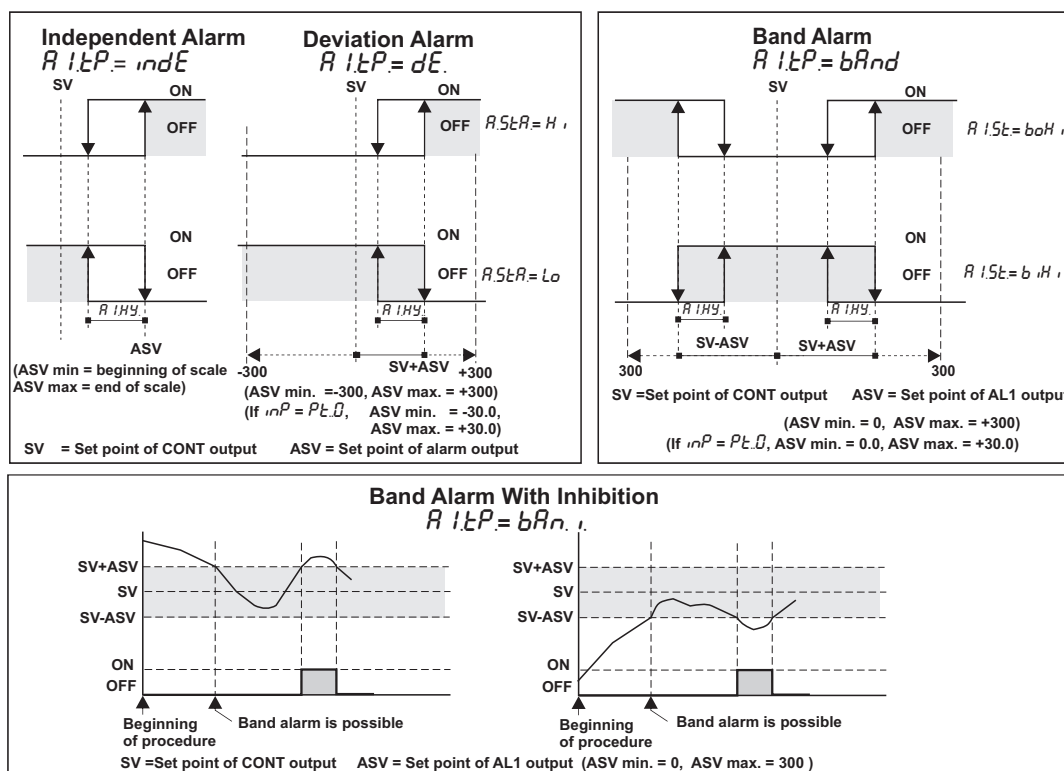
For five-step program  $S_{mode}$  should be "5".



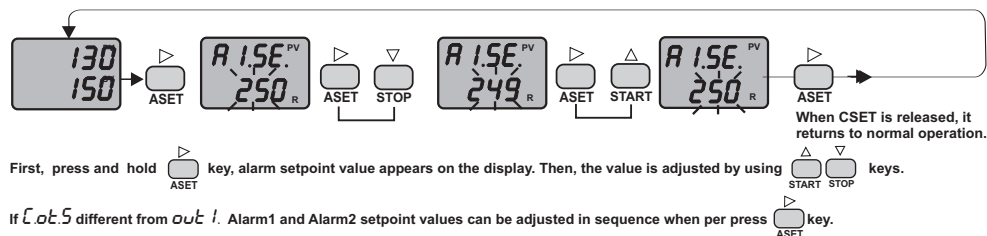
## TERMS

	<p>( 1 ) Measurement value (At running mode) Parameter name (At programming mode)</p> <p>( 2 ) Set value (At running mode) Parameter value (At programming mode)</p> <p>Timer run LED</p> <p>( 3 ) Value increment key (At running and programming mode) START key (At running mode) Parameter selection key (At programming mode)</p> <p>( 4 ) Value decrement key (At running and programming mode) STOP key (At profile programming mode) If only this key is pressed in running mode, software version number is seen. Parameter selection key (At programming mode)</p> <p>( 5 ) Alarm set key (At running mode) Menu selection key (At programming mode)</p> <p>( 6 ) The profile set values adjustment key (At running mode) Parameter set key (At programming mode)</p>
( 1 ) PV display	4 digits 7 segment red LED
( 2 ) TIMER display	4 digits 7 segment yellow LED
Character heights	PV display : 20mm
	TIMER display :14mm
( 3 ),( 4 ),( 5 ),( 6 ) Keypad	Mikro switch
( 7 ) State indicator	3 red LEDs for Control, Alarm1 and SSR outputs

## ALARM1 AND ALARM2 OUTPUT TYPES



## MODIFICATION OF CONTROL AND ALARM SET POINTS



**NOTE:** The maximum of  $CLSEt$  is the value of  $CHiL$  parameter and the minimum of it is the value of  $CLoL$  parameter.

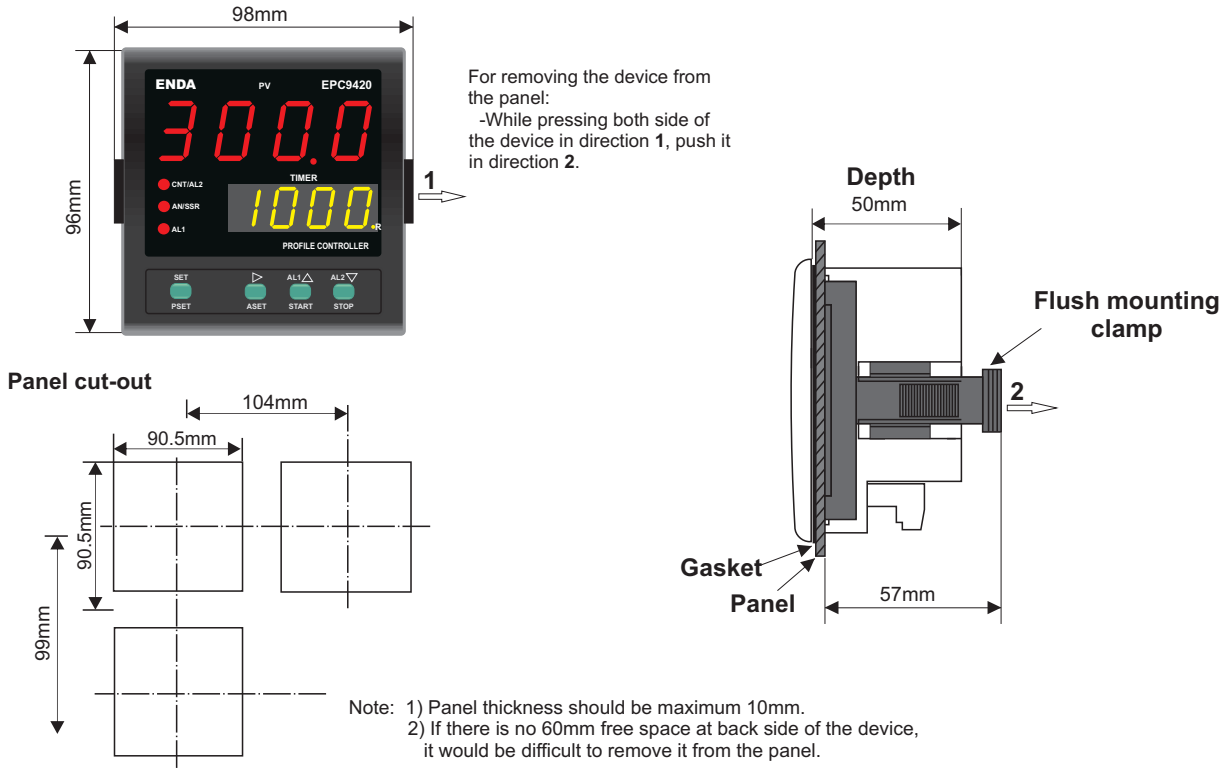
If independent alarm is selected,  $R1SE$  and  $R2SE$  values can be adjusted between the limits of the full scale.

If deviation alarm is selected,  $R1SE$  and  $R2SE$  values can be adjusted between -300 and +300.

If band alarm is selected,  $R1SE$  and  $R2SE$  values can be adjusted between 0 and +300.

Error Messages			
Temperature value is higher than the scale	Temperature value is lower than the scale	Temperature sensor is broken or over temperature	Pt 100 or a sensor line is short circuited

## DIMENSIONS

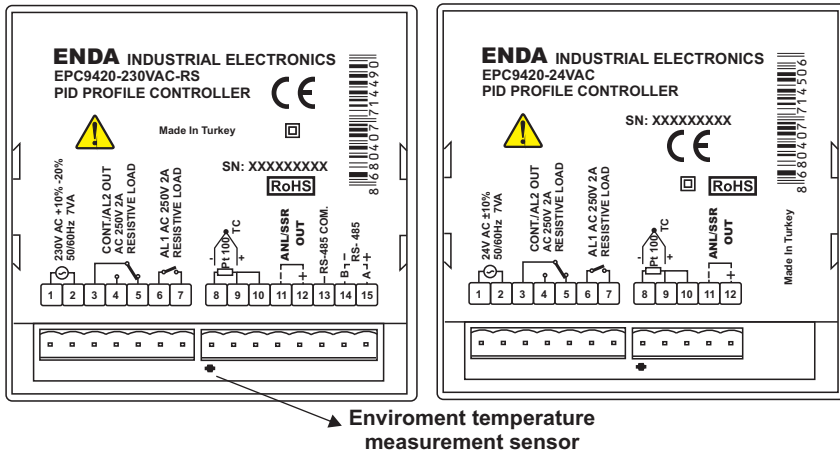


## CONNECTION DIAGRAM



ENDA EPC9420 is intended for installation in control panels. Make sure that the device is used only for intended purpose. The shielding must be grounded on the instrument side. During an installation, all of the cables that are connected to the device must be free of energy. The device must be protected against inadmissible humidity, vibrations, severe soiling and make sure that the operation temperature is not exceeded. All input and output lines that are not connected to the supply network must be laid out as shielded and twisted cables. These cables should not be close to the power cables or components. The installation and electrical connections must be carried on by a qualified staff and must be according to the relevant locally applicable regulations.

## Screw-terminal connections



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

- Note 1) Mains supply cords shall meet the requirements of IEC 60227 or IEC 60245.  
2) In accordance with the safety regulations, the power supply switch shall bring the identification of the relevant instrument and it should be easily accessible by the



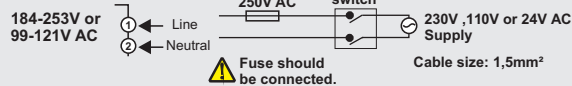
Holding screw  
0.4-0.5Nm



Equipment is protected throughout by DOUBLE INSULATION.

### NOTE :

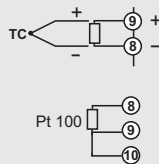
#### SUPPLY :



#### SENSOR INPUT :

For J-K-T-S-R type thermocouple :  
Use suitable compensation cables. Don't use jointed cables. Pay attention to the polarities of the thermocouple cables as shown in the figure right are connected to the .

For resistance thermometer :  
When 2 wired Pt 100 is used, terminals 9 and 10 must be short circuited.



Order Code : EPC9420-□□□□□□-□□

### 1- Supply Voltage

230VAC...230V AC  
110VAC...110V AC  
24VAC...24V AC  
SM.....9-30V DC / 7-24V AC

### 2- Modbus Option

RS.....RS-485 Modbus communication  
None....Don't support RS-485 Modbus communication