



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 ETC4420 PID TEMPERATURE CONTROLLER

Thank you for choosing ENDA ETC4420 temperature controller.

- \* 48 x 48mm 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.
- \* Soft-Start.
- \* Communication via RS-485 ModBus protocol (Optional).
- \* Selectable SSR or relay control output.
- \* Relay output can be programmable as second alarm or control output.
- \* AL1 relay output for first alarm out.
- \* Selectable Heat/Cool control.
- \* Input offset feature.
- \* In the case of sensor failure periodical running or relay state can be selected.
- \* Parameter access protection on 3 levels.
- \* Programming by using keypad or Modbus.
- \* CE marked according to European Norms.



## 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/Rh-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. 5VA
Wiring	2.5mm <sup>2</sup> 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: 1997, A1: 1998, A2: 2001 (Performance criterion B for standard EN 61000-4-3)
Safety requirements	EN 61010-1: 2001 (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).
SSR out	Selectable logic control output. (Max 12V 20mA)
Life expectancy for relay	Mechanical 30.000.000 operation; Electrical 300.000 operation

## CONTROL

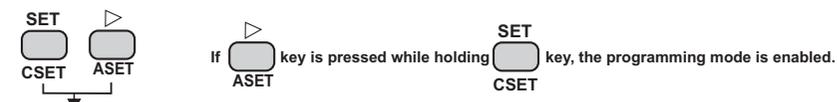
Control type	Single set-point and alarm control
Control algorithm	On-Off / P, PI, PD, PID (selectable)
A/D converter	15 bits
Sampling time	500ms
Proportional band	Adjustable between 0% and 100%. If Pb=0%, On-Off control is selected.
Integral time	Adjustable between 0.0 and 100.0 minutes
Derivative time	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

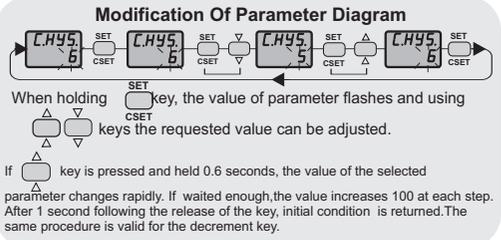
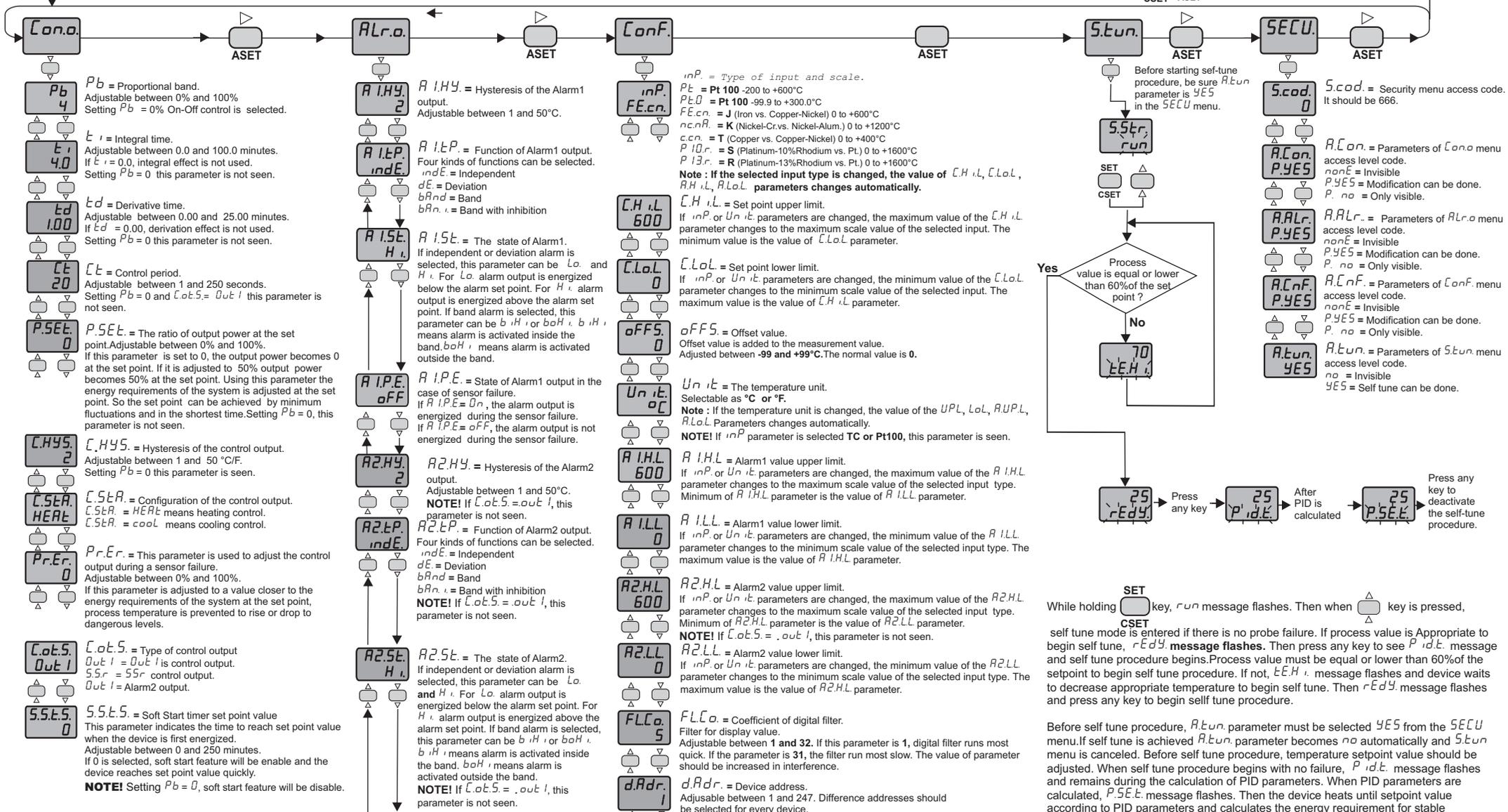
Housing type	Suitable for flush-panel mounting according to DIN 43 700.
Dimensions	W48xH48xD87mm
Weight	Approx. 250g (after packing)
Enclosure material	Self extinguishing plastics.



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 **CSET** **ASET** keys together.



While holding **CSET** key, **run** message flashes. Then when **ASET** key is pressed, self tune mode is entered if there is no probe failure. If process value is appropriate to begin self tune, **rEdy** message flashes. Then press any key to see **P idt** message and self tune procedure begins. Process value must be equal or lower than 60% of the setpoint to begin self tune procedure. If not, **EEH i** message flashes and device waits to decrease appropriate temperature to begin self tune. Then **rEdy** message flashes and press any key to begin self tune procedure.

Before self tune procedure, **Atun** parameter must be selected **YES** from the **SECU** menu. If self tune is achieved **Atun** parameter becomes **no** automatically and **Stun** menu is canceled. Before self tune procedure, temperature setpoint value should be adjusted. When self tune procedure begins with no failure, **P idt** message flashes and remains during the calculation of PID parameters. When PID parameters are calculated, **PSEL** message flashes. Then the device heats until setpoint value according to PID parameters and calculates the energy requirement for stable temperature and writes **PSEL** parameter as % and run mode enters.

If any key is pressed while **P idt** message flashes, self tune procedure is deactivated before calculation of PID parameters. If any key is pressed while **PSEL** message flashes, then self tune procedure is deactivated as PID parameters are calculated and **PSEL** parameter is done 0.

**TERMS**

(1) Process value during normal operation  
Mnemonic parameter code during programming

(2) Set point during normal operation.  
Data value during programming

(3) Increment key during normal operation and programming  
Parameter selection key during programming

(4) Decrement key during normal operation  
If only this key is pressed in normal operation, software version number is seen.  
Parameter selection during programming

(5) Alarm set key during normal operation  
Menu selection key during programming

(6) Heat set key during normal operation  
Parameter selection key during programming

(1) PV display	4 digits 7 segment red LED
(2) SV display	4 digits 7 segment yellow LED
Character heights	PV display :7 mm
	SV display :7 mm
(3),(4),(5),(6) Keypad	Micro switch
(7) State indicator	3 red LEDs for Control, Alarm1 and SSR outputs

**ALARM1 AND ALARM2 OUTPUT TYPES**

**Independent Alarm**  
 $R1.t.P = indE$

**Deviation Alarm**  
 $R1.t.P = dE$

**Band Alarm**  
 $R1.t.P = bAnd$

(ASV min = beginning of scale  
ASV max = end of scale)

(ASV min. = -300, ASV max. = +300)  
(If  $inP = Pt.0$ , ASV min. = -30.0, ASV max. = +30.0)

SV = Set point of CONT output ASV = Set point of alarm output

**Band Alarm With Inhibition**  
 $R1.t.P = bAn.i$

SV = Set point of CONT output ASV = Set point of AL1 output (ASV min. = 0, ASV max. = 300)

**MODIFICATION OF CONTROL AND ALARM SET POINTS**

When CSET is released, it returns to normal operation.

First, press and hold **CSET** key until the message **C.SET** appears on the display. Then, the value is adjusted by using **SET** and **ASET** keys.

When ASET is released, it returns to normal operation.

First, press and hold **ASET** key, alarm setpoint value appears on the display. Then, the value is adjusted by using **SET** and **ASET** keys.

If **Lo.t.S** different from **out.i**, Alarm1 and Alarm2 setpoint values can be adjusted in sequence when per press **ASET** key.

**NOTE:** The maximum of **C.SET** is the value of **CH.iL** parameter and the minimum of it is the value of **CL.oL** parameter.  
If independent alarm is selected, **A1.SE** and **A2.SE** values can be adjusted between the limits of the full scale.  
If deviation alarm is selected, **A1.SE** and **A2.SE** values can be adjusted between -300 and +300.  
If band alarm is selected, **A1.SE** and **A2.SE** values can be adjusted between 0 and +300.

**Error Messages**

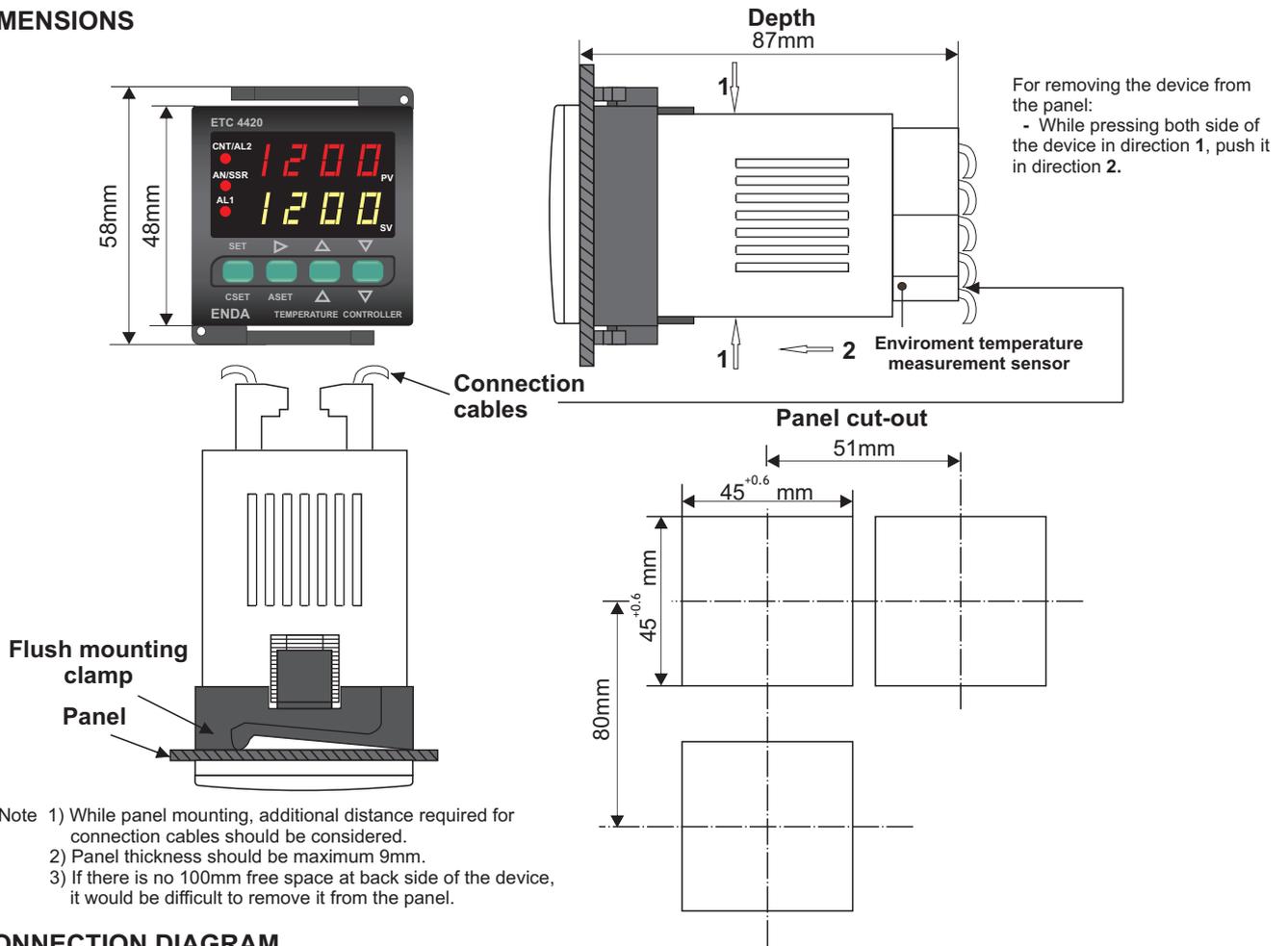
Temperature value is higher than the scale

Temperature value is lower than the scale

Temperature sensor is broken or over temperature

Pt 100 or a sensor line is short circuited

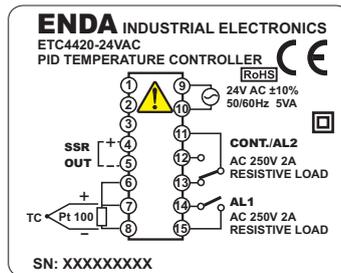
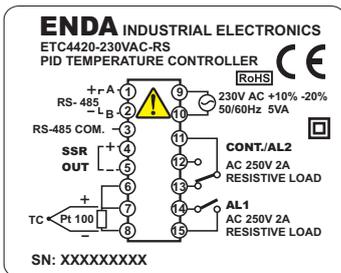
## DIMENSIONS



## CONNECTION DIAGRAM



ENDA ETC4420 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.

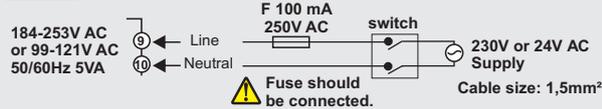


Logic output of the instrument is not electrically insulated from the internal circuits. Therefore, when using a grounding thermocouple, do not connect the logic output terminals to the ground.

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 operator.

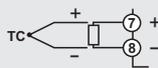
### NOTE :

#### SUPPLY :

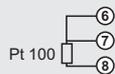


#### SENSOR INPUT :

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 6 and 7 must be short circuited.



Holding screw  
0.4-0.5Nm



Equipment is protected throughout  
by DOUBLE INSULATION.

Order Code : ETC4420-□□□□□□-□□  
1 2

#### 1- Supply Voltage

230VAC...230V 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