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.

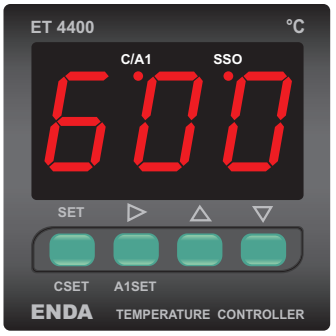
# ENDA ET4400 PID TEMPERATURE CONTROLLER

## Thank you for choosing ENDA ET4400 temperature controller .

* 48 x 48mm sized.
* Selectable SSO or relay control output.
* Automatic calculation of PID parameters. (SELF TUNE).
* Selectable heating/cooling control.

The system before starting the first time,the system PID parameters should be entered if known ,otherwise Self-Tune property must not be operated.

* Soft-Start feature.
* Alarm or control output can be programmed as C/A1 relay output.
* Selectable heating and cooling control.
* For input offset feature.
* In the case of sensor failure periodical running or relay state can be selected.
* For keypad protection levels.
* CE marked according to European Norms.




CE RoHS Compliant

## TECHNICAL SPECIFICATIONS

| Input type | | Temperature Range °C | Temperature Range °F | Accuracy |
|---|---|---|---|---|
| J (Fe-CuNi) Thermocouple | EN 60584 | 0... 600 °C | +32... +1112 °F | 0,5% (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. |
| Protection class | According to EN 60529 Front panel : IP65<br>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 | 2.5mm² screw-terminal connections |
| Line resistance | For thermocouple max.100ohm |
| 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 | |
|---|---|
| C/A1 | Relay : 250V AC, 2A ( for resistive load), NO/NC. Selectable as Control or Alarm1 output. |
| SSO out | Selectable logic control output. (Max 12V 20mA) |
| Life expectancy for relay | Without load switching 30.000.000 mechanical operation;250V AC,on the 2A resistive load 300.000 electrical switching |

| CONTROL | |
|---|---|
| Control type | Single set-point and alarm control |
| Contro algorithm | On-Off / P (selectable) |
| A/D converter | 12 bit |
| Sampling time | 500ms |
| Proportional band | Adjustable between 0% and 100%. If Pb=%0, On-Off control is selected. |
| Integral time | 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. |

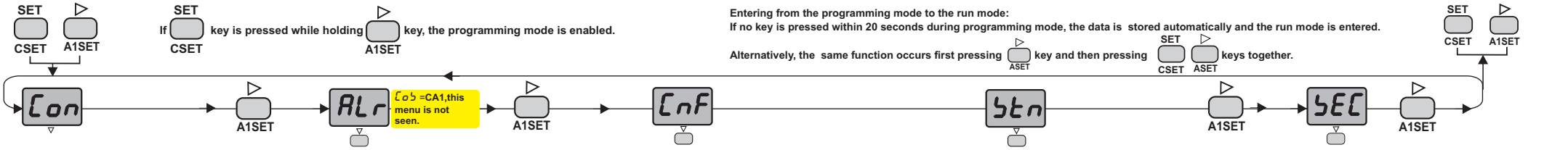
While cleaning the device, solvents (thinner, benzine, acid etc.) or corrosive materials must not be used.

SET + CSET / A1SET

If SET + CSET key is pressed while holding A1SET key, the programming mode is enabled.

**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 + CSET keys together.




**Pb** = Proportional band.
Adjustable between 0% and 100%
Setting Pb = 0% On-Off control is selected.

**ChY** = Hysteresis of the control output.
Adjustable between 1 and 50 °C/F.
Setting Pb = 0 this parameter is seen.

**t i** =Control output integral time.
Adjustable between 0 and 999 minutes.Unit: 0.1 minute.
⚠ Pb parameter is different from "0", this parameter appears.

**td** =Control output derivative time.
Adjustable between 0 and 999 minutes.Unit: 0.1 minute.
⚠ Pb parameter is different from "0", this parameter appears.

**Ct** = Control period.
Adjustable between 1 and 250 seconds.
Setting Pb = 0 and this parameter is not seen.

**PSt** = The ratio of output power at the set point.Adjustable between 0% and 100%.
If this parameter is set to 0, the output power becomes 0 at the set point. If it is adjusted to 50% output power becomes 50% at the set point. Using this parameter the energy requirements of the system is adjusted at the set point. So the set point can be achieved by minimum fluctuations and in the shortest time.Setting Pb = 0, this parameter is not seen.

**PEr** = This parameter is used to adjust the control output during a sensor failure.
Adjustable between 0% and 100%.
If this parameter is adjusted to a value closer to the energy requirements of the system at the set point, process temperature is prevented to rise or drop to dangerous levels.

**SSt** =Sofy starter timer set value
This parameter indicates the time to reach set point value when the device is first enegised.
Adjustable between 0 and 250 minutes.
If 0 is selected, soft start feature will be enable and the device reaches set point value quickly.
⚠ Setting Pb = 0, sotf start feature will be disable.

**CtY** = Control output type.
CtY = HEA means heating control.
CtY = coo means cooling control.

**AHY** = Hysteresis of the Alarm1 output.
Adjustable between 1 and 50°C.

**A1tP**. = Function of Alarm1 output.
Four kinds of functions can be selected.
indE. = Independent
dE. = Deviation
bAnd = Band
bAn. i. = Band with inhibition

**A1.St**. = The state of Alarm1.
If independent or deviation alarm is selected, this parameter can be Lo. and Hi. For Lo. alarm output is energized below the alarm set point. For Hi. alarm output is energized above the alarm set point. If band alarm is selected, this parameter can be Hi , means alarm is activated inside the band.Lo means alarm is activated outside the band.
⚠ AtP=bA i, this parameter is not seen.

State of Alarm1 output in the case of sensor failure.
If AEr= On , the alarm output is energized during the sensor failure.
If AEr= oFF, the alarm output is not energized during the sensor failure.

**Cos** = Control output selection value
CA1 = C/A1 control output.
SSr = SSO control output active.
SSO control output is selected,Out1 output runs as an alarm output.
SSr = PID control output.

**FLc**= Coefficient of digital filter.
Filter for display value.
Adjustable between 1 and 200. If this parameter is 1, digital filter runs most quick. If the parameter is 200, the filter run most slow. The value of parameter should be increased in interference.

**oFS**. = Offset value.
Offset value is added to the measurement value.
Adjusted between -99 and +99°C.The normal value is 0.

**Uni** = The temperature unit.
Selectable as °C or °F.
Note : If the temperature unit is changed, the value of the CSL., CSH, ASL, ASH Parameters changes automatically.

**CSL** = Set value lower limit.
If Uni parameter is changed, the minimum value of the CSL parameter changes to the minimum scale of as minimum scale value. The maximum value is the value of CSH parater.

**CSH** = Set value upper limit.
If Uni parameter is changed,the maximum value of the CSH parameter changes to the maximum scale of as maximum scale value. The minimum value is the value of CSL parameter.

**ASL** = Alarm1 value lower limit.
If Uni parameter is changed,the minimum value of the ASL parameter 's changes minimum value.The maximum value is the value of ASH parameter.
⚠ Cos = CA1 ,this parameter is not seen.

**ASH** = Alarm1 value upper limit.
If Uni parameter is changed,the maximum value of the ASH parameter's changes maximum value. The maximum value is the value of ASL parameter.
⚠ Cos = CA1, this parameter is not seen.

**StU** = Self tune control
no= Self tune is stopped.
YES= Self tune is started.
Pressing key after the yes or no selection, selt tune is started or stopped.

Selt tune begins when the measurement value display 25 and PtU messages are shown alternately.Self tune process completed automatically after the StU parameter is done no and is entered to the working mode.
Self tune process begin when the measured temperature is expected fall below 60% of the set value the display shows the measured temperature 80 and tHi messages alternately.Expected to fall below the temperature set point 60% evolved and then self tune process starts automatically.If asked to abort the self tune process,stu parameter is done no and is pressed key.

**Scd**= Security menu access code.
It should be 440.

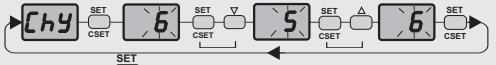
**CoA** = Parameters of Con menu security access level code.
non = Invisible
PyE = Modification can be done.
Pno= Only visible.

**ALA**= Parameters of ALr menu security access level code.
non = Invisible
PyE = Modification can be done.
Pno = Only visible.

**CnA** = Parameters of CnF menu security access level code.
non = Invisible.
PyE = Modification can be done.
Pno = Onyl visible

**StA** = StU menu. Security level parameter.
non = Invisible
PyE = Modification can be done.

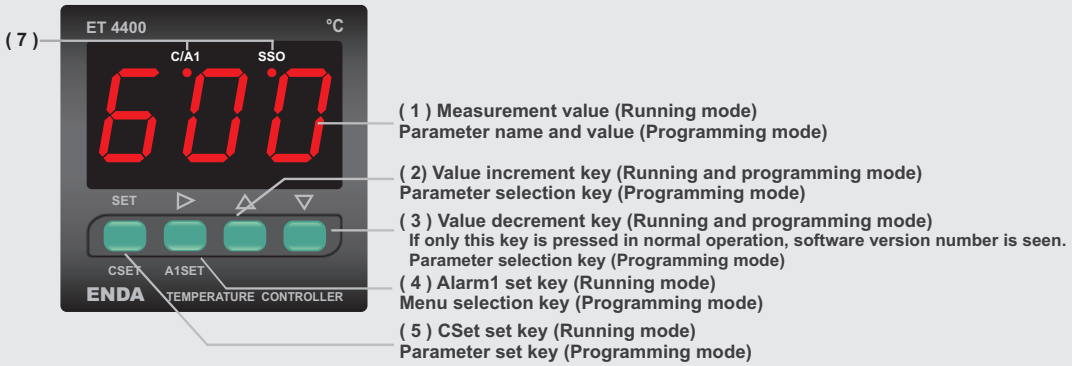
### Modification Of Parameter Diagram




When holding SET + CSET key, the value of parameter flashes and using keys the requested value can be adjusted.

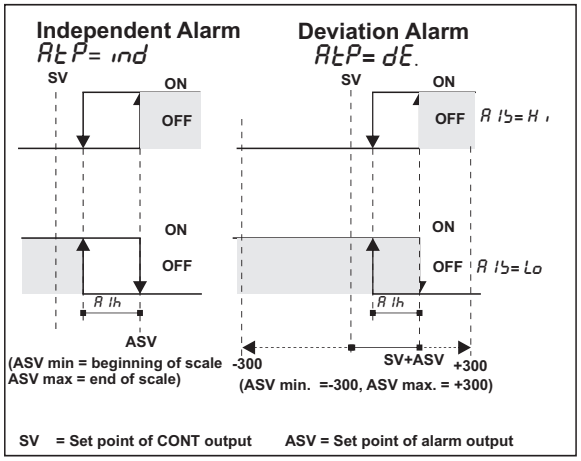
If key is pressed and held 0.6 seconds, the value of the selected parameter changes rapidly. If waited enough,the value increases 100 at each step. After 1 second following the release of the key, initial condition is returned.The same procedure is valid for the decrement key.

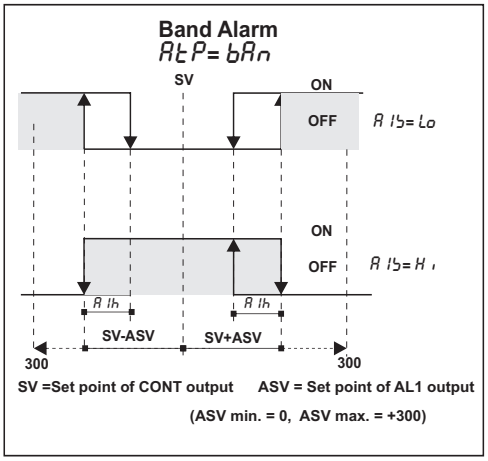
## TERMS

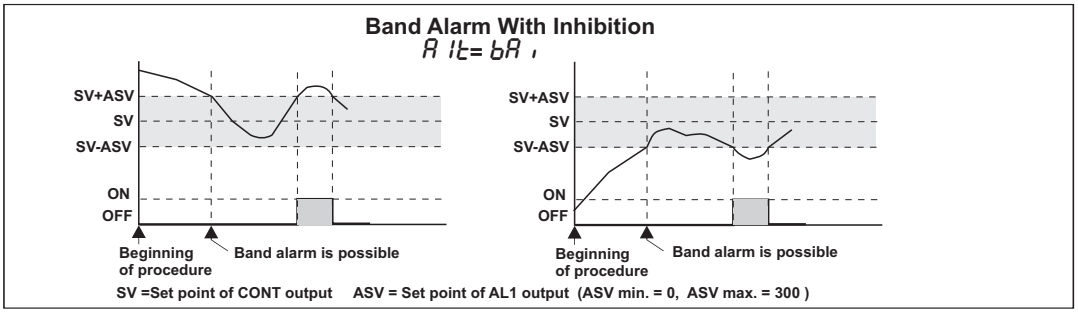



| | |
|---|---|
| ( 1 ) PV display | 3 digits,7 segment red LED display |
| Character heights | PV display : 14 mm |
| ( 2 ),( 3 ),( 4 ),( 5 ) Keypadı | Micro switch |
| ( 7 ) State indicator | 2 red LEDS for control,Alarm1 and SSO outputs |

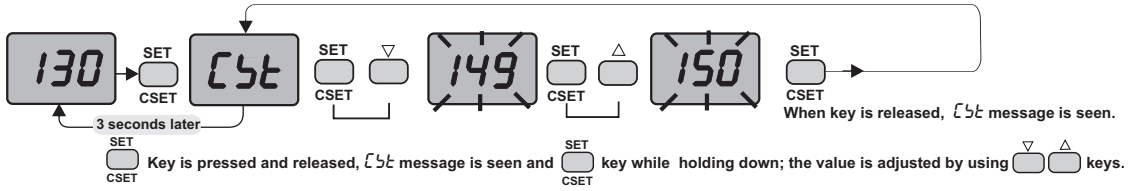
## ALARM1 OUTPUT TYPES

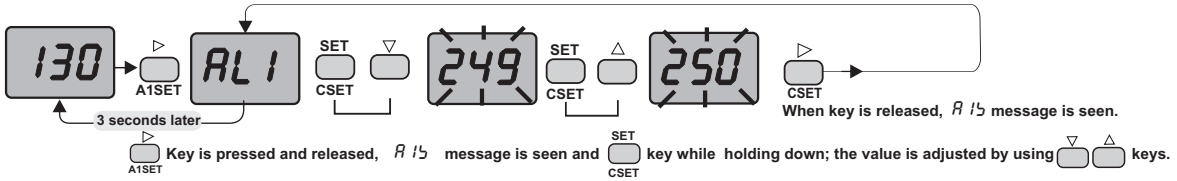



## MODIFICATION OF CONTROL AND ALARM SET POINTS

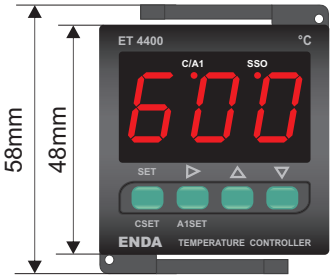


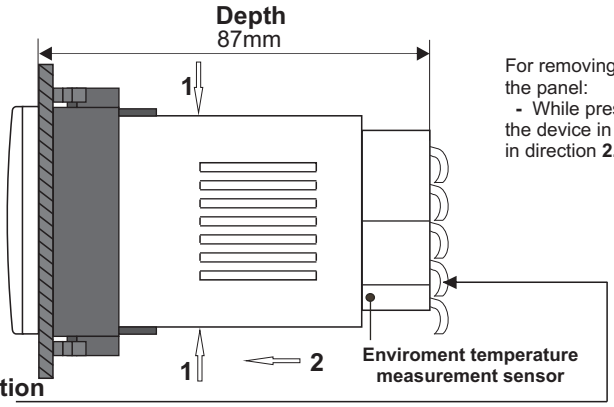




**NOTE:** The minimum of CSt is the value of CSL parameter and the maximum of it is the value of CSH parameter. Alarm type;the independent alarm is selected,A 1S value full scale can be adjusted within limits.
. If deviation alarm is selected, A 1S value can be adjusted between 0 and +99.

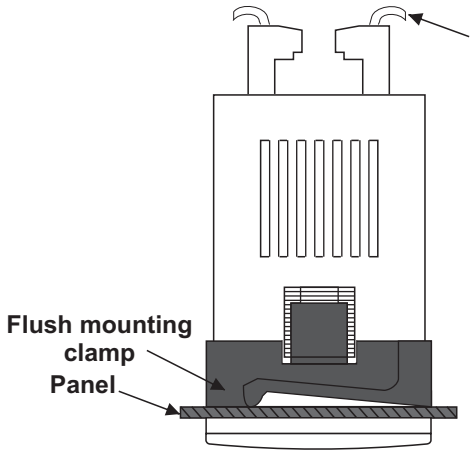
**Sensor Error Messages**

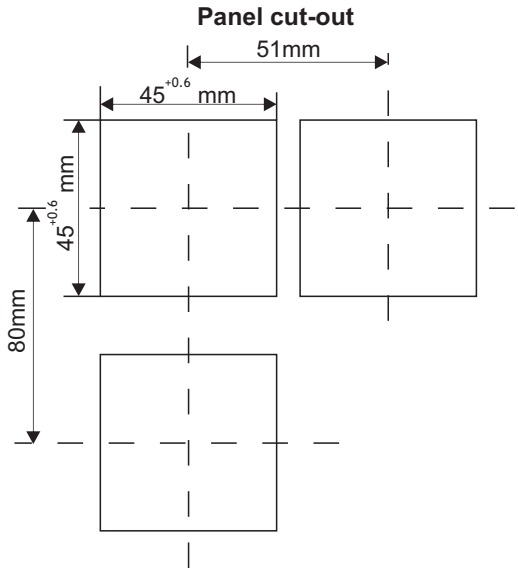
## DIMENSIONS




For removing the device from the panel:
- While pressing both side of the device in direction **1**, push it in direction **2.**

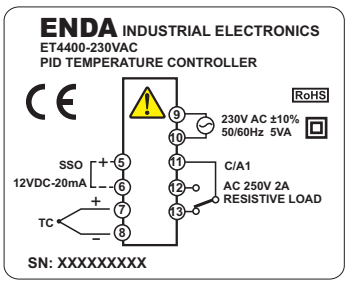


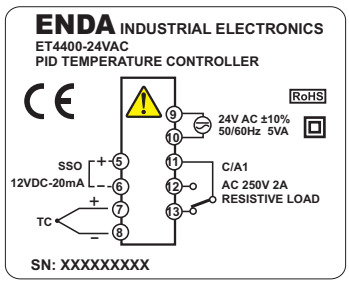




Note 1) While panel mounting, additional distance required for connection cables should be considered.
2) Panel thickness should be maximum 9mm.
3) If there is no 100mm free space at back side of the device, it would be difficult to remove it from the panel.

## CONNECTION DIAGRAM

ENDA ET4400 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.

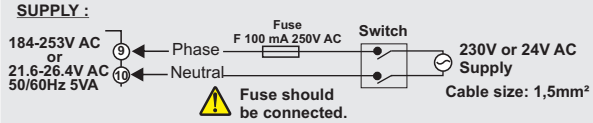
Note 1) Mains supply cords shall meet the requirements of IEC 60227 or IEC 60245.
2) In accordance with the safety regulations, the power supply switch shall bring the identification of the relevant instrument and it should be easily accessible by the operator.

**Holding screw 0.4-0.5Nm**

**Equipment is protected throughout by DOUBLE INSULATION.**

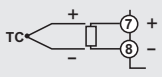
**NOTE :**

**SUPPLY :**




**SENSOR INPUT :**

**For J 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 .**




**Order Code : ET4400-** □□□□□□
**1**

**1- Supply Voltage**
230VAC...230V AC
24VAC.....24V AC
SM.....9-30V DC / 7-24V AC

**SİSEL MÜHENDİSLİK ELEKTRONİK SAN. VE TİC. A.Ş.**
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