




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 ET2011 PID TEMPERATURE CONTROLLER

Thank you for choosing ENDA ET2011 temperature controller.

- \* 77 x 35mm sized.
- \* Selectable dual-set value.
- \* Selectable thermocouple types or Pt100 input.(Selection must be specified in order).
- \* 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 feature.
- \* Input offset feature.
- \* C/A2 Relay output can be programmable as alarm or control output.
- \* Selectable SSR control output.
- \* Selectable heating/cooling control.
- \* In the case of sensor failure periodical running or relay state can be selected.
- \* CE marked according to European Norms.



**RoHS**  
Compliant

### TECHNICAL SPECIFICATIONS

| Input type                             | Temperature range |                  | Accuracy                         |
|--|-------------------|------------------|----------------------------------|
|  | °C                | °F               |                                  |
| Pt 100 Resistance thermometer EN 60751 | -99.9...300.0 °C  | -99.9...543.0 °F | ± 0,5% (of full scale) ± 1 digit |
| Pt 100 Resistance thermometer EN 60751 | -200...600 °C     | -328...1112 °F   | ± 0,5% (of full scale) ± 1 digit |
| J (Fe-CuNi) Thermocouple EN 60584      | 0... 600°C        | +32... +1112°F   | ± 0,5% (of full scale) ± 1 digit |
| K (NiCr-Ni) Thermocouple EN 60584      | 0...1300°C        | +32... +2372°F   | ± 0,5% (of full scale) ± 1 digit |
| T (Cu-CuNi) Thermocouple EN 60584      | 0... 400°C        | +32... +752°F    | ± 0,5% (of full scale) ± 1 digit |
| S (Pt10Rh-Pt) Thermocouple EN 60584    | 0...1700°C        | +32... +3092°F   | ± 0,5% (of full scale) ± 1 digit |
| R (Pt13Rh-Pt) Thermocouple EN 60584    | 0...1700°C        | +32... +3092°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. |               |      |
| 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              | Power connector: 2.5mm <sup>2</sup> screw-terminal, Signal connector: 1,5mm <sup>2</sup> screw-terminal connection. |
| Line resistance     | Max. 100ohm   |
| Data retention      | EEPROM (minimum 10 years)   |
| EMC                 | EN 61326-1: 2006  |
| Safety requirements | EN 61010-1: 2010 (Pollution degree 2, overvoltage category II)  |

#### OUTPUTS

|                           |  |
|---------------------------|--|
| C/A2 output               | Rôle : 250V AC, 8A (for resistive load), Selectable as NO+NC Control or Alarm2 output.<br>Rôle : 250V AC, 16A (for resistive load), Selectable as NO Control or Alarm2 output. |
| SSR output                | Max 20mA 12Volt (as control output)  |
| Life expectancy for relay | Without load 30.000.000 mechanical operation; 250V AC, on the 8A resistive load 100.000 electrical switching   |

#### CONTROL

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

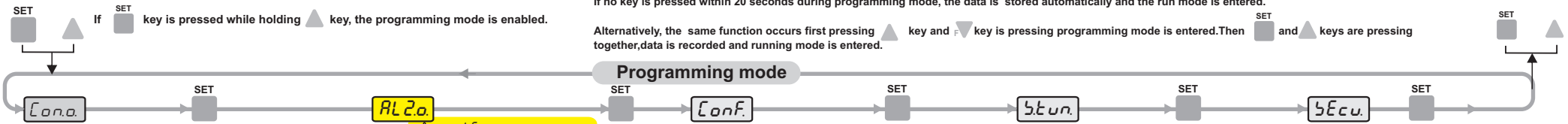
|                    |  |
|--------------------|--|
| Housing type       | Suitable for flush-panel mounting according to DIN 43 700. |
| Dimensions         | W77xH35xD71mm  |
| Weight             | Approx. 200g (after packing)                               |
| Enclosure material | Self extinguishing plastics.                               |



While cleaning the device, solvents (thinner, benzine, 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  $\Delta$  key and  $\nabla$  key is pressing programming mode is entered. Then  $\square$  and  $\Delta$  keys are pressing together, data is recorded and running mode is entered.



**CSLo** CSLo = Control set point lower limit.(for selected output)  
 Adjustable between 0 and CSHi.

**CSHi** CSHi = Control setpoint upper limit.(for selected output)  
 Adjustable between CSLo and Upper scale value.

**CPb** CPb = Proportional band.(for selected output)  
 Adjustable between %0.0 and %100.0.  
 CPb = %0.0, On-Off control is selected.

**CHYb** CHYb = Hysteresis of the output.(for selected output)  
 Adjustable between 1 and 50 °C.  
 CHYb = 0, this parameter is active.

**CEI** CEI = Integral time.(for selected output)  
 Adjustable between 0 and 100.0 minutes.  
 CEI = 0.0, integral impact is disable.  
 CEI parameter is different from "0", this parameter appears.

**CEd** CEd = Derivative time.(for selected output)  
 Adjustable between 0 and 25.00 minutes.  
 CEd = 0.0, derivative time is disable.  
 CEd parameter is different from "0", this parameter appears.

**CEt** CEt = Period time.(for selected output)  
 Adjustable between 1 and 250 second.  
 CEt parameter is different from "0", this parameter appears.

**CEPst** CEPst = The ratio of output power at the setpoint. Adjustable between %0 and %100.

**CEPs** CEPs = The percentage of faulty sensor selected output power. Adjustable between %0 and %100.

**SESt** SESt = 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, soft start feature will be disable.

**CEYP** CEYP = Control output type  
 CEYP = HEAt means heatign control.  
 CEYP = COol means cooling control.

**AL2L** AL2L = Alarm2 set value lower limit.  
 Adjustable between 0 and AL2H parameter value.

**AL2H** AL2H = Alarm2 set value upper limit.  
 Adjustable between AL2L parameter value and upper scale value.

**AL2HY** AL2HY = Hysteresis of the Alarm2 output.  
 Adjustable between 1 and 50 °C.

**AL2P** AL2P = Function of Alarm2 type.  
 Four kinds of functions can be selected.

**AL2E** AL2E = The state of Alarm2 output.  
 Hi = If A2 output is above the set value.(on)  
 Lo = If A2 output is above the set value.(off)

**AL2Er** AL2Er = State of Alarm2 output in the case of sensor failure.  
 on = A2 output is probe failure (on).  
 off = A2 output is probe failure (off).

**inPt** inPt = Input type selection.  
 FEcn = J type, ncnR = K type, ccn = T type  
 P10r = S type, P13r = R type thermocouple selection.  
 This parameter varies when changing some parameters.

**Unit** Unit = The temperature unit.  
 OF = °C, OF = °F  
 (This parameter varies when changing some parameters.)

**FLtr** FLtr = 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.

**CoSE** CoSE = Control output selection  
 C-A2 = C/A2 (Relay) output selection  
 SSR = SSR output selection

**OFFs** OFFs = Offset value.  
 Offset value is added to the measurement value.  
 Adjusted between -100 and +100°C. The normal value is 0.

**FFEL** FFEL = Function key setting parameter  
 nonE = Function key is off.  
 CEbR = The function key with 2.set value is used.  
 nRnu = Manual mode can be achieved with the function key.  
 dBPo = Only the temperature display mode is entered with function key.

**nsEt** nsEt = The percentage of manual output parameter.  
 Adjustable between %0 and %100.  
 This parameter allows manual adjustment of the output power when the manual output selection.  
 CEpb = 0, this parameter is not seen.

**SECo** SECo = Self tune control parameter.  
 If both  $\square$  and  $\Delta$  keys are pressed, SESt message is displayed on the screen and self tune process is started automatically.

If both  $\square$  and  $\nabla$  keys are pressed, no message is displayed on the screen and self tune process is stopped.

Self tune begins when the measurement, Pidt. message and measurement value are shown alternately. Self tune process completed automatically after the SECo parameter is done no and is entered to the working mode. Self tune process begin when the measured temperature is expected fall below 90% of the set value the display shows EPH message 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, SECo parameter is done no and  $\nabla$  key is pressed.

**SECoD** SECoD = Security menu access code.  
 It should be 2011.

**CoSc** CoSc = Parameters of Cono menu security access level code.  
 nonE = Invisible.  
 PSEb = Modification can be done.  
 Pno = Only visible.  
 AL2Sc = Parameters of AL2o menu security access level code.  
 nonE = Invisible.  
 PSEb = Modification can be done.  
 Pno = Only visible.

**ConSc** ConSc = Parameters of Conf menu security access level code.  
 nonE = Invisible.  
 PSEb = Modification can be done.  
 Pno = Only visible.

**SEStSc** SEStSc = Parameters of SESt menu security access level code.  
 nonE = Invisible.  
 PSEb = Modification can be done.

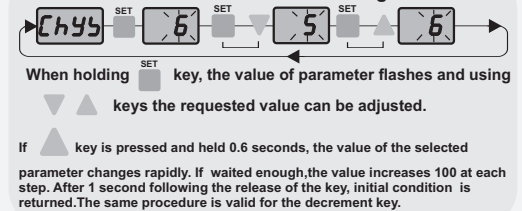
**dEFP** dEFP = Parameters of Conf menu security access level code.  
 no = Parameter settings are not change.  
 SESt = Parameter setting will be restored.

While the parameter names appear, if  $\Delta$  and  $\nabla$  keys are pressed together, returns to the program mode.

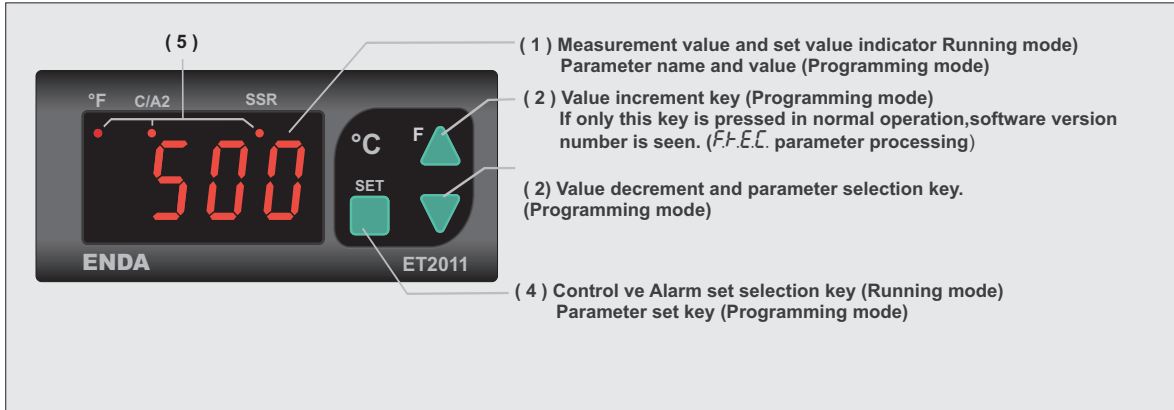
**DEFAULT PARAMETERS**

| Set parameters | Control output parameters |             | Alarm2 output parameters |             | Configuration parameters |             |          | Self tune parameters |          | Security parameters |        |      |
|----------------|---------------------------|-------------|--------------------------|-------------|--------------------------|-------------|----------|----------------------|----------|---------------------|--------|------|
|                | TC input                  | Pt100 input | TC input                 | Pt100 input | TC input                 | Pt100 input | TC input | Pt100 input          | TC input | Pt100 input         |        |      |
| CSLo           | 400                       |             | AL2L                     | 0           | -200                     | inPt        | FEcn     | PT                   | AL2Er    | no                  | CoSc   | PSEb |
| CSHi           | 400                       | 600         | AL2H                     | 600         |                          | Unit        | OF       |                      |          |                     | AL2Sc  | PSEb |
| CPb            | 500                       | 0           | AL2HY                    | 2           |                          | FLtr        | 25       |                      |          |                     | ConSc  | PSEb |
| CHYb           |                           | 2           | AL2P                     | indE        |                          | CoSE        | C-R2     |                      |          |                     | SEStSc | PSEb |
| CEI            |                           | 4.0         | AL2E                     | Hi          |                          | OFFs        | 0        |                      |          |                     | dEFP   | no   |
| CEd            |                           | 1.00        | AL2Er                    | on          |                          | FFEL        | nonE     |                      |          |                     |        |      |
| CEt            |                           | 20          |                          |             |                          | nsEt        | 50       |                      |          |                     |        |      |
| CEPst          |                           | 0           |                          |             |                          |             |          |                      |          |                     |        |      |
| CEPs           |                           | 0           |                          |             |                          |             |          |                      |          |                     |        |      |
| SESt           |                           | 0           |                          |             |                          |             |          |                      |          |                     |        |      |
| CEYP           |                           | HEAt        |                          |             |                          |             |          |                      |          |                     |        |      |

**Modification Of Parameter Diagram**

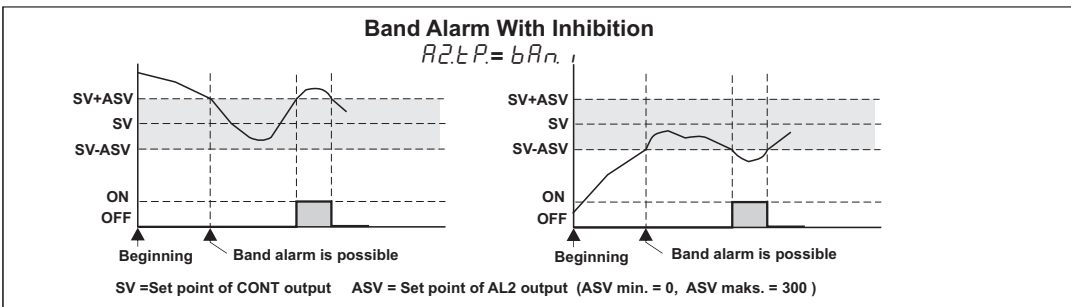
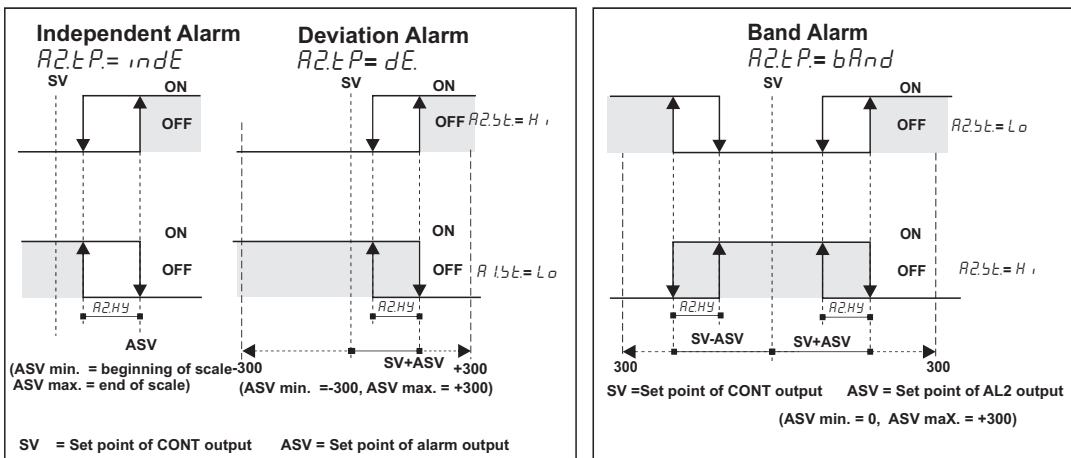


# TERMS

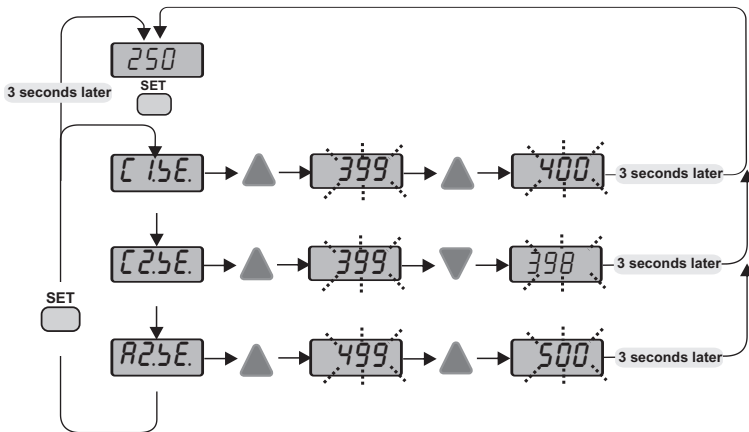


|                       |  |
|-----------------------|--|
| (1) PV and SV display | 7 segment, 4 digits red LED display                  |
| Character heights     | 12 mm  |
| (2),(3),(4) Keypad    | Mikro switch   |
| (5) State indicator   | For control, Alarm1 and SSR outputs 3 digits red LED |

# ALARM2 OUTPUT TYPES



# MODIFICATION OF CONTROL AND ALARM SET POINTS



**ERROR MESSAGES**

- PFR** Sensor is broken
- Temperature value is higher than the value
- Temperature value is lower than the scale
- P5C** Pt100 sensor is short circuit

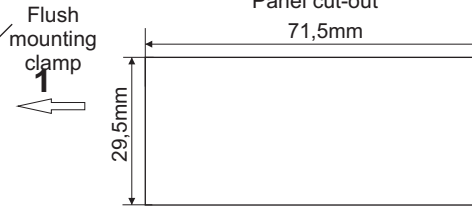
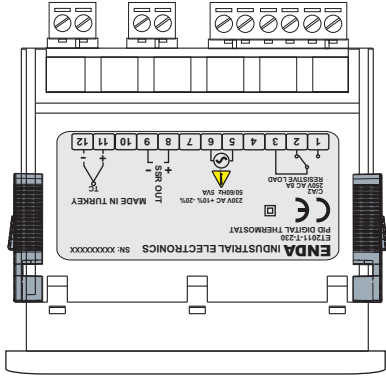
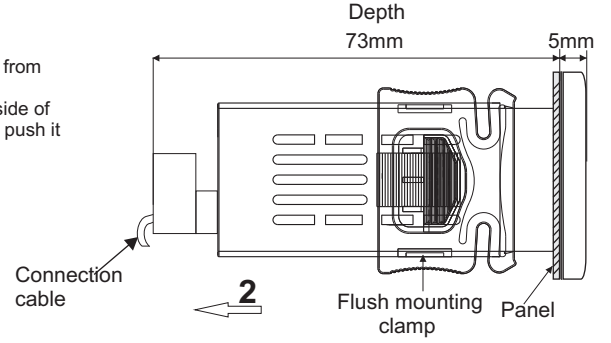
F.F.E.C. parameter, is set to the C25R parameter, this parameter is displayed.

C05E parameter is set to the output of SSR, this parameter is seen.

## 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) Panel thickness should be maximum 7mm.
- 2) If there is no 60mm free space at back side of the device, it would be difficult to remove it from the panel.

Order Code: ET2011-X- XXX- X

**Input selection**  
RT.....PT100 input  
T.....TC input

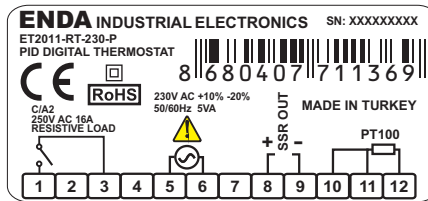
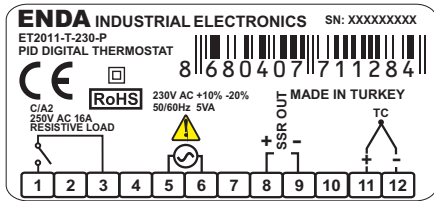
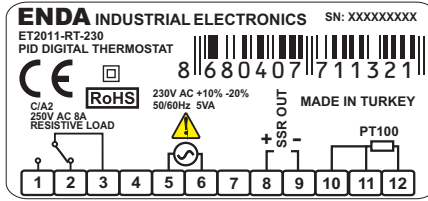
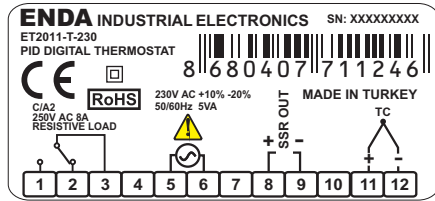
**Supply voltage**  
230VAC.....230V AC  
110VAC.....110V AC  
024VAC.....24V AC  
SM.....9-30VDC/7-24V AC

**Contact current selection**  
None.....8A contact output  
P.....16A contact output

## CONNECTION DIAGRAM



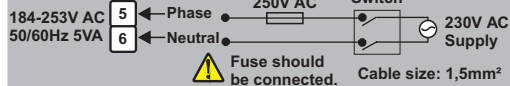
ENDA ET2011 is intended for installation in control panels. Make sure that the device is used only for intended purpose. The shielding must be grounded on the instrument side. During an installation, all of the cables that are connected to the device must be free of energy. The device must be protected against inadmissible humidity, vibrations, severe soiling. 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.



Holding screw  
0.4-0.5Nm

Equipment is protected throughout  
by DOUBLE INSULATION.

**NOTE :**  
**SUPPLY:**



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.