Read this document carefully before using this device. The guarantee will be expired by device demages 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.

- 35x77mm sized.
- Dual setpoint selection.
- Thermocouple types or PT100 input selection (specify at order).
- PID Self Tune.
  - **Selftune automatic PID calculation or manually enter PID parameters if known.**
- Soft-Start feature.
- Zero point input shift.
- Alarm or temperature control assignment for CA/2 relay output.
- SSR Output control selection.
- Heating/Cooling control selection.
- Incase of sensor failure, manual control or relay positions can be selected.
- CE Marked According to European Norms.

RoHS Compliant

Order Code : ET2011 - □□ – □□□□□□□ – □□

1- Input Selection
RT....PT100 Input
T.....TC Input

2- Supply Voltage
230VAC.....230V AC
110VAC.....110V AC
024VAC.....24V AC
SM.....10-30VDC/8-24V AC

3- Relay Current Selection
Blank.....8A Contact Output
P.....16A Contact Output

TECHNICAL SPECIFICATIONS

Input Type		Scale Range °C	Scale Range °F	Accuracy
PT100 Resistance thermometer	EN 60751	-99.9...300.0 °C	-99.9...543.0 °F	± 0,5% (of full scale) ± 1 digit
PT100 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% Relative humidity for temperatures up to 31°C, decreasing linearly to 50% at 40°C.
Rated Pollution Degree	According to EN 60529 ; Front Panel : IP62, Rear Panel : IP20
Height	Max. 2000m

KEEP AWAY device from exposed to corrosive, volatile and flammable gases or liquids and DO NOT USE the device in similar hazardous locations.

ELECTRICAL CHARACTERISTICS	
Supply	230V AC / 110V AC +%10 -%20 or 24V AC ±%10, 50/60Hz or 10-30V DC / 8-24V AC ±%10 SMPS
Power Consumption	Max. 5VA
Wiring	Power connector: 2.5mm²' screw-terminal conenction.
Line Resistance	Max. 100Ω
Data Retention	EEPROM (minimum 10 years).
EMC	EN 61326-1: 2013
Safety Requirements	EN 61010-1: 2010 (Pollution degree 2, overvoltage category II)

OUTPUTS	
C/A2 Output	Relay : 250V AC, 8A (for resistive load), Selectable as NO+NC Control or Alarm2 output. Relay : 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	Mechanical 30.000.000; Electrical 100.000 operation. 250V AC, 8A and 16A (resistive load).

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	Can be adjusted between 0% and 100%. If Pb = 0%, On-Off control is selected.
Control Period	Can be adjusted between 1 and 250 seconds.
Hysteresis	Can be adjusted between 1 and 50°C/F.
Output Power	The ratio of power at a setpoint can be adjusted between 0% and 100%.

HOUSING	
Housing Type	Suitable for flush-panel mounting according to DIN 43 700.
Dimensions	W77xH35xD71mm
Weight	Approx. 215g (after packing)
Enclosure Material	Self extinguishing plastics.

Avoid any liquid contact when the device is switched on.
DO NOT clean the device with solvent (thinner, gasoline, acid etc.) and / or abrasive cleaning agents.

sisel
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SET

If SET key is pressed while holding ▲ key, the Programming Mode is enabled.

⚠ *To returning the "Programming Mode" (to main tabs) during parameter settings, ▲ + ▼ keys are pressed together.*

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 Running Mode is entered.

Alternatively, the same function occurs first pressing ▲ key and ▼ key is pressing Programming Mode is entered.Then SET and ▲ keys are pressing together, data is recorded and Running Mode is entered.

SET ▲

Programming Mode

`Con.o.` → SET → `AL2.o.` → SET → `ConF.` → SET → `5.tun.` → SET → `5Ecu.` → SET

⚠ ***Following parameter settings will be valid for selected output(s).***

`C.5Lo.` Setpoint Lower Limit for Output Control.
Can be set between 0 and `C.5.H i.` parameter value.

`C.5.H i.` Setpoint Upper Limit for Output Control.
Can be set between 0 and `C.5.Lo.` parameter value.

`C. Pb` Proportional Band Value.
Can be set between 0.0% and 100.0%.
⚠ **On-Off Controll will be activated when the `C.Pb` is set to 0.0%.**

`C.HYS` Output Hysteresis Value.
Can be set between 1 and 50 °C.
⚠ **This parameter will be activated when the `C.Pb` is set to 0.**

`C. t i` Output Integral Value.
Can be set between 0 and 100.0 minutes.
Integral function will be disabled if set to 0.
⚠ **This parameter will be activated when the `C.Pb` parameter is set different from 0.**

`C. td` Derivative Time Value.
Can be set between 0.00 and 25.00 minutes.
Devirate function will be disabled if set to 0.00.
⚠ **This parameter will be activated when the `C.Pb` parameter is set different from 0.**

`C. Ct.` Period Time Value.
Can be set between 1 to 250 seconds.
⚠ **This parameter will be activated when the `C.Pb` parameter is set different from 0.**

`C.PSt` Output Power Ratio at Setpoint Value.
Can be set between 0% and 100%.

`CEPS.` Output Power Ratio at Sensor Failure.
Can be set between 0% and %100.

`S.St.S.` Soft Start Setpoint Value.
This parameter determines how long duration will take to reach to the setpoint value when the device is power-up.
Can be adjusted between 0 and 250 minutes.
⚠ **Soft start feature will be disabled if the `Pb` parameter is set to 0 and its also reaches rapidly to the maximum setpoint value.**

`C.tYP` Control Output Type Selection.
`HEAt` = Heating operation runs.
`CooL` = Heating operation runs.

`AL2.o.`
⚠ **This parameter is available only in SSR featured devices and it appears when the `c.o.5E` parameter is set to different from `C-A2` parameter.**

`A2.5.L` Alarm2 Setpoint Value Lower Limit.
Can be set between 0 and `A2.5.H` parameter value.

`A2.5.H` Alarm2 Setpoint Value Upper Limit.
Can be set between `A2.5.L` parameter value and upper scale value.

`A2HY` Alarm2 Output Hysteresis Value.
Can be adjusted between 1 and 50 °C.

`A2.tP` Alarm Type Selection for Alarm2.
Four different alarm type can be selected.
`indE.` = Independent.
`dE.` = Deviation.
`bAnd` = Band.
`bAn. i` = Band with Inhibition.

`A2.5t.` Alarm2 Output Behavior.
`H i` = A2 Output ON at above setpoint value.
`Lo` = A2 Output OFF at below setpoint value.

`A2.Er.` Alarm2 Output Behavior at Sensor Failure.
`on` = A2 Output ON at probe failure.
`oFF` = A2 Output OFF at probe failure.

`inPt.` Input Type Selection.
`Pt.O` = PT100 Decimal,
`Pt` = PT100,
`FE.cn.` = J type,
`nc.nA.` = K type,
`c.cn.` = T type,
`P 10r.` = S type,
`P 13r.` = R type thermocouple selection.
⚠ **Changing this parameter causes some parameters to change.**

`Un it` Temperature Unit Selection.
`°C` = °C, `°F` = °F
⚠ **Changing this parameter causes some parameters to change.**

`FLtr.` Digital Coefficient Filter.
Provides to filtering the displayed value.
Can be set between 1 and 200 response time value. This parameter value should be increased in interference conditions.

`Co.5E` Control Output Selection.
C-A2 = C/A2 (Relay) output selection.
SSR = SSR output selection.

`oFFS.` Zero Point Input Shift (Offset value).
The offset value is added to the measured value.
This feature is used to eliminate errors that may occur due to the distance of the measuring probe to the measuring point. Can be set to -100 and +100°C. The normal value is 0.

`FtEC` Function Key Parameters.
`nonE` = Function key is OFF.
`C2S.P.` = Function key is used with the 2nd setpoint value.
`mAnu.` = Manual mode is entered with the function key.
`dSPo.` = Only the temperature monitoring mode with the function key.

`m.5Et.` Manual Output Percentage.
Can be set between 0% and 100%.
This parameter provides to set output power manually.
⚠ **This parameter can not be displayed when `C.Pb` parameter is set to 0.**

`St.Co` Self-tune Control Parameter.
If both SET ▲ keys are pressed, `YES` message is displayed on the display and self-tune process starts automatically.
If both SET ▼ keys are pressed, `no` message is displayed on the display and self-tune process stops.

When the self tune begins, `P idt.` message and measurement value are shown alternately.
After the completion of the self tune process, `St.Co.` parameter is automatically changed to `no` and the device returns to Running Mode.
If the measured temperature is higher than 90% of the set value at the beginning of the self tune process, then `tEH i.` message is displayed alternately and the measured temperature is waited to go below %60 of the set value. After that, self tune operation is started automatically.
If it is intended to abort the self tune process, `St.Co.` parameter is changed to `no` and ▼ key is pressed.

`S.Cod` Security Menu Access Code.
To access the security menu, 2011 must be entered.

⚠ **During in `S.Cd = 0`, by holding down the SET key then pressing the ▼ key for 3 seconds, `dEF` parameter is displayed and default settings apllied.**

`Co.Sc.` `Con.o` Menu Security Access.
`nonE` = Menu Invisible.
`PyES` = Modification can be done.
`P. no` = Only visible.

`A2.Sc.` `AL2.o` Menu Security Access.
`nonE` = Menu Invisible.
`PyES` = Modification can be done.
`P. no` = Only visible.

`Cn.Sc.` `ConF` Menu Security Access.
`nonE` = Menu Invisible.
`PyES` = Modification can be done.
`P. no` = Only visible.

`St.Sc.` `5tun` Menu Security Access.
`nonE` = Menu Invisible.
`PyES` = Modification can be done.

Default Parameters

Set parameters

`C.1SE.`	400
`C.2SE.`	400
`A2.SE.`	500

Control output parameters

	TC input	PT100 input
`C.5Lo.`	0	-200
`C.5.H i.`	600	
`C. Pb`	0	
`C.HYS`	2	
`C. t i.`	4.0	
`C. td`	1.00	
`C. Ct.`	20	
`C.PSt`	0	
`CEPS.`	0	
`S.St.S.`	0	
`C.tYP`	HEAt	

Alarm2 output parameters

	TC input	PT100 input
`A2.5L`	0	-200
`A2.5.H`	600	
`A2HY`	2	
`A2.tP`	indE	
`A2.5t.`	H i	
`A2.Er.`	on	

Configuration parameters

	TC input	PT100 input
`inPt.`	FE.cn	Pt.
`Un it`	°C	
`FLtr.`	25	
`Co.5E.`	C-A2	
`oFFS.`	0	
`FtEC`	nonE	
`m.5Et.`	50	

Self tune parameters

	TC input	PT100 input
`A2.Er.`	no	

Security parameters

	TC input	PT100 input
`Co.Sc.`	PyES	
`A2.Sc.`	PyES	
`Cn.Sc.`	PyES	
`St.Sc.`	PyES	

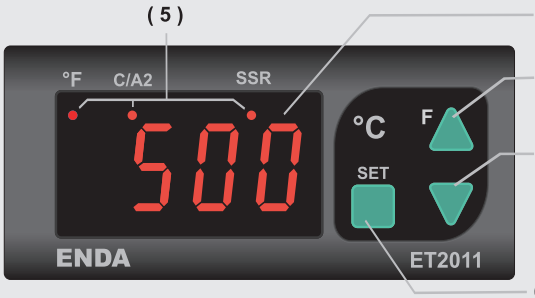
Parameter Setting Diagram

`CHYS` SET `6` SET `5` SET `6`

When holding SET 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) Measurement value and set value indicator Running mode)
Parameter name and value (Programming mode)

(2) Value increment key (Programming mode)
If only this key is pressed in normal operation,software version number is seen. (F.F.E.C. parameter processing)

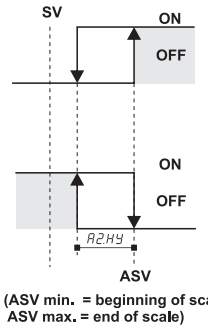
(3) Value decrement and parameter selection key.
(Programming mode)

(4) Control ve Alarm set selection key (Running mode)
Parameter set key (Programming mode)

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

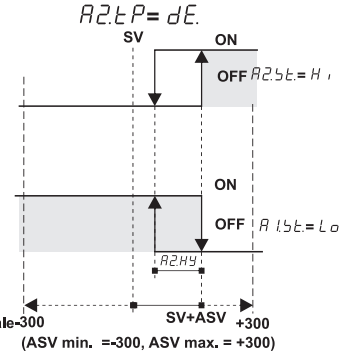
ALARM2 OUTPUT TYPES

Independent Alarm
A2.tP.= indE



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

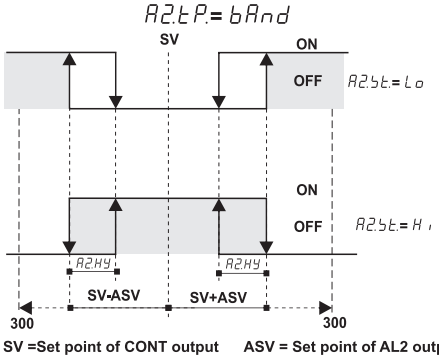
Deviation Alarm
A2.tP= dE.



(ASV min. =-300, ASV max. = +300)

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

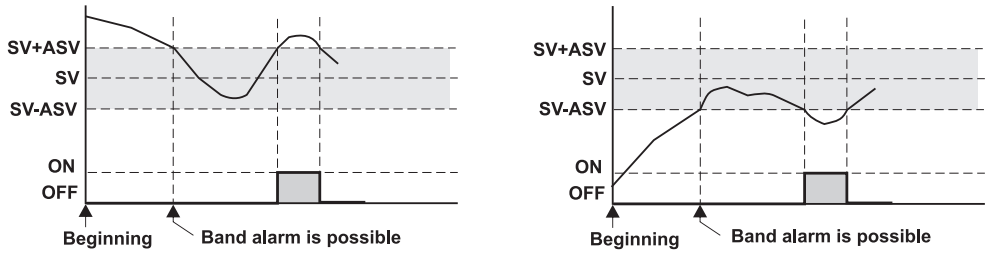
Band Alarm
A2.tP.= bAnd



SV =Set point of CONT output ASV = Set point of AL2 output

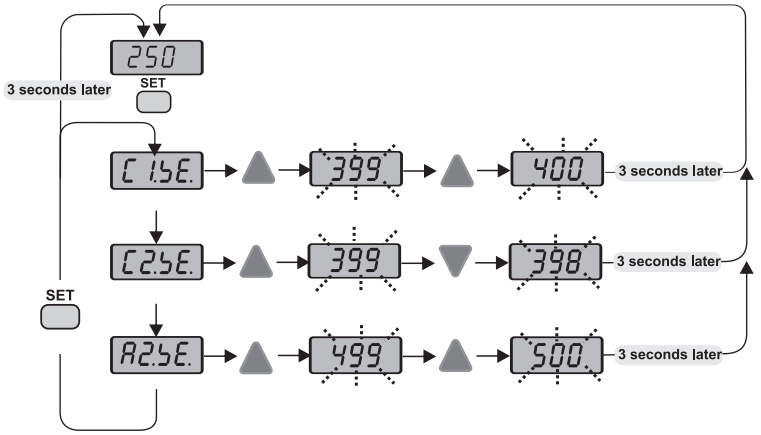
(ASV min. = 0, ASV max. = +300)

Band Alarm With Inhibit
A2.tP.= bAn. i



SV =Set point of CONT output ASV = Set point of AL2 output (ASV min. = 0, ASV max. = 300)

MODIFICATION OF CONTROL AND ALARM SET POINTS



F.F.E.C. parameter, is set to the C2.5.A parameter,this parameter is displayed.

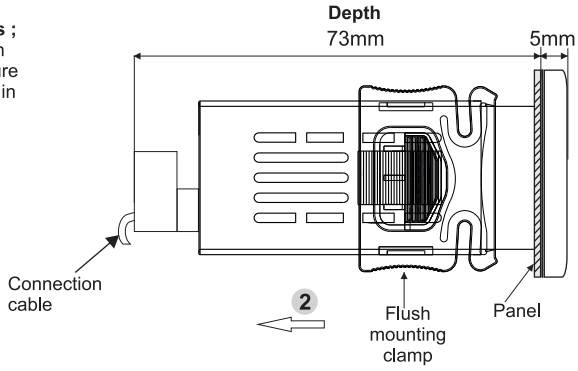
C.o.5E.parameter is set to the output of SSR,this parameter is seen.

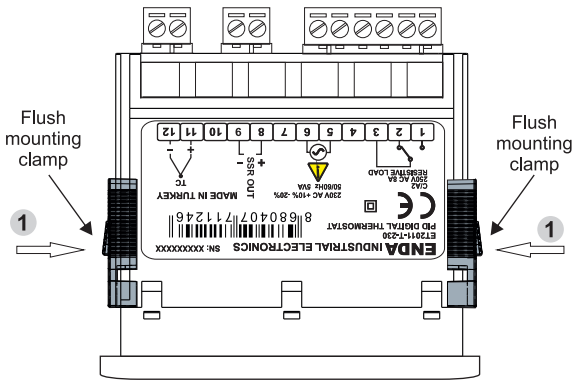
ERROR MESSAGES

PFA	Sensor is broken
----	Temperature value is higher than the value
----	Temperature value is lower than the scale
P5C	PT100 sensor is short circuit

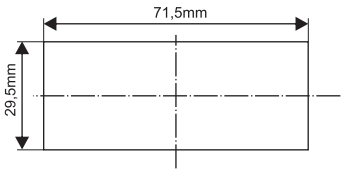
DIMENSIONS

To removing mounting clamps ;
- Push flush mounting clamps in direction (1) as shown in the figure below. Then pull out the clamps in direction (2).





Panel Cut-out

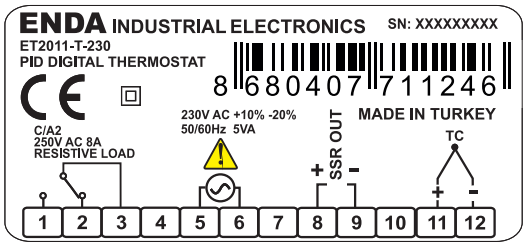


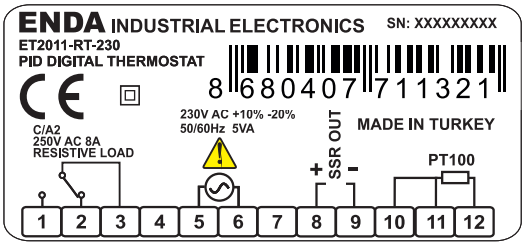
Note :

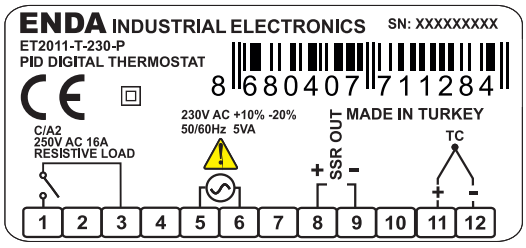
1) Panel thickness should be maximum 7mm.
2) If there is no 60mm free space at back side of the device, it would be difficult to remove it from the panel.

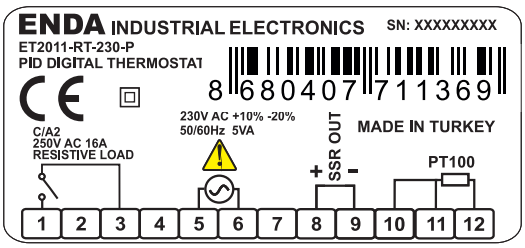
Connection Diagram

ENDA ET2011 is intended for installation within 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 electrical power. 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 out by a qualified staff and must be according to the relevant locally applicable regulations.





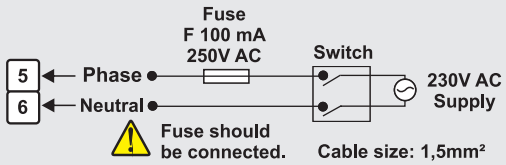




Equipment is protected throughout by DOUBLE INSULATION.

Holding screw 0.4-0.5Nm.

NOTE :
SUPPLY :
184-253V AC
50/60Hz 5VA



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.