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.

*** 77 x 35mm sized.**
*** Selectable dual setpoint.**
*** Selectable thermocouple types or PT100 input. (Specify at order).**
*** Automatic calculation of PID parameters. (SELFTUNE).**

Selftune for automatic PID calculation or manually enter PID parameters if known.

*** Soft-Start feature.**
*** Zero point input shift.**
*** C/A2 Relay output programmable as alarm or control output.**
*** Selectable SSR control output.**
*** Selectable heating/cooling control.**
*** In the case of sensor failure, manual control can be selected.**
*** CE marked according to European Norms.**

CE R HS Compliant

TECHNICAL SPECIFICATIONS

Input type		Temperature range °C	Temperature 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	Relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity 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	Power connector: 2.5mm² screw-terminal, Signal connector: 1,5mm² screw-terminal conenction.
Line resistance	Max. 100ohm
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	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.

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If SET key is pressed while holding ▲ 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 ▲ key and F ▼ key is pressing programming mode is entered.Then SET and ▲ keys are pressing together, data is recorded and running mode is entered.

Programming mode

`Cono.` → SET → `AL2o.` → SET → `conF.` → SET → `5tun.` → SET → `5Ecu.` → SET

⚠ If `co5E` parameter is different from C-A2, this parameter is seen.

`C.5Lo.` `C.5Lo`= Control set point lower limit.(for selected output)
Adjustable between 0 and `C.5H1`

`C.5H1` `C.5H1`= Control setpoint upper limit.(for selected output)
Adjustable between `C.5Lo.` and Upper scale value.

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

`C.HY5` `C.HY5` = Hysteresis of the output.(for selected output)
Adjustable between 1 and 50 °C.
⚠ `C. Pb` = 0,this parameter is active.

`C. t1` `C. t1` = Integral time.(for selected output)
Adjustable between 0 and 100.0 minutes.
`C. t1` = 0.0,integral impact is disable.
⚠ `C. Pb` parameter is different from "0",this parameter appears.

`C. td` `C. td` = Derivative time.(for selected output)
Asjustable between 0.00 and 25.00 minutes.
`C. td` = 0.0, derivative time is disabled.
⚠ `C. Pb` parameter is different from"0",this parameter appears.

`C. Ct.` `C. Ct` = Period time.(for selected output)
Adjustable between 1 and 250 second.
⚠ `C. Pb` parameter is different is different from"0",this parameter appears.

`C.P.5t` `C.P5t` = The ratio of output power at the setpoint.Adjustable between %0 and %100.

`C.E.P5.` `C.EP5` = The percentage of faulty sensor selected output power.
Adjustable between %0 and %100.

`5.5t.5.` `5St.5` =Sofy starter timer set value
This parameter indicates the time to reach set point value when the device is first energised.
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 disabled.

`Ct.YP.` `Ct.YP` = Control output type
`Ct.YP` = `HEAt` means heating control.
`Ct.YP` = `CooL` means cooling control.

⚠ While the parameter names appear, if ▲ and F ▼ keys are pressed together, returns to the program mode.

`AL2o.`

`A2.5L` `A2.5L` = Alarm2 set value lower limit.
Adjustable between 0 and `A2.5H` parameter value.

`A2.5H` `A2.5H` = Alarm2 set value upper limit.
Adjustable between `A2.5L` parameter value and upper scale value.

`A2.HY` `A2HY` = Hysteresis of the Alarm2 output.
Adjustable between 1 and 50 °C.

`A2.tP` `A2tP` = Function of Alarm2 type.
Four kinds of functions can be selected.
`ndE.` = Independddnt alarm (Independent)
`dE.` = Deviation
`bAnd` = Band alarm (Band)
`bAn1` = Band with inhibition

`A2.5t.` `A2.5t.` = The state of Alarm2 output.
`H1` = If A2 output is above the set value. (on)
`Lo` = If A2 output is above the set value (off).

`A2.Er.` `A2Er` = State of Alarm2 output in the case of sensor failure.
`on` = A2 output is probe failure (on).
`oFF` = A2 output is probe failure (off).

`conF.`

`inP.t.` `inPt.` = Input type selection.
`Pt.0` = PT100 Decimal,
`Pt` = PT100,
`FEcn` = J type,
`ncnA` = K type,
`ccn.` = T type,
`P10r` = S type,
`P13r` = R type thermocouple selection.
⚠ This parameter varies when changing some parameters.

`Un.it` `Un.it` = The temperature unit.
`°C` = °C, `°F` = °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.

`C.o.5E` `Co5E` = Control output selection
`C-A2` = C/A2 (Relay) output selection
`SSr` = SSR output selection

`oFF5.` `oFF5` = Offset value.
Offset value is added to the measurement value.
Adjusted between -100 and +100°C.The normal value is 0.

`F.F.E.C.` `FtEC.` = Function key setting parameter
`nonE` = Function key is off.
`C2SA.` = The function key with 2.set value is used.
`AMnu.` = Manual mode can be achieved with the function key.
`d5Po.` = Only the temperature display mode is entered with function key.

`n.5Et.` `n5Et.` = 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.
⚠ `C. Pb`= 0, this parameter is not seen.

`5t.Co` `5t.Cu` = Self tune control parameter.
If both SET ▲ keys are pressed ,`YE5` message is displayed on the screen and selftune process is started automatically.

If both SET ▼ keys are pressed, `no` message is displayed on the screen and selftune process is stopped.

When the self tune begins, `P 1dt.` message and measurement value are shown alternately.
After the completion of the self tune process, `5t.Co.` parameter is automatically changed to `no` and the device returns to working mode.
If the measured temperature is higher than 90% of the set value at the beginning of the self tune process, then `tE.H1` message is shown 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, `5t.Co.` parameter is changed to `no` and ▼ key is pressed.

`5.Cod.` `5Cod` = Security menu access code.
It should be 2011.

`Co.5c.` `Co5c` = Parameters of `Cono.` menu security access level code.
`nonE` = Invisible.
`PYE5` = Modification can be done.
`P. no` = Only visible.

`A2.5c.` `A25c` = Parameters of `AL2o.` menu security access level code.
`nonE` = Invisible.
`PYE5` = Modification can be done.
`P. no` = Only visible.

`Cn.5c.` `Co5c` = Parameters of `conF.` menu security access level code.
`nonE` = Invisible.
`PYE5` = Modification can be done.
`P. no` = Only visible.

`5t.5c.` `5t5c` = Parameters of `5tun.` menu security access level code.
`nonE` = Invisible.
`PYE5` = Modification can be done.

`dEF.P.` `Co5c` = Parameters of `conF.` menu security access level code.
`no` = Parameter settings are not change.
`YE5` = Parameter setting will be restored.

DEFAULT PARAMETERS

Set parameters

`C.15E.`	`400`
`C.25E.`	`400`
`A2.5E.`	`500`

Control output parameters

	TC input	PT100 input
`C.5Lo.`	0	-200
`C.5H1`	600	
`C. Pb`	0	
`C.HY5`	2	
`C. t1`	4.0	
`C. td`	1.00	
`C. Ct`	20	
`C.P5t.`	0	
`C.EP5`	0	
`5St.5`	0	
`Ct.YP`	`HEAt`	

Alarm2 output parameters

	TC input	PT100 input
`A2.5L`	0	-200
`A2.5H`	600	
`A2HY`	2	
`A2tP`	`ndE`	
`A2.5t.`	`H1`	
`A2Er.`	`on`	

Configuration parameters

	TC input	PT100 input
`inPt`	`FEcn`	`Pt.`
`Un.it`	`°C`	
`FLtr.`	25	
`Co5E.`	`C-A2`	
`oFF5.`	0	
`FtEC`	`nonE`	
`n5Et.`	50	

Self tune parameters

	TC input	PT100 input
`A2Er.`	`no`	

Security parameters

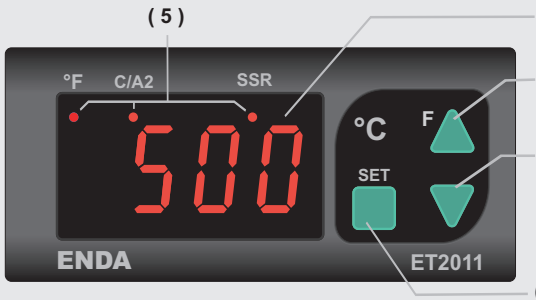
	TC input	PT100 input
`Co5c.`	`PYE5`	
`A2.5c.`	`PYE5`	
`Cn.5c.`	`PYE5`	
`5t.5c.`	`PYE5`	
`dEF.P.`	`no`	

Modification Of Parameter Diagram

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. (FH.E.C. parameter processing)

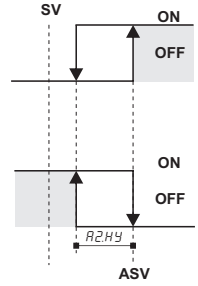
(3) Value decrement and parameter selection key.
(Programming mode)

(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

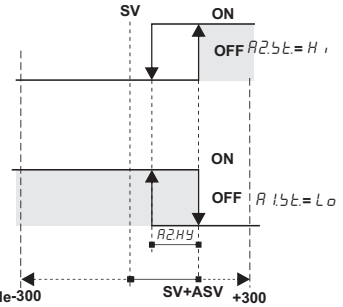
ALARM2 OUTPUT TYPES

Independent Alarm
A2.tP.= indE



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

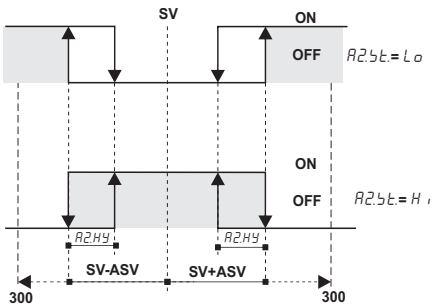
Deviation Alarm
A2.tP= dE.



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

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

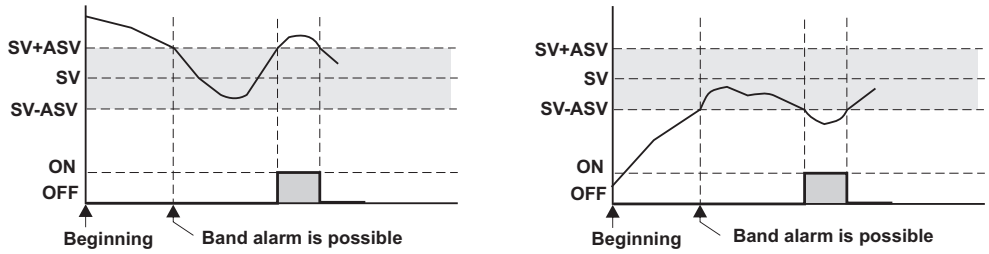
Band Alarm
A2.tP.= bAnd



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

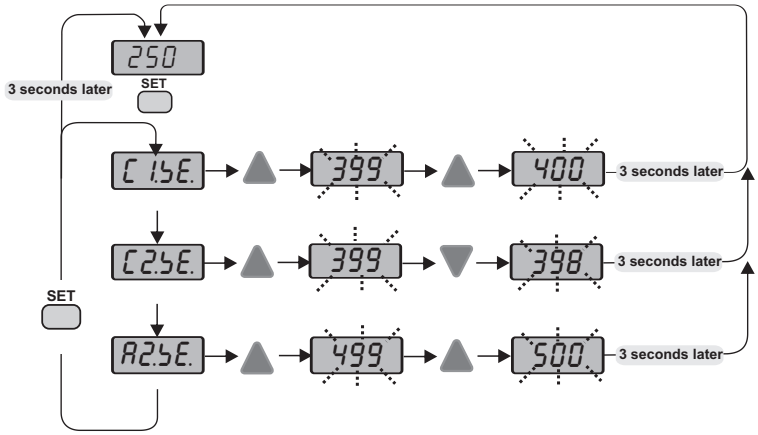
(ASV min. = 0, ASV max. = +300)

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



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

Co.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

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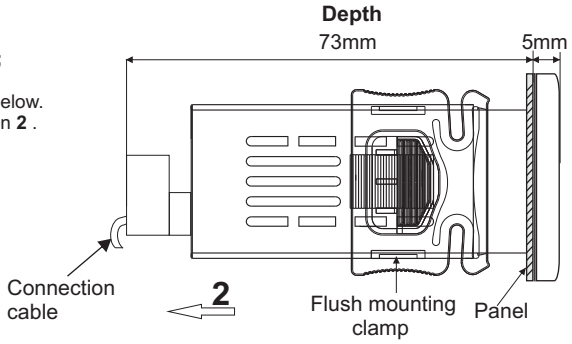
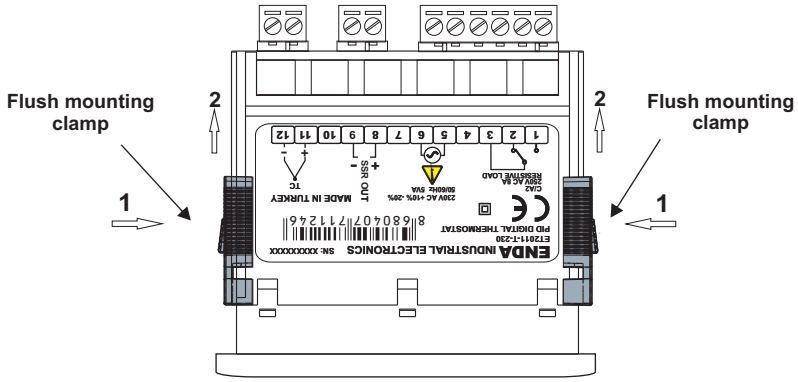
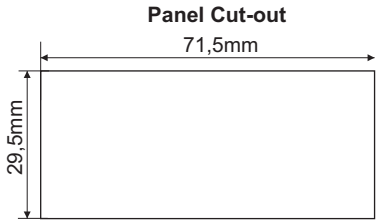
DIMENSIONS

For removing mounting clamps ;
- Push flush mounting clamps in direction **1** as shown in the figure below. Then pull out the clamps 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-□ - □□□□□□ - □□□
1 2 3

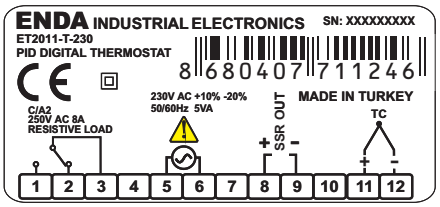
1- Input selection
RT....PT100 input
T....TC input

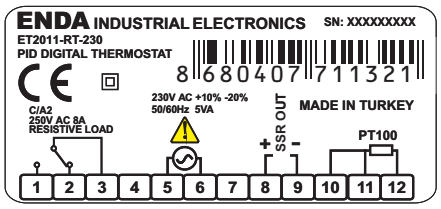
2 - Supply Voltage
230VAC....230V AC
110VAC....110V AC
024VAC.....24V AC
SM.....9-30V DC / 7-24V AC

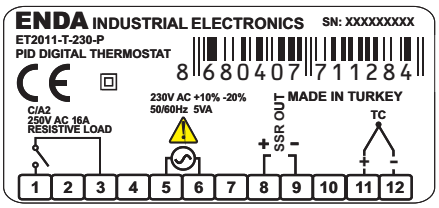
3- Contact Current Selection
Blank.....8A contact output
P.....16A contact output

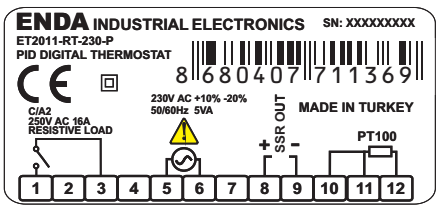
CONNECTION DIAGRAM

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.





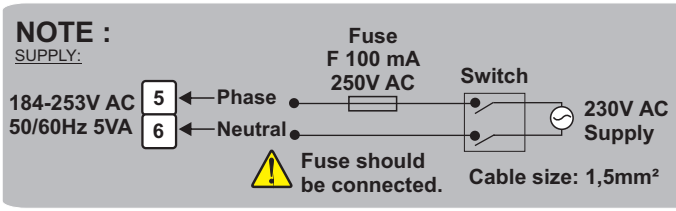




Holding screw 0.4-0.5Nm

Equipment is protected throughout by DOUBLE INSULATION.

NOTE :



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.

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