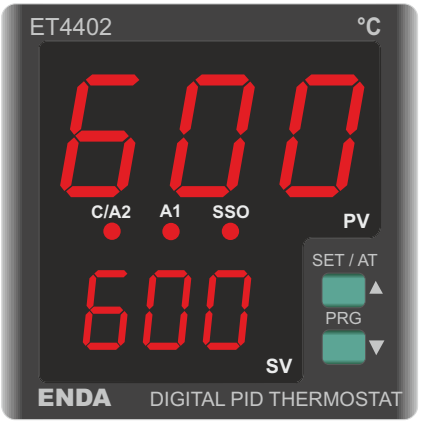
Read this document carefully before using this device. The guarantee will be expired by device demages if you don't attend to the directions in user manual. Also we don't accept any compensations for personal injury, material damage or capital disadvantages.

ENDA ET4402 PID TEMPERATURE CONTROLLER

Thank you for choosing **ENDA ET4402** temperature controller.

* 48 x 48mm sized.
* 14.2 mm Led display.
* Selectable thermocouple types.
* Automatic calculation of PID parameters. (self tune).
  self tune for automatic PID calculation or manually enter PID parameters if known.
* Soft-Start feature.
* Selectabe SSR control output.
* C/A2 Relay output can be setted as secondary alarm or temperature control.
* A1 Relay output can be used as primary alarm.
* Zero point input shift.
* in case of sensor failure, manual control can be selected.
* CE marked according to European Norms.



Order Code : ET4402- □□□
1

1 - Supply Voltage
230.....230V AC
110.....110V AC
024.....24V AC
SM.....10-30V DC / 8-24V AC

CE

RoHS Compliant

TECHNICAL SPECIFICATIONS

Input Type		Temperature Range °C	Temperature Range °F	Accuracy
J (Fe-CuNi) Termokupl	EN 60584	-30....600°C	-22....999 °F	± 0,5% (of full scale) ± 1 digit
K (NiCr-Ni) Termokupl	EN 60584	-30....999°C	-22....999°F	± 0,5% (of full scale) ± 1 digit
L (Fe-CuNi) Termokupl	DIN 43710	-30....600°C	-22....999°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 / 110V AC +%10 -%15, 50/60Hz or 24V AC ± % 10, 50/60Hz, 10-30V DC / 8-24V AC SMP
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 (Performance criterion B is satisfied for EN 61000-4-3)
Safety requirements	EN 61010-1: 2010 (Pollution degree 2, overvoltage category II)
OUTPUTS	
C/A2 output	Relay : 250V AC, 5A (for resistive load), Selectable as N.O. + N.C. Control or Alarm2 output.
A1 output	Relay : 250V AC, 5A (for resistive load), Selectable as N.O. Alarm1 and Cooling Control.
SSR output	Max 20mA 12Volt logic control output.
Life expectancy for relay	5.000.000 Switching for no-load operation; 200.000 switching for 5A resistive load at 250VAC.
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 125 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	W48xH48xD53mm
Weight	Approx. 230g (after packing)
Enclosure material	Self extinguishing plastics.

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

sisel
SİSEL MÜHENDİSLİK ELEKTRONİK SAN. VE TİC. A.Ş.
Şerifali Mah. Barbaros Cad. No:18 Y.Dudullu 34775
ÜMRANİYE/İSTANBUL-TURKEY
Tel : +90 216 499 46 64 Pbx. Fax : +90 216 365 74 01
url : www.enda.com.tr

Running Mode

500.
600

SET / AT

If key is pressed for 1 second continuously,

Control and Alarm setpoint setting mode is entered.

See page 3

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 SET / AT key for 2 seconds continuously, Programming Mode is entered.

Then PRG key is pressing 2 seconds continuously, data is recorded and Running Mode is entered.

If PRG key is pressed for 2 seconds continuously, Programming Mode is entered.

If PRG key is pressed for 2 seconds continuously, Running Mode is entered.

PRG

Co.o.

If pressed for 2 seconds continuously, Running Mode is entered.

C.5L. = C/A2 output control set-point lower limit.
Adjustable between 0 and C.5U parameter value.

C.5U. = C/A2 output control set-point upper limit.
Adjustable between C.5L. parameter value and upper scale value.

C.Pb. = C/A2 output proportional band value.
Adjustable between %0.0 and %100.0.
If C. Pb = %0.0, On-Off control is selected.

C.HY = C/A2 output hysteresis value.
Adjustable between 1 and 50 °C.
⚠ If C.Pb. parameter is selected 0, this parameter will be active.

C.t i. = C/A2 output integral time value.
Adjustable between 0 and 50.0 minutes.
If C.t i. = 0.0, integral impact is disable.
⚠ If C.Pb. parameter is different from "0", this parameter will be active.

C.t d. = C/A2 output derivative time value.
Asjustable between 0.00 and 9.99minutes.
If C.t d. = 0.0, derivative time is disable.
⚠ If C.Pb. parameter is different from"0",this parameter will be active.

C.C t. = C/A2 output period time.
Adjustable between 1 and 125 second.
⚠ If C.Pb. parameter is different from"0", this parameter will be active.

C.P5. = C/A1 ratio of output power percentage at C/A2 setpoint value.
Adjustable between %0 and %100.

C.E.P. = Incase of sensor failure C/5A output power percentage can be adjusted between %0 and %100.
If C.Pb = 0.0 (On/Off control) and If C.E.P = 0 , incase of failure output is OFF. If the parameter is different from 0, incase of failure output is ON.

5.5t. = Soft 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.

A 1.o.

If pressed for 2 seconds continuously, Running Mode is entered.

A 1L. = Alarm1 set value lower limit.
Adjustable between 0 and A 1U. parameter value.

A 1U. = Alarm1 set value upper limit.
Adjustable between A 1L. parameter value and upper scale value.

A 1H. = Hysteresis of the Alarm1 output.
Adjustable between 1 and 50 °C.

A 1t. = Function of Alarm1 type.
Four kinds of functions can be selected.
ind= Independent alarm
dE. = Deviation alarm
bAn. = Band alarm (Band)
bA i. = Band with inhibition alarm

A 15. = The state of Alarm1 output.
H i = If A1 output is above the set value. (ON)
Lo= If A1 output is above the set value (OFF)

A 1E. = State of Alarm1 output in case of sensor failure.
on = A1 output probe failure ON.
oFF= A1 output probe failure OFF.

A2.o.

For SSR output devices, if the o.5E. parameter is selected as 55r , this menu is visible.

A2L. = Alarm2 set value lower limit.
Adjustable between 0 and A2U. parameter value.

A2U. = Alarm2 set value upper limit.
Adjustable between A2L. parameter value and upper scale value.

A2H. = Hysteresis of the Alarm2 output.
Adjustable between 1 and 50 °C.

A2t. = Function of Alarm2 type.
Four kinds of functions can be selected.
ind= Independent alarm (Independent)
dE. = Deviation alarm
bAn = Band alarm (Band)
bA i. = Band with inhibition alarm

A25. = The state of Alarm2 output.
H i = If A2 output is above the set value. (ON)
Lo = If A2 output is above the set value (OFF)

A2E. = State of Alarm2 output in case of sensor failure.
on = A2 output probe failure ON.
oFF = A2 output probe failure OFF.

CnF.

A.tu. = self tune (Automatic PID calculation)
on = self tune enabled.
oFF = self tune disbled.

inP. = Probe input type section
J = J Type,
K = K Type,
L = L Type,

Un i. = Temperature unit value.
°C= °C, °F= °F
⚠ (If this parameter is changed, some of the parameters value changes.)

C.tP. = Control type selection.
HEA= Heating selection (Above the set value; "OFF")
CoL. = Cooling selection (Above the set value; "ON")

FLt. = Digital filter coefficients.
Enables filtering the measured value. Adjustable between 1 and 200. If this parameter is 1, digital filter runs most quick. If the parameter is 200, the filter runs most slow. The value of parameter should be increased in interference.

o.5E. = Control output selection.
C.A2= C/A2 (Relay) out selection
55r = SSR out selection

oF5. = Zero point input shift (Offset) value.
Zero point input shift value is added to the measuring value. This feature which is the point of measurement due to its distance measurement probe, is used to eliminate errors that might occur. Adjustable between -99 and 100°C. Normal value=0.

If pressed for 2 seconds continuously, Running Mode is entered.

STARTING SELF TUNE

100
600

Running Mode

If the A.tu. parameter is on and if, key is pressed for 3 seconds in Running Mode, self tune started automatically.

100
A.tu.

if the temperature is not high, A.tu. message flashes on display and self tune process starts automatically. If the initial temperature is higher to self tune, tH i message appears and the device waits until the temperature goes down. Then A.tu. message appears and automatically self tune procedure is starts. After the self tune procedure, C.Pb, C.t i, C.dt and C.C t. values are recorded in memory, then the device returns to Run Mode. After the successful self tune completion, A.tu. parameter menu is automatically oFF . In order to return, A.tu. parameter should be set to on in A.tu. menu.

STOPPING SELF TUNE

If self tune process wanted to be terminated for any reason, press SET / AT key for 2 seconds, self tune procedure stops and system returns to Running Mode.

SEC.

5.Cd. = Security menu access code.
It should be 402.

⚠ **5.Cod. = 0** : In this position, first PRG key is pressed and than PRG key is pressed for 4 seconds, dPAr. is seen on display and the device is returned to factory settings.

Co.5. = Co.o. menu security, access level parameter.
non. = Menu invisible.
PuE. = Modification can be done.
Pno = Only visible.

A 15. = A 1.o. menu security, access level parameter.
non. = Menu invisible.
PuE. = Modification can be done.
Pno = Only visible.

A25. = A2.o. menu security, access level parameter.
non. = Menu invisible.
PuE. = Modification can be done.
Pno = Only visible.

Cn.5. = CnF. menu security, access level parameter.
non. = Menu invisible.
PuE. = Modification can be done.
Pno = Only visible.

Parameter Setting Diagram

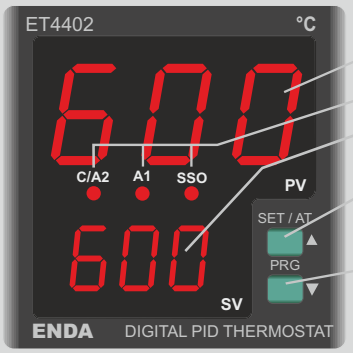
C.HY 6 → PRG → C.HY 6 → PRG → C.HY 5 → SET / AT → C.HY 6

If wait for 3 seconds without pressing any key, returns to the parameter display.

While C.HY parameter seen, if PRG button is pressed and released, the selected parameter value flashes and pass to parameter setting status. In this case, parameter is set to the desired value with SET / AT PRG keys.

If SET / AT key is pressed and held 0.6 seconds, the value of the selected parameter increases rapidly. If waited enough,the value increases a hundred at each step. After 1 second, following the release of the key, initial increasing condition is returned. Same procedure is valid for the decrementing.

TERMS



(1) Measurement value indicator (Running Mode).
Parameter name and indicator (Programming Mode).

(2) Output state indicators.

(3) Set value indicator (Running Mode).
Parameter value indicator (Programming Mode).

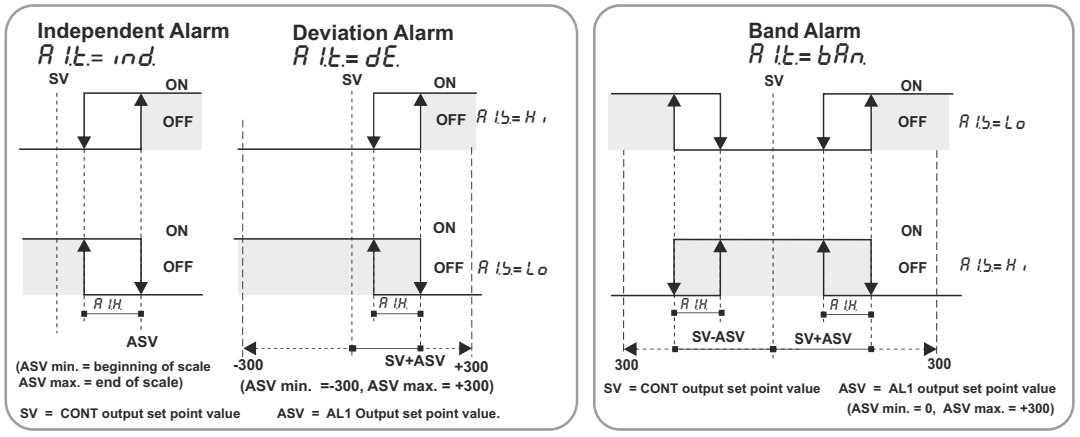
(4) Control setpoint input adjustment and self tune key (Running Mode).
Parameter selection key (Programming Mode).
Value increment key (Running Mode and Programming Mode).

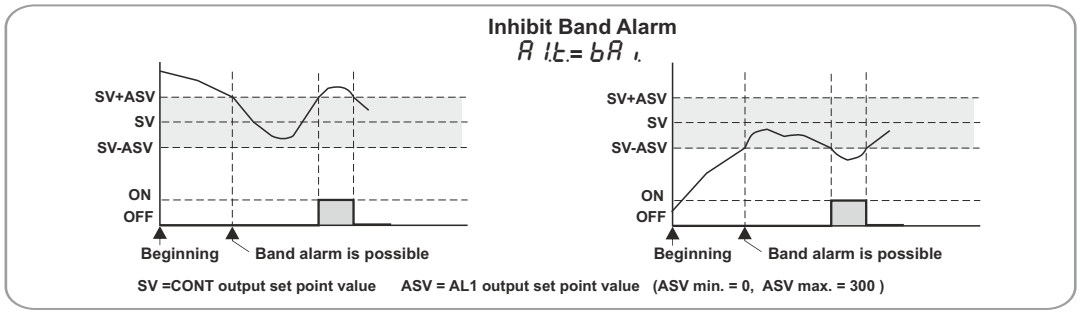
(5) Programming Mode enter key (Running Mode).
Menu selection key (Programming Mode).
Parameter setting transition key (Programming Mode).
Value decrement key (Running Mode and Programming Mode).

(1),(3) PV and SV indicator	PV 7 Segment 3 digits red, SV 7 segment 3 digits red LED display
Character heights	PV indicator : 14.2mm, SV indicator : 9.1 mm
(4), (5) Keypad	Mikro switch
(2) State indicators	3 Red LEDs for Control , Alarm1 and SSR outputs

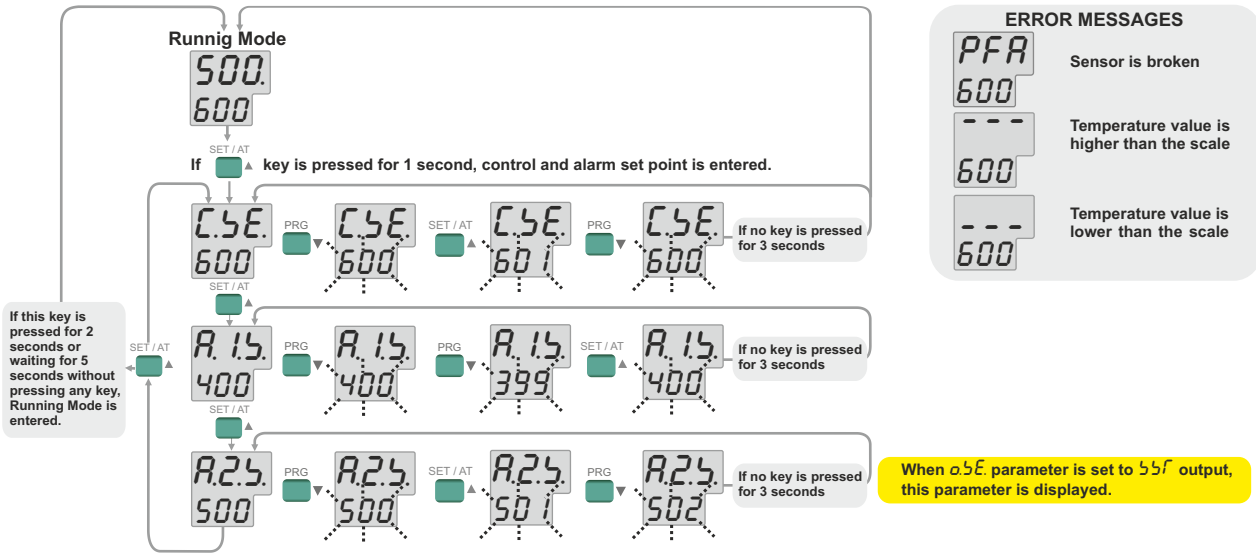
ALARM1 AND ALARM2 OUTPUT TYPES

(Graphics are for alarm 1)





CONTROL AND ALARM SET POINT ADJUSTMENT



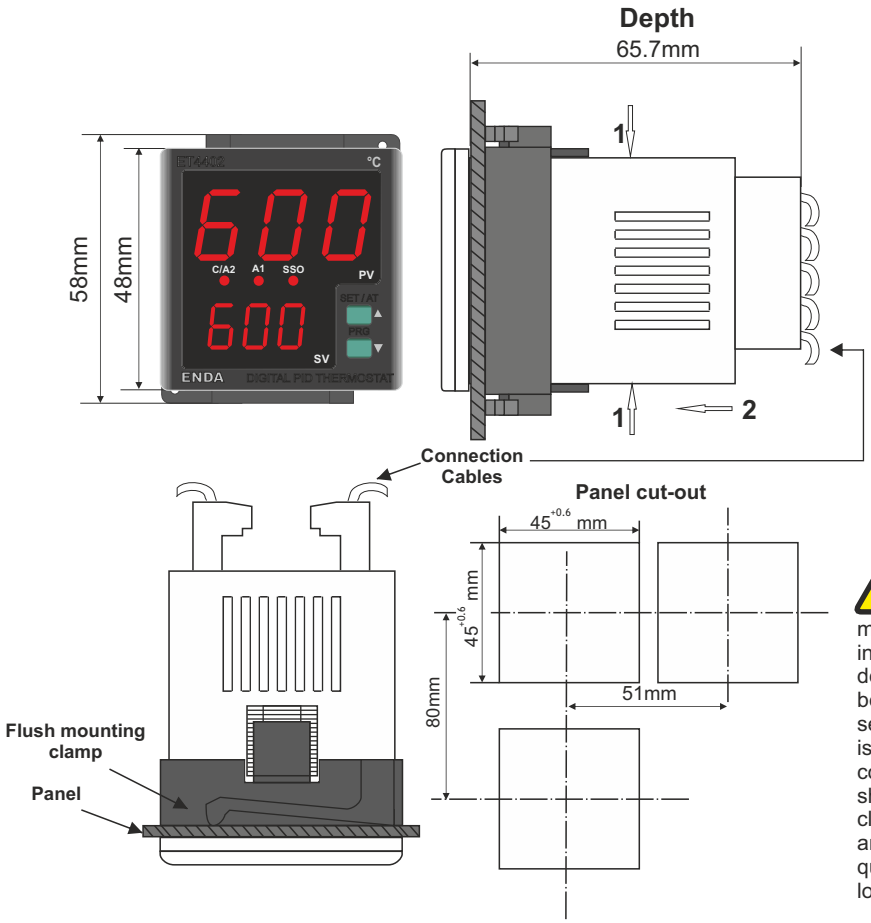
ERROR MESSAGES

Sensor is broken

Temperature value is higher than the scale

Temperature value is lower than the scale

DIMENSIONS



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

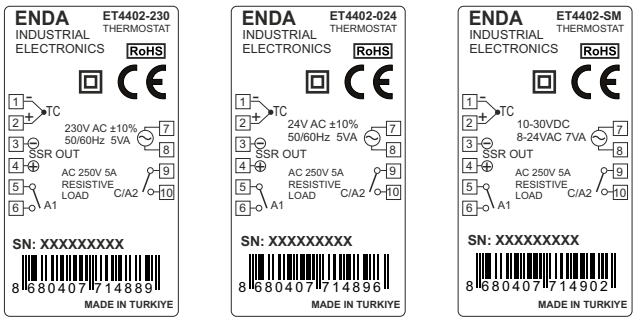
Note : 1) While performing panel mounting, additional space should be allocated for cables.
2) Panel thickness should be maximum 9mm.
3) If there is no 100mm free space at back side of the device, it would be difficult to remove it from the panel.

ENDA ET4402 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.

Logic output of the device is not electrically isolated. Therefore, if the grounded thermocouple is used, logic outputs of the device should not be grounded.

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.

CONNECTION DIAGRAM



Holding screw 0.4-0.5Nm.

Equipment is protected throughout by DOUBLE INSULATION

NOTE :

SUPPLY :
184-253V AC or 21.6-26.4V AC 50/60Hz 5VA

Fuse should be connected.
F 100 mA 250V AC
Switch
Phase
Neutral
230V AC or 24V AC Supply
Cable size : 1,5mm²

SENSOR INPUT:
For Thermocouple :
Use the correct compensating cable. Do not make any supplement to cables. Connect the thermocouple cables to the right places at the input terminal

TC