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, metarial damage or capital disadvantages.

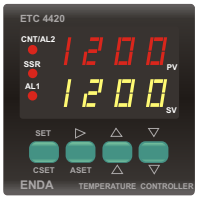
english

ENDA ETC SERIES PID TEMPERATURE CONTROLLERS

Thank you for choosing ENDA ETC SERIES temperature controllers

* Selectable sensor type.
* Automatic calculation of PID parameters (SELF TUNE).
  Enter PID parameters of the system if they are known at the begining. Otherwise, Self-Tune should be activated.
* Soft-Start.
* Communication via RS-485 ModBus protocol (Optional).
* Selectable SSR or relay control output.
* Relay output can be programmable as second alarm or control output.
* AL1 relay output for first alarm out.
* Selectable Heat/Cool control.
* Input offset feature.
* In the case of sensor failture periodical running or relay state can be selected.
* Parameter access protection on 3 levels.
* Programming by using keypad or Modbus.
* CE marked according to European Norms.

CE RoHS Compliant

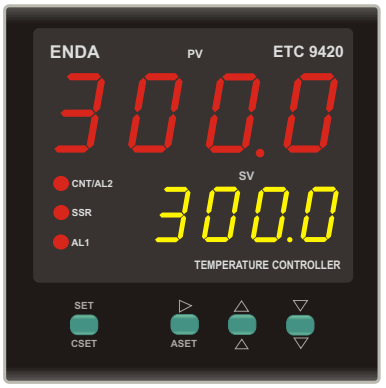


Order Code : ETC□□□□-□□□□□□-□□
1 2 3

1 - Dimensions
4420.....48x48x87mm
7420.....72x72x97mm
8420.....48x96x87mm
9420.....96x96x50mm

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

3 - Modbus Option
RS.....RS-485 Modbus communication
None.....Don't support RS-485 Modbus comm.



TECHNICAL SPECIFICATIONS

Input type		Temperature range	
J (Fe-CuNi) Thermocouple	EN 60584	0... 600°C	+32... +1112°F
K (NiCr-Ni) Thermocouple	EN 60584	0...1200°C	+32... +2192°F
T (Cu-CuNi) Thermocouple	EN 60584	0... 400°C	+32... +752°F
S (Pt10Rh-Pt) Thermocouple	EN 60584	0...1600°C	+32... +2912°F
R (Pt13Rh-Pt) Thermocouple	EN 60584	0...1600°C	+32... +2912°F
Pt 100 Resistance thermometer	EN 60751	-200...600°C	-328... +1112°F
Pt 100 Resistance thermometer	EN 60751	-99.9...300.0°C	-99.9...+543.0°F

ENVIROMENTAL 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 .
Rated population 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	230VAC +%10 -%20 or 24VAC ±%10, 50/60Hz or by your choose 9-30VDC / 7-24VAC ±%10 SMPS
Power consumption	Max. 7VA (For ETC4420 5VA)
Wiring	2.5mm² screw-terminal connections
Line resistance	For thermocouple max. 100ohm, for 3 wired Pt 100 max. 20ohm
Accuracy	± 0,2% (of full scale) ±1 digit
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	
CONT./AL2	Relay : 250V AC, 2A (for resistive load), Selectable as Control or Alarm2 output.
AL1	Relay : 250V AC, 2A (for resistive load), NO/NC selectable. (Alarm1 output).
SSR out	Selectable logic control output. (Max 12V 20mA).
Life expectancy for relay	Mechanical 30.000.000 operation; Electrical 300.000 operation

CONTROL	
Control type	Single set-point and alarm control
Control algorithm	On-Off / P, PI, PD, PID (selectable)
A/D converter	Better than 15 bits
Sampling time	500ms
Propotional band	Adjustable between %0 and %100. If Pb=%0, On-Off control is selected.
İntegral time	Adjustable between 0.0 and 100.0 minutes.
Derivative time	Adjustable between 0.00 and 25.00 minutes.
Control period	Adjustable between 1 and 250 seconds.
Hysteresis	Adjustable between 1 and 50°C/F .If inP=Pt.0, adjustable between 0,1 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	ETC4420 : G48xY48xD87mm ETC7420 : G72xY72xD97mm ETC8420 : G48xY96xD87mm ETC9420 : G96xY96xD50mm
Weight	Approximately 400g after packing (For ETC4420 250g).
Enclosure material	Self extinguishing plastics.

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

TERMS

PV Display :
Process value during normal operation
Mnemonic parameter code during programming

SV Display :
Set point during normal operation
Date value during programming

SET / CSET — Control set key during normal operation Parameter selection key during programming

ASET — Alarm set key during normal operation Menu selection key during programming

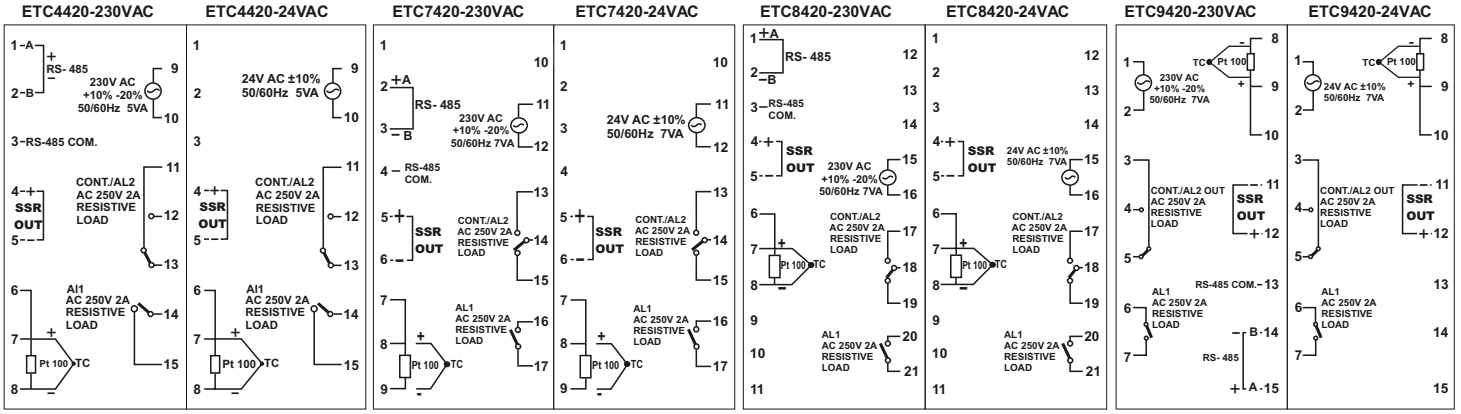
Increment key during normal operation and programming Parameter selection key during programming

Decrement key during normal operation If only this key is pressed in normal operation, software version number is seen

PV display	7 segment, 4 digits, red LED indicator yellow LED ind.(ETC8420)
SV display	7 segment, 4 digits, yellow LED indicator
Character heights	PV display : 7mm(ETC4420) 12.5mm(ETC8420) 14mm(ETC7420) 20.3mm(ETC9420)
	SV display : 7mm(ETC4420) 12.5mm(ETC8420) 10.2mm(ETC7420) 14mm(ETC9420)
Keypad	Mikro Switch
State indicator	3 red LEDs for Control, Alarm1 and SSR outputs

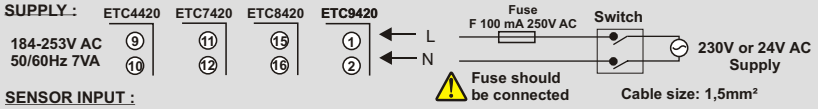
CONNECTION DIAGRAM

ENDA ETC series are 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.



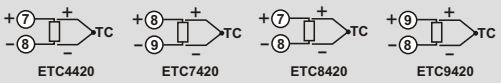
NOTE :

SUPPLY :

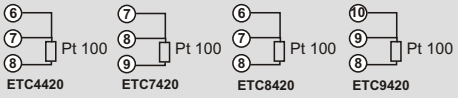


SENSOR INPUT :

For J-K-T-S-R 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.



For resistance thermometer :
When 2 wired Pt 100 is used, terminals that are shown at the right of there must be short circuited for each product.



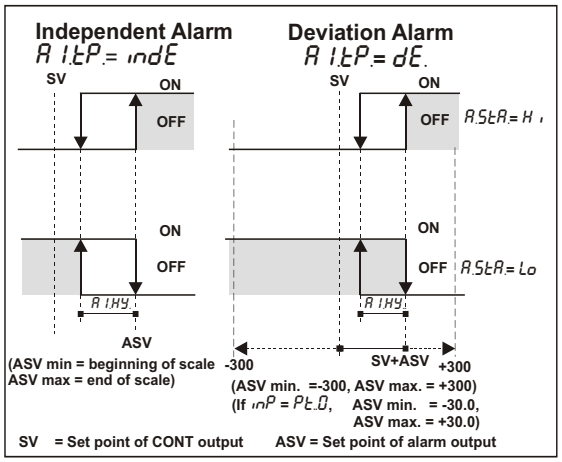
Holding screw
0.4-0.5Nm

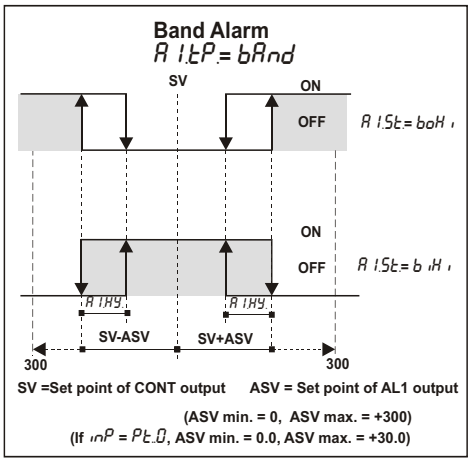
Equipment is protected throughout by DOUBLE INSULATION

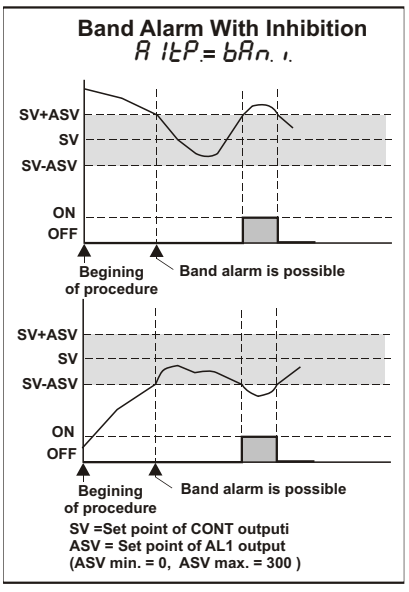
Logic output of the instrument is not electrically insulated from the internal circuits. Therefore, when using a grounding thermocouple, do not connect the logic output terminals to the ground.

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

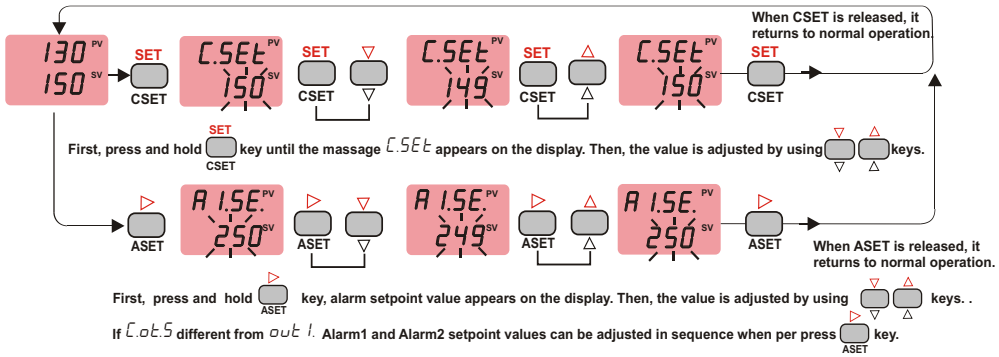
ALARM1 AND ALARM2 OUTPUT TYPES





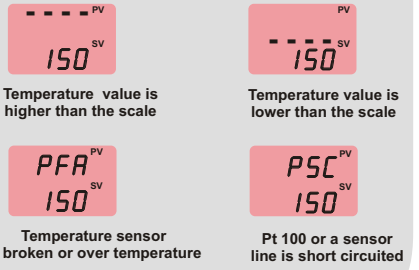


MODIFICATION OF CONTROL AND ALARM SET POINTS



NOTE: The maximum of C.SEt is the value of C.H .L. parameter and the minimum of it is the value of C.Lo.L. parameter.
If independent alarm is selected, A 1.SE. and A2.SE. values can be adjusted between the limits of the full scale.
If deviation alarm is selected, A 1.SE. and A2.SE. values can be adjusted between -300 and +300.
If band alarm is selected, A 1.SE. and A2.SE. values can be adjusted between 0 and +300.

Error Messages



SET / CSET — ASET

If ASET key is pressed while holding SET CSET 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 ASET keys together.

`Con.o` — ASET — `ALr.o` — ASET — `conF` — ASET — `S.tun` — ASET — `SECU` — ASET

Con.o

`Pb 4` — **Pb** = Proportional band.
Adjustable between 0% and 100%
Setting Pb = 0% On-Off control is selected.

`t i 4.0` — **t i** = Integral time.
Adjustable between 0.0 and 100.0 minutes.
If t i = 0.0, integral effect is not used.
Setting Pb = 0 this parameter is not seen.

`td 1.00` — **td** = Derivative time.
Adjustable between 0.00 and 25.00 minutes.
If td = 0.00, derivation effect is not used.
Setting Pb = 0 this parameter is not seen.

`Ct 20` — **Ct** = Control period.
Adjustable between 1 and 250 seconds.
Setting Pb = 0 and C.ot.S. = Out 1 this parameter is not seen.

`P.SEt. 0` — **P.SEt.** = 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.

`C.HYS. 2` — **C.HYS.** = Hysteresis of the control output.
Adjustable between 1 and 50 °C/F.
Adjustable between 0,1 and 50 °C/F ,if inP=Pt.0
Setting Pb = 0 this parameter is seen.

`C.StA. HEAt` — **C.StA.** = Configuration of the control output.
C.StA. = HEAt means heating control.
C.StA. = cool means cooling control.

`Pr.Er. 0` — **Pr.Er.** = 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.

`C.ot.S. Out 1` — **C.ot.S.** = Type of control output
out 1 = Out 1 is control output.
SSr = SSr is control output..
(Time proportional SSR output)
Out 1 = Alarm2 output.

`S.S.t.S. 0` — **S.S.t.S.** = Soft Start timer set point 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.
NOTE! Setting Pb = 0, sotf start feature will be disable.

ALr.o

`A 1.HY. 2` — **A 1.HY.** = Hysteresis of the Alarm1 output.
Adjustable between 1 and 50°C.

`A 1.tP. ndE.` — **A 1.tP.** = Function of Alarm1 output.
Four kinds of functions can be selected.
ndE. = Independent
dE. = Deviation
bAnd = Band
bAn. i. = Band with inhibition

`A 1.St. H i.` — **A 1.St.** = The state of Alarm1.
If independent or deviation alarm is selected, this parameter can be Lo. and H i.. For Lo. alarm output is energised below the alarm set point. For H i. alarm output is energized above the alarm set point. If band alarm is selected, this parameter can be b iH i or boH i. b iH i means alarm is activated inside the band.boH i means alarm is activated outside the band.

`A 1.P.E. oFF` — **A 1.P.E.** = State of Alarm1 output in the case of sensor failure.
If A 1.P.E.= On, the alarm output is energised during the sensor failure.
If A 1.P.E.= oFF, the alarm output is not energized during the sensor failure.

`A2.HY. 2` — **A2.HY.** = Hysteresis of the Alarm2 output.
Adjustable between 1 and 50°C.
NOTE! If C.ot.S. =.out 1, this parameter is not seen.

`A2.tP. ndE.` — **A2.tP.** = Function of Alarm2 output.
Four kinds of functions can be selected.
ndE. = Independent
dE. = Deviation
bAnd = Band
bAn. i. = Band with inhibition
NOTE! If C.ot.S. = .out 1, this parameter is not seen.

`A2.St. H i.` — **A2.St.** = The state of Alarm2.
If independent or deviation alarm is selected, this parameter can be Lo. and H i.. For Lo. alarm output is energised below the alarm set point. For H i. alarm output is energized above the alarm set point. If band alarm is selected, this parameter can be b iH i or boH i. b iH i means alarm is activated inside the band. boH i means alarm is activated outside the band.
NOTE! If C.ot.S. = .out 1, this parameter is not seen.

`A2.P.E. oFF` — **A2.P.E.** = State of Alarm2 output in the case of sensor failure.
If A2.P.E.= On, the alarm output is Energised during the sensor failure.
If A2.P.E.= oFF, the alarm output is not energized during the sensor failure.
NOTE! If C.ot.S. = .out 1, this parameter is not seen.

conF

`inP. FE.cn.` — inP. = Type of input and scale.
Pt = **Pt 100** -200 to +600°C
Pt.0 = **Pt 100** -99.0 to +300.0°C
FE.cn. = **J** (Iron vs. Copper-Nickel) 0 to +600°C
ncnA. = **K** (Nickel-Cr.vs. Nickel-Alum.) 0 to +1200°C
c.cn. = **T** (Copper vs. Copper-Nickel) 0 to +400°C
P 10r. = **S** (Platinum-10%Rhodium vs. Pt.) 0 to +1600°C
P 13r. = **R** (Platinum-13%Rhodium vs. Pt.) 0 to +1600°C
Note : If the selected input type is changed, the value of C.H i.L, C.Lo.L , AH i.L, A.Lo.L. parameters changes automatically.

`C.H i.L 600` — **C.H i.L.** = Set point upper limit.
If inP. or Un it. parameters are changed, the maximum value of the C.H i.L. parameter changes to the maximum scale value of the selected input. The minimum value is the value of C.Lo.L. parameter.

`C.Lo.L 0` — **C.Lo.L.** = Set point lower limit.
If inP. or Un it. parameters are changed, the minimum value of the C.Lo.L. parameter changes to the minimum scale value of the selected input. The maximum value is the value of C.H i.L. parameter.

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

`Un it °C` — **Un it** = The temperature unit.
Selectable as **°C or °F.**
Note : If the temperature unit is changed, the value of the UPL., LoL., A.UP.L., A.Lo.L. Parameters changes automatically.
NOTE! If inP parameter is selected **TC or Pt100,** this parameter is seen.

`A 1.H.L 600` — **A 1.H.L** = Alarm1 value upper limit.
If inP. or Un it. parameters are changed, the maximum value of the A 1.H.L parameter changes to the maximum scale value of the selected input type.
Minimum of A 1.H.L. parameter is the value of A 1.L.L. parameter.

`A 1.LL 0` — **A 1.L.L.** = Alarm1 value lower limit.
If inP. or Un it. parameters are changed, the minimum value of the A 1.L.L. parameter changes to the minimum scale value of the selected input type. The maximum value is the value of A 1.H.L. parameter.

`A2.H.L 600` — **A2.H.L** = Alarm2 value upper limit.
If inP. or Un it. parameters are changed, the maximum value of the A2.H.L parameter changes to the maximum scale value of the selected input type.
Minimum of A2.H.L. parameter is the value of A2.L.L. parameter.
NOTE! If C.ot.S. = .out 1, this parameter is not seen.

`A2.LL 0` — **A2.L.L.** = Alarm2 value lower limit.
If inP. or Un it. parameters are changed, the minimum value of the A2.L.L. parameter changes to the minimum scale value of the selected input type. The maximum value is the value of A2.H.L. parameter.
NOTE! If C.ot.S. = .out 1, this parameter is not seen.

`FLCo. 4` — **FLCo.** = Coefficient of digital filter.
Filter for display value.
Adjustable between **1 and 32.** If this parameter is **1,** digital filter runs most quick. If the parameter is **31,** the filter run most slow. The value of parameter should be increased in interference.

`d.Adr. 1` — **d.Adr.** = Device address.
Adjusable between 1 and 247. Difference addresses should be selected for every device.

`bAud 9600` — **bAud**= Modbus baud rate.
Selectable **1200, 2400, 4800** and **9600.**
If bAud= oFF, Modbus communication will be disable.

S.tun

Before starting sef-tune procedure, be sure A.tun parameter is YES in the SECU menu.

`S.Str. run` — SET CSET

Process value is equal or lower than 60%of the set point ?
Yes
No
`70 tE.H i.`

`25 rEdY` — Press any key — `25 P id.t.` — After PID is calculated — `25 P.SE.t.` — Press any key to deactivate the self-tune procedure.

While holding SET CSET key, run message flashes. Then when △ key is pressed, self tune mode is entered if there is no probe failure. If process value is Appropriate to begin self tune, rEdY. **message flashes.** Then press any key to see P id.t. message and self tune procedure begins.Process value must be equal or lower than 60%of the setpoint to begin self tune procedure. If not, tE.H i. message flashes and device waits to decrease appropriate temperature to begin self tune. Then rEdY. message flashes and press any key to begin sellf tune procedure.

Before self tune procedure, A.tun. parameter must be selected YES from the SECU menu.If self tune is achieved A.tun. parameter becomes no automatically and S.tun menu is canceled. Before self tune procedure, temperature setpoint value should be adjusted. When self tune procedure begins with no failure, P id.t. message flashes and remains during the calculation of PID parameters. When PID parameters are calculated, P.SE.t. message flashes. Then the device heats until setpoint value according to PID parameters and calculates the energyrequirement for stable temperature and writes P.SE.t. parameter as %and run mode enters.

If any key is pressed while P id.t. message flashes, self tune prosedure is deactivated before calculation of PID parameters. If any key is pressed while P.SE.t. message flashes, then self tune prosedure is deactivated as PID parameters are calculated and P.SE.t. parameter is done 0.

SECU

`S.cod. 0` — **S.cod.** = Security menu access code.
It should be 666.

`A.Con. P.YES` — **A.Con.** = Parameters of Con.o menu access level code.
nonE = Invisible
P.YES = Modification can be done.
P. no = Only visible.

`A.ALr. P.YES` — **A.ALr.** = Parameters of ALr.o menu access level code.
nonE = Invisible
P.YES = Modification can be done.
P. no = Only visible.

`A.CnF. P.YES` — **A.CnF.** = Parameters of conF. menu access level code.
nonE = Invisible
P.YES = Modification can be done.
P. no = Only visible.

`A.tun. YES` — **A.tun.** = Parameters of S.tun. menu access level code.
no = Invisible
YES = Self tune can be done.

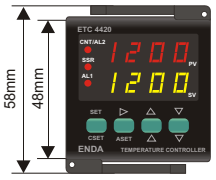
Modification Of Parameter Diagram

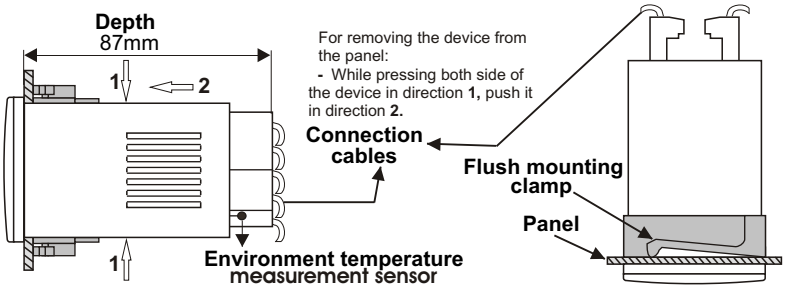
`C.HYS. 6` — SET CSET — `C.HYS. 6` — SET CSET — `C.HYS. 5` — SET CSET — `C.HYS. 6` — SET CSET

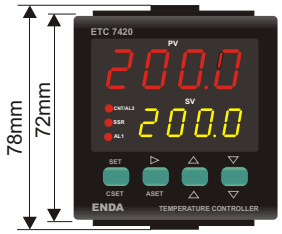
When holding SET CSET key, the value of parameter flashes and using △ ▽ keys the requested value can be adjusted.

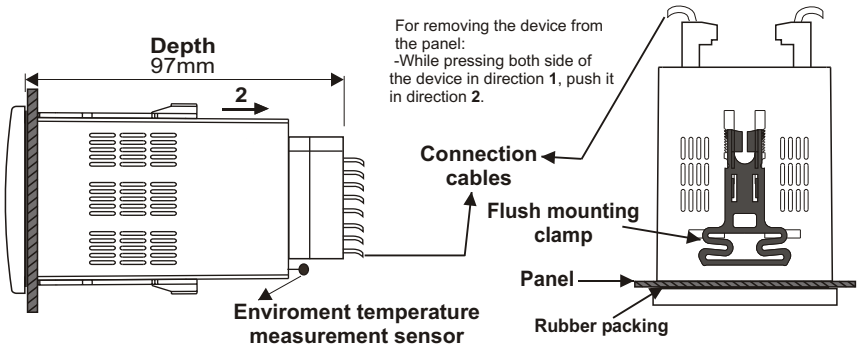
If △ key is pressed and held 0.6 seconds, the value of the selected parameter changes rapidly. If waited enough,the value increases 100 at each step. After 1 second following the release of the key, initial condition is returned.The same procedure is valid for the decrement key.

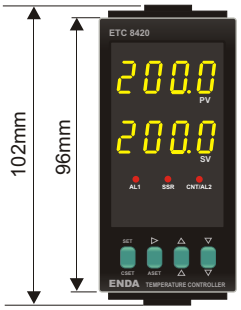
DIMENSIONS

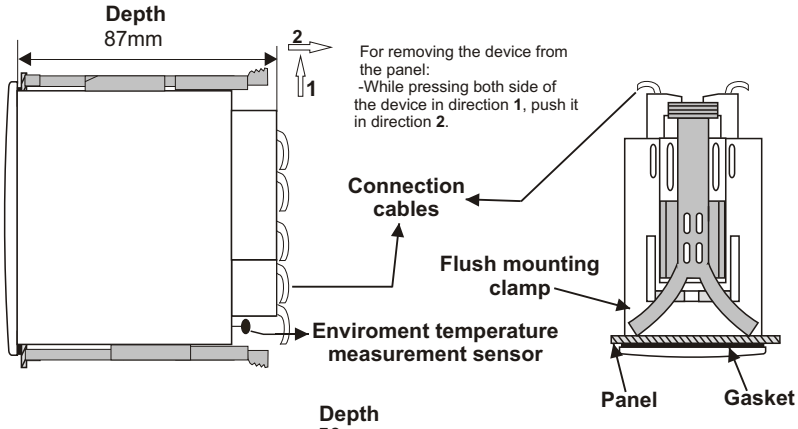


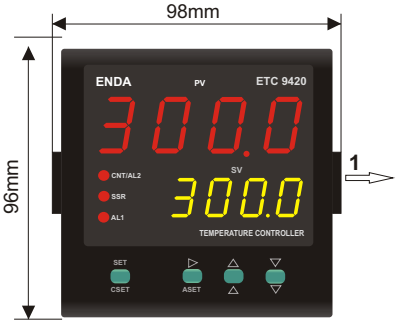


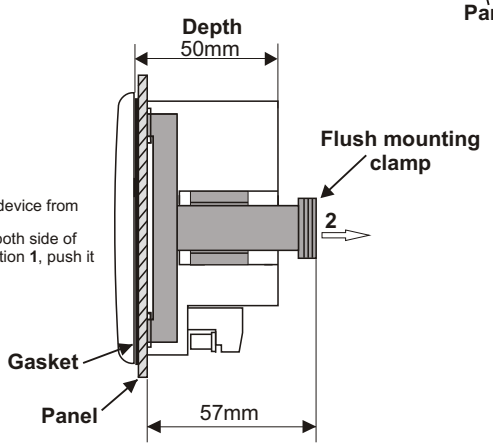




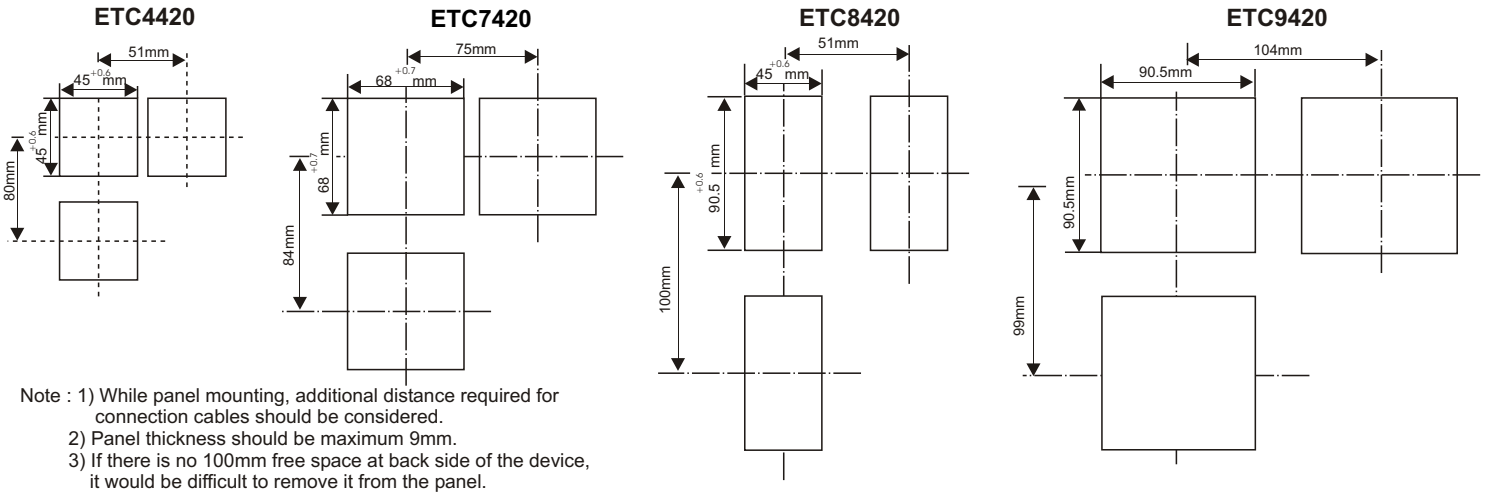








Panel cut-out:



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.

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