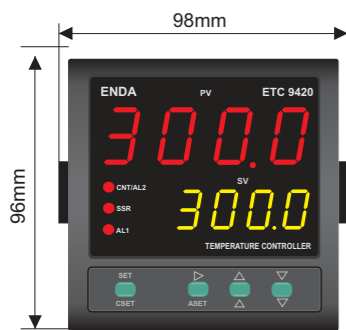
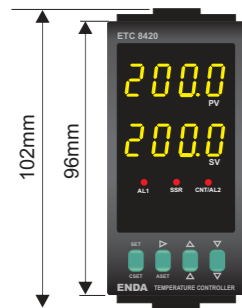
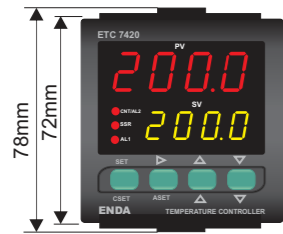
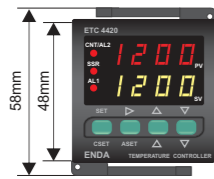
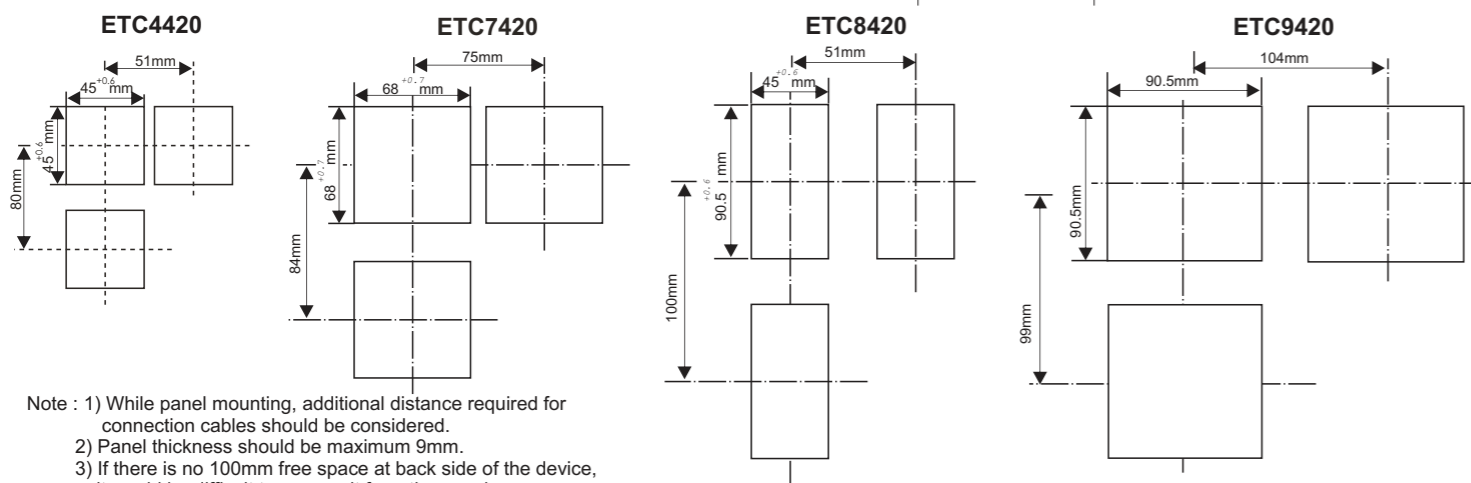


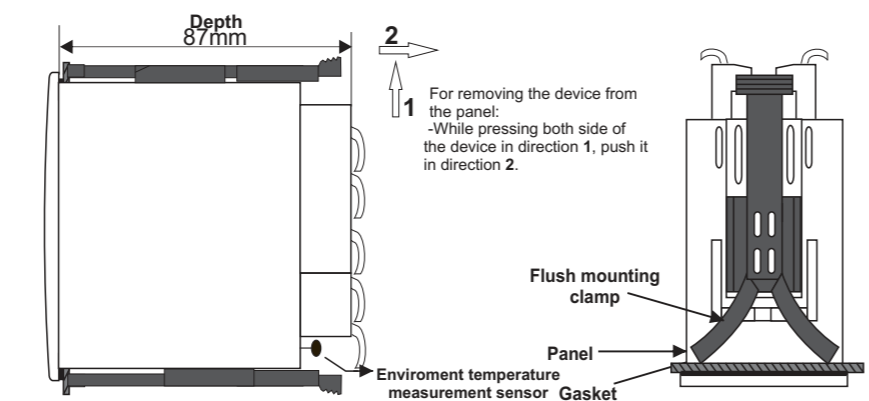
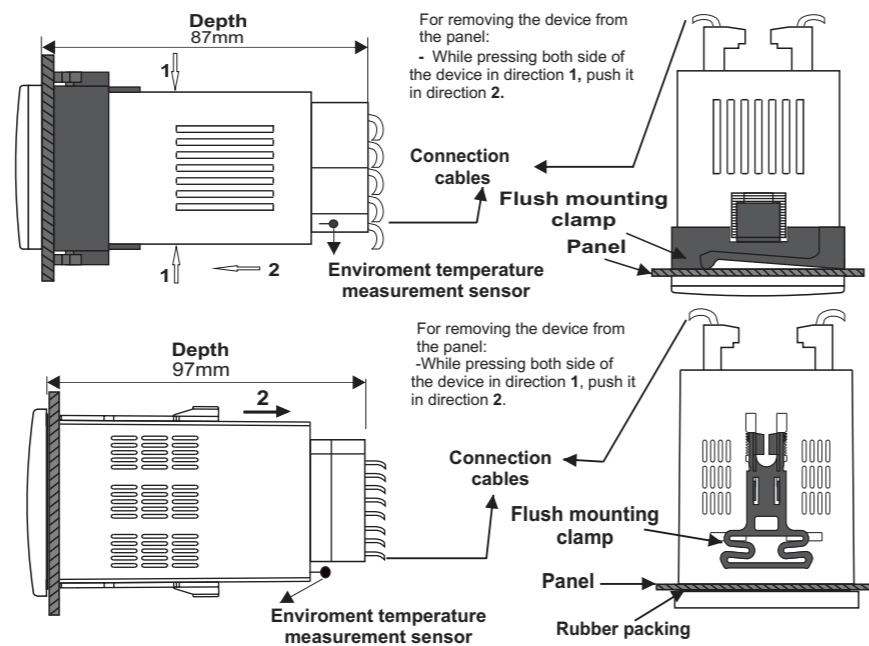
## DIMENSIONS



### 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.



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.

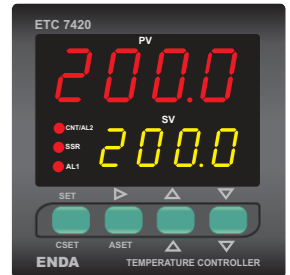
# ENDA ETC SERIES PID TEMPERATURE CONTROLLERS

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 beginning. 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 failure 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.



RoHS Compliant



Order Code : ETC    -    -

- |                       |                            |  |
|-----------------------|----------------------------|--|
| <b>1 - Dimensions</b> | <b>2 - Supply Voltage</b>  | <b>3 - Modbus Option</b>                   |
| 4420.....48x48x87mm   | 230VAC...230V AC           | RS.....RS-485 Modbus communication         |
| 7420.....72x72x97mm   | 24VAC.....24V AC           | None.....Don't support RS-485 Modbus comm. |
| 8420.....48x96x87mm   | SM.....9-30V DC / 7-24V AC |  |
| 9420.....96x96x50mm   |                            |  |

## 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

## 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°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
Proportional band	Adjustable between %0 and %100. If $Pb=0$ , On-Off control is selected.
Integral 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 $inP=PID$ , 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, benzene, 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

Control set key during normal operation  
 Parameter selection key during programming

Alarm set key during normal operation  
 Menu selection key during programming

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

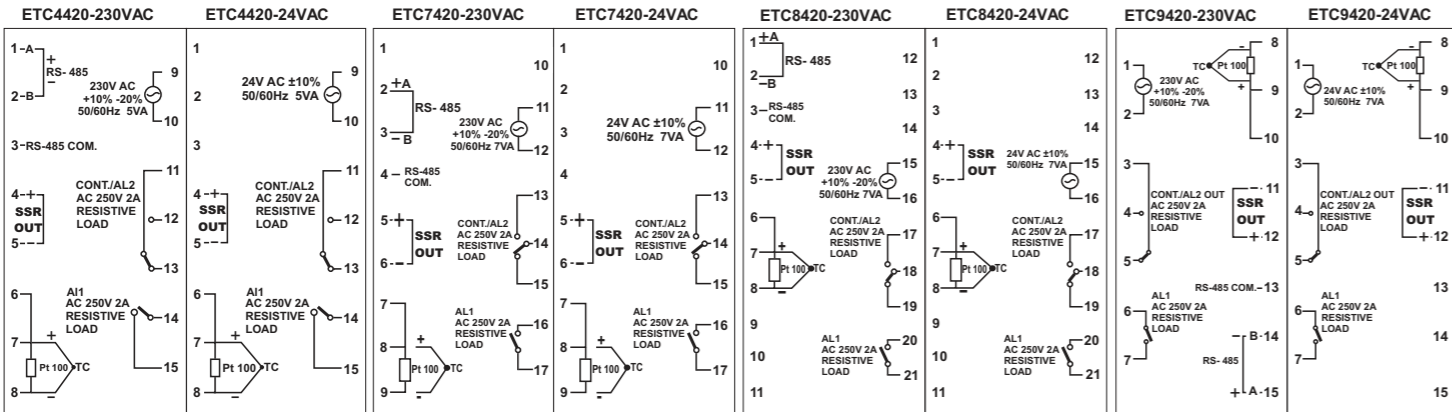
Decrement key during normal operation  
 If only this key is pressed in normal operation, software version number is seen

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 :

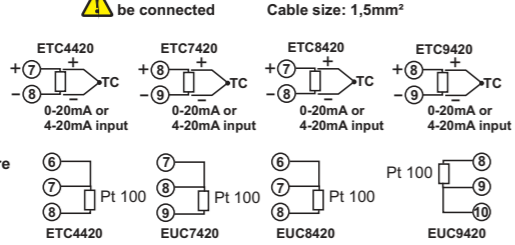
**SUPPLY :** ETC4420 (9, 10) ETC7420 (11, 12) ETC8420 (15, 16) ETC9420 (1, 2)

184-253V AC 50/60Hz 7VA

### 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

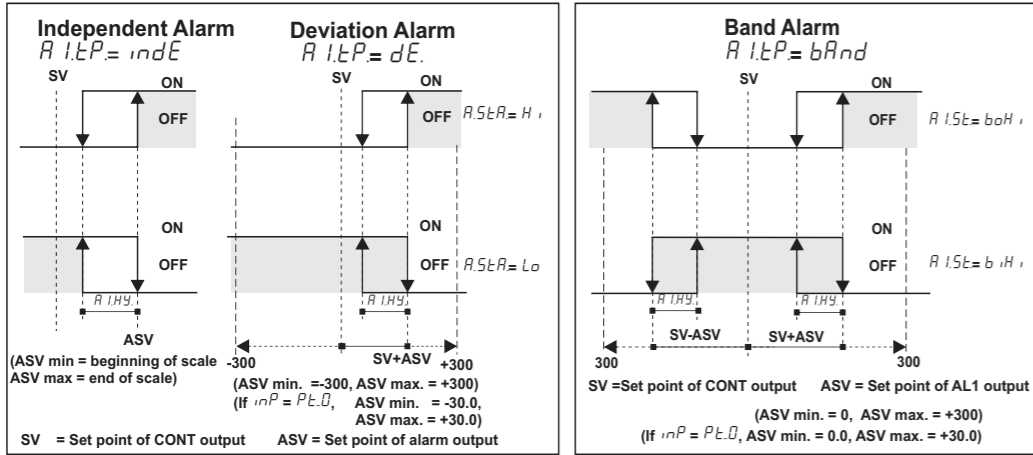
Equipment is protected throughout by DOUBLE INSULATION



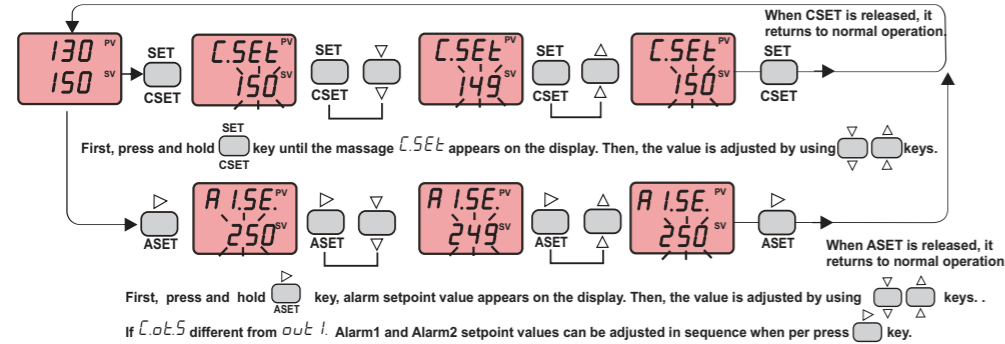
Logic output of the instrument is not electrically insulated from the internal circuits. Therefore, when using a grounding thermocouple, do not connect the logic output terminals to the ground.

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.

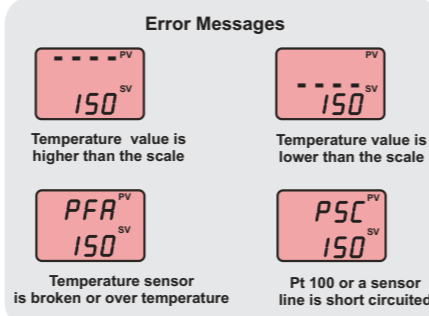
# ALARM1 AND ALARM2 OUTPUT TYPES



# MODIFICATION OF CONTROL AND ALARM SET POINTS



**NOTE :** The maximum of  $CSET$  is the value of  $CHL$  parameter and the minimum of it is the value of  $CLoL$  parameter. If independent alarm is selected,  $A1SE$  and  $A2SE$  values can be adjusted between the limits of the full scale. If deviation alarm is selected,  $A1SE$  and  $A2SE$  values can be adjusted between  $-300$  and  $+300$ . If band alarm is selected,  $A1SE$  and  $A2SE$  values can be adjusted between  $0$  and  $+300$ .



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 key and then pressing CSET keys together.

Before starting self-tune procedure, be sure  $RLEn$  parameter is '5' in the  $SELU$  menu.

Press any key to deactivate the self-tune procedure.

While holding SET key, run message flashes. Then when CSET pressed, self tune mode is entered. If there is no probe failure. If process value is appropriate to begin self tune,  $rtdy$  message flashes. Then press any key to see  $PdL$  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,  $LdH$  message flashes and device waits to decrease appropriate temperature to begin self tune. Then  $rtdy$  message flashes and press any key to begin self-tune procedure.

Before self tune procedure,  $RLEn$  parameter must be selected '5' from the  $SELU$  menu. If self tune is achieved  $RLEn$  parameter becomes '0' automatically and  $SELU$  menu is adjusted. Before self tune procedure begins with no failure,  $PdL$  message flashes and remains during the calculation of PID parameters. When PID parameters are calculated,  $P5EL$  message flashes. Then the device heats until setpoint value according to PID parameters and calculates the energy requirement for stable temperature and writes  $P5EL$  parameter as % and run mode enters.

If any key is pressed while  $PdL$  message flashes, self tune procedure is deactivated before calculation of PID parameters. If any key is pressed while  $P5EL$  message flashes, then self tune procedure is deactivated as PID parameters are calculated and  $P5EL$  parameter is done.

**Parameters:**  
 $Scod$  = Security menu access code. It should be 666.  
 $RCon$  = Parameters of  $Cono$  menu access level code.  
 $nonE$  = Invisibile  
 $P5E5$  = Modification can be done.  
 $RALr$  = Parameters of  $RALr$  menu access level code.  
 $nonE$  = Invisibile  
 $P5E5$  = Modification can be done.  
 $RCLr$  = Parameters of  $CLr$  menu access level code.  
 $nonE$  = Invisibile  
 $P5E5$  = Modification can be done.  
 $RLEn$  = Parameters of  $SELU$  menu access level code.  
 $nonE$  = Invisibile  
 $P5E5$  = Self tune can be done.

**Parameters:**  
 $inP$  = Type of input and scale.  
 $Pt$  = Pt 100, 200 to +1600 °C  
 $FED$  = Pt 100, 99.9 to +300.0 °C  
 $nCrn$  = J (Iron vs. Copper-Nickel) 0 to +600 °C  
 $nCrn$  = K (Nickel-Cr vs. Nickel-Alum.) 0 to +1200 °C  
 $nCrn$  = T (Copper vs. Copper-Nickel) 0 to +400 °C  
 $P13r$  = S (Platinum-10%Rhodium vs. Pt) 0 to +1600 °C  
 $P13r$  = R (Platinum-13%Rhodium vs. Pt) 0 to +1600 °C  
 $CHL$  = Set point upper limit.  
If  $inP$  or  $Un$  parameters are changed, the maximum value of the selected  $CHL$  parameter changes to the maximum scale value of the selected input.  
 $CLoL$  = Set point lower limit.  
If  $inP$  or  $Un$  parameters are changed, the minimum value of the selected  $CLoL$  parameter changes to the minimum scale value of the selected input. The maximum value is the value of  $CHL$  parameter.  
 $oFF5$  = Offset value.  
Offset value is added to the measurement value.  
 $Un$  = The temperature unit.  
Selectable as °C or °F.  
Note: If the temperature unit is changed, the value of the  $UPL$ ,  $LoL$ ,  $RUP$ ,  $RLoL$  parameters changes automatically.  
 $ALH$  = Alarm 1 value upper limit.  
If  $inP$  or  $Un$  parameters are changed, the maximum value of the selected  $ALH$  parameter changes to the maximum scale value of the selected input type. Minimum of  $ALH$  parameter is the value of  $RLoL$  parameter.  
 $ALL$  = Alarm 1 value lower limit.  
If  $inP$  or  $Un$  parameters are changed, the minimum value of the selected  $ALL$  parameter changes to the minimum scale value of the selected input type.  
 $ARHL$  = Alarm 2 value upper limit.  
If  $inP$  or  $Un$  parameters are changed, the maximum value of the selected  $ARHL$  parameter changes to the maximum scale value of the selected input type. Minimum of  $ARHL$  parameter is the value of  $R2LoL$  parameter.  
 $ARL$  = Alarm 2 value lower limit.  
If  $inP$  or  $Un$  parameters are changed, the minimum value of the selected  $ARL$  parameter changes to the minimum scale value of the selected input type. The maximum value is the value of  $ARHL$  parameter.  
 $FLCo$  = 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 32, the filter run most slow. The value of parameter should be increased in interference.  
 $USCL$  = Lower scale value for mA inputs.  
Adjustable between -999 and the  $(USCH-100)$  seen.  
NOTE! If  $inP$  is selected one of the mA input types, this parameter is adjustable between 0 and 2.  
 $USCH$  = Upper scale value for mA inputs.  
Adjustable between  $(USCL+100)$  and 4000.  
NOTE! If  $inP$  is selected one of the mA input types, this parameter is seen.  
 $dPnL$  = Decimal point for mA inputs.  
Adjustable between 0 and 2.  
NOTE! If  $inP$  is selected one of the mA input types, this parameter is seen.  
 $dAdr$  = Device address.  
Adjustable between 1 and 247. Difference addresses should be selected for every device.  
 $bRud$  = Modbus baud rate.  
Selectable 1200, 2400, 4800 and 9600.  
If  $bRud$  = off, Modbus communication will be disable.

**Parameters:**  
 $R1HY$  = Hysteresis of the Alarm1 output.  
 $A1LP$  = Function of Alarm1 output.  
Four kinds of functions can be selected.  
 $indE$  = Independent  
 $dE$  = Deviation  
 $bAnd$  = Band  
 $bAnd$  = Band with inhibition  
 $A1SE$  = The state of Alarm1. If independent or deviation alarm is selected, this parameter can be  $Lo$  and  $H$ . For  $Lo$  alarm output is energized below the alarm set point. For  $H$  alarm output is energized above the alarm set point. If band alarm is selected, this parameter can be  $b/H$  or  $boH$ .  $b/H$  means alarm is activated inside the band,  $boH$  means alarm is activated outside the band.  
 $A1PE$  = State of Alarm1 output in the case of sensor failure. If  $A1PE$  = 0, the alarm output is energized during the sensor failure. If  $A1PE$  = off, the alarm output is not energized during the sensor failure.  
 $A2HY$  = Hysteresis of the Alarm2 output.  
Adjustable between 1 and 50 °C.  
NOTE! If  $LoE5$  = on, this parameter is not seen.  
 $A2LP$  = Function of Alarm2 output.  
Four kinds of functions can be selected.  
 $indE$  = Independent  
 $dE$  = Deviation  
 $bAnd$  = Band  
 $bAnd$  = Band with inhibition  
NOTE! If  $LoE5$  = on, this parameter is not seen.  
 $A2SE$  = The state of Alarm2 output in the case of sensor failure. If  $A2SE$  = 0, the alarm output is energized during the sensor failure. If  $A2SE$  = off, the alarm output is not energized during the sensor failure.  
NOTE! If  $LoE5$  = on, this parameter is not seen.

**Parameters:**  
 $Pb$  = Proportional band. Adjustable between 0% and 100%. Setting  $Pb$  = 0 means On-Off control is selected.  
 $Et$  = Integral time. Adjustable between 0.0 and 100.0 minutes. If  $Et$  = 0.0, integral effect is not used.  
 $Dt$  = Derivative time. Adjustable between 0.00 and 25.00 minutes.  
 $CL$  = Control period. Adjustable between 1 and 250 seconds. Setting  $Pb$  = 0 and  $LoE5$  = on, this parameter is not seen.  
 $P5EL$  = 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%, the 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.  
 $CHY5$  = Hysteresis of the control output. Adjustable between 1 and 50 °C/F. Setting  $Pb$  = 0 this parameter is seen.  
 $CL5LR$  = Configuration of the control output.  
 $CL5LR$  = HEAT means heating control.  
 $P5Er$  = This parameter is used to adjust the control output during a sensor failure. If this parameter is set to a value close to the process temperature is prevented to rise or drop to dangerous levels.  
 $LoE5$  = Type of control output.  $out1$  =  $Out1$  control output.  $55r$  = 55r control output.  
 $55E5$  = Soft Start timer set point value. This parameter indicates the time to reach set point value when the device is first energized. 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, soft start feature will be disable.

**Modification Of Parameter Diagram**  
When holding SET key, the value of parameter flashes and using CSET 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 walked 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.