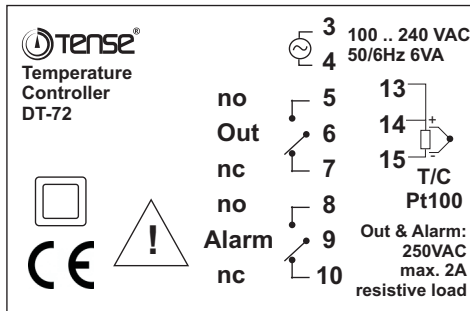


**General Specification**

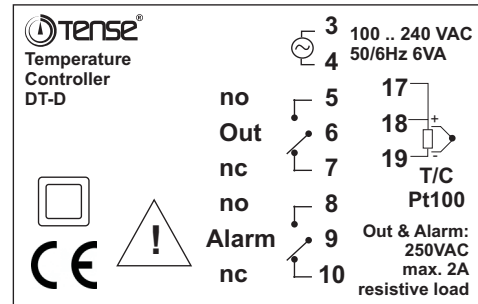
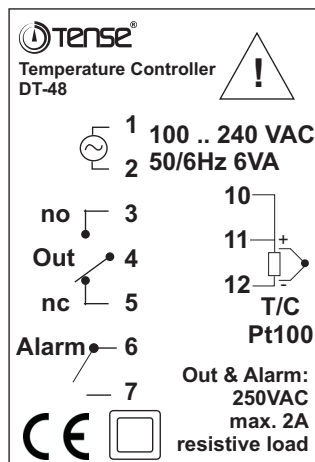
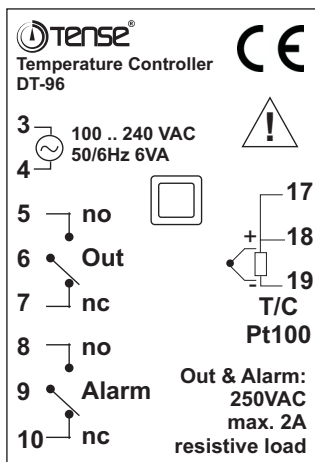
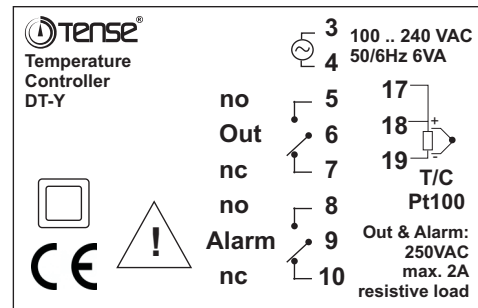
- $\mu$ P based, PID temperature controller with OUT and ALARM outputs
- Auto-tuning for PID parameters
- Sensor type: T/C (J,K,T,S,R), Pt100, selectable, multi-input
- Selectable control type: P, PI, PD, PID or ON-OFF
- Automatic "Overshoot" elimination in PID mode "Anti-windup"
- "Anti-windup"
- Upper and Lower limit for SET and ALARM settings
- Selectable relative, absolute or band alarm
- ON-delay for OUT in cooling mode
- Displays SET and PROCESS values
- Cold-junction compensation for T/C
- Line compensation for Pt100
- Excellent linearity with  $^{\circ}\text{C}/\text{mV}$  and  $^{\circ}\text{C}/\text{W}$  look-up tables
- Input "Offset" feature
- Password protection
- High accuracy
- EEPROM memory to store settings
- Optional SSR output
- Easy connection with plug-in connectors

**Connection**

**Warning:** If 2 wire Pt100 is used, connect compensation lead to measuring lead.  
(DT-96/ DT-Y/DT-D: 17-18, DT-72: 13-14, DT-48: 10-11)



no: Normally open  
nc: Normalde closed



## Technical Specification

- Dimension : DT-96:96x96, DT-72:72x72, DT-48:48x48, DT-D, DT-Y:48x96mm
- Display : 4 Digits 7 Segment (PV), 4 digits 7 Segment (SV)
- Sensor Type : J,K,T,S,R type T/C, Pt100 selectable
- Measuring Scale : -100 .. 600 °C, J type T/C, (Inpt=J), -100 .. 1300 °C, K type T/C, (Inpt=k)  
-100 .. 400 °C, T type T/C, (Inpt=t), 0 .. 1750 °C, S type T/C, (Inpt=S)  
0 .. 1750 °C, R type T/C, (Inpt=r), -100 .. 600 °C, Pt100, (Inpt=Pt)  
-99.9 .. 600.0 °C, Pt100, (Inpt=Pt.0)
- Resolution :  $\pm 1^{\circ}\text{C}$  or  $\pm 0.1^{\circ}\text{C}$
- Accuracy :  $\pm \% 0.3$  (Over full scale)
- Control Form : ON-OFF or P,PI,PD,PID - selectable
- Out Output : Relay (NO + NC), 250VAC, 2A, Resistive load, (optional SSR)
- Alarm Output : Relay (NO + NC), 250VAC, 2A, Resistive load, (only NO for Dt48)
- Heat SET : Lower Limit .. Upper Limit °C (H.Set)
- Alarm SET : AL.tY = Abs,-Abs; Lo.L .. UP.L °C (A.Set)  
AL.tY = rel, -rel, bnd, -bnd, bn.i, -bn.i; -100 .. +100 / -10.0 .. +10.0 (Pt.0)
- Heat Hysteresis : 0 .. 50 / 0.0 .. 5.0 °C (H.Hys); PID is active if set to 0
- Alarm Hysteresis : 1 .. 50 / 0.1 .. 5.0 °C (A.Hys)
- Proportional Band : 1 .. 130 °C (Pb.C)
- Integral Time : 0 .. 30,0 min. (OFF if set to 0)
- Derivative Time : 0.. 10,0 min. (OFF if set to 0)
- Control Period : 4 .. 200 sec (Ct)
- Offset : -100..+100 °C / -10.0 .. +10.0 (oFFS)
- Heating/Cooling : Selectable (only ON-OFF control form is active for cooling)
- Cold. Junc. Comp. : 0... 50 °C (T/C)
- Line Comp. : 10 Ohm maks. (3 wire Pt100)
- Operation Temp : -20°C... 50 °C
- Supply Voltage : 100...240VAC, 50/60Hz
- Power Consump. : < 6VA
- Weight : < 0.5 kg
- Altitude : < 2000 m
- Failure : ALARM output is always OFF, OUT output is active according to P.Err and Ct parameters in case of sensor failure, measurement out of range or hardware fails to measure input signal (OUT output is OFF if Perr is 0)

### Error Message:

- **FAIL** : Displays "FAiL" message in case of sensor failure, measurement out of range or hardware fails to measure input signal.
- **Err** : Hardware failure.

### **Warning:**

- Use shielded and twisted signal cables and connect shield to ground on device side. Use correct compensation cables for T/C sensors. Connect T/C cable directly to the device connectors. Keep all signal cables away from contactors, devices/cables emitting electrical noise, power cables.
- Keep device away from contactors, devices/cables emitting electrical noise, power cables. Take precautions against environmental conditions like humidity, vibration, pollution and high/low temperature during installation.
- Use fuse (slow 250mA 250VAC) on mains/supply input of the device. Use appropriate cables for mains connections. Apply safety regulations during installation.




# Programming Parameter:




Press for 2 sec.  + 




Upper Display




 **CodE** **Enter 162**   Enter 162 to pass to parameters prog. mode.  **CodE** **Enter 262 to start "auto-tune"**  




Back  
Press "Back" to return to the top of parameters programming block.

 **Inpt** **Sensor Type (1)**    
**J: J Type T\C, K: K Type T\C**  
**T: T Type T\C, S: S Type T\C**  
**R: R Type T\C, Pt: Pt100**  
**Pt.0: 0.1°C resolution Pt100**




 **h-C** **Select Function (2)**    
**HeAt: Heating Function**  
**Cool: Cooling Function**




 **H.Hys/C.Hys** **0..50 / 0.0 .. 5.0 °C (3)**    
**Heat/Cool Hysteresis (°C):**  
**PID is active if set to 0 (for H.Hys)(°C)**




 **A.hys** **1..50 / 0.0 .. 5.0 °C (3)**    
**Alarm Hysteresis(°C)**




 **Pb.C** **10 .. 130 °C**    
**Proportional Band in (°C)**




 **Ct** **4..200 sec**    
**Control Period (sec.)**




 **ti** **0..30.0 min**    
**Integral Time:**  
**In minutes. If set to 0, P, PD is active (integral OFF).**

 **td** **0..10.0 min**    
**Derivative Time:**  
**In minutes. If set to 0, P, PI is active (derivative OFF).**




 **UP.L** **Lo.L .. Upper Scale (°C)**    
**Upper limit value for Lo.L, H.SET and A.SET. Upper Scale value differs according to the selected sensor type.**

 **LO.L** **Lower Scale .. UP.L (°C)**    
**Lower limit value for UP.L, H.SET and A.SET. Lower Scale value differs according to the selected sensor type.**




 **oFFS** **-100 .. +100 / -10.0 .. +10.0 (°C) (3)**    
**Offset Value; Offset is directly added to the measured value. This feature shall be used for user calibration. Normally set to 0.**

 **AL.tY** **Abs, rel, bnd, bn.i / -Abs, -rel, -bnd, -bn.i**    
**Alarm Type:**  
**Abs: Absolute, -Abs: Absolute, invert out**  
**rel: Relative, -rel: Relative, invert out**  
**bnd: Band, -bnd: Band, invert out**  
**bn.i: Band inhibit, -bn.i: Band, invert out**

AL.tY= Abs, -Abs

 **r.ALr/ b.ALr** **-100.. +100 / -10.0 .. +10.0 (°C) (3)**    
**Relative or band Alarm Value. Displayed if AL.tY is other then Abs or -Abs.**

h-C= heat

 **C.dLY** **0..30 sec**    
**Active only in cooling mode. Minimum delay before OUT becomes ON after it becomes OFF.**

 **P.Err** **%0..100**    
**Determines the duty cycle of OUT output when "Fail" message is displayed. If 0, OUT is always OFF. If 100, OUT is always ON, when device "fails". Period is Ct.**

## Auto Tune:

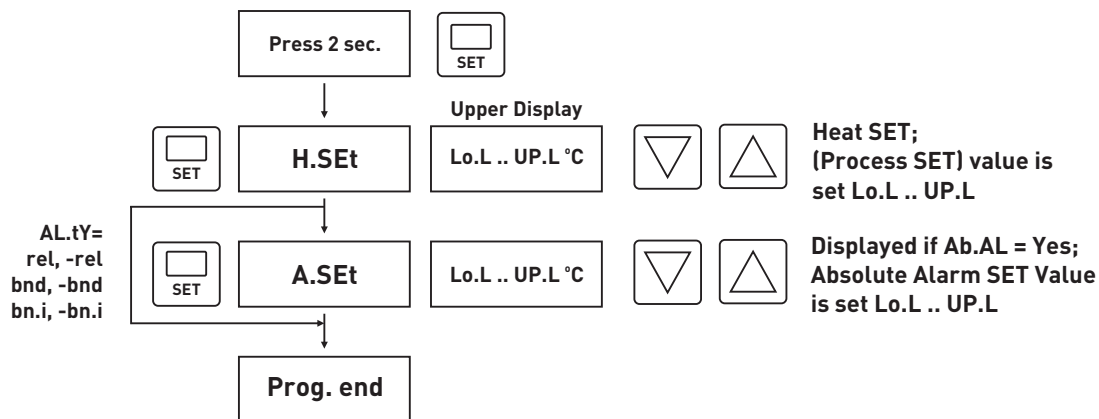
- Before starting "Auto-tune", adjust H.SET.
- "Auto tune" does not start in "cooling" mode.
- Process value may exceed H.Set during auto-tune.
- After auto-tuning, control form automatically switches to PID mode.
- Auto-tuning is stopped (interrupted) ant time by pressing any key. In this case, the parameters before auto-tuning is valid.
- Auto-tuning may not always determine the best values for your process.

## Factory Set Values:

H.Set: 100 °C  
 A.Set: 400 °C  
 Inpt: J  
 H-C: Heat  
 H.hys: 3 °C  
 A.hys: 3 °C  
 Pb.C: 30 °C  
 Ct: 4 sec.  
 ti: 5.0 min.  
 td: 1.0 min.  
 UP.L: 400 °C  
 Lo.L: 0 °C  
 oFFS: 0 °C  
 AL.tY: rel  
 r.ALr: 3 °C  
 C.dLy: 15 sec.  
 P.Err: 0

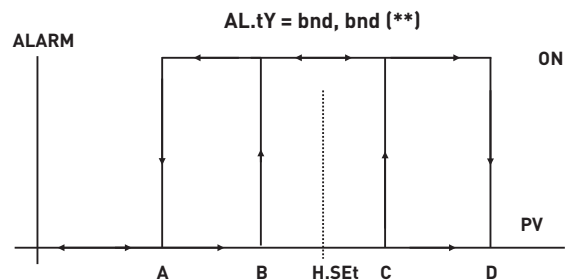
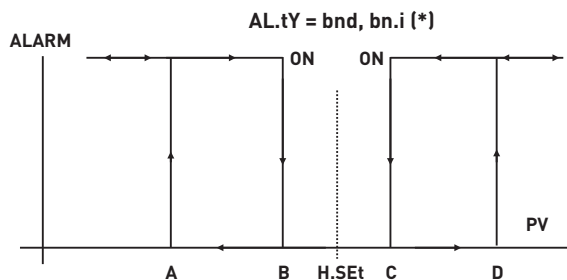
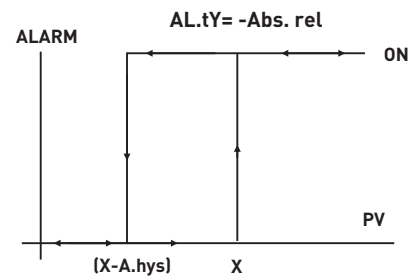
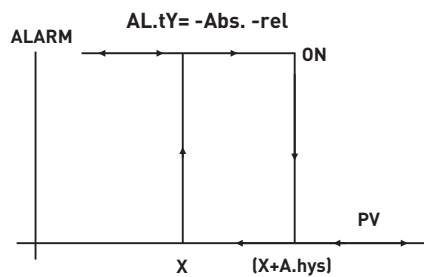
(1) When sensor type is changed, Up.L, Lo.L, H.Set or A.Set may be set to a new value automatically, if any of then violates measuring scale of the selected sensor.  
 (2) ON-OFF control is only option for Cooling function.  
 (3) If sensor type is selected as Pt.0.

## Programming Heat SET and Absolute Alarm SET:



## ALARM Output

AL.tY = Abs, -Abs; X = A.SET  
 AL.tY = rel, -rel ; X = H.SET + r.Alr



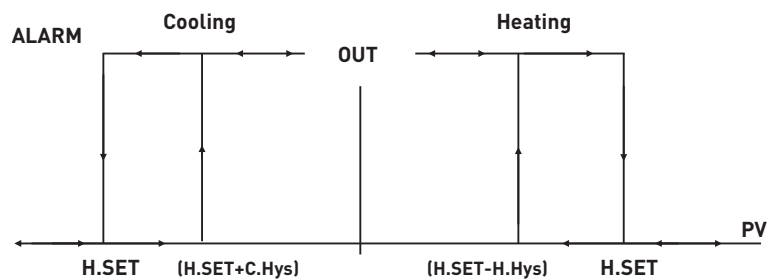
$$A = H.SET - b.Alr, B = H.SET - b.Alr + A.hys, C = H.SET + b.Alr - A.hys, D = H.SET + b.Alr$$

(\*) AL.tY = bn.i is same as bnd except that if AL.tY = bn.i, ALARM is never ON before PV is in band.

(\*\*) AL.tY = -bn.i is always same as -bnd.

## OUT Output (ON-OFF Control):

- ON-OFF is active when "H.Hys" is other than 0.



## PID Parameters:

- P, PI, PD, PID is active when "H.Hys" is set to 0 (only for heating; h-C is set to "HEAT").
- **PbC:** Proportional band in °C.
- **Ct:** Control period for PID control. Prefer 4-10 sec.
- **Ti:** Integral time; Set in minutes. Determines how fast controller reacts to compensate the offset between SET point and the process value. If set to 0, integral part is OFF. If set too low, process value may oscillate.
- **Td:** Derivative time; Set in minutes. If set to 0, derivative part is OFF. Determines how sensitive the controller is to changes of the offset between SET point and the process value. If set too high, process value may oscillate or overshoot.