AUTO-TUNE PID TEMPERATURE & TIMER

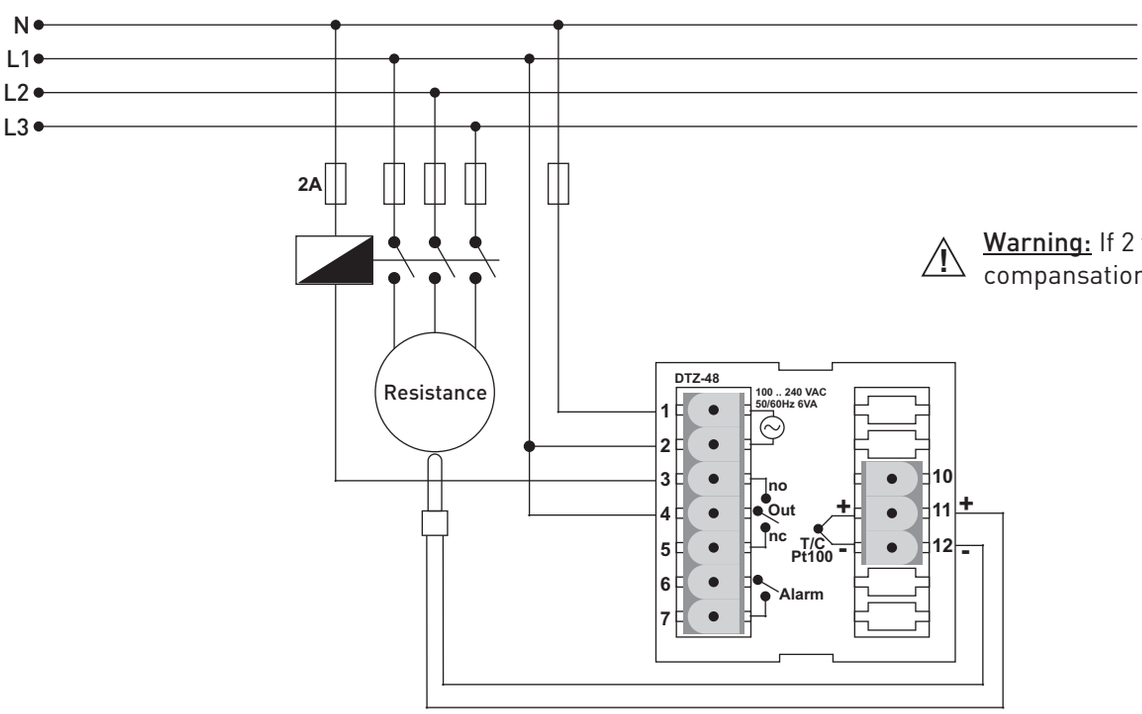
General Specifications

- PID temperature controller with built in Timer
- Auto-tuning for PID parameters
- Timer SET (Delay) value; up to 99:59 hours
- Timer ON duration; up to 99:59 minutes
- Selectable automatic OFF for OUT after Timer SET time
- 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"
- Upper and Lower limit for SET
- Displays SET and TIMER values
- Cold-junction compensation for T/C
- Line compensation for Pt100
- Excellent linearity with °C/mV and °C/Ω look-up tables
- Input "Offset" feature
- Password protection
- High accuracy
- EEPROM memory to store settings
- Optional SSR output

⚠ Warning:

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

Connection:



⚠ Warning: If 2 wire Pt100 is used, connect compansation lead to measuring lead.

MADE IN TURKEY

Technical Specifications

- **Panel Hole Sizes** : for DTZ-48 46x46mm
- **Display** : 4 Digits 7 Segment PV, 4 Digits 7 Segment SV
- **Sensor Type** : J, K, T, S, R tipi 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** : ±1 °C or ±0.1 °C
- **Accuracy** : ± %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), 250VAC, 2A Resistive Load
- **Time SET** : 00:00.....99:59 hours (t.SET)
- **Timer Resolution** : 1 minute
- **ALARM ON SET** : 00:00.....99:59 minutes (A.off). Set to 00:00 for latch ALARM output
- **ALARM ON SET Re.** : 1 second
- **Timer Accuracy** : ± %1.5 (of SET or A.Off values)
- **Timer Threshold** : 1.....1250 / 1.5.....125.0 °C (t.Hys)
- **Heat SET** : Lo.L.....UP.L °C (H.Set)
- **Heat Hysteresis** : 0.....50 / 0.0.....5.0 °C (H.Hys); PID is active if set to 0
- **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)
- **Cold Junc. Comp.** : 0.....50 °C (T/C)
- **Line Comp.** : 10 Ohm max. (3 wire Pt100)
- **Supply Voltage** : 100....240VAC, 50/60Hz
- **Power Consump.** : < 8VA
- **Operation Temp.** : -20 °C....55 °C
- **Operating Altitude** : < 2000m
- **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 P.Err is 0)

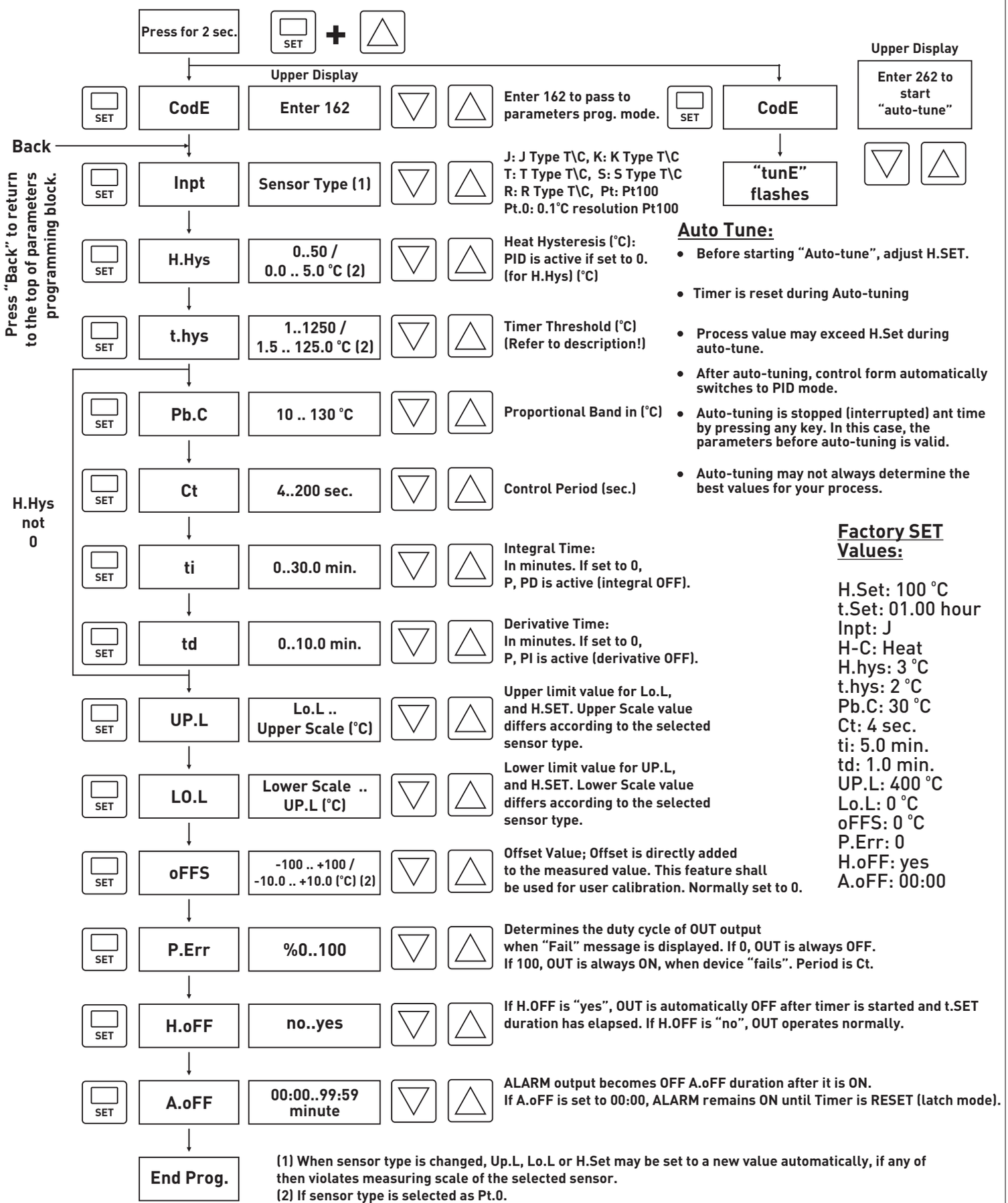
Messages:

- **hEAt** : Timer has not been started yet.
- **End** : Timer elapsed and Alarm is ON.
- **FAIL** : Displays "FAiL" message in case of sensor failure, measurement out of range or hardware fails to measure input signal.
- **Err** : Hardware failure.

Lower Display:

- Lower display cycles SET value (H.SET) and Timer status/remaing time value, 3 seconds each. Timer status;
  - If "heat" is displayed, Timer has not been started and system is heating.
  - If "End" is displayed, counting down ended and ALARM output is ON for "A.Off" duration (remaing ON duration is displayed periodically) or latch ON if "A.Off" is set to 00:00, or Timer has started counting down continues. In this case, remaing time is displayed.

Programming Parameters:



Auto Tune:

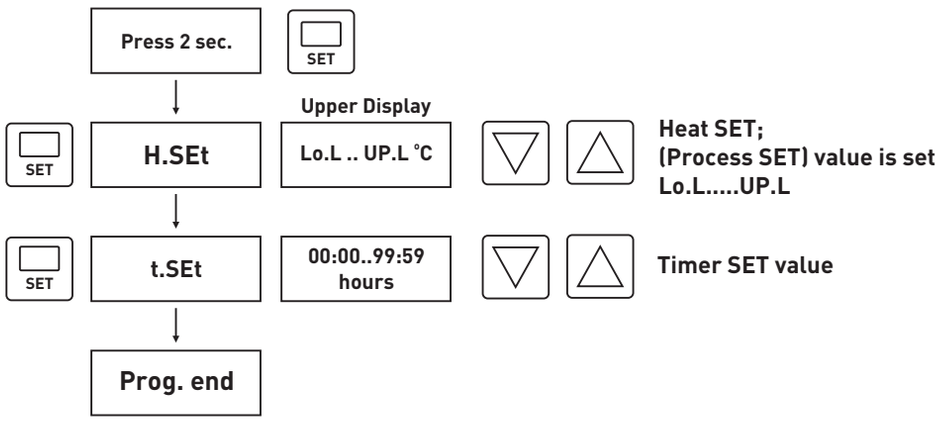
- Before starting "Auto-tune", adjust H.SET.
- Timer is reset during Auto-tuning
- Process value may exceed H.Set during auto-tune.
- After auto-tuning, control form automatically switches to PID mode.
- Auto-tuning is stopped (interrupted) ant time by pressing any key. In this case, the parameters before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

Factory SET Values:

H.Set: 100 °C
t.Set: 01.00 hour
Inpt: J
H-C: Heat
H.hys: 3 °C
t.hys: 2 °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
P.Err: 0
H.oFF: yes
A.oFF: 00:00

(1) When sensor type is changed, Up.L, Lo.L or H.Set may be set to a new value automatically, if any of then violates measuring scale of the selected sensor.
(2) If sensor type is selected as Pt.0.

Programming Heat SET and Timer SET Values:



START of Timer:

Process Value (PV), SET Value (H.SET), Timer Threshold (t.HYS);

- Timer starts when PV > = (H.SET-t.HYS). Time value (t.SET) counts down to 0. Once Timer starts, it keeps on counting down until it is reset. At the end of counting down, ALARM output is ON. Example; Let H.SET=180, t.HYS=2. When process value is greater or equal to 180-2=178 °C, Timer starts counting down.

For sensor type "Pt.0", t.HYS may be set interval 1.5 °C.....5.0°C. For other sensor types t.HYS may be set interval 1 °C.....50 °C.

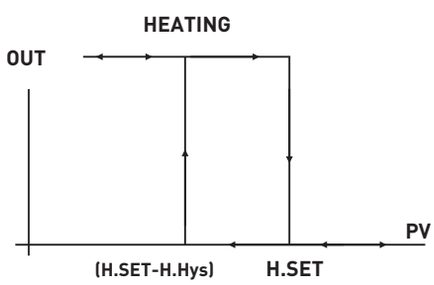
Reset of Timer:

Timer is RESET and ALARM output is OFF in case;

- After power on,
- Continuous pressing of RESET button on front panel for 3 seconds.

OUT Output (ON-OFF Control):

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



PID Parameters:

- P, PI, PD, PID is active when "H.Hys" is set to 0
- **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 compansate 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.