

Combo PID Temperature+Timer Controller

Instruction Manual

CPXT-TT05-C1

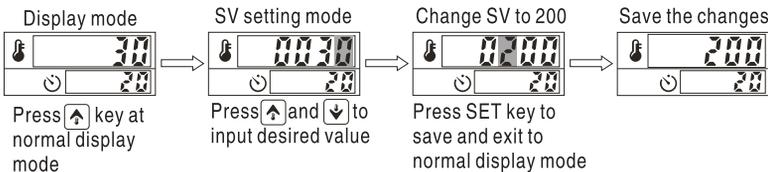
Please read this manual carefully before using and keep it in a safe place for future reference

General Information

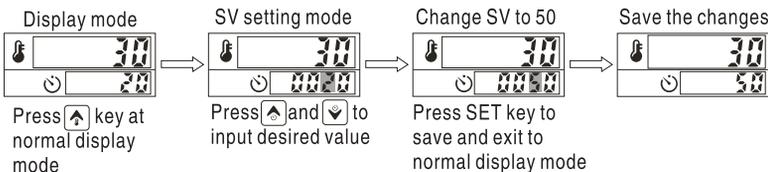
- This combo temperature +Timer controller, offer PID control and timer control 2 in 1 function, 4 digits Dual LED display with bar graphic for output indication, 0.3% measuring accuracy, 0.1 seconds resolution for timer
- Please make sure the power supply and the output was correctly wired prior to use, always refer to the stickers on the controller for wiring in field application. please refer to our selection guide for more information
- You can field select the input between thermocouple and RTDs, but the analog signal has to be specified prior to order. select a correct sensor input code is very important. you will see more information under section (6.3) in this manual for the input sensor configuration, the timer has two counting mode up or down which is selectable via software, the timer can be triggered manually via a dry contact switch and can be reset via dry contact switch as well
- Factory default control mode for controller is PID mode with auto-tuning function
- If you put P=0, control mode switch to ON/OFF mode, the hysteresis value is HYS, when PV>SV, OUT terminated in heating mode, Output initiated when PV<SV-HYS Output initiated when PV>SV+HYS in cooling mode, Output terminated when PV<SV refer to section(6.1) in this manual for more information
- When P≠0, I=0, D=0, control switch to time proportional mode, Proportional reset value is rSt, control cycle time would be CYT, output decrease when rSt decrease in heating mode, Output decrease when rSt increase in cooling mode
- Please always perform auto-tuning process to get a optimized PID value to have a better control result, refer to section(7) in this manual for more info on the auto-tuning
- Soft-start function for analog output is very useful to have a stable control process, the soft-start can be initiated to achieve stable control effect, check section (6.1)
- RS-485 Modbus-RTU is available on request

1. Quick Start Guide

1.1 Setting value configuration for temperature controller

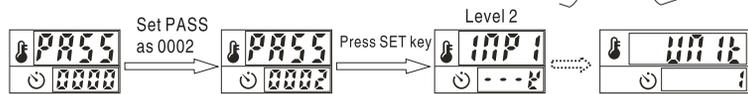


1.2 Setting value configuration for timer



1.3 Switch the display from Celsius to Fahrenheit

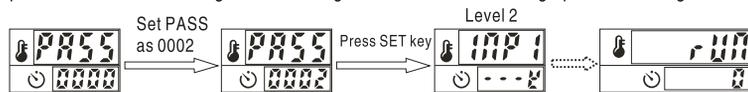
Press SET and \downarrow the same time to pass word menu, input "0002" as password and goes to parameter level 2



Located the parameter "Unit" and change the value to 1, then the display will be changed to fahrenheit

1.4 Configure the timer counting mode

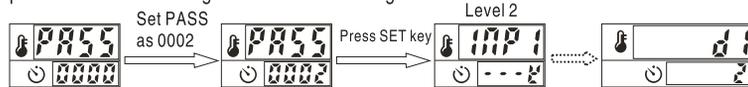
Following the procedure at above 1.3 and goes to parameter level 2, and locate the parameter "rUN" to change the counting mode between counting up and counting down



Put the value as "0" for counting up mode, put the value as "1" for counting down mode

1.5 Several mode to active the timer

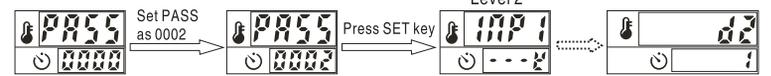
Following the procedure at above 1.3 and goes to parameter level 2, and locate the parameter "d1" to configure the timer initiating mode



Put d1=2, the timer will be initiated if you "close and release" D1 dry contact switch.
Put d1=3, the timer will be initiated if D1 closed and keep it at closed status, the timer stop working if D1 released and timer reset.
Put d1=4, the timer will be initiated once d1 closed and will keep working regardless of the status of the d1 contact, no matter the status is closed or release

1.6 Timer reset contact D2 configuration

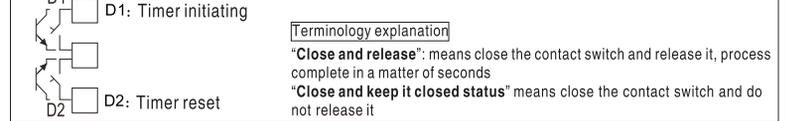
Following the procedure at above 1.3 and goes to parameter level 2, and locate the parameter "d2" to configure the timer initiating mode



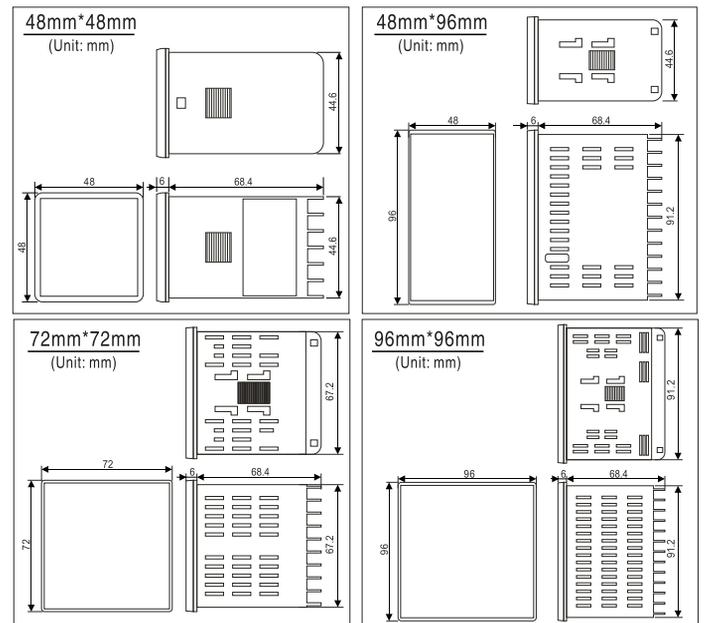
Put d2=0, the D2 contact switch for timer reset function disabled

Put d2=1, the D2 contact switch for timer reset function activated. timer reset once d2 closed

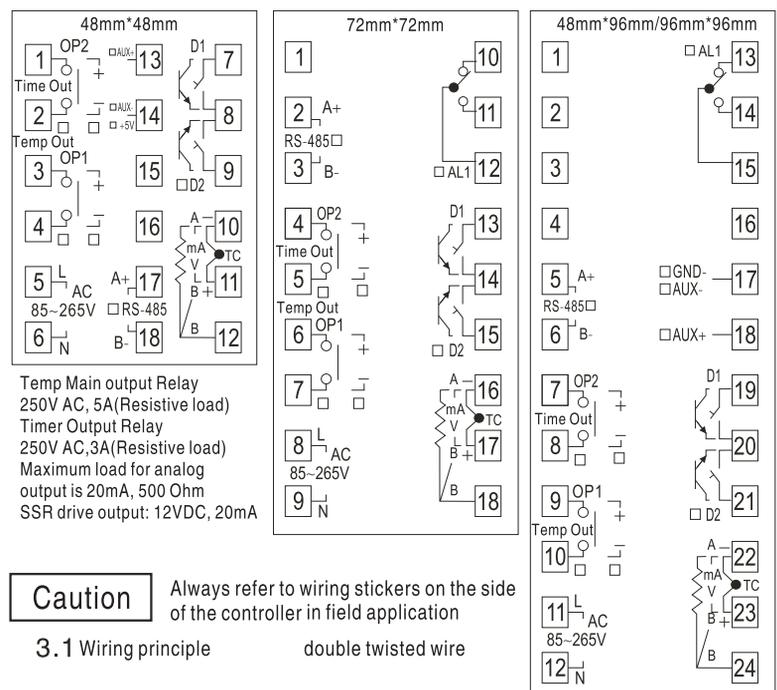
** Below is the wiring details for timer initiating and timer reset function, you can connect a foot switch or toggle switch between d1 to trigger the timer



2. Mounting and Dimensions



3. Wiring Diagram

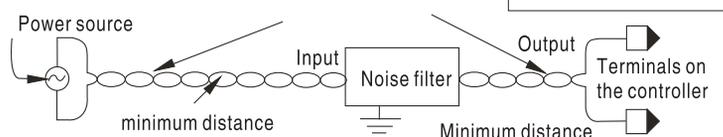


Caution

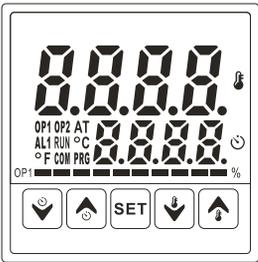
Always refer to wiring stickers on the side of the controller in field application

3.1 Wiring principle

double twisted wire



4. Panel discription



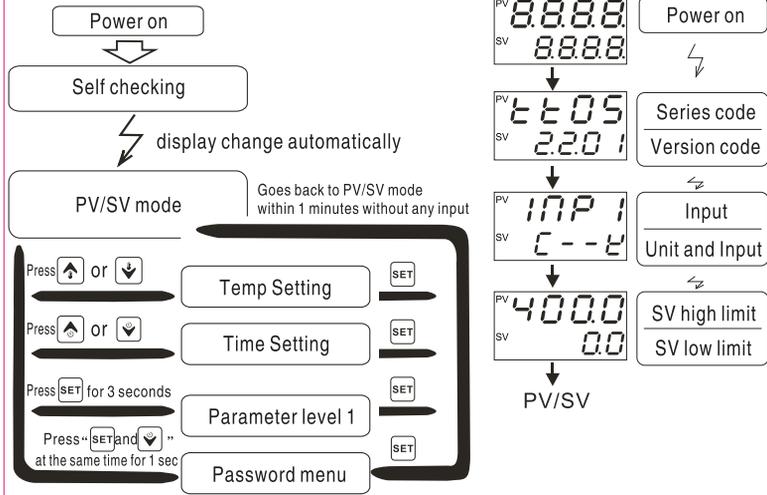
☼ : Temperature control display
 ☼ : Timer Display
 Bar graphic: Output percentage display for temperature
 Indicator: OP1 temperature output indication
 OP2 timer output indication
 AT auto-tuning process indication
 AL1 Temperature alarm output indication
 RUN, Timer operation indication
 °C, Temperature unit display in Celcibus
 °F, Temperature unit display in Fahrenheit
 COM, communication indication
 PRG, reversed for future use

SET Function Key, Enter Key

Time decrease Time increase Temp decrease Temp increase

5. Setting

5.1 Access to setting mode



6. Parameters

6.1 Parameter level 1

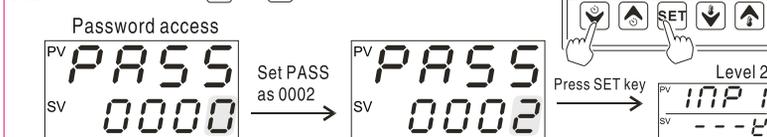
Press SET key for 3 seconds to access to parameter level 1

6.1.1 How to configure the parameter values

The parameter notation will be displayed one by one by pressing the SET key. press can increase and decrease the parameter value. press SET for 3 seconds to save the modification and exit to PV/SV state #1 Factory default

| Notation | Name | Range | 1# | Description |
|----------|-------------------------------------|------------------|-------|--|
| AT | Auto-tuning AT | NO or YES | NO | AT=Yes, AT activated. AT=No, AT disabled. |
| AL1 | Alarm 1 value | -1999 to 9999 | 10 | Define the alarm value for alarm 1, Hysteresis=AH1 |
| SC | Input offset | -199 to 199 | 0.0 | To compensate the error caused by sensors |
| P | Proportional band | 0.0 to 200.0 | 20.0 | Proportional band in PID mode, P=0 for ON/OFF control P=20.0 equals to 200 for analog input, recommend P=2.0 in analog input case |
| HYS | Hysteresis value for ON/OFF Control | 0 to 999 | 1.0 | When P=0, control mode switch to ON/OFF. Heating: PV>SV output terminated, PV<SV-HYS, Output activated Cooling: PV>SV+HYS output activated, PV<SV, output terminated |
| I | Integral time | 0 to 3600 sec | 210 | Integral action off when I=0, system became less stable when decrease the I value but more efficient on the integral action |
| D | Derivative time | 0 to 3600 sec | 30 | Derivative action off when D=0, increase the D value a little bit can counter balance the system overshoot |
| CYt | Cycle time | 0 to 999 sec | 20 | Control cycle time for system, SET 20 seconds for Relay output 2 seconds for SSR drive output |
| -SR | Proportional Reset | -199 to 200 | -5.0 | Supress overshoot at first round of heating(rst>-P/2), better calculate via auto-tuning, heating up fast when decrease the value |
| OPL | Output lower limit | 0.0 to 100.0% | 0.0 | Define the output lower limit value |
| OPH | Output higher limit | 0.0 to 100.0% | 100.0 | Define the output higher limit value |
| t2 | Timer output Reset delay t2 | 0.0 to 200.0 sec | 0.0 | When tot=0, the timer output when timing finished and reset delay for t2. t2=0.0 means no reset after timer output. other value means reset delay time |
| buFF | Soft-start for analog output | 0.0 to 100% | 100.0 | This function only applies to analog output, it restrain the output variance at a preset ratio, 100% means no soft-start function, e.g. buF=5%, means the variance ratio of the output will be at 5% maximum |
| LCK | Access protection | 0-2 | 0 | LCK=0: All parameters can be modified LCK=1: SV and auto-tuning accessible LCK=2: Auto-tuning accessible |

6.2 Password Press SET and at the same time for 3 seconds



6.3 Parameter level 2

SET PASS=0002 to access parameter level 2, below notation will de displayed one by one after each press. press can increase and decrease the parameter value Press SET for 3 seconds to save the configuration #1 Factory default

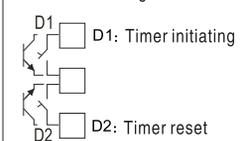
| Notation | Name | Range | 1# | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------|---------------------------------------|---------------|---------|--|----------|--------|--------|---|---|----------|---|---|---|---|------|---------|--------|---------|--------|--------|--------|-------|--|--|-------|--------|--------|--------|--|--------|--|--------|--|--|
| 17P1 | Input code | | | <table border="1"> <tr> <td>Notation</td> <td>K</td> <td>E</td> <td>J</td> <td>N</td> <td>Wu3_Re25</td> <td>S</td> <td>T</td> <td>R</td> <td>B</td> </tr> <tr> <td>Name</td> <td>2-10VDC</td> <td>1-5VDC</td> <td>0-10VDC</td> <td>0-5VDC</td> <td>0-50mV</td> <td>0-20mV</td> <td colspan="3">P1100</td> </tr> <tr> <td>Range</td> <td>4-20mA</td> <td>0-20mA</td> <td colspan="2">0-50mV</td> <td colspan="2">0-20mV</td> <td colspan="3">800 °C</td> </tr> </table> | Notation | K | E | J | N | Wu3_Re25 | S | T | R | B | Name | 2-10VDC | 1-5VDC | 0-10VDC | 0-5VDC | 0-50mV | 0-20mV | P1100 | | | Range | 4-20mA | 0-20mA | 0-50mV | | 0-20mV | | 800 °C | | |
| Notation | K | E | J | N | Wu3_Re25 | S | T | R | B | | | | | | | | | | | | | | | | | | | | | | | | | |
| Name | 2-10VDC | 1-5VDC | 0-10VDC | 0-5VDC | 0-50mV | 0-20mV | P1100 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Range | 4-20mA | 0-20mA | 0-50mV | | 0-20mV | | 800 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| dP | Decimal point | 0 to 1 | 0 | 0: Without decimals 1: 1 decimals(For all inputs) 2: 2 decimals 3: 3 decimals(For analog input only) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LSPL | SV lower limit | -1999 to 9999 | 0 | SV lower limit value, or zero point for re-transmission | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| USPL | SV higher limit | -1999 to 9999 | 400 | SV higher limit value, or maximum point for re-transmission | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| UNIt | Display unit | 0 or 1 | 0 | 0: Celcibus F: Fahrenheit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PuFl | Digital filter strength | 0 to 60 | 55 | 1-30: normal strength 31-60: Enhanced strength | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ANL1 | lower limit display for analog input | -1999-9999 | 0 | E.g. for 4-20mA input, the display will be ANL1 when input is 4 mA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ANH1 | higher limit display for analog input | -1999-9999 | 2000 | E.g. for 4-20mA input, the display will be ANL2 when input is 20 mA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ALd1 | Alarm mode for AL1 | 00 to 16 | 11 | Alarm output mode for alarm 1, refer to alarm mode table for more information | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AH1 | HYS for alarm 1 | 0.0 to 100.0 | 0.4 | Hysteresis for alarm 1 (high alarm: negative HYS, Low alarm: positive HYS) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| dPt | Decimals for time display | 0 or 1 | 0 | =0 no decimal =1 1 decimal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -rUN | Timing mode | 0 or 1 | 0 | RUN=0 timing up RUN=1 timing down | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| d1 | Timer triggering mode via D1 terminal | 2-4 | 2 | =2: D1 close and release to initiate the timer =3: D1 close to initiate the timer, Open to stop timing and reset =4: D1 close and release or keep closing to initiate the timer | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| d2 | Timer reset mode via D2 terminal | 0 or 1 | 0 | =0: No timer reset function =1: D2 used to reset the timer | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| tOt | Timer output mode | 0 or 1 | 1 | =0: Output when timing finished(Relay close or release after delay t2) =1: Output when timing starts, reset after timing finished | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BEr | Soft-start function for output | 0, 1, 2 | 0 | 0: Without soft-start function 1: Soft-start function effective all the time 2: Soft-start kick in when output increase, disable when output decrease | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IdNO | Controller address | 0-127 | 1 | To define the address for controller in communication | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BAUD | Baud rate | | 9.6 | 2.4K, 4.8K, 9.6K, 19.2K | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

** Alarm mode description (ALd =00-16)

- 10: No alarm output
- 11: Deviation high alarm
- 12: Deviation low alarm
- 13: Deviation high/low alarm
- 14: Deviation band alarm
- 15: Process high alarm
- 16: Process low alarm
- 00: No alarm output
- 01: Deviation high alarm with hold action
- 02: Deviation low alarm with hold action
- 03: Deviation high/low alarm with hold action
- 04: Deviation band alarm with hold action
- 05: Process high alarm with hold action
- 06: Process low alarm with hold action

NOTE: The alarm action will be suppressed right after power on even the condition is satisfied, and the alarm standby only works 1 time right after power on. the alarm will go off if the condition satisfied again after suppression at the first time

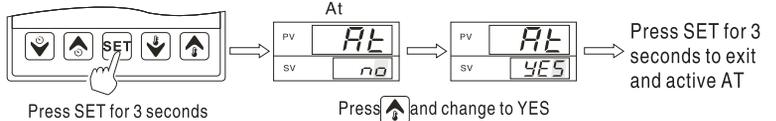
** Timer initiating and manual reset



"Close and release": D1 close for a moment and release, timer initiated
 "Closing": Relay keep closing
 "D2 reset": D2 close, timer reset and the output reset immediately

7. Auto-tuning

Better auto-tuning result can be achieved when units just power on and PV still far away from SV



8. Input sensor description

| Input type | code | Input type | code |
|-----------------|---------------------|------------|------|
| K | 0 to 400 °C | K | A4 |
| | 0 to 600 °C | K | A6 |
| | 0 to 1300 °C | K | B3 |
| E | 0 to 200 °C | E | A2 |
| | 0 to 400 °C | E | A4 |
| | 0 to 600 °C | E | A6 |
| J | 0 to 400 °C | J | A4 |
| | 0 to 600 °C | J | A6 |
| | 0 to 800 °C | J | A8 |
| T | 0 to 200 °C | T | A2 |
| | 0 to 300 °C | T | A3 |
| | 0 to 400 °C | T | A4 |
| S | 0 to 1600 °C | S | B6 |
| R | 0 to 1700 °C | R | B7 |
| B | 200 to 1800 °C | B | B8 |
| N | 0 to 1300 °C | N | B3 |
| Wu3_Re25 | 600 to 2000 °C | W | B0 |
| Pt100 | 0 to 400 °C | D | A4 |
| | 0 to 600 °C | D | A6 |
| | 0 to 800 °C | D | A8 |
| | -100 to +200 °C | D | C2 |
| | -200 to +800 °C | D | C8 |
| | -100.0 to +200.0 °C | D | F2 |
| Input type | code | Input type | code |
| | 0 to 20mV | V | 01 |
| | 0 to 50mV | V | 02 |
| | 0 to 5VDC | V | 03 |
| | 0 to 10VDC | V | 04 |
| | 1 to 5VDC | V | 08 |
| -199.9 to 999.9 | V | 09 | |
| | 2 to 10VDC | V | 09 |
| | 4 to 20mA | A | 03 |
| 0 to 20mA | A | 02 | |