

Combo PID Temperature+Timer Controller Instruction Manual

CPXT-TT05-C1

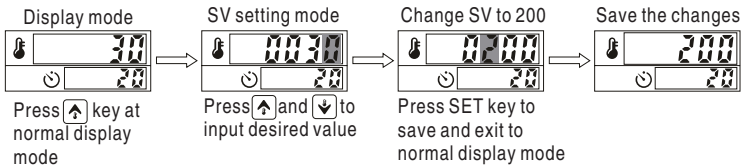
Please read this manual carefully before using and keep it in a safe place for future reference

General Information

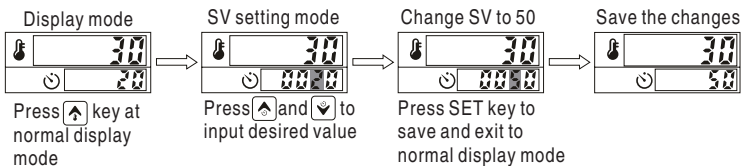
- This combo temperature +Timer controller, offer PID control and timer control 2 in 1 function, 4 digits Dual LED display with bar graphic for output indication, 0.3% measuring accuracy, 0.1 seconds resolution for timer
- Please make sure the power supply and the output was correctly wired prior to 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

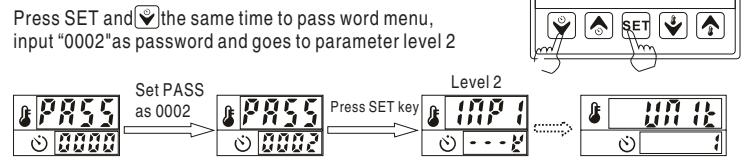
1.1 Setting value configuration for temperature controller



1.2 Setting value configuration for timer



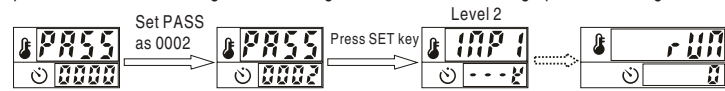
1.3 Switch the display from Celsius to Fahrenheit



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

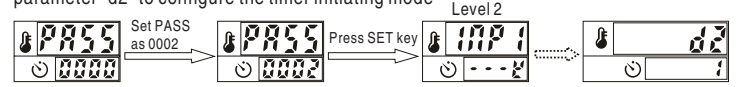
Following the procedure at above 1.3 and goes to parameter level 2, and locate the parameter "d1" to configure the timer initiating mode



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

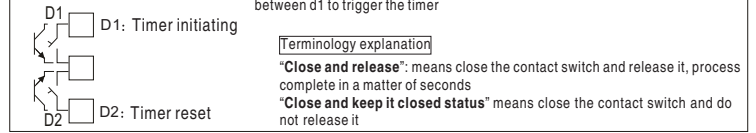
Following the procedure at above 1.3 and goes to parameter level 2, and locate the parameter "d2" to configure the timer initiating mode



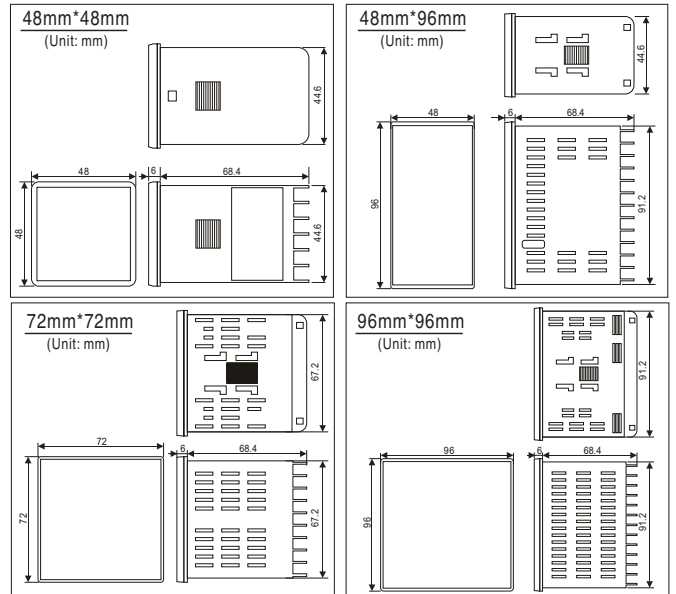
Put d2=0, the D2 contact switch for timer reset function disabled

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

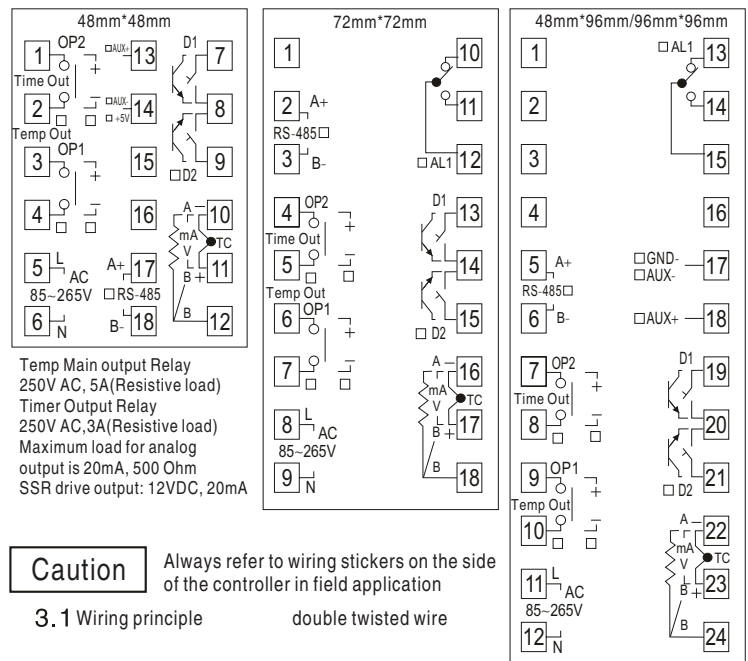
** Below is the wiring details for timer initiating and timer reset function, you can connect a foot switch or toggle switch between d1 to trigger the timer



2. Mounting and Dimensions



3. Wiring Diagram

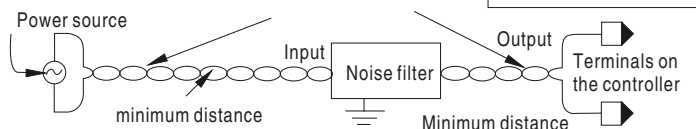


Caution

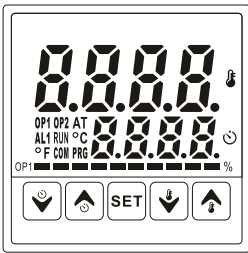
Always refer to wiring stickers on the side of the controller in field application

3.1 Wiring principle

double twisted wire



4. Panel description



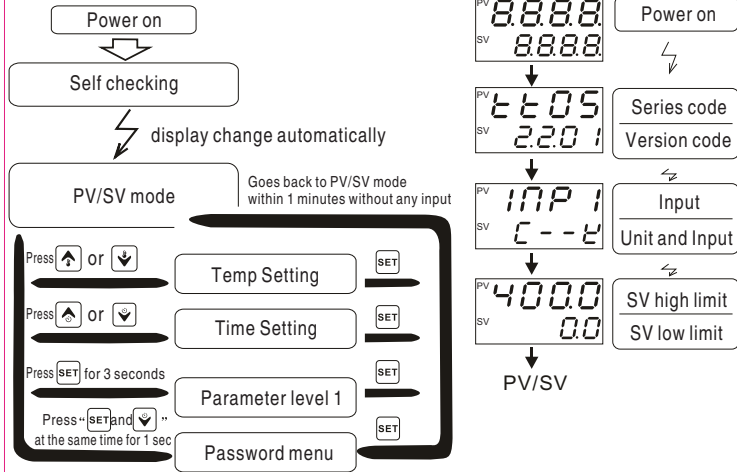
- ☺ : Temperature control display
- ⌚ : Timer Display
- Bar graphic: Output percentage display for temperature
- Indicator: OP1 temperature output indication
- OP2 timer output indication
- AT auto-tuning process indication
- AL1 Temperature alarm output indication
- RUN, Timer operation indication
- °C, Temperature unit display in Celcius
- °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

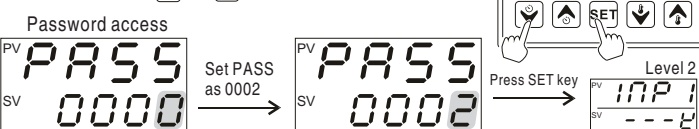
Press SET key for 3 seconds to access to parameter level 1

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

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
RS	Proportional Reset	-199 to 200	-5.0	Suppress 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 be displayed one by one after each press. press ⏪ ⏩ can increase and decrease the parameter value Press SET for 3 seconds to save the configuration

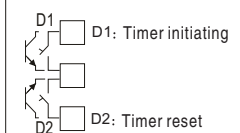
Notation	Name	Range	1#	Description																								
INP1	Input code	<table border="1"> <thead> <tr> <th>Notation</th> <th>K</th> <th>E</th> <th>J</th> <th>N</th> <th>Wu3_Re25</th> <th>S</th> <th>T</th> <th>R</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>Range</td> <td>1300 °C</td> <td>600 °C</td> <td>800 °C</td> <td>1300 °C</td> <td>2000 °C</td> <td>1600 °C</td> <td>400 °C</td> <td>1700 °C</td> <td>1800 °C</td> </tr> </tbody> </table>			Notation	K	E	J	N	Wu3_Re25	S	T	R	B	Range	1300 °C	600 °C	800 °C	1300 °C	2000 °C	1600 °C	400 °C	1700 °C	1800 °C				
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		<table border="1"> <thead> <tr> <th>Notation</th> <th>AN4</th> <th>AN3</th> <th>AN2</th> <th>AN1</th> <th>PL</th> </tr> </thead> <tbody> <tr> <td>Name</td> <td>2-10VDC</td> <td>0-10VDC</td> <td>0-5VDC</td> <td>0-20mA</td> <td>Pt100</td> </tr> <tr> <td>Range</td> <td>1-5VDC</td> <td>0-5VDC</td> <td>0-20mA</td> <td>0-50mV</td> <td>0-20mV</td> </tr> <tr> <td></td> <td>4-20mA</td> <td></td> <td></td> <td></td> <td>800 °C</td> </tr> </tbody> </table>			Notation	AN4	AN3	AN2	AN1	PL	Name	2-10VDC	0-10VDC	0-5VDC	0-20mA	Pt100	Range	1-5VDC	0-5VDC	0-20mA	0-50mV	0-20mV		4-20mA				800 °C
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Range	1-5VDC	0-5VDC	0-20mA	0-50mV	0-20mV																							
	4-20mA				800 °C																							
DP	Decimal point	0 to 1	0	0: Without decimals 1: 1 decimal (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: Celcius F: Fahrenheit																								
PFLT	Digital filter strength	0 to 60	55	1-30: normal strength 31-60: Enhanced strength																								
ANL1	lower limit display for analog input	-199-9999	0	E.g. for 4-20mA input, the display will be ANL1 when input is 4 mA																								
ANL2	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)																								
dPL	Decimals for time display	0 or 1	0	=0 no decimal =1 1 decimal																								
tUAT	Timer timing units	0 or 1	0	=0 for seconds =1 for minutes																								
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																								
ADR	Controller address	0-127	1	To define the address for controller in communication																								
BRUD	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

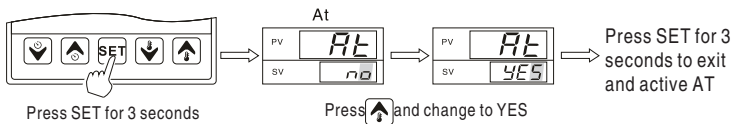
** Timer initiating and manual reset



"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
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

Input type	code
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
	-50.0 to +200.0 °C D G2

Input type	code
0 to 20mV	V A1
0 to 50mV	V A2
0 to 5VDC	V A3
0 to 10VDC	V A4
1 to 5VDC	V A8
2 to 10VDC	V A9
4 to 20mA	A A3
0 to 20mA	A A2