V100 Series Temperature Controllers
User's manual

Thank you for purchasing model V100 Series PID Temperature Controller.
Before installing, connecting or using the instrument, please go through this instruction manual carefully and use the unit in proper manner.

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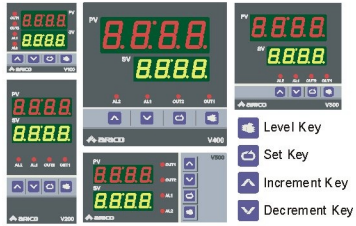
(11)Faceplate



PV : Normal mode : Present temp. value
Level select mode : Parameter level 1~4
Parameter mode : Parameter name
SV : Normal mode : Setting value 、Manual output percentage
Parameter mode : Parameter value
OUT1 : Main output indicator
OUT2 : Aux. output indicator
AL1 : Alarm 1 output indicator
AL2 : Alarm 2 output indicator

(12)Key Operation

1、Entry into level select mode and select level, and press into parameter mode.
2、In parameter mode, press level key leave parameter mode to Level select mode.
3、In setting mode, press level key for saving parameter and return to parameter mode.

1、Press set key enable set value.
2、In parameter mode, press set key for enable to set parameter.
3、In setting mode, press set key for saving parameter or setting digit, and return to parameter mode.

1、In level select mode, press increment key to entry parameter mode
2、In parameter mode, press increment key for selecting parameter.
3、In setting mode, press increment key to increase the setting value until high limit.

1、In level select mode, press decrement key to entry parameter mode
2、In parameter mode, press decrement key for selecting parameter.
3、In setting mode, press decrement key to decrease the setting value until low limit,,

Press + at the same time for 2 sec to start or stop self-tuning.

Press decrement key for 2 sec to start or stop control output.

Press increment key for 2 sec to start or stop manual output.

Press set key for 8 sec to set the password "0044" automatically

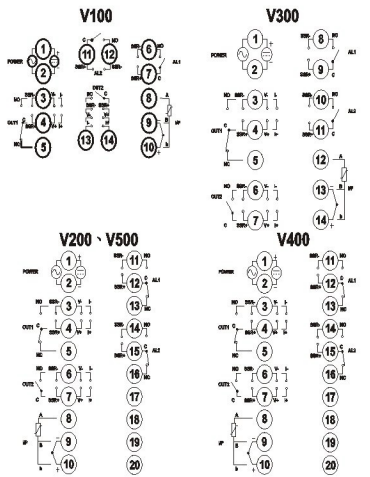
Press to return to the head of level in parameter mode.

Press for 2 sec to return to normal mode.

(21)Specifications

1. Power Supply : 100~240VAC±10%, 50/60HZ
2. Display : 2 * 4digits
3. Key : 4 machinery keys
4. Accuracy : 0.5%full scale (25℃)
5. Main Input : TC: J、K RTD: Pt100
6. Output : Main output :
   Relay : 250V NO:7A / NC:5A
   Digital Voltage : DC24V/20mA
   Analog volt. : 0~10V、0~5V、1~5V
   Analog current : 0~20mA、4~20mA
   Alarm1/2 & Aux.output :
   Relay : 250V NO:7A / NC:5A
   Digital Voltage : DC24V/20mA
   (* V100 output for aux. and alarm1/2 : 250V/5A)
7. Function : Heating and cooling
8. Control Mode : ON/OFF, PID (Self-tuning)
9. Alarm Mode : 6
10. Ambient : Temperature : 0~55℃(32℉~130℉)
    Humidity : 10%~80%(non-condensing)

(22)Wiring



(23)PID Control

1. Output control mode

P	P	Main : PID Aux. : PID
o	P	Main : on/off Aux. : PID
P	o	Main : PID Aux. : on/off
o	o	Main : on/off Aux. : on/off

2. Output heating &cooling control mode

H	C	Main :heating Aux. :cooling
C	H	Main :cooling Aux. :heating

Auxiliary output function assists main output function in avoiding the temperature out of control. They have opposite modes to control.

3. Alarm Hysteresis band :

The output cycle time is one of important factor in control.It's necessary to evaluate the heating and cooling system efficiency to set the output cycle time.suggest that the output cycle time >20sec in relay output. If the output cycle time=0, it will be analog output mode for that the higher temperature stability system is desired,and the time=1~19 are for voltage output mode and lower stability system

4. Proportional Band : P

Range=1~100 ℃or℉ and it 's avalible to set by user.

5. Integral Time : I

The I time is fluctuation.

6. Differential Time : D

Range=0~250 units,1unit=0.1sec and 0 for disable.It's avalible to set by user.

7. What is the "PID" Control?

"P" is proportional band and unit = ℃ or ℉.It can describe with the following equation:
P = [(SV - PV) * 100] / proportional band

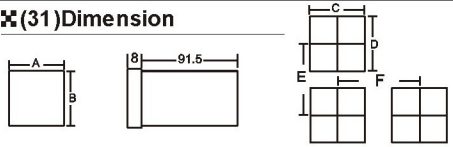
"D" is differential time and unit=0.1sec. If "D"=10,10*0.1=1 sec, it means that differential action will be executed once per sec. The setting is smaller and the time is shorter and the output percentage is fewer.

8. PID Value Self Tuning :

PID value self tuning has three types: The first is disable for self tuning,the second is only once ,and the other is every times after power on.

But it only will be executed by the following situations: The setting value of heating system should be higher than the present temperature for 45℃or 85℉. Or the setting value of cooling system should be lower than the present temperature for 45℃or 85℉.If this function was executed is desired,it's necessary to start this one, to set value,and to comfirm that the temperature range is enough to execute it, then turn off the power supply and restart the instrument, we will see the PID value and the flashing of decimal point in the right-down horn.It will be shuted after changing value during self tuning.

(31)Dimension



Unit:mm

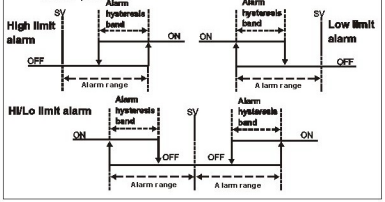
Model	A	B	C	D	E	F
V100	48	48	45+0.5	45+0.5	72	60
V200	48	96	45+0.5	92+0.5	120	60
V300	72	72	68+0.5	68+0.5	96	84
V400	96	96	92+0.5	92+0.5	120	108
V500	96	48	92+0.5	45+0.5	60	120

(32)Alarm Function

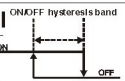
Alarm Range :
It's avalible to set alarm range from 0 to 99 in unit °C or°F

Alarm Hysteresis band :
It's avalible to set alarm hysteresis band from 0 to 10 in unit°C or°F
And avoid temperature to unstable and fast change in critical point.

nUL	No alarm
Lo	Low limit
H i	High limit
LH	Lo/Hi limit
S Lo	Low limit standby
S LH	Lo/Hi limit standby



(33)ON/OFF Control



In ON/OFF control type, we can set ON/OFF hysteresis band to control temperature in desired range.

(34)Manual Control Type

The user can force to set output percentage.

(35)Output Function

1. Relay Output :
It's better to set output cycle time >20sec in relay output. The setting time is larger and the duration of relay is longer.
2. Digital voltage Output :
It's available to set output cycle time from 1 to 60 sec as user's need in digital voltage output (24V).
3. Analog Output :
It's available to set the high and low limits of analog output after the value of output cycle time equal 0. The range of analog output are 0~20mA or 0~10V.

(36)Parameter Configuration Flow Chart

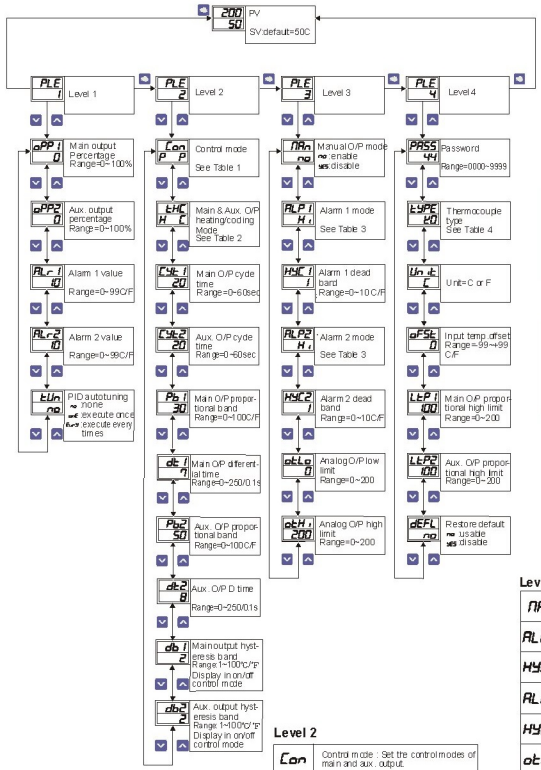


Table 1 Output control mode

P P	Main : PID Aux. : PID
o P	Main : on/off Aux. : PID
P o	Main : PID Aux. : on/off
o o	Main : on/off Aux. : on/off

Table 2 Output heating &cooling control mode

H C	Main :heating Aux. :cooling
C H	Main :cooling Aux. :heating

Table 3 Alarm mode

nUL	No alarm
Lo	Low limit
H i	High limit
LH	Lo/Hi limit
S Lo	Low limit standby
S LH	Lo/Hi limit standby

Table 4 Input thermocouple type

J0	J type Without DP, Range 0~900°C/0~1200°F
J1	J type With DP, Range 0.0~900.0°C/0.0~999.9°F
K0	K type Without DP, Range 0~1200°C/32.0~1500°F
K1	K type With DP, Range 0.0~999.9°C/32.0~999.9°F
Pt0	Pt100 Without DP, Range -200~600°C/-300~1200°F
Pt1	Pt100 With DP, Range -199.9~600.0°C/-199.9~999.9°F

*DP:Decimal point
*C/F:°C/°F

(41)Other Parameter Function

1. Password
Password has 4 digits.The units digit controls the using of parameter level 1~4, the tens digit controls the setting of Parameterlevel 1~4, and the other digits should be set by 0. The example is the following :
Password = 0023
The parameter level 1~3 can be used and the level 1~2 can be set.
2. Thermocouple type

J0	J type without DP,Range :0~900°C/0~1200°F
J1	J type with DP, Range :0~900.0°C/0~999.9°F
K0	K type without DP,Range :0~1200°C/32.0~1500°F
K1	K type with DP, Range :0~999.9°C/32.0~999.9°F
Pt0	Pt100 without DP,Range :-200~600°C/-300~1200°F
Pt1	Pt100 with DP, Range :-199.9~600.0°C/-199.9~999.9°F

*DP:Decimal point
3. Unit
The unit :°C or°F
4. Temperature Offset
The tem-99~+99°C/°F perature offest range :
5. Main Output Percentage High Lim it :
This function can magnify and minify the output percentage of PID control. The related equation as the following:
Output percentage after tuning = (output percentage before tuning * output percentage high limit) / 100
6. Aux. Output Percentage High Lim it :
This function can magnify and minify the output percentage of PID control. The related equation as the following:
Output percentage after tuning = (output percentage before tuning * output percentage high limit) / 100
7. Restore The Default :
This function will restore the default from the user's settings.

	TC-type	RTD-type
JPA	short	open
JPB	open	short
JPC	open	short
JPD	open	short

(42)Error Messages

UUUU	Lower than the low limit
----	Thermocouple breaking

(43)Special Function

1.PID Self Tuning :
The condition for starting : Present value should be lower than setting for 45°C . Present value will flash during executing self-tuning.
2.Manual Output Control :
Under manual output control,setting value is manual output percentage and setting output key to tuning output percentage directly.

(44)Order Code

1 — 2 3 4 5

1. Mode
V100 : 48*48
V200 : 48*96
V300 : 72*72
V400 : 96*96
V500 : 96*48

2 3. Main / Aux. Output
O : None
R : Relay
V : Digital volt. Output 24V / 20mA
I : Analog current output 0~20mA,4~20mA
L : Analog volt. output 0~10V,0~5V,1~5V

4 5. Alarm 1/2 Output
O : None
R : Relay
V : Digital volt. output 24V / 20mA

* : Standard model

Parameter description

Level 1

oPP1	Main output percentage : Display the percentage of main output, and it was controled by PID control function.
oPP2	Aux. output percentage : Display the percentage of aux. output.
ALr1	Alarm 1 value : Set the range of alarm 1.
ALr2	Alarm 2 value : Set the range of alarm 2.
tUn	PID auto tuning : Execute the PID value automatically.

Level 2

Con	Control mode : Set the control modes of main and aux. output.
tHC	Main & aux. output heating& cooling mode : Set the control modes of main & aux. heating & cooling.
CYt1	Main output cycle time : Set the cycle time of main output.
CYt2	Aux. output cycle time : Set the cycle time of aux. output.
Pb1	Main output proportional band : Set the value P of main output proportional band.
dt1	Main output differential time : Set the value D of main output differential time.
Pb2	Aux. output proportional band : Set the value P of aux. output proportional band.
dt2	Aux. output differential time : Set the value D of aux. output differential time.
db1	Main output hysteresis band : Set the value of main output hysteresis band Display and adjust in on/off control mode.
db2	Aux. output hysteresis band : Set the value of aux. output hysteresis band Display and adjust in on/off control mode.

Level 3

MAn	Manual output mode : Switch usable & disable for mainual output.
ALP1	Alarm1 mode : Set the alarm 1 action mode.
HYC1	Alarm 1 hysteresis band : Set the value of alarm 1 hysteresis band.
ALP2	Alarm2 mode : Set the alarm 2 action mode.
HYC2	Alarm 2 hysteresis band : Set the value of alarm 2 hysteresis band.
otLo	Analog output low limit : Output the low limit when analog output.
otH1	Analog output high limit : Output the high limit when analog output.

Level 4

PASS	Password : Set the password to change the parameter using and setting.
tYPE	Thermocouple type : Set the thermocouple type.
Un it	Unit : °C or°F are selectable.
oFSt	Input temperature offset : Set offset value to increase or decrease the present temperature.
LtP1	Main output percentage high limit : Set the percentage high limit of main output.
LtP2	Aux. output percentage high limit : Set the percentage high limit of aux. output.
dEFL	Default value : Restore default from the user settings.