N2006P PID TEMPERATURE CONTROLLER

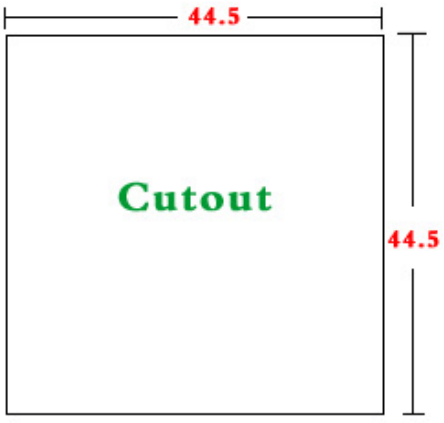
The Installation & Wiring Diagrams

- Input type can be RTD input (Pt100, Cu50) or thermocouple input (T, R, J, B, S, K, E and Wre-Wre25)
- Time proportioning output can be relay contact output or voltage pulse output
- Two alarm outputs can perform double - limit alarm or three - position control
- This instrument has autotuning function to self adapt to different systems
- This instrument has overshoot suppress function

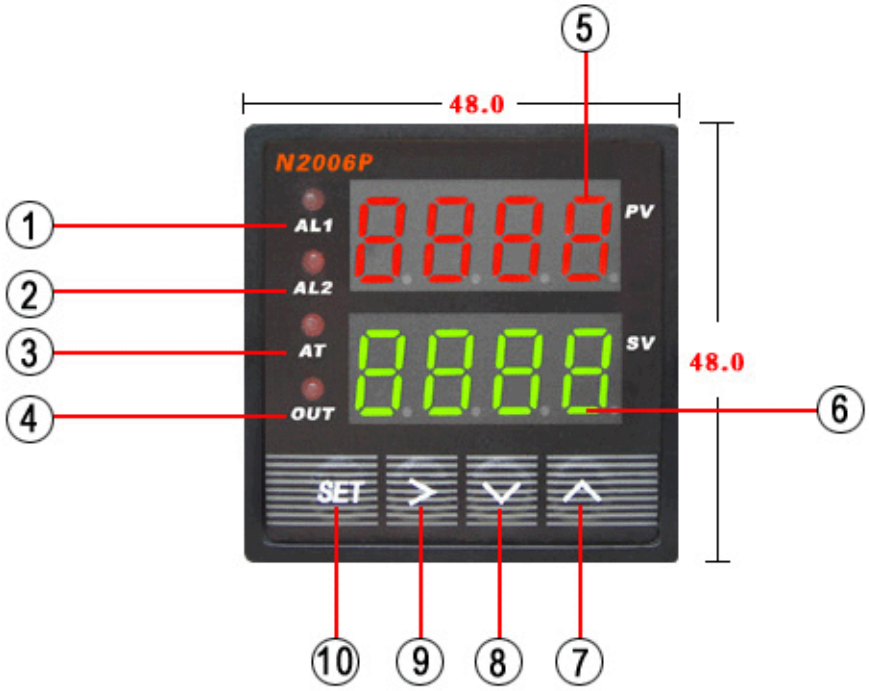
Specifications

1) Power Supply Voltage: AC 36-260V/DC 36-360V(< 3W)
2) Relay Contact Output Rated: AC220V/3A
3) Voltage Pulse Output: 8V(open-circuit voltage) 40mA(short-circuit current)
4) Temperature Precision: 0.2%FS
5) Overscal or Undercscal Display: EEEE

Dimensions of Cutout



Names of Functional Parts and Functions



① AL1 - Relay J1 Output Lamp	Lights when output is turned on
② AL2 - Relay J2 Output Lamp	Lights when output is turned on
③ AT - Autotuning Lamp	Flashes during autotuning execution
④ Out - Control Outpout Lamp	Stays on when the control output is ON
⑤ Measured Value (PV) Display Unit	Displays measured value(PV)
⑥ Set Value (SV) Display Unit	Displays set value(SV)
⑦ UP Key	Used for selecting next parameter or increase numerals
⑧ DOWN Key	Used for selecting previous parameter and used to increase numerals
⑨ SHIFT Key (Autotuning Key)	Used to shift the digit when the setting is changed and used to perform autotunning function
⑩ Set Key	Used for parameter registration/calling up

Parameters Setting Guide

1. Initiation Function Parameters

(Log in by inputting password "0089" after pressing set key)

(1) Details of Parameters

Symbol		Description	Setting Range	Factory Set Value	Remarks
InTy	Inty	Input Type	See Table 1	Pt100	
outy	Outy	Control Output Type	0, 1 , 2	2	Note 1
Atdu	Atdu	Autotuning SV bias	0--200	10	Note 2
PSb	PSb	PV bias	-100. 0--100. 0	0	
rd	Rd	Control Action Type	0: Heat 1: Cool	0	
CorF	CorF	Engineering Unit Selection	0: ℃ 1: °F	0	
End	End	End Mark			

Note 1:

0: Realy JI and J2 are used for alarm and there is no voltage pulse output.
This mode is used for high or low limit alarm or ON/OFF coutrol, and SV is invalid in this mode.

1: Relay JI is used for alarm, Relay J2 is used for PID coutrol output, and there is no voltage pulse output
SV is valid but AH2 and AL2 are invalid.

2: Realy JI and J2 are used for alarm, and control output type is voltage pulse output.

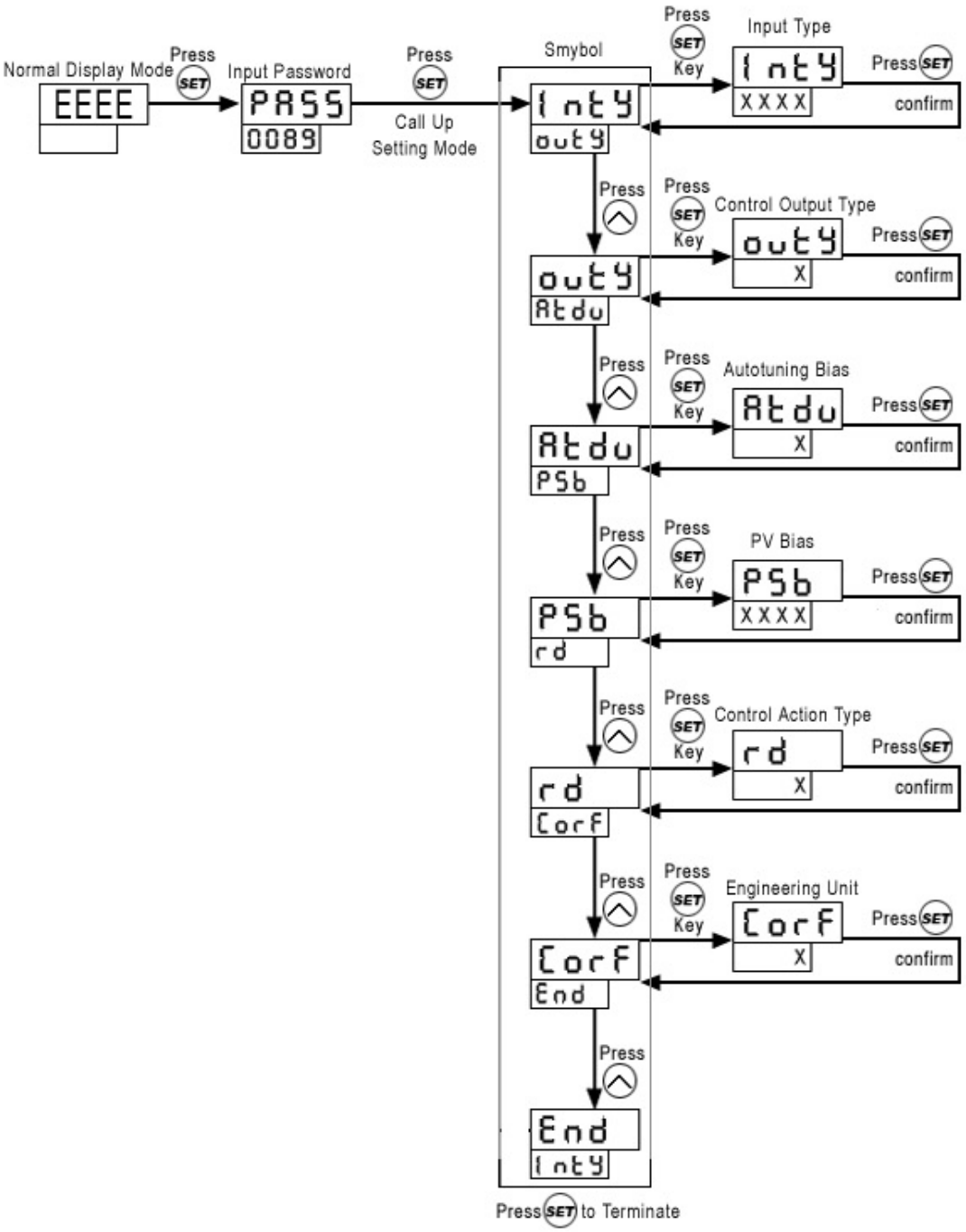
Node 2:

Set bias is used for preventing form overshooting only for autotuning function. (See autotuning curve)

Table 1

Input Signal Code	Input Signal Code	Display Scope	Resolution	Precision	Input Impedance
00	T TC	-200--400 ℃	1 ℃	0.2%	100K
01	R TC	-50--1600 ℃	1 ℃	0.2%	100K
02	J TC	-200--1200℃	1 ℃	0.2%	100K
03	Wre3-Wre25 TC	0--2300 ℃	1 ℃	0.2%	100K
04	B TC	350--1800℃	1 ℃	0.2%	100K
05	S TC	-50--1600 ℃	1 ℃	0.2%	100K
06	K TC	-200--1300℃	1 ℃	0.2%	100K
07	E TC	-200--900 ℃	1 ℃	0.2%	100K
08	Ptl00 RTD	-199.9--600.0℃	0.1℃	0.2%	(0.2mA)
09	Cu50 RTD	-50--1600 ℃	0.1℃	0.2%	(0.2mA)
10	0--75 remote pressure	Low and high limit of scope can be set from -1999 to 9999	Display scope is continuous from -1999 to 9999 using 16bit A/D sample	0.2%	(0.2mA)
11	0--75mV current divider			0.1%	100K
12	0--30mV			0.1%	100K
13	0--5V standard signal			0.1%	100K
14	1--5V standard signal			0.1%	100K
15	0--10V standard signal			0.1%	100K
16	0-l0mA standard signal			0.1%	20Ω
17	0-20mA standard signal			0.1%	20Ω
18	0-20mA standard signal			0.1%	20Ω

Parameters Setting Procedure



Remark:

1) Call up setting mode by pressing (SET) key
2) Input password and parameter by using ⟩ ⌄ and ⌃
3) Parameter registration by using (SET) key
4) ⌃ key is used for selecting previous parameter and ⌄ Key for next parameter

PID and Interrelated Parameters

2. PID Parameters

(Log in by inputting password "0036" after pressing set key)

(1) Detail of PID Parameters

Symbol		Description	Setting Range	Factory Set Value	Remarks
P	P	Proportional band	0.1--99.9 (%)	5.0	Note 3
I	I	Integral time	2--1999 (sec.)	100	Note 4
d	D	Derivative time	0--399 (sec.)	20	Note 5
SouF	SouF	Overshoot suppression factor	0. 0-- 1. 0	0.2	Note 6
ot	Ot	Proportional cycle	2--199 (sec.)	2	Note 7
FILt	FILt	Digital filter factor	0--3	0	Note 8
End	End	End mark			

Autotuning is suggested, because PID parameters are crucial for the control precision and response speed

(2) Settings of PID parameters are same as above

(3) PID parameters setting guide

Note 3

P: the temperature oscillation is inverse proportion of P value and proportion of the response speed

Note 4

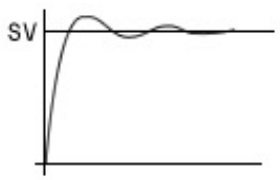
I: Set the time of integral action which eliminate the offset occurring in proportional control

Note 5

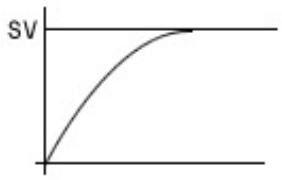
D: Set the time of derivatlve action which prevents ripples by predicting output change abd thus improves control stability

Note 6

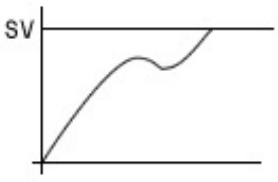
SouF: Overshooting and undershooting are restricted by the Souf and increase of the parameter call suppress the overshooting



SMALL SouF



RIGHT SouF



LARGE SouF

Note 7

Ot: In general,control cycle is 2 when output type is voltage pulse output, and it is 5-15 when output type is relay contact output

Note 8

Filt: Digital filter. This parameter can be set 0,1,2,3. 0 means the PV digital filter is turned off. I, 2 and3 are weak, medium and strong, respectively

SV and Alarm Parameters

3. SV and Alarm Parameters

(Log in by inputting password "0001" after pressing set key)

(1) Detail of SV and alarm parameters

Symbol		Description	Setting Range	Factory Set Value	Remarks
SV	SV	set value	Measured range	80.0	Note 9
AH1	Ah1	Relay J1 pull-in set value	Measured range	80.0	
AL1	Al1	Relay J1 drop out set value	Measured range	90.0	
AH2	Ah2	Relay J2 pull-in set value	Measured range	80.0	
AL2	Al2	Relay J2 drop out set value	Measured range	90.0	
End	End	End mark			

Note 9

In normal display mode, the SV is increased by using the Up key and is decreased by using the Down key

(2) Settings of SV and alarm parameters are same as above

(3) Setting guide of relay pull-in value and drop out value

① If AH1=AL1(AH2=AL2), relay has no effect

② If AH1>AL1(AH2>AL2), relay acts as shown in Fig. 1, usually used in high limit alarm

③ If AH1<AL1(AH2<AL2), relay acts as shown in Fig. 2, usually used in Iow limit alarm

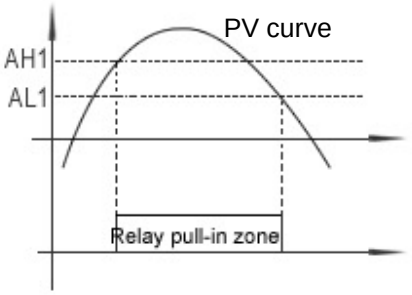


Figure 1

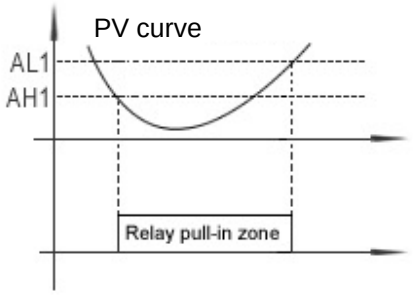
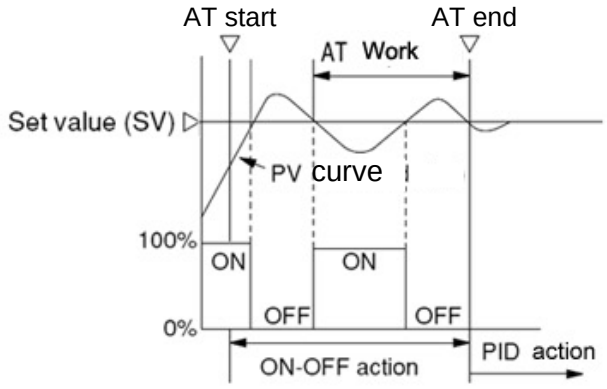


Figure 2

Autotuning (AT) Function

The AT function automatically measures, computes and sets the optimum PID parameters. The function is activated after—ON, during temperature rise and/or when control is stabilized from any process state

(1) Autotuning Curve



(2) The Start and End of AT function

① How to start the AT function:

Press (>) key until the AT lamp start flash, which indicates that instrument starts AT function: The AT lamp will turn off if AT function is over, and instrument starts PID action according to computed parameters. (AT function has effect only when control type is 1 or 2)

② How to end the AT function:

In AT process, press (>) key until the AT lamp turning off then the AT process ends. The original PID parameters aren't changed

Parameters Setting and Wiring

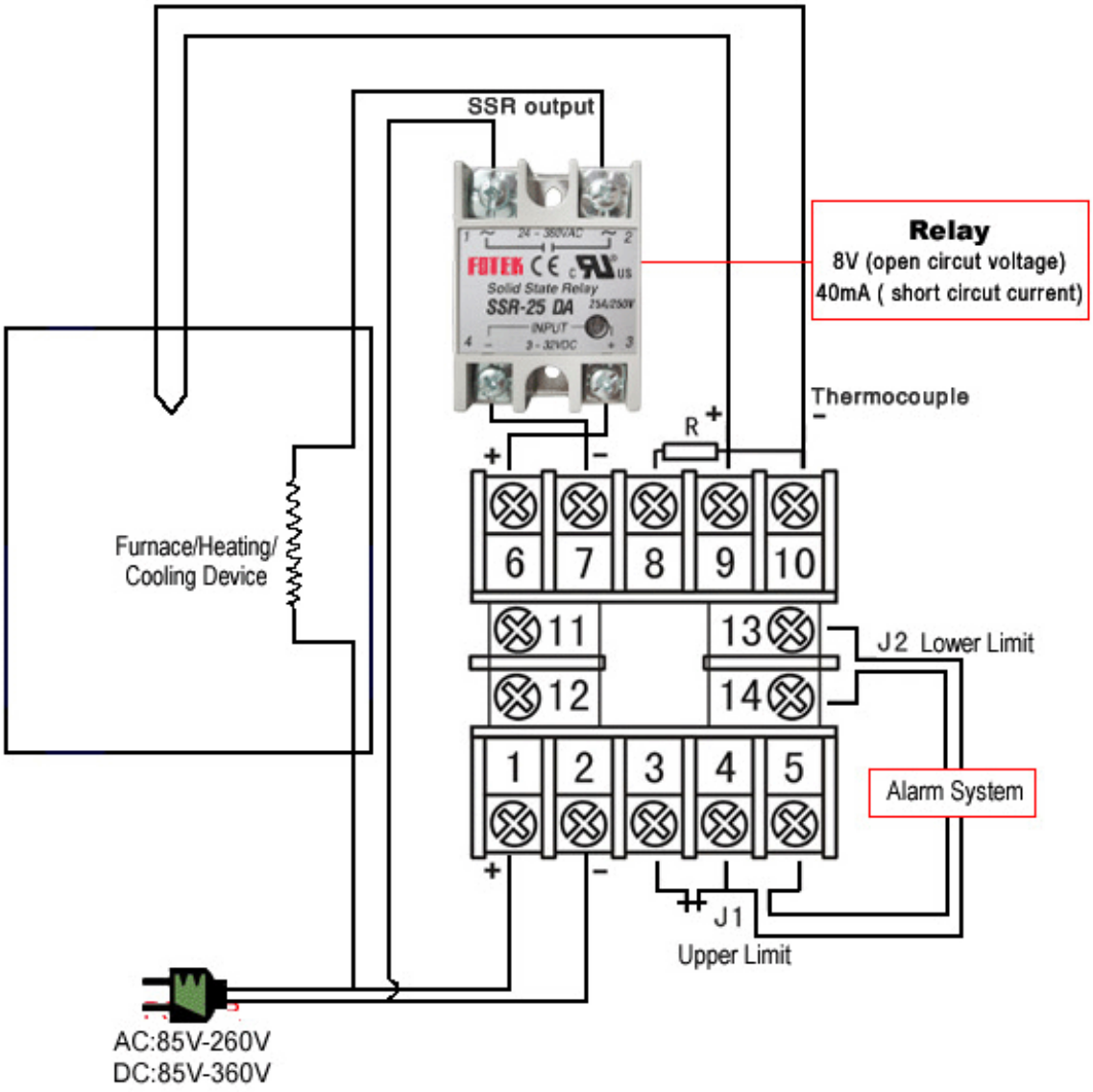
Assume the control object is heating furnace temperature. Its measured range is from 0℃ to 1000 ℃ , and optimum value is 800 ℃ . Its high limit alarm acts if temperature is higher than 850 ℃ , and low limit alarm acts if temperature is lower than 750℃ . Its power supply is AC220V, and panel cutout dimensions is 44.5 X 44.5 (mm). Its heating driver is solid-state relay (SSR)

(1) Parameter Setting

Input type (Inty)=K
Output type (outy)=2
AT bias (Atdu) =10
PV bias (Psb)=0
Control action type (rd)=0
Engineering unit (CorF)=0
PID parameters come from AT results
Set value(SV)=800(℃)
Relay J1 pull-in set value (AHI)= 850(℃)
Relay J1 drop out set value (ALI)=848(℃)
Relay J2 pull-in set value (AH2)=750(℃)
Relay J2 drop out set value (AL2)=752(℃)

(2) Start Instrument: (PID control using AT function)

After the instrument is powered on, press (>) key until the AT lamp flashing. When the AT lamp turning off; the AT function is done and the instrument starts normal PID control



Please consult your licensed electrician/electrical engineer for professional advice before installation