RT-1300

气氛退火炉使用说明书

目录

感谢您购买 RT-1300 气氛退火炉。为防止误操作对实验炉的损伤，请在使用前仔细阅读本使用说明书。

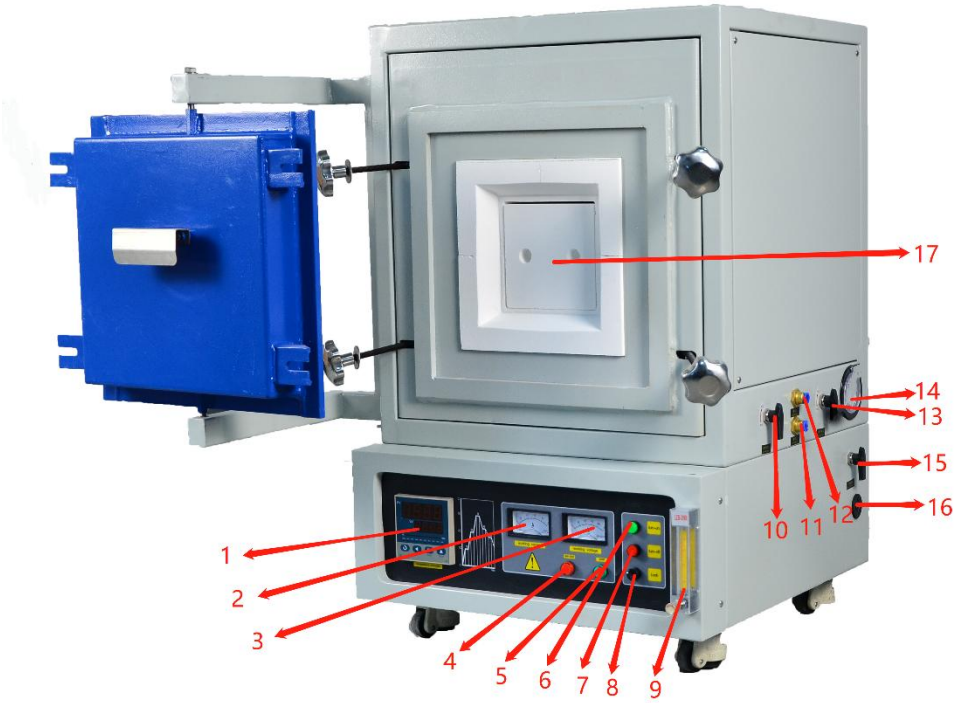
一、概述

RT-1300 气氛退火炉使用高品质硅碳棒作为加热元件，最高炉温可达到 1300℃。可编制 30 段的升温曲线升温，自动运行，温度跟踪性好。该电炉广泛应用于金属材料，陶瓷，玻璃等的研究.

二、技术指标

名称	单位	参数
功率	KW	4
电源电压	V HZ	220V，50HZ
最高温度	℃	1300
正常工作温度	℃	1200
加热速率	℃/min	<20
控制精度	℃	±1℃
加热元件	电热丝	硅碳棒
热电偶分度号	分度	S 分度
炉膛尺寸	mm	200*170*150mm

三、电炉构造



1 温控仪表　　5 电源指示灯　　9 流量计　　13 抽气开关
2 电流表　　6 启动按钮　　10 进气开关　　14 压力表
3 电压表　　7 停止按钮　　11 抽气口　　15 调压阀
4 故障指示灯　　8 控制面板供电开关　　12 进气口　　16 真空泵插座

四、518P 人工智能工业调节仪的介绍

1. 智能温控仪的介绍

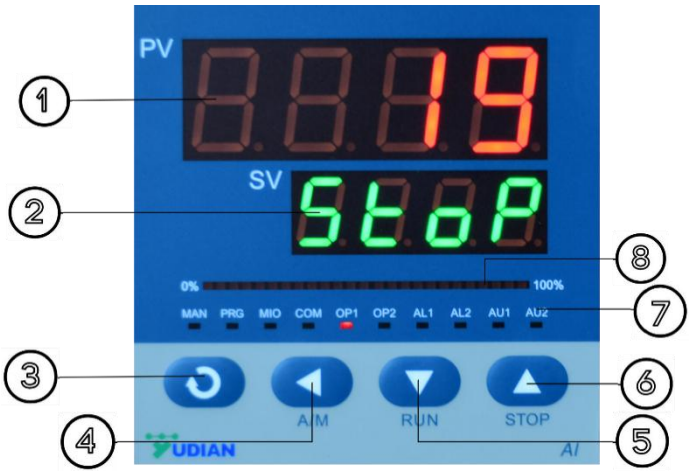
1、主要特点：

(1)采用先进的AI人工智能调节算法，无超调，具备自整定功能，可实现任意斜率的升、降温 控制，具有跳转（循环）、运行、暂停及停止等操作命令。测量精度：0.25级。

(2) 30段程序控制功能。

(3)掉电数据保存

2、仪表面板



（1）炉温显示 （P V）

（2）给定值显示 （S V）

（3）设置键（确认键）

（4）数据移位键（兼程序设置进入） （A/M）

（5）数据减少键（兼程序运行/暂停操作） （RUN/HOLD）

（6）数据增加键（兼程序停止操作） （STOP）

（7）功能指示

（8）功率输出百分比（灯带亮一半为百分之五十输出，全亮为百分之百的输出。

2. 智能温控仪的显示切换

仪表的工作显示表示仪表所处的工作状态，其工作状态决定您是否可进行某种操作，因此用户 使用该设备或进行某项操作时要注意仪表的工作状态。

1、开机状态： 仪表开机显示仪表型号及软件版本号约几秒钟后，即进入温度测量显示的基本状态，“SV”闪动显示“STOP”表示程序处于停止状态如图所示。

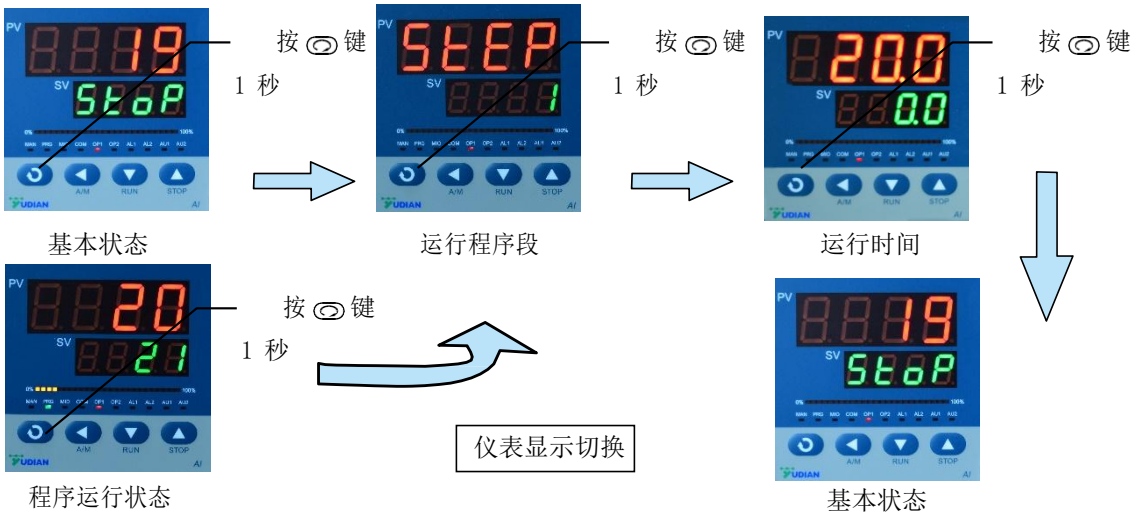
仪表型号及版本号 基本状态

2、显示切换如下图所示：

（1）在基本状态或程序运行状态下，按 键1秒切换至界面显示（PV-STEP、SV- XX段） 运行程序段状态。（设置运行段或显示正在运行的温度段）

（2）再按 键1秒切换至该段运行时间状态。（显示运行段总运行时间PV xxxx分钟，已运 行时间SV xxxx分钟）

（3）再按 键一秒返回基本状态。



3. 智能温控仪程序的设定

控温程序的设定是用户对自身烧结材料工艺条件的选择，正确的设置控温程序是成功烧结材料的前提。

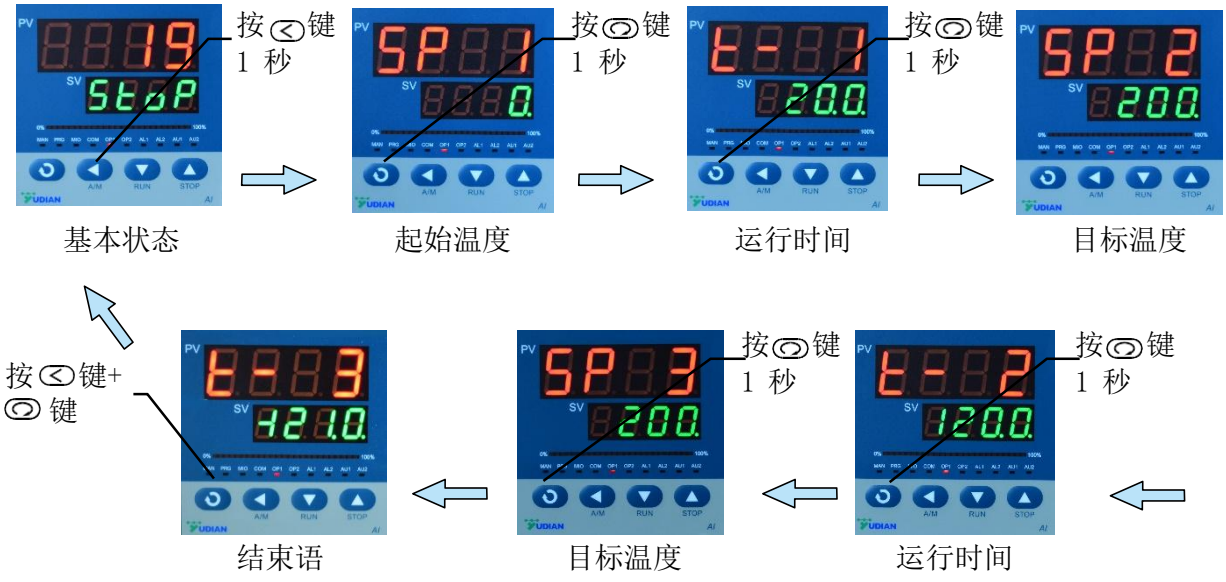
1. 控温程序设置如下图示：

① 基本状态下按键1秒，仪表就进入控温程序设置状态，仪表首先显示的是当前运行段起 始给定值，可按 三键修改各参数数值。一般初始值设置为 0 即可。

②按键1秒将依次显示下一个要设置的程序值（当前段运行时间），每段控温按 SP T SP的方式依次排列，即该段的起始温度→该段运行时间→目标值，该段目标值是下一段的起始温度。设置完-121.0 之后按一下确认后方可退出程序界面。（按三键修改数值，数值修改完成之后按确认。）

③按键约2秒，可返回设置上一参数。

④ 先按键再按键可退出控温程序设置状态。如果没有任何按键可操作，约10秒钟后仪 表自动退出参数设置状态。（程序设置完返回后请再次检查程序，确认无误后方可升温。）

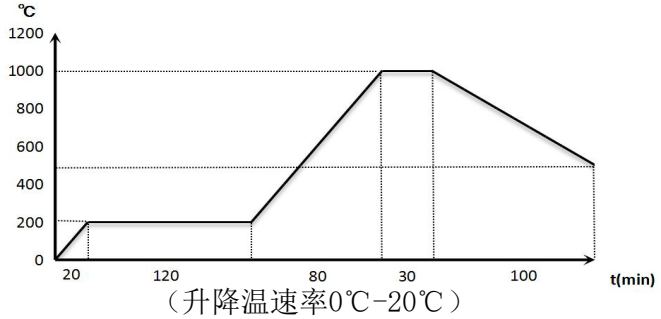


控温程序设置

2. 程序设置举例： 用键盘输入

如下温度程序曲线：

仪表采用 SP T SP的形式来输入温度曲线，用各种提示符来提示应输入的数据，曲线形状由折点 处的坐标来确定。



（升降温速率0℃-20℃）

在输入数据之前请按下列顺序和格式填写数据表：

提示符	输入数据	意义
SP 01	0	起始温度值
T- 01	20.0	第一段运行时间
SP 02	200	第一折点的温度值（前一段的目标值，后一段的起始值）
T- 02	120.0	第二段运行时间
SP 03	200	第二折点的温度值（前一段的目标值，后一段的起始值）
T-03	80.0	第三段运行时间
SP 04	1000	第三折点的温度值（前一段的目标值，后一段的起始值）
T-04	30.0	第四段运行时间
SP 05	1000	第四折点的温度值（前一段的目标值，后一段的起始值）
T- 05	100.0	第五段运行时间
SP 06	500	第五折点的温度值（前一段的目标值，后一段的起始值）
T-06	-121.0	程序运行结束返回第一段并执行Stop 操作，自然降温

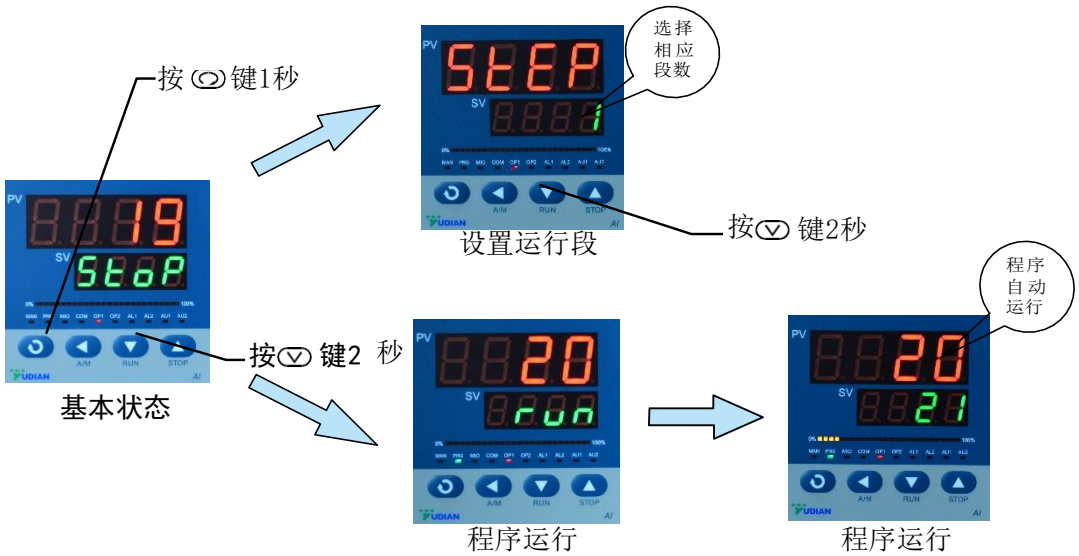
用◎<∨∧四键，将上述数据依次输入，即完成程序曲线设置。 注意：运行曲线结束一定要设置结束语”tx-121.0”!!! 并注意程序要有连续性。在运行控制过程中不可进行控温程序的修改，如需更改控温程序可先停止程序运行后再修改控温程序。

4. 控温程序运行

投入自动控制如下图示：

1. 若仪表原来只处于基本状态（程序处于停止状态，下显示器SV交替显示”STOP”),按 ◎ 键1秒， 进入运行程序状态（PV “STEP”、SV “XX” 段）用户可以自己选择从第几段开始，通常程序运行段号”STEP” 随着程序的执行自动增加或跳转，无需人为干涉。有时因特殊因素，在程序运行中有时希望从程序的某一段开始，或直接跳到某一段执行程序，可通过修改”STEP” 值来实现。再按< 键+◎键返回基本状态。

2. 按∨键约2秒钟（下显示器SV显示”run”)仪表投入自动控制状态。



5. 智能温控仪程序的暂停

暂停控制如下图所示：

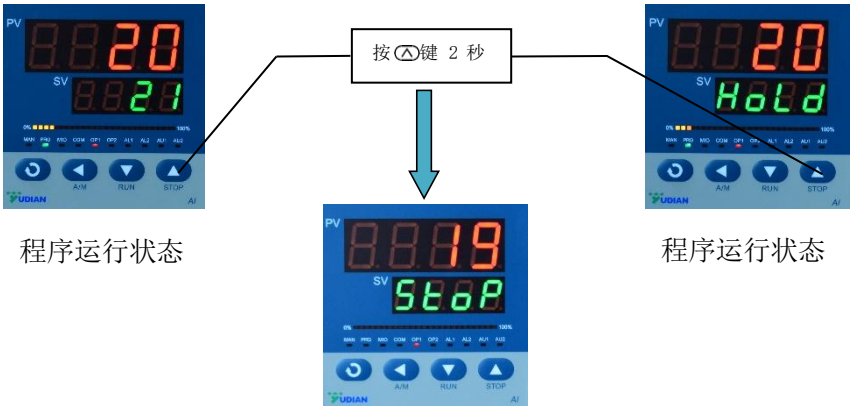
在程序运行状态中按 键约2秒钟，仪表下显示器SV交替显示”HOLD”符号则仪表进入暂停状态，暂停时仪表仍执行控制，并将温度控制在暂停时的给定值上，但控温时间停止增加。在暂停状态下按 键2秒钟仪表下显示器SV显示“run”符号，则仪表又重新运行。

程序运行状态　　程序暂停运行　　程序继续运行

程序暂停控制

6. 智能温控仪的程序停止

停止控制如下图所示：在程序处于运行或暂停状态下，按 键约2秒钟，仪表下显示器SV将 显示“STOP”的符号，此时结束程序控制，仪表处于基本状态，同时参数“STEP”被修改为“1”。此时PV显示炉温“XXXX℃”，SV显示“STOP”。



程序运行状态　　程序运行状态

基本状态程序停止

程序停止制

五、维护注意事项

注意：　送入电源后应听见散热风扇运转的“呜`呜”声，若无此声，应立即停机检查更换散热风扇。

风扇规格：轴流风扇 AC220v/120×120mm

如果长期搁置或者在潮湿环境中工作，应在第一次使用时对电炉实行 3 个小时的低温烘烤【≤300 度】

使用炉子时请正确放置挡火砖。

1.炉子使用时，输入功率不得超过额定功率，炉温不得超过额定温度，以免损坏加热元件及炉衬。
2.各温度段的升速率不易差别太大，设置升温速率时应充分考虑所烧结材料的物理化学性质，以免出现喷料现象，污染炉膛。
3.定期检查温度控制系统的电器连接部分的接触是否良好。
4.本炉适用于下列工作条件：
（1） 环境温度在-10～75℃之间。
（2） 周围环境的相对湿度不超过 85%。
（3） 炉子周围没有导电尘埃，爆炸性气体及严重破坏金属和绝缘材料的腐蚀性气体。
（4） 没有明显的倾斜、振动和颠簸。
（5） 在电炉长期搁置，或者工作环境比较潮湿的情况下，要注意在使用时要进行 3 个小时的【≤300度】炉膛烘干操作，以免炉膛的受潮发生皲裂，影响保温效果。

RT-1300

Manual of atmosphere annealing furnace

Contents

Thank you for purchasing the RT-1300 atmosphere annealing furnace. In order to prevent damage to the experimental furnace due to misuse, please read this instruction manual carefully before use.

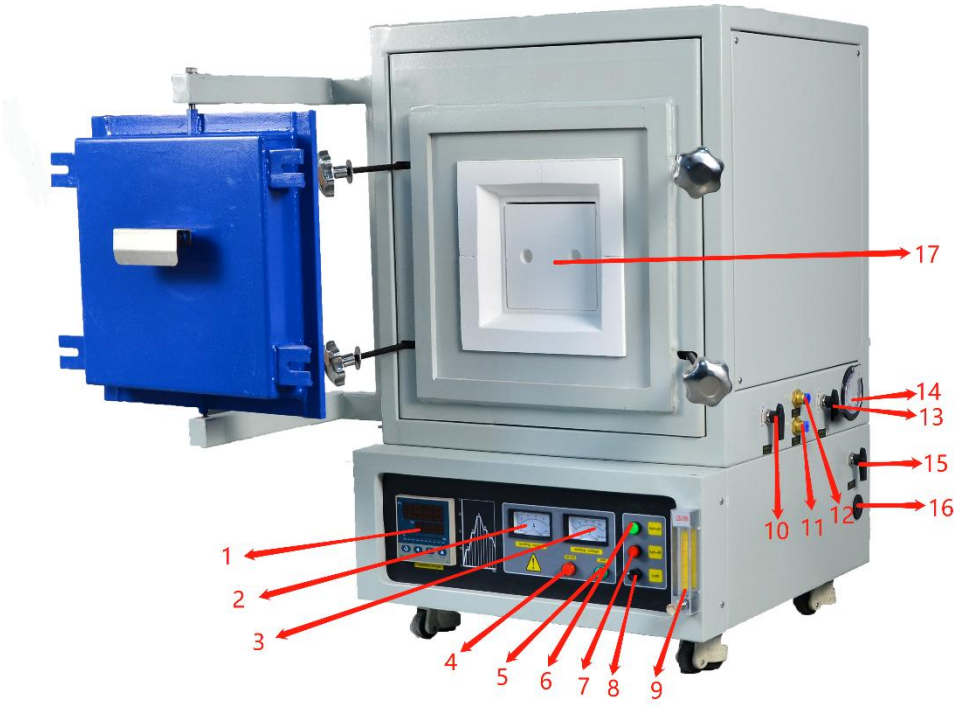
一、Overview

The RT-1300 atmosphere annealing furnace uses high-quality silicon carbide rods as heating elements, and the maximum furnace temperature can reach 1300°C. 30-segment heating curve can be programmed to heat up, automatic operation, and good temperature tracking. The electric furnace is widely used in the research of metal materials, ceramics, glass, etc.

二、Technical parameter

name	unit	parameter
power	KW	9
voltage	V HZ	220V, 50HZ
maximum temperature	℃	1300
normal working temperature	℃	1200
heating rate	℃/min	<20
control precision	℃	±1℃
Heating element	Heating wire	Silicon carbide rod
Thermocouple graduation number	graduation	S type
Furnace size	mm	300*200*200mm

三、Furnace structure



1 temperature control instrument 5 power indicator light 9 flow meter 13 exhaust switch
2 ammeter 6 start button 10 intake switch 14 pressure gauge
3 Voltmeter 7Stop button 11Exhaust port 15Pressure regulating valve
4 Fault indicator light 8 Control panel power switch 12 Air inlet 16 Vacuum pump socket

4.0、Introduction of intelligent temperature controller 518P

4.1. Main features:

(1) Adopt advanced AI artificial intelligence adjustment algorithm, no overshoot, with self-tuning function, can realize temperature rise and fall control with any slope, and have operation commands such as jump (cycle), run, pause and stop. Measurement accuracy: 0.25 level.

(2) 30 segments PID

temperature control

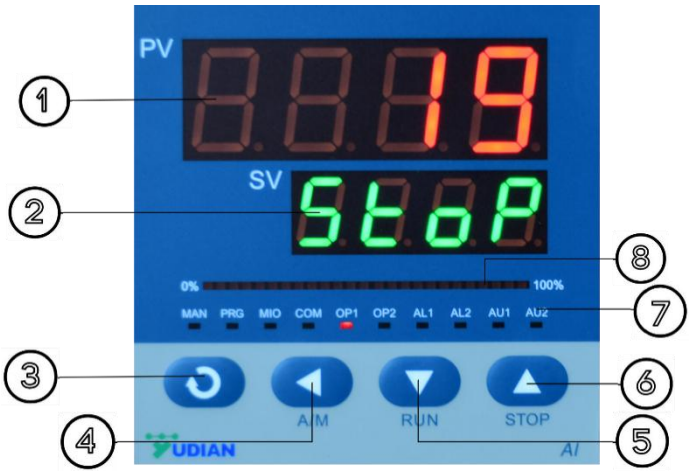
program control

function.

(3) Save data when

power off

2、Panels description



（1）Furnace Temperature （P V）

（2）Target Temperature （S V）

（3）Set key （Confirm key）

（4）Data shift key(Program setup entry) （A/M）

（5）Data down key(Run/Hold too) （RUN/HOLD）

（6）Data up key(Stop too) （STOP）

（7）Function indication

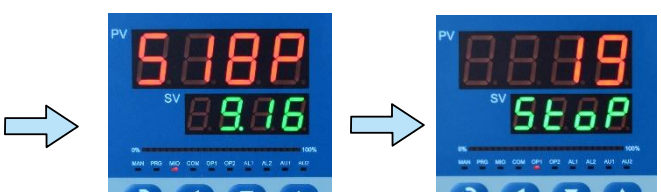
（8）Percentage of power output（Light half stands for 50% output of rating power,lightning full standing for 100% output of rate power)

2.Display switch of intelligent controller

The working display of digital display indicates the working state of the controller, and its working state determines whether you can perform certain operations, so the user should pay attention to the working status of the controller panel when using the device or performing certain operations.

1、Boot state：

After a few seconds of



temperature controller model No.and software version displayed ,the basic state of temperature measurement will be displayed."SV" flashing and displays "STOP", indicating that the program is in a stopped state, as shown in the figure at right side

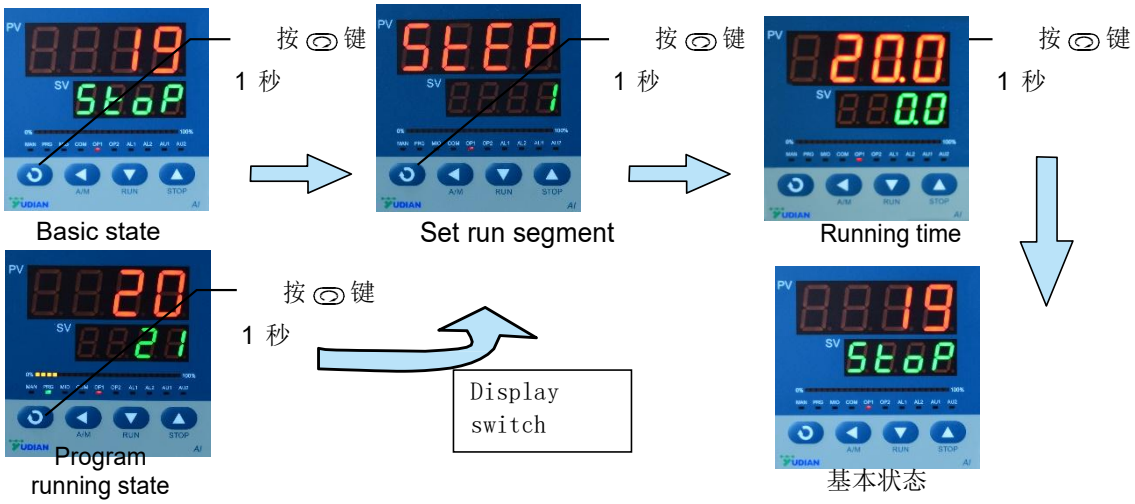
Model No.and Version Basic state

2、Display switch as below instruction：

(1)In the basic state or program running state, press the XX key for 1 second to switch to the interface display (PV-STEP, SV-XX segment) programs running segment state. (Set the running segment or display the running temperature segment)

(2) Press XX the key again for 1 second to switch to the state of the running time of the segment. (Display the total running time of the running segment PV xxxx minutes, and elapsed running time SV xxxx minutes correspondingly)

(3) Press XX the key again for 1 second to return to the basic state.



3.Programs setting of intelligent temperature controller

The setting of the temperature control program is the user's choice of the process conditions of the sintering material, and the correct setting of the temperature control program is the prerequisite for the successful sintering of the material.

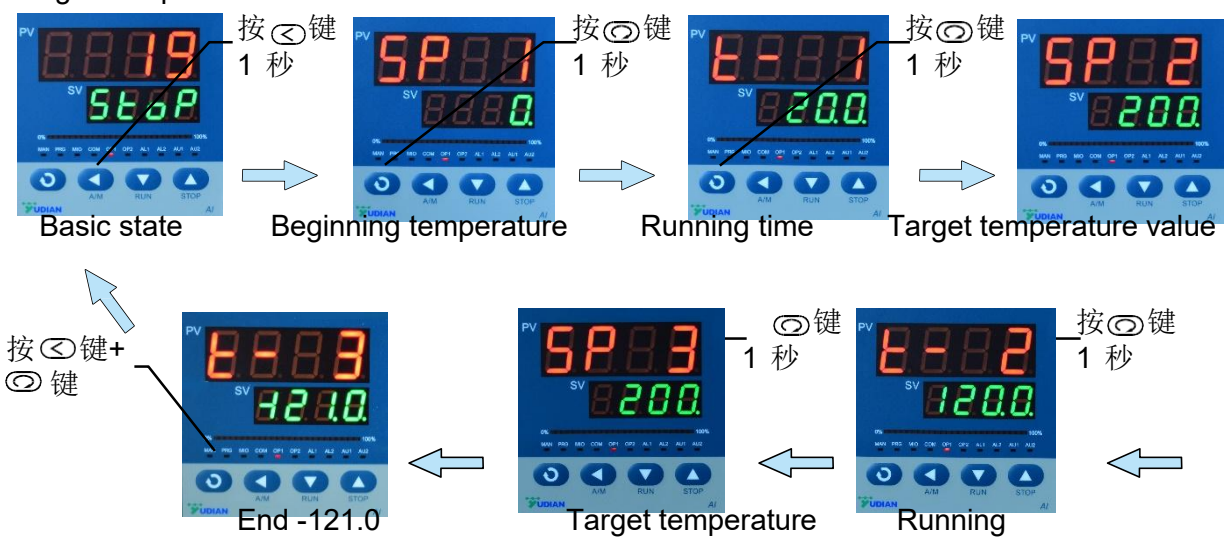
1. Programs setting as below：

(1) under basic state,Press YY for 1 second,controller enter the programs setting state.Controller firstly displayed the given value of the the present running segments,modify the value by press XYZ.The beginning value is 0 generally.

(2).Press YY for 1 second,the next program value to be set(current segment running time)will be displayed in turn ,each segment of temperature control will be arraged in the order of SP T SP.That is the meaning as temperature of beginning of the segment--running time of the segment--target temperature value.The target value of temperature is the beginning temperature of next segments programs.Press XX after finished setting “-121.0” to quit the programs interface(Press XYZ to modify the value,after finished wanted value,press XX to confirm)

(3)Press YY for 2 seconds,user can return to the former parameter of programs.

(4)Press X firstly then press Y simultaneously to quit the temperature control setting state.Controller will quite the parameter setting state if without any operation for 10seconds.(Please check and confirm the programs are set rightly after setting finished to start running of temperature controller.

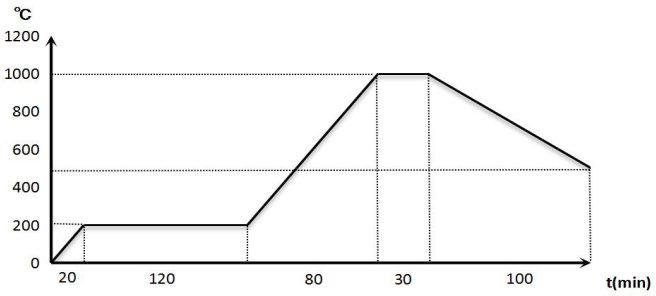


temperature programs setting

2. Example of temperature-time programs setting

The controller adopts the form of SP

T SP to input the temperature curve, and uses various symbol to prompt the data to be input, and the shape of the curve is determined by the coordinates at the turning points.



（Heating rate0℃-20℃）

Please fill out the data sheet in the following order and format before entering data：

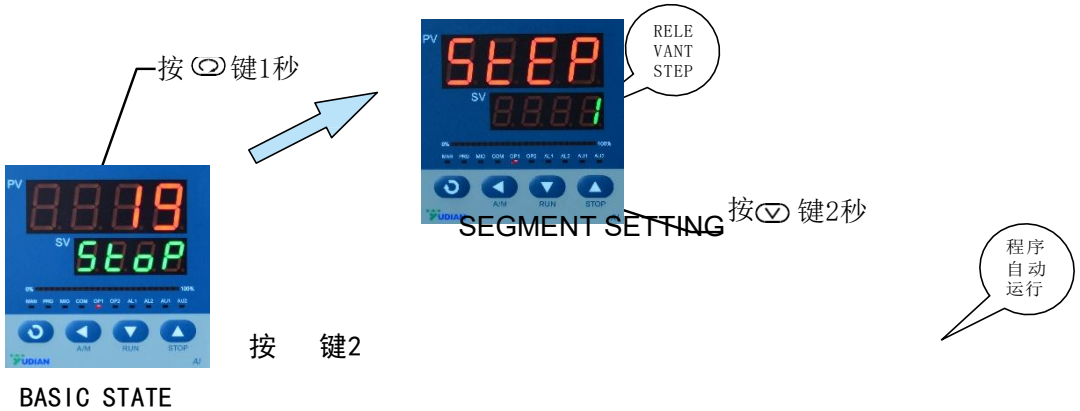
Prompt	Input value	Meaning
SP 01	0	The beginning temperature
T- 01	20.0	Running time of first segment program
SP 02	200	Temperature value of the first turning point（Target temperature value of SP 01，The beginning temperature value of SP 02）
T- 02	120.0	Running time of SP 02
SP 03	200	Temperature value of the second turning point（Target temperature value of SP 02 ，The beginning temperature value of SP 03）
T-03	80.0	Running time of SP 03
SP 04	1000	Temperature value of the third turning point（Target temperature value of SP 03 ，The beginning temperature value of SP 04）
T-04	30.0	Running time of SP 04
SP 05	1000	Temperature value of the forth turning point（Target temperature value of SP 04 ，The beginning temperature value of SP 05））
T- 05	100.0	Running time of SP 05
SP 06	500	Temperature value of the fifth turning point（Target temperature value of SP 05 ，The beginning temperature value of SP 06）
T-06	-121.0 0	Finished programs setting

Using XXYY,input the temperature-time curve data into the controller in turn,then the programs setting finished.Attention:After finished the temperature curve,the end “-121.0”is a must to input!!!When programs running,there is no access to modify the data.If in need to modify the programs,stop the programs is needed then modify the temperature curve.

4.Running of intelligent temperature controller

Automatic control is as below:

1. If the controller is only in the basis state(programs-stop,SV show STOP),Press XX for 1 second,enter running program state(PV-STEP,SV-XX segment),user can choose the needed step-segments by press ZZ or TT,Generally,the step number will raised automatically,and there is no need to interfere by operator.Sometimes,user wanted specified segments to start or jump at certain programs,then modify the STEP to achieve the goal.Then press XX+YY to return the basis state.
2. Press YY for 2seconds(SV show run),the controller enter into automatic control state.

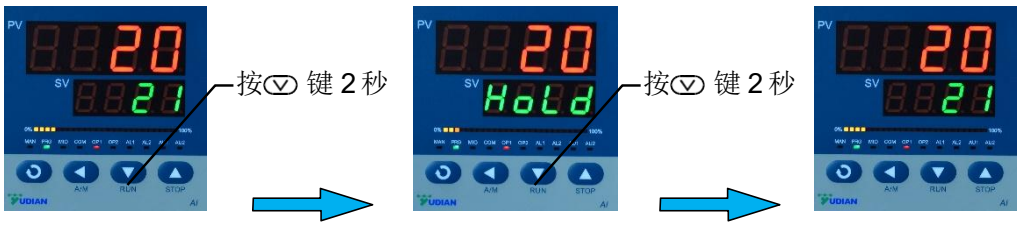



秒
PV
20
SV
run
RUN
PV
20
SV
21
RUNNING

5.HOLD(PAUSE) OF intelligent temperature controller

Pause is as below：

Press ZZ for 2 seconds when programs running,SV show “HOLD”symbol then the controller is at pause state(Temperature remain the control pause temperature and time stops increasing).In a paused state press TT again for 2 seconds ,SV show “RUN”,then controller will run again.



Program running state　　Program running state　Program continue to run”

Program
holding

6. Stop of Intelligent temperature controller

Stop control is as following:

When the programs is running or paused,press ZZ for 2 seconds,the controller will display “STOP”symbol,At this point,the program control is ended,the controller is in the basic state of stop state,meanwhile,STEP is modified to “1”.At this time,PV show furnace temperature”XXXX℃”， SV display“STOP”

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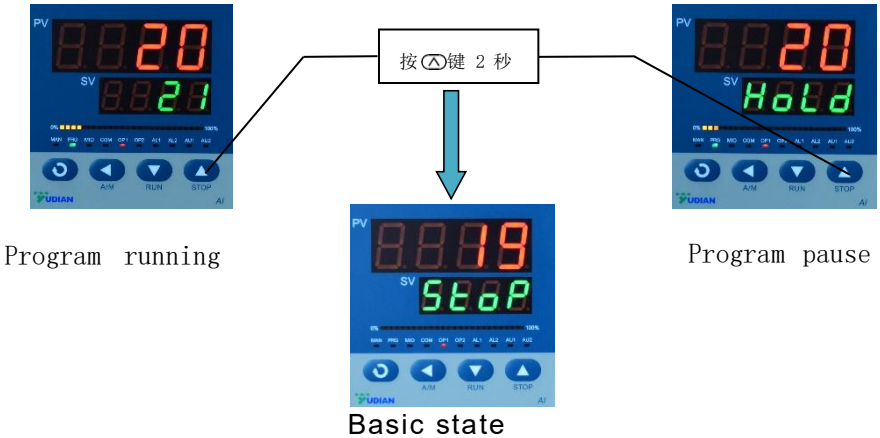

Program running　　Program pause

Basic state
program stop
基本状态程
序停止

程序停止制

五、

Maintenance precautions

Note:

After the power supply is turned on, the sound of the cooling fan running should be heard. If there is no such sound, stop the machine immediately to check and replace the cooling fan. Fan specification: Axial flow fan AC220v/120×120mm

If the furnace is put aside for a long time or works in a humid environment, the electric furnace should be baked at a low temperature for 3 hours when it is used for the first time [≤300 degrees]

Please place the fire block correctly when using the furnace.

1. When the furnace is in use, the input power must not exceed the rated power, and the furnace temperature must not exceed the rated temperature, so as not to damage the heating element and furnace lining.
2. The rising rate of each temperature section should not be too different. When setting the heating rate, the physical and chemical properties of the sintered material should be fully considered to avoid material spraying and pollute the furnace.
3. Regularly check whether the contact of the electrical connection part of the temperature control system is good.
4. This furnace is suitable for the following working conditions:

（6） The ambient temperature is between -10°C and 75°C.

（7） The relative humidity of the surrounding environment should not exceed 85%.

（8） There is no conductive dust, explosive gas and corrosive gas that seriously damages metal and insulating materials around the furnace.

（9） There is no obvious tilt, vibration and bump.

（10） When the electric furnace is put aside for a long time or the working environment is relatively humid, it is necessary to pay attention to the furnace drying operation for 3 hours [≤300 degrees] during use, so as to prevent the furnace from being damp and cracked, which will affect the heat preservation effect.