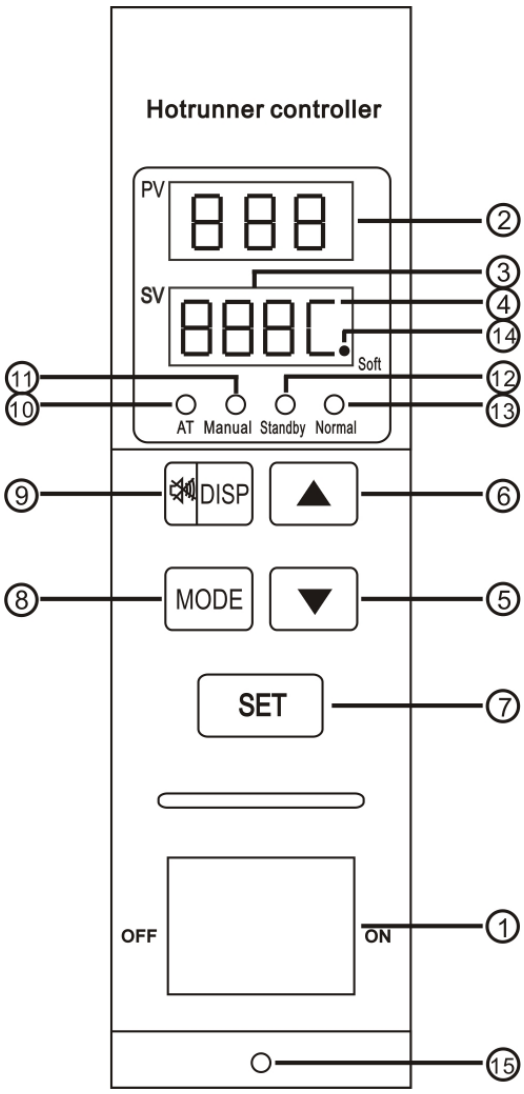
Hot-Runner Temperature Controller

USER'S MANUAL

For avoid wrong operation to make human injured or machine damage, please read this instruction carefully before use the instrument.

1. TEMPERATURE CONTROL MODULE

1-1. Faceplate



① **Power Switch**: Turn on or turn off.

② **PV**: a) Normal mode: Present value.
b) Parameter mode: Parameter name.
c) Power output mode: Present value.
d) Alarm mode: Error code about sensor.

③ **SV**: a) Normal mode: Setting value.
b) Parameter mode: Parameter value.
c) Power output mode: "u"+ power output (%)
d) Alarm mode: Error code about triac or load.

④ **Temperature Unit**: Celsius (C) or Fahrenheit (F).

⑤ **Down Key**: Used to decrease setting number.

⑥ **Up Key**: Used to increase setting number.

⑦ **SET Key**: Used for parameter Calling up/Registration.

⑧ **Mode Key**: Press it for more than 1sec. to switch control mode:
Normal (Auto) \ Standby \ Manual \ AT (Auto Tune).
**** When shift to AT mode, press SET key in 3s to start auto-tuning, or the controller auto-back to normal mode.**

⑨ **Disp Key**:
a) Press it for more than 1sec. to switch display mode:
Normal mode: PV and SV display;
Power output mode: PV and power output (%) display
Control mode locked mode: disable to switch control mode.
b) Press it to keep silence for 3min. when the buzzer is beeping.

⑩ **AT indicator**: Light up when controller is in AT mode.

⑪ **Manual indicator**: Light up when controller is in Manual mode.

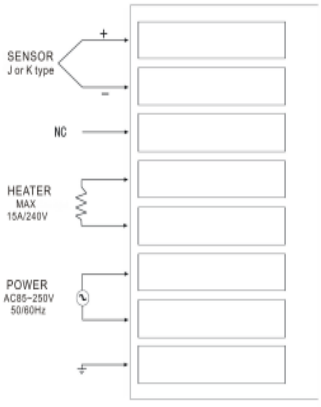
⑫ **Standby indicator**: Light up when controller is in Standby mode.

⑬ **Normal indicator**: Light up when controller is in Normal mode.

⑭ **Soft indicator**: Light up when controller is in soft start mode.

⑮ **Mounting hole** .

1-2. Wiring

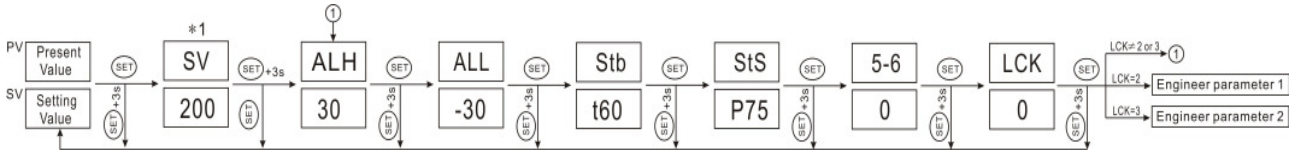


1-3. Specifications

- Power requirements: AC85~265V, 50/60Hz
- Sensor type: J or K thermocouple
- Setting range: 0℃~450℃ (32℉~842℉)
- Control Accuracy: ±0.25% of full scale
- Control Mode: Auto PID or Manual
- Control Output Device: Triac.
- Load Capability: 15A / 240Vac; Optional 20A
- Operating Temperature: 0℃~55℃(32℉~131℉)
- Operating Humidity: 10~80%, non-condensing
- Storage Temperature: -20℃~70℃ (-4℉~158℉)

1-4. Operating description

1-4-1. General parameter flow chart



*1: When engineer parameter SVP = 0, "PV"& "SV" display as flow chart, and the setting value can be set by ∧∨.

When SVP =1, "PV" displays present value, "SV" displays flashing setting value and the setting value can be set by ∧∨.

When SVP =2, the setting value can be set by ∧∨ directly when the controller is in normal mode .

1) SV: setting value.

range: Sdo ~ Sup (engineer parameter 2).

2) ALH: high deviation alarm value.

When present value > SV+ALH, the buzzer is beeping and the output is shut off.

3) ALL: low deviation alarm value.

When present value < SV+ALL, the buzzer is beeping. It initializes when the process temperature reaches setpoint.

4) Stb-t: standby time.

range: 0~600 minutes.

5) StS-p: standby temperature (the percentage of setting value).

Example:

if

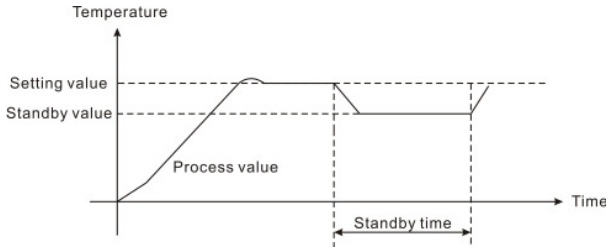
SV=200℃, Stb-t=60, StS-p=75,

then

standby time is 60 minutes,

standby temperature is 150℃

(i.e. 200℃×75%) .



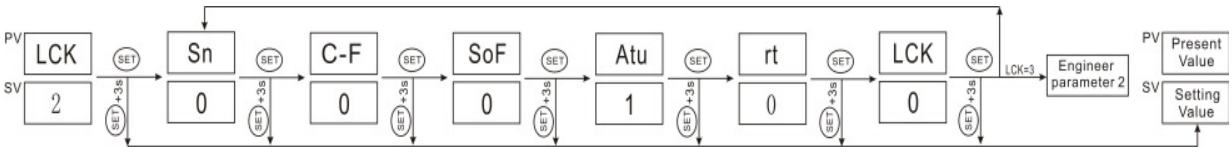
6) 5-6: power frequency.

0: 50Hz; 1: 60Hz.

7) LCK: parameter setting lock.

0: no; 1: lock.

1-4-2. Engineer parameter 1 flow chart



1) Sn: sensor Type.

0: J type thermocouple; 1: K type thermocouple.

2) C-F: temperature unit.

0: ℃; 1: ℉.

3) SoF: soft start (heater dehumidify) function.

0: On (soft start time see parameter "rt"); 1: Off.

To avoid the humidity make the heater burn out, the soft start function could output a lower current (by phase control type) to make dehumidify action when turn on the power.

During soft start time, the output power step up from 0% to 30%. When 100°C (212°F) has been achieved or soft start time is over, the controller returns to normal (auto) control mode.

Soft start condition:

a) The controller is set for Normal (Auto) Control mode.

b) The process temperature is less than 100°C (212°F).

4) Atu: PID Auto-tuning mode.

0: Auto-tuning at setting value; 1: Auto-tuning at 80% of setting value; 2: Fast Auto-tuning after power on.

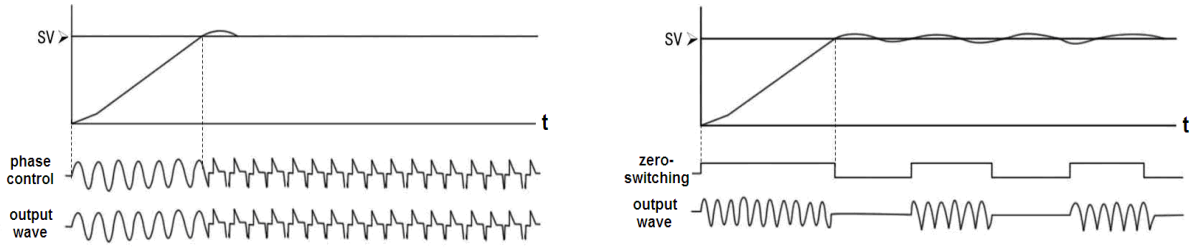
5) rt: output control type / soft start time / proportion cycle.

0: phase control output;

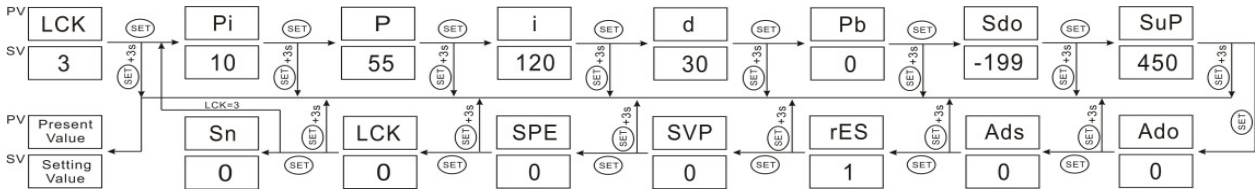
soft start time =auto (40s ~ 133s), when SoF=0;

n (n>0): zero-switching control output & proportion cycle = n×1s;

soft start time =auto(40s ~133s) + n×20s, when SoF=0



1-4-3. Engineer parameter 2 flow chart



1) Pi: filtering value. Used to reduce the influence of interference.

Note: The larger the value is, the slower the controller responded. When it is too large, the controller may be out of control.

2) P: control proportional band, 1 to span.

3) i: integral time, 1~3600s.

4) d: differential time, 1~3600s.

5) Pb: PV bias. Sensor correction is made by adding Pb to measured value (PV).

6) Sdo: SV low limit.

7) SuP: SV high limit.

8) Ado: 0℃ shift.

9) Ads: 1000℃ shift.

10) rES: initialize controller.

1: Off. 2: All parameters recovery to default value after power on.

11) SVP: setting value modification mode.

0: Press “SET” key to enter general parameter setting mode, controller display parameters “SV” and its value.

1: Press “SET” key to enter general parameter setting mode, controller display PV and flashing SV.

2: SV can be easily adjusted up or down at any time in normal mode by pressing ∧ or ∨.

12) SPE: speed of temperature rise.

0: auto n (n>0): n (℃/min) or n (℉/min)

1-4-4. Operating modes

The controller divide into normal mode and parameter mode. In normal mode, press "SET" key could entry parameter mode.

Normal mode: Controller display PV and SV, when parameter "SVP"=2, use ∧∨ for SV modification.

Parameter mode: Controller display parameter name and its value, use ∧∨ for value modification.

Note: The keys ∧∨ can be pressed and released one unit digit at a time, or for larger changes, the key can be held down for continuous change. The speed at which the setting is changed is ramped from slow to very fast. The longer the key is held in the faster the numbers change.

1-4-5. Control modes

Normal (Auto) mode:

The controller uses a PID algorithm to determine the required output power to hold the PV=SV.

This type of control is a "closed loop" system and requires a thermocouple feedback signal.

Standby mode:

When standby mode start, the controller uses a PID algorithm to determine the required output power to hold the PV=Standby value (SV × StS-P%). At the end of standby time, the controller back to normal control mode.

Manual mode:

The controller regulates load power determined by the user selected power output setting. The power delivered is constant and will only change with user input.

This type of control is an "open loop" system and requires no thermocouple feedback signal.

The power output setting is indicated on the SV display. It can be adjusted up or down with ∧∨ keys.

AT (Auto Tune) mode:

For get the optimal PID value in some system, it is possible to execute "PID auto tuning" function when first use or heater system changed.

After finished auto tuning, the optimal PID would be save into the controller.

PS：To start PID auto-tuning function, PV must lower than SV.

After the controller get the optimal PID value, it returns to normal (auto) control mode.

1-5. Error message

Error Code	Troubles	Solution
ErH	Thermocouple open	Check the sensor, or switch to manual control mode.
ErL	Thermocouple inverse	
SHrt	Load short	Replace the load.
HEAt	Load open	
AL-H	High deviation alarm	Check the controller.
AL-L	Low deviation alarm	Check the system thermal insulation, or switch to manual control mode.

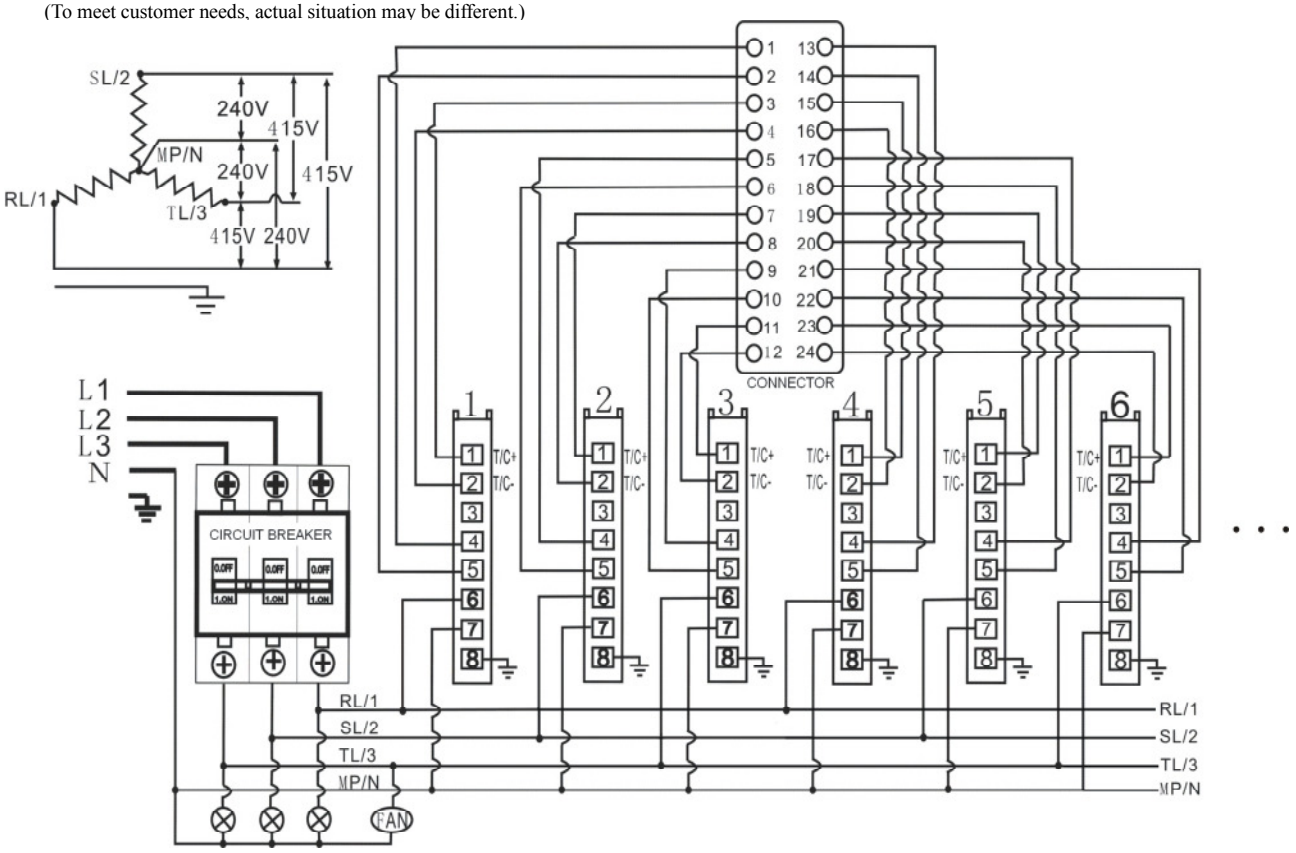
1-6. Default of parameters

Parameter Name	Default	Parameter Name	Default	Parameter Name	Default
SV	200	C-F	0	Pb	0
ALH	30	SoF	0	Sdo	-199
ALL	-30	Atu	1	SuP	450
Stb-t	60	rt	0	Ado	0
StS-P	75	Pi	10	Ads	0
5-6	1	P	55	rEs	1
LCK	0	i	120	SVP	0
Sn	0	d	30	SPE	0

2. TEMPERATURE CONTROL MAINFRAME

2-1. Power wiring

(To meet customer needs, actual situation may be different.)



Caution:

1. Before operating, check connection and its voltage.

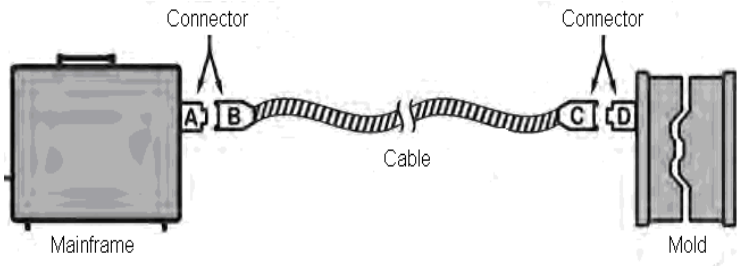
2. All instruments must be used in accordance with the specification to prevent fire or damage to instrument and equipment.

3. Be sure the ac power input is switched off before maintenance.

⚠The FGND must be connected with earth ground.

2-2. Connection description

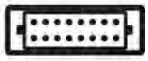
(To meet customer needs, actual situation may be different.)



Mainframe	Output Connector
2-Zone	16pins×1
4-Zone	16pins×1
6-Zone	24pins×1
8-Zone	16pins×2
10-Zone	24 pins×2
12-Zone	24 pins×2
24-Zone	24 pins×4

Connector type

a: single hook



b: single button

c: dual hook

d: dual button

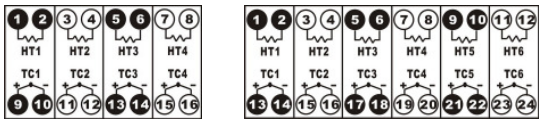
Connector		A	B	C	D
Name		Housing	Hood	Hood	Housing
Type		Socket	Plug	Socket	Plug
	1*	c	d	d	c
	2	a	b	b	a
	3	d	c	c	c

* Standard type

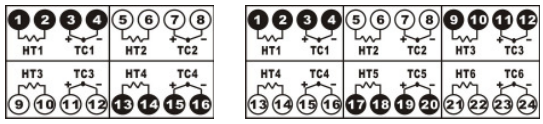
2-3. Connector wiring

Mainframe connector wiring are divided into four types as below (Actual wiring mode see the figure on mainframe):

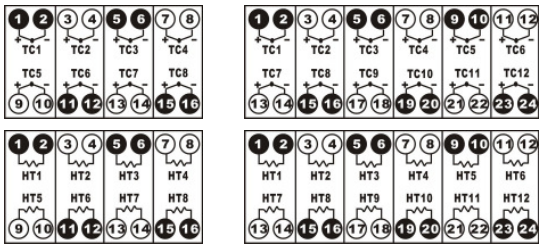
Wiring mode 1:



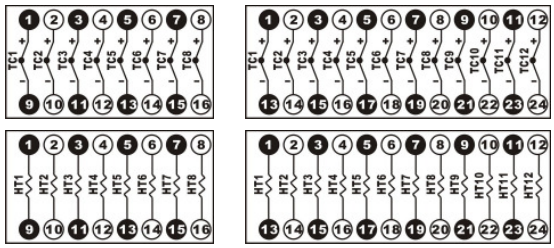
Wiring mode 2:



Wiring mode 3:



Wiring mode 4:



3. SAFETY WARNING

⚠ **The high voltage required to operate this temperature controller and the high temperatures created by its operation can cause serious injury or death, and presents a potential fire hazard.**

Installation and operation of this equipment should only be performed by qualified individuals and all directions should be carefully followed. Caution should be taken to guarantee that only the rated voltage is applied to this unit and appropriate limiting control devices should be used for safe operation.

DISCONNECT THE MAIN POWER FROM THE CONTROL SYSTEM BEFORE SERVICING!

Hazardous voltage is present on the inside of the controller and mainframe system.

Standard safety procedures should be followed. Additionally, the following guidelines will help prevent personal injury and product damage:

- **Do not apply a voltage greater than that specified on the product nameplates.**
- **Do not operate controllers or mainframe systems without appropriate supply ground connections.**
- **Do not insert or remove controllers into mainframe systems with power applied.**
- **Do not operate any controller or mainframe system without all covers in place and properly secured.**
- **Do not operate this product when wet or in a damp environment.**
- **Do not operate this product in an explosive atmosphere.**