



PHRS TEMPERATURE CONTROLLER MANUAL

Revision 1
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Operation Method the Temperature Controlling Card Unit

The model of the temperature controlling unit is **MD18**.

MD18 is hot runner special use temperature controller, is suitable for all the hot runner heaters with a load no more than 15A. Its outline and installation mode adopt international standard structure which fits to any standard machine case. The power equipped wiring and load connection mode are both of standard structure. Each control card controls heating temperature of a loop. It is very easy for exchange operation and is exchangeable with temperature control card from other supplier.



1. Function and features:

- ◆ Operation panel of Temperature control card adopts light-touch key and double row 4 bits LED display mode, equips with 3 pieces of LED indicating light to display equipment running status.
- ◆ Simple operation, accurate temperature control, fast for new user to enter working state.
- ◆ Temperature control card adopts international universal standard structure. It is easy to exchange it and exchangeable with other supplier's product.
- ◆ Each temperature control card has the same function so that it is exchangeable with each other, easy for user's maintenance and spare parts storage.
- ◆ Can set K type and J type of thermocouple sensor signal, accurate temperature non-linear treatment and integrated cold junction compensation.
- ◆ Zero-crossing trigger control mode, PWM pulse width output adjustment.
- ◆ Temperature setting and display with Centigrade and Fahrenheit.
- ◆ Thermocouple disconnection alarm function and thermocouple disconnection auto-protect.
- ◆ Thermocouple reverse connection alarm function and auto-protect.
- ◆ Heater open circuit alarm and auto protect.
- ◆ Silicon control breakdown alarm and auto-protect.
- ◆ FUZZY+PID control algorithm, PID parameter has two modes, on-line automatic setting & manual setting.
- ◆ Equip with hot runner soft-start heating mode, soft-start heating power and time can freely set.
- ◆ Except for system auto-control, it also has manual control mode for heating mode of special occasion.
- ◆ There is a protection function for wrong connections to 380V, in order to ensure the safety of the temperature controlling card.

2. Technical specifications

Service Ambient Temperature	32 ^o -131 ^o F (0 ^o -55 ^o C)
Storage Ambient Temperature	-40 ^o -158 ^o F (-40 ^o -70 ^o C)
Sensor Type	J or K Type Thermocouple Sensor
Sensor Temperature Range	32 ^o -860 ^o F (0 ^o -450 ^o C)
Temperature Accuracy	0.3%
Fuse Protection	220V 20A Two-Path Fast Acting Fuse
Control Output Mode	Triac 20A 220VAC
Power Supply	86—240VAC 50/60Hz

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3. Operation panel description:


PV row designs as 4-bit nixie tube, will show control object's temperature value under normal display and show error code under alarm status


- E- 02** Indicate that the thermocouple has broken cables or is disconnected
- E- 03** Indicate that the thermocouple's polarity is reversed
- E- 06** Indicate that the thermocouple is short-circuit


SP row design as 4-bit nixie tube, will display setting temperature value under normal status

- c200** Indicate set temperature is 200°C
- F200** Indicate set temperature is 200°F
- E- 01** Indicate temperature exceeds ranges
- E- 04** Indicate the heater is broken or is disconnected
- E- 05** Indicate silicon control breakdown short circuit

The 3 luminant indication lights from left to right are soft-start, auto-running and manual running indication lights.

 **SOFT** After initial power on, system will enter soft-start status to dehumidify heater. Soft-start output power and running time can be set by menu. When soft-start, this light will flash.

 **AUTO** Under auto constant-temperature operation status of the system, this light will flash.

 **MANU** Under manual operation status of the system, this light will flash.

Actual Temp →

Set Temp →

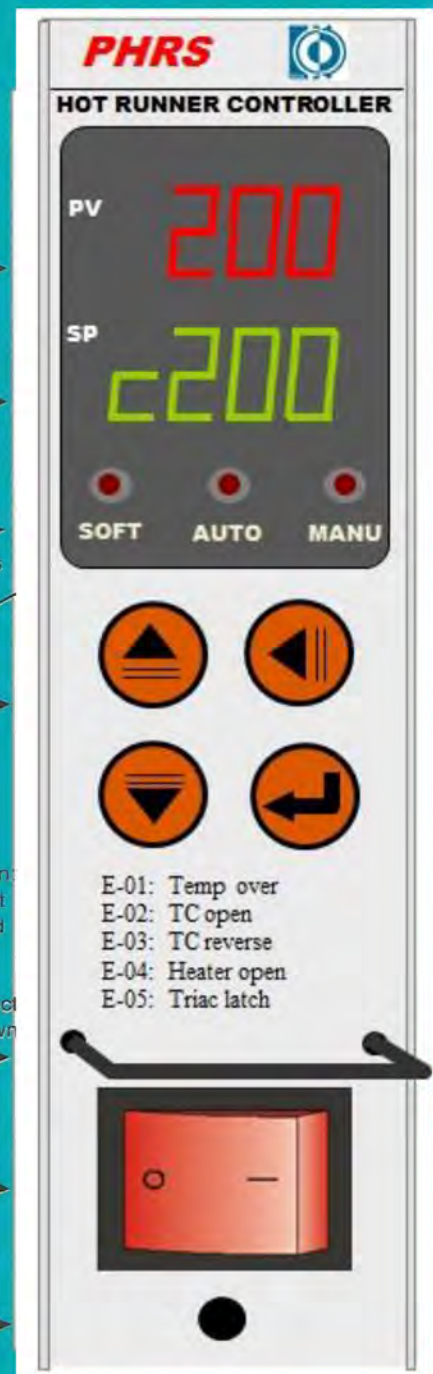
LED →
Operating Status

KEY →
Input Keys

Alarm Description:
Temp. Over Limit
TC Disconnected
TC Reversed
connection
Heater Disconnect
TRIAC Breakdown
Handle →

Power Switch →

Lock →



- E-01: Temp over
- E-02: TC open
- E-03: TC reverse
- E-04: Heater open
- E-05: Triac latch

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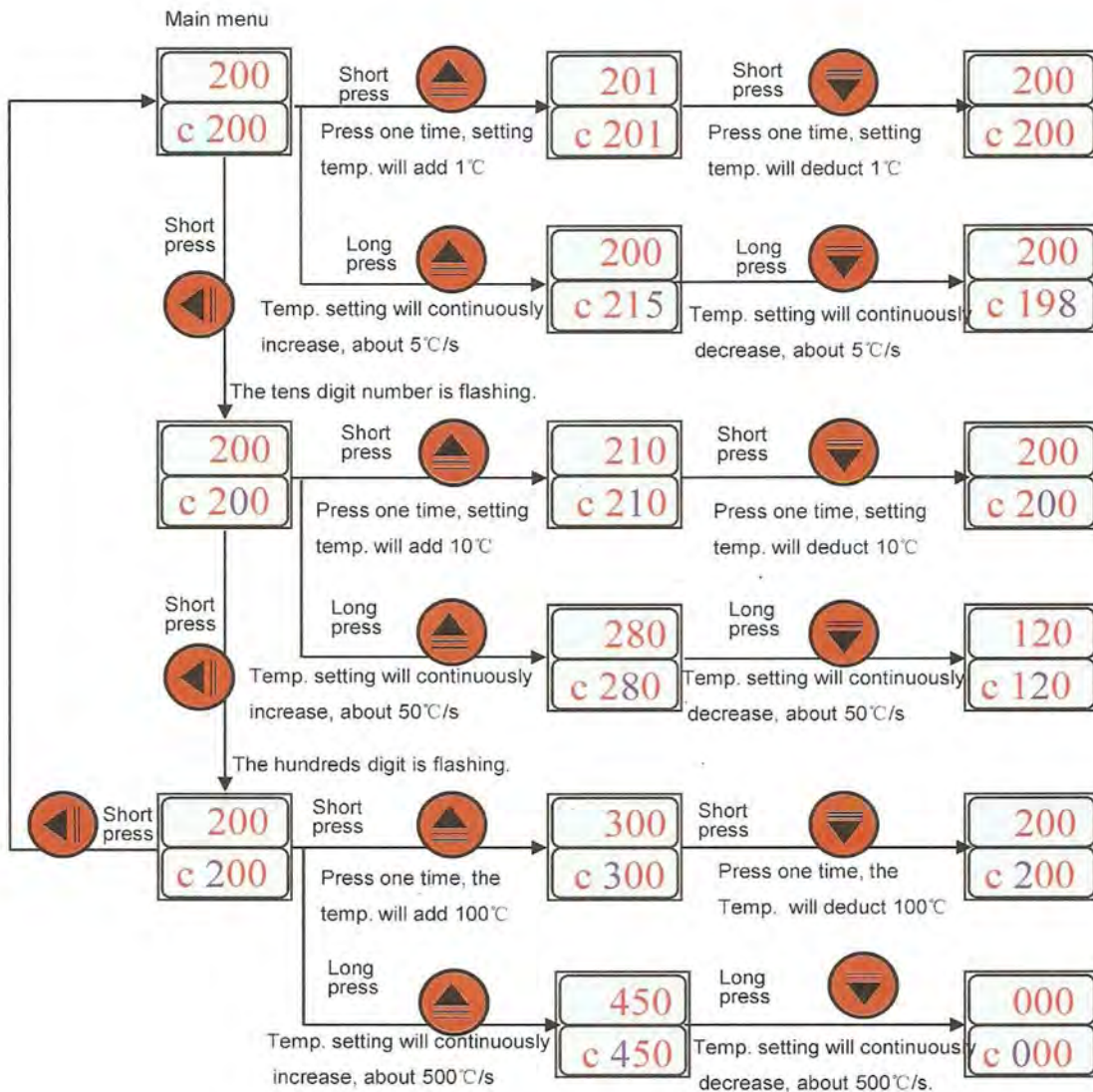


4. Temperature setting method

Description of Terms:

Short Press: It means you press the key one time and then release the press (the pressing time is not more than 1 second).

Long Press: It means you press the key and then hold it for more than 3 seconds and then release the press.



After temperature setting is finished, if Shift Key and function keys are pressed together, then data concerned will be stored rapidly, or if no any other key pressing are done within 5 seconds, the system's data will be auto-stored on OM of EEPR and won't be changed until the parameters are modified by users next time. The Max. setting temperature is 450°C.

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5. Status shift and display

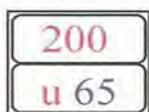
After controller is power-on, if initial object temperature is below 100°C while set as soft-start mode, system automatically enter soft-start mode. If initial temperature is over 100°C or soft-start mode is on OFF status, system will directly enter auto-running mode. If system is on soft-start mode after start, "SOFT" light will flash with a frequency of 1 second. Its duty ratio is proportional to soft-start output power. Soft-start time and output power can be set in the menu.

After completion of soft-start and system shifts to auto-running mode with "AUTO" light flashing with a frequency of 1 second. Its duty ratio is proportional to auto-running output power. After system is power-on, it will directly enter auto-running status if detected object value is over 100°C or soft-start is turned off.

How to inter-shift from auto-operation status to manual-operation status :



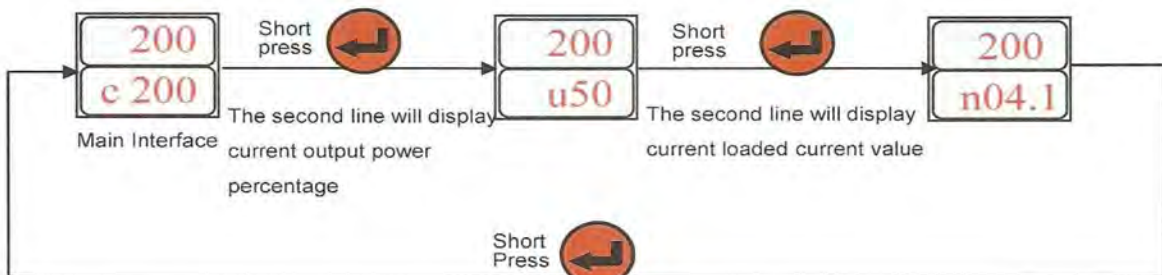
On manual running status, "MANU" light will flash with a frequency of 1 second. On manual working status, SV screen displays manual output power value, SP screen displays current actual status. Manual output power setting method is the same as temperature setting.



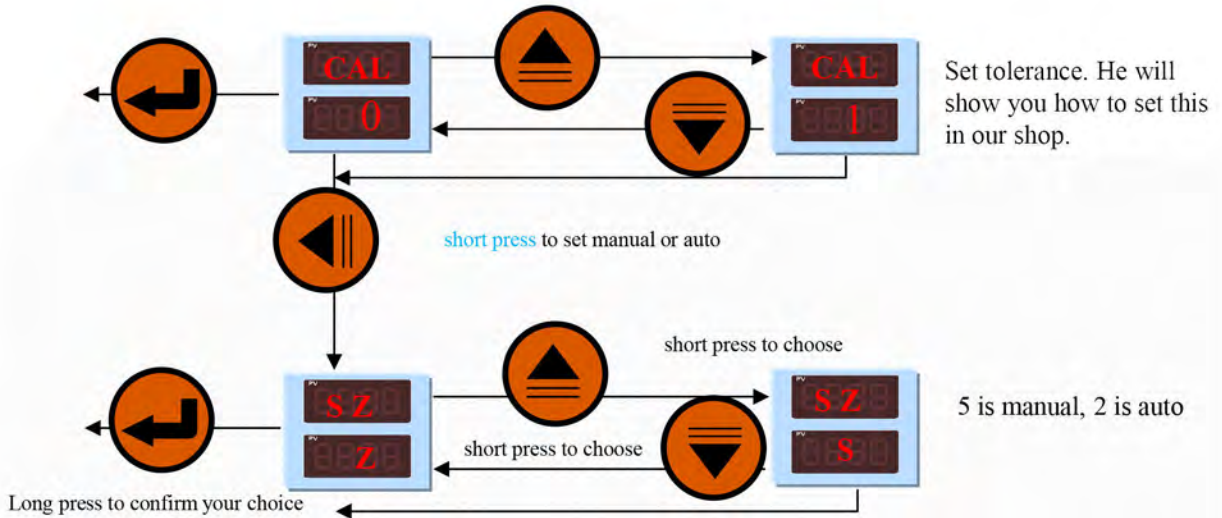
Display the real current temperature or alarm status

Display manually-set output power percentage (The Max. value is 99%, the Min. value is 0%)

6. Running parameter monitoring



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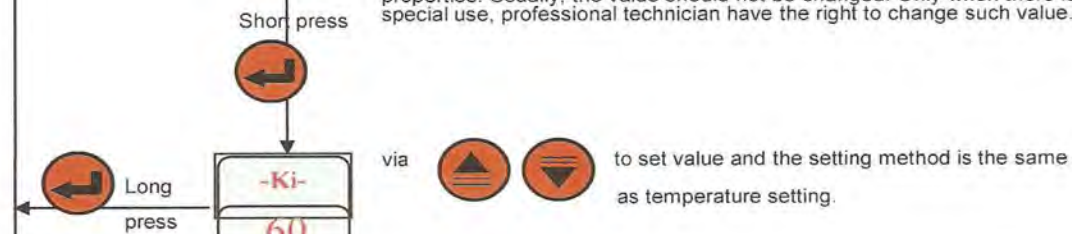


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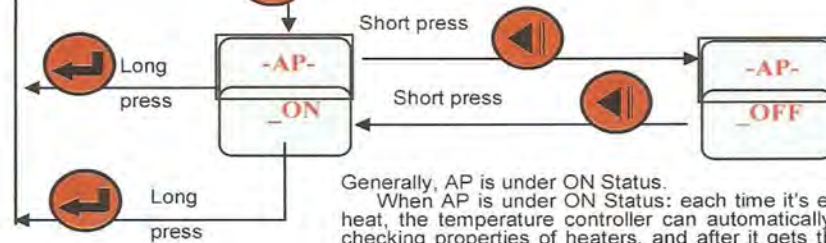
Function: KP Value is a proportional amplification coefficient of a temperature control algorithm. When AP is ON, the temperature controller can make auto-calculation and save this value according to heater properties. Usually, the value should not be changed. Only when there is a special use, professional technician have the right to change such value.



Function: Ki Value is a integral amplification coefficient of a temperature control algorithm. When AP is ON, the temperature controller can make auto-calculation and save this value according to heater properties. Usually, the value should not be changed. Only when there is a special use, professional technician can have the right to change such value.



Function: Kd Value is a deferential amplification coefficient of a temperature control algorithm. When AP is ON, the temperature controller can make auto-calculation and save this value according to heater properties. Usually, the value should not be changed. Only when there is a special use, professional technician can have the right to change such value.



Generally, AP is under ON Status.

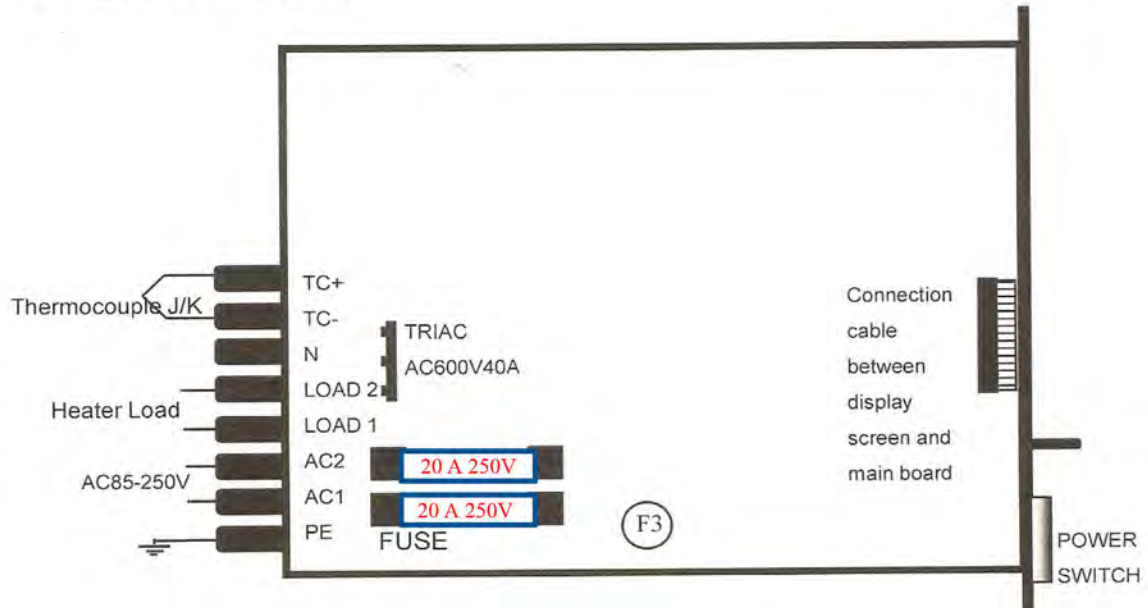
When AP is under ON Status: each time it's electrified and begins to heat, the temperature controller can automatically get into the status of checking properties of heaters, and after it gets the exact parameters of such property, the controller can carry out comparatively accurate controlling.

When AP is under OFF Status: the temperature controller doesn't check properties of heaters, but it uses the last-time-recorded property parameters of heaters taken out from its memory (if the temperature controller controls the same heater every time, this way can be relatively stable).

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8. Hardware description



8. Fault diagnosis

E- 02

Thermocouple disconnection alarm: There are two kinds of situation for such alarm, one is that thermocouple is broken, the other is that connector loosens. Please check each connection or send back to supplier for maintenance.

E- 03

Thermal electrode polarity reverse connection alarm: Please check polarity of thermocouple.

E- 04

Heater disconnection alarm: Check each connector of relevant heater, is it loosen? Check relevant circuit, is it disconnected? Check heater, is it broken?

E- 05

Silicon control breakdown alarm: Silicon control is broken, please replace it.

No Displaying:

Please check if the power switch is switched on.

Check if the external power supply and corresponding cables are in a normal and correct situation, the null line is correctly connected? The earth wire is reliably grounded, if no, send it back to the supplier for repair.

The golden finger turns black: Please check if the socket circlip that connects with golden finger has lost elasticity or not; and please replace it with a new socket if yes.

Notes: Before power-on, please confirm whether the wiring is correct or not. AC220V(Voltage) is supplied to the temperature controlling card. Cable connecting specifications between HRTC and the mold and the connecting cables must match. If cables are wrongly connected, the temperature controlling card will probably suffer from permanent damage when electrified.

END OF DOCUMENT