

**Instruction Manual**

**RDK-150-DC Supplementary Instruction Manual**

Version 1.2 (May, 2015)



**WARNING**

- The default set temperature on RDK-150-DC is 500 °F. The controller will start to heat the coil immediately after it is power up; so please make sure the coil is placed in a secure place before power up.
- **Disconnect the coil from the controller before you change any of the parameter that is locked with pass code. Failure to do so may result in coil heater damage from overheating.**
- The coil heater should NOT be heated above 1000 °F. Build-in alarm is preset to 1000 °F.
- When controller is turned off, the coil will stay at very high temperature for at least 20 minutes. The heated coil is very dangerous: it will cause severe burn if touched.

**1. Introduction**

This is a supplementary manual for the RDK-150-DC hot runner coil heater. Only the advanced parameter settings will be covered in this manual. Please check the main instruction manual for a quick guide. Advanced parameters are divided into groups and can be accessed by entering a special access code.

**2. Parameter Setting**

**2.1. Temperature setting and Alarm setting (accessed by code 0001)**

Table 1. Temperature and alarm parameters

Symbol	SV	Description	Range	Initial	Note
Su	SV	Target temperature	Arbitrary value within the measuring range	500	Note 1
AH1	AH1	Alarm 1 on temperature		1000	Note 2
AL1	AL1	Alarm 1 off temperature		999	
AH2	AH2	Alarm 2 on temperature		250	
AL2	AL2	Alarm 2 off temperature		250	
End	END	Exit			

**Note 1. Set Temperature.**

There are two ways to set the target temperature.

a. During the normal operation mode, press  $\Delta$  or V once to switch the display from process value (PV) to set value (SV, or target temperature). The display will start to blink. Press  $\Delta$  or V again to increase or decrease the SV. When finished, wait 8 seconds and the settings will take effect automatically (the display will stop blinking).

b. Press SET key once. Use  $\Delta$ ,  $\Delta$  and V keys to enter code 0001. Press SET key to confirm, then the display would be SV (Su). Press SET key again to display the SV setting. Use  $\Delta$ ,  $\Delta$  and V keys to enter the new SV value and press SET to confirm. Press V key to change the display to END. Then, press SET to exit. You can also ignore the steps after confirmation of SV. The controller will return to normal operation mode automatically if no key is pressed for 1 minute. The flow chart below shows how to set the SV and alarms in details.

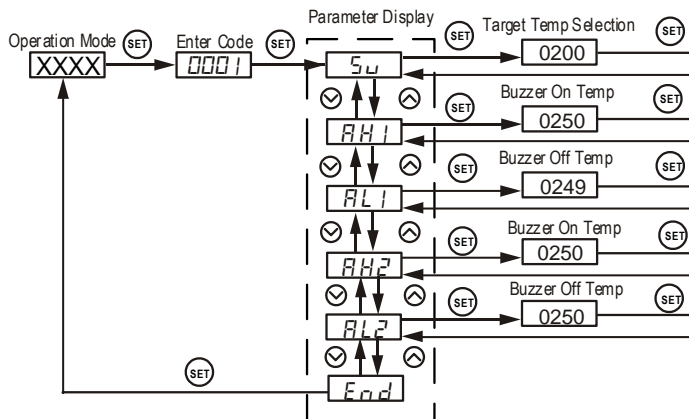


Figure 1. Flow chart for how to set target temperature and alarm.

**Note 2. Set alarm**

The controller offers two alarms that can be set to turn on the buzzer at specific temperatures. The first alarm is controlled by parameters AH1 and AL1. The initial setting will turn on the buzzer at 1000°F and off when temperature drops below 999°F. The second alarm is controlled by parameters AH2 and AL2. The second alarm is initially deactivated.

AH1 and AH2 are the temperatures to turn buzzer on; AL1 and AL2 are the temperatures to turn buzzer off. When AH1(2) > AL1(2), the alarm is set for absolute high alarm as shown in Figure 2 below. When AH1(2) < AL1(2), the alarm is set for absolute low alarm as shown in Figure 3 below. When AH1(2)=AL1(2), the alarm is deactivated.

Example, if AH1=250, AL1=249, when the temperature goes up to 250°F, the buzzer will be on; when the temperature drops down to 249°F, the buzzer will be off.

User can press the shift key (>) to temporarily mute the buzzer sound. The alarm will buzz again if the alarm set temperature is reached again. To permanently deactivate the alarm, set AH1=AL1 or AH2=AL2. Please see flow chart in Figure 1 on how to set the value.

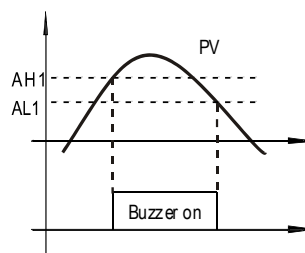


Figure 2. Absolute high alarm

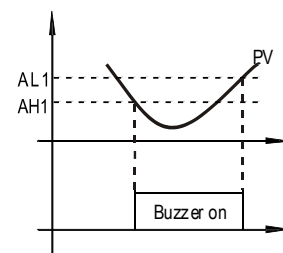


Figure 3. Absolute low alarm

The contents below are for reference and advanced applications. Most users do not need to read beyond this point.

**2.2 PID parameter setting (accessed by code 0036)**

The values of P, I and D parameters are critical for good response time, accuracy and stability of the system. The values of the PID parameters have been optimized for hot runner coil heater. User should not change it unless the result is not satisfactory.

Setting PID parameters is similar to the setting of the Temperature and Alarm Parameter as shown in the flow chart of Figure 1. The difference is that these parameters are accessed by enter code 0036 instead of 0001.

Table 2. PID and relevant parameters

Symbol	Description	Range	Initial	Note	
P	p	Proportional Constant	0.1~99.9(%)	2.0	Note 3
I	I	Integral Constant	2~1999(Sec)	40	Note 4
d	d	Derivative Constant	0-399(Sec)	10	Note 5
SouF	SouF	Damp Constant	0.1~1.0	0.4	Note 6
ot	ot	Cycle Rate	2~199(Sec)	002	Note 7
FILE	FILt	Digital Filter Strength	0~3	0	Note 8
End	End	Exit			

**Note 3.** Proportional Constant (P): When P increases, the system is more stable. When P decreases, the system is less stable. If the P is too small, the system would be oscillatory or even non-convergent.

**Note 4.** Integral time (I): Brings the system up to the set value by adding a constant to the output that is proportional to how far the process value (PV) is from the set value (SV) and how long it has been there. When I decreases, the response speed is faster but the system is less stable. When I increases, the respond speed is slower, but the system is more stable. When I is 0, then it turns to be PD control.

**Note 5.** Derivative time (d): Responds to the rate of PV change, so that the controller can compensate in advance before |SV-PV| gets too big. A larger number increases its action. Setting d-value too small or too large would decrease system stability, cause oscillation or even non-convergence.

**Note 6.** Damp constant (SouF): The parameter is controlled by the artificial intelligence of the controller. This constant helps the PID control quality. When its value is too high, the system will be over damped. When its value is too low, the system may overshoot.



Figure 4. Damp constant

**Note 7.** Cycle rate (ot): It is the time period that the controller uses to calculate its output. The initial value is set to 2. Short time causes the fan to pulse at higher frequency. Longer time may reduce the quality of control.

**Note 8.** Digital Filter (Filt): can be set as 0, 1, 2, 3. Filt=0, filter disabled; Filt=3, strongest filtering effect. Stronger filtering increases the stability of readout display, but causes more delay in the response to changes in temperature.

**2.3 System Configuration Parameters (accessed by code 0089)**

Table 3. System configuration parameter setting

Symbol	Description	Range	Initial	Note
Inty	Inty	Not applicable	P	
Outy	Outy	Not applicable	2	
Hy	Hy	Not applicable	3	
Adtu	Adtu	Not applicable	10	
Psb	Psb	Not applicable	0	
Rd	Rd	Not applicable	0	
CorF	Corf	Display Unit	0: °C 1: °F	Note 9
End	End	Exit		

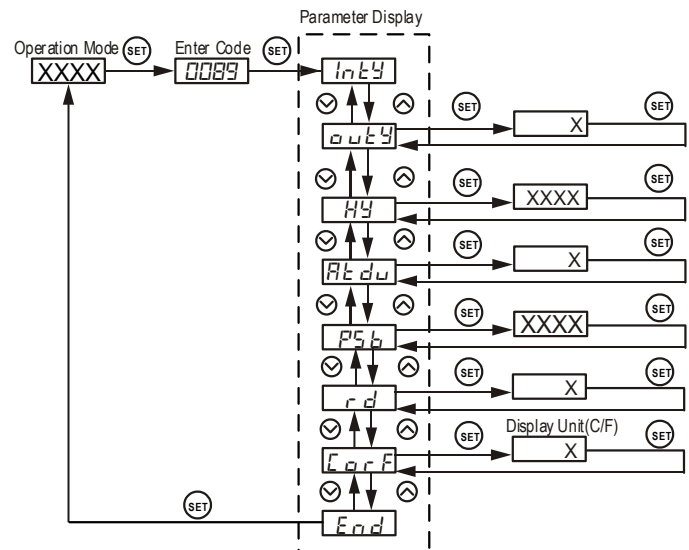


Figure 5. The system setup flow chart

**Note 9.** Display unit selection CorF: 0 for Celsius (°C); 1 for Fahrenheit (°F). By default, CorF is set to 1 (Fahrenheit). For Celsius display, you need to set CorF to 0 and divide your original P value by 1.8. For example, assuming your original P value is 2.0. To change to Celsius display, you need to set CorF=0 and P = 1.1 (2.0/1.8=1.11).

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