



# Athena<sup>®</sup>

## Series RMB X15 000 009

### Hot Runner Controller

### Quick Set-Up Guide

#### Operating Limits

**Ambient Temperature** 0 °C to 55 °C

**Relative Humidity Tolerance** 10 to 95%  
Non-Condensing

**Shipping Temperature** -40 °C to 70 °C

**Power Requirements** 115 to 240 Vac  
50 or 60 Hz nominal, CE compliant.

#### Set-Up Procedure

##### 1) Prepare the controller.

- Unpack the RMB controller.
- Inspect the controller for damage.
- Make sure the power switch on the front of the controller is set to off (O).

If a controller shows signs of having been damaged during shipping, do not install or power up the controller.

##### 2) Install the controller.

This guide assumes that the mainframe has already been wired.

- Make sure the plunger in the center of the locking pin is pulled out.
- With the controller and mainframe power switches set to off (O), align the RMB controller's printed circuit board with the guide channels in a slot in the Hot Runner mainframe.
- Slide the controller into the mainframe until the RMB connectors are firmly seated in the backplane of the mainframe.
- Lock the controller in the frame by pushing in the locking pin plunger (or by tightening the locking screw).



##### 3) Apply power to the mainframe and controller.

When the controller is powered up, the output may be activated.

- Turn on the power to the mainframe.
- Set the power switch on the front of the controller to on (I).

When the controller is powered up, the display and LEDs light briefly, and then the firmware version number is displayed.

##### 4) Adjust the setpoint.

When the controller is powered up, it will automatically do a CompuStep<sup>®</sup> soft start for heater bake out if the process value is below 93 °C. (PV is on the top line of the display. SP is on the lower line.) During the soft start the NORMAL LED flashes.

During the soft start (which lasts five minutes or until the PV is 93 °C), adjust the setpoint to a value that is representative of the setpoint you expect to use when the controller is in service.<sup>1</sup>

To adjust the setpoint press ▲ or ▼.

## 5) Wait for the controller to tune itself.

New RMB controllers are set to do a soft start every time they are powered up (if the PV is less than 93 °C), and then to do an Autotune operation each time the controller is powered up until a successful Autotune is completed.

**Let the Autotune proceed without interruption.** During Autotune, the process value alternates with tun.

At the conclusion of a successful Autotune, the flashing tun disappears. The display reverts to the normal mode operating display: PV on top line, SP on lower line. The proportional band and rate values calculated by the controller during the Autotune have been saved.<sup>2</sup>

RMB controllers do not require calibration.  
**The controller is ready to use.**

## If Autotune is Unsuccessful

At the conclusion of an unsuccessful Autotune, you will see Er plus a one-digit error code (alternating with tun). The controller output goes to 0%. Tuning errors and remedies are on page 4.

<sup>1</sup> If the PV is greater than 93 °C, then the controller will skip the soft start, and will Autotune as soon as you power up the controller the first time. However, the tuning will not be valid, because you have not yet entered the appropriate setpoint for your process. Press **MODE** once to interrupt the Autotune. With the controller in normal mode (NORMAL LED lit), adjust the setpoint, and then cycle power to start Autotune again with a valid setpoint.

<sup>2</sup> The integral (reset) action for PID control is always set to five times the rate (derivative) value in an RMB controller.

## Autotune Is Disabled Automatically

After a successful Autotune, the controller automatically sets itself to disable Autotune. Autotune remains disabled,

even if you cycle power to the controller, until you enable Autotune again by changing the value of the Pi d menu At.OP parameter as described below. (Soft start is always enabled.)

## Changing Parameter Values

The procedure for changing any Pi d menu parameter value is:

- 1) Press **MODE** to put the controller in Standby (STANDBY LED lit).
- 2) Press and hold **DISPLAY** until you see Pi d.
- 3) Press **MODE** repeatedly until you see the parameter you want.
- 4) Use the ▲ and ▼ keys to set the value you want.
- 5) Press and hold **DISPLAY** to return to the PV and SP display.

## Pi d Menu Parameters

Pb (proportional band) – Valid range is 0 to 537 °C. Default is 13 °C.

rATE (derivative) – The valid range is 0.0 to 999 seconds. Default is 7 seconds.

At.OP (Autotune operation) – Choices are:

- dIS Autotune disabled
- oNCE Autotune once at next power up, then disable if Autotune was successful.
- E nA Autotune enabled every time controller is powered up.

## Operation Basics

**To see the process value:** Look at the PV on the top line of the display. The top line shows the PV, unless the controller detects an error, or Autotune is active, or you are in the Pi d menu.

**To see if the output is on:** Look at the HEAT LED. It is on when the output is on.

**To change the mode:** Press **MODE** repeatedly until the LED lights for the mode you want. The modes are:

- **normal** (closed loop control) – Controller uses input value to calculate output needed to maintain setpoint shown on lower line.
- **manual** (open loop control) – Controller output is percent shown on lower line. Input is ignored.
- **standby** – Standby setpoint or standby fixed output is on lower line, depending on how standby parameters are configured.

**To change the setpoint (normal mode) or output (manual mode):**

Press the ▲ or ▼ key until the setpoint or output percentage you want is on the lower line.

**To see the output percent and measured heater current in normal mode:** Press the **DISPLAY** key repeatedly to cycle through the setpoint, output percent, and heater current in amps (on lower line).

**To see the measured heater current in manual mode:** Press the **DISPLAY** key repeatedly to cycle through the output percent and heater current in amps (on lower line).

**To use the configured boost output or boost setpoint:** Press the **BOOST** key. The LED above the **BOOST** key lights. For the next 15 seconds (or until you push the **BOOST** key again, whichever is sooner) 20% is added to the controller output (100% output maximum).

**To stop the soft start:** If the NORMAL mode LED flashes, the controller is doing a CompuStep® soft start. You can stop the soft start by pressing **MODE** once.

## Error Messages and Codes

If the controller detects a problem, the highest priority error is displayed. See the table on the next page for possible errors and suggested operator actions in response.

When one of these error codes is displayed, the output is 0%. In the case of the Out SHrt (output short) and bAd Htr (bad heater) errors, the output failure relay interrupts the output.

Display	Error Condition	Operator Action
<p><b>Highest Priority</b> – Controller has detected a problem with its own operation. All errors of this type shut down controller activity (except for display of error message).</p>		
Err nnnn  <i>(nnnn is a four-digit number)</i>	Problem in the controller itself.	Cycle power to clear the message. Note the error code and call for service.
<p><b>High Priority</b> – PV is displayed on top line, unless an input error (medium priority) occurs simultaneously. In that case, the top line is blank; no valid PV is available. If two high priority error states are detected, the one ranked highest will be displayed on the lower line (see numbers below).</p>		
1) gFl	Hard ground fault detected.	Turn off controller. Fix the problem. Turn on the controller.
2) bAd Htr	Heater problem detected.	
3) Out SHrt	Output is off, but current flow is detected.	
4) LPbr	PV has not increased at least 1% of supported sensor span in 999 seconds.	
5) Ht.rd Err	Heater conversion error occurred.	Cycle power to clear the message. Call for service.
<p><b>Medium Priority</b> – SV is displayed on lower line. These conditions cannot occur simultaneously.</p>		
tC oPn	Thermocouple is open.	If the condition is fixed, the message will clear automatically. To clear the message manually, cycle the power.
tC rEu	Thermocouple leads are reversed.	
<p><b>Low Priority</b> – SV is displayed on lower line. Output goes to 0%. Only one Autotune error will be displayed.</p>		
tun Er3	Setpoint is higher than the process value. Look at the setpoint. If it is realistic for your process, then check the thermocouple leads; maybe they are reversed.	
tun Er5	There is not enough difference between initial PV and the setpoint. For Autotune to work, the difference must be at least 5 °C.	
tun Er8	The startup curve (change in PV) was not acceptable to the Autotune algorithm. This could be caused by a process upset that occurred during tuning. Try Autotuning again when the process is stable. If the error recurs, your process is not suitable for Autotuning. Use manual tuning.	
tun Er9	The Autotuning timed out, because the process was unresponsive (or extremely slow). Your process is not suitable for Autotuning. Use manual tuning.	