



## *Help for Novices*



## *AutoMate II Kiln Control Systems*

### What the Controls Do

The three items pictured above have been a popular means of providing fully automatic control for ceramic and pottery kilns over the past several years because of their simplicity and very reasonable price.

To understand what these devices do, keep in mind that firing is an art, rather than a science, and that firing is a process of subjecting the ware to *heat*. It is heat that does the work, not necessarily temperature. Firing is also a very simple process and evidently not one where a successful outcome depends upon precision control of time and temperature. Ancient potters were regularly successful using rudimentary pit-firing techniques without any technology at all.

The KilnSitter® is a simple mechanical limit switch which uses pyrometric cones as a sensing device. Pyrometric cones are available in an array of values which bend at different extremes of heat. Cones are selected according to the firing instructions for the ware or glaze being fired. The KilnSitter is used by inserting that particular cone into its tripper mechanism and pushing its reset button to engage its electrical contacts.

After being subjected to the prescribed conditions of heat, the cone will bend, releasing the tripper mechanism, which opens the electrical contacts and thereby turns the kiln off. If the KilnSitter is equipped with a timer, as shown above, the timer serves as a backup safety device. It can be set to an hour or two more than the expected firing time to ensure that the kiln will be shut off if, for any reason, the tripper mechanism fails to operate properly.

The AutoMate II™ Automatic Kiln Switch is used to regulate the heat up rate of the kiln. Kilns are usually designed to be capable of reaching temperatures upwards of 2400°F. The heating capacity of their electric heating elements is very high at low temperatures and declines as the temperature in the kiln reaches their maximum skin temperature, which is about 2432°F. Some means is therefore needed to throttle the kiln during the early firing stages to ensure against damage to the ware being fired by thermal shock. The AutoMate II does that by turning up the heat at a linear rate during the turn-up time set on its dial. This control can also be used to “smoke out” ware that is suspected of containing excess moisture, in order to keep entrapped moisture from turning into steam and damaging the pieces being fired.

### Simple “Quick Start” Setup

Select an appropriate cone for the ware or glaze being fired, according to the instructions for that material. Insert the cone in the KilnSitter’s tripper mechanism inside the kiln, lifting and latching the tripper weight.

To set the turn-up time on the AutoMate II, refer to the cone charts to find the *maturity temperature* for the cone being used, and divide that number by 270. For example:

$$\begin{aligned}\blacktriangle 06 &= 1830^\circ\text{F} @ 270^\circ\text{F}/\text{Hr} \\ 1830/270 &= 6.8\end{aligned}$$

Therefore, set the **TURN-UP TIME** on the AutoMate II at about 6.8 hours.

When ready to proceed with the firing, press the button in the KilnSitter’s tripper mechanism to engage its contacts. The **TIMING** light on the AutoMate II will begin to flash, but nothing else will happen until it has incremented its output up to about 5%, at which time the **HEATING** light will flash briefly for the first time, and the kiln will be turned on momentarily.

Notice that 5% of 6.8-hours will amount to about 20-minutes. If you don’t wish to wait that long, or trust that the system will eventually begin as it is supposed to, move the dial to the **SET** position, and hold it there until the heating light blinks for the first time. Then return it to the 6.8-hour setting. But now, since you’re beginning with the kiln already turned up about 10%, the AutoMate II will complete the turn-up process in 90% of the 6.8-hour period or, in other words, just a little over six hours. As a practical matter, that probably won’t make any difference.

If the ware in the kiln is suspected of containing some sensible moisture, or on the other hand is bone-dry and you are doing a glaze firing, you might wish to retard or accelerate the firing. Notice that time/temperature information is given in the cone charts for slow, normal and fast firings, or 108°F/Hr, 270°F/Hr and 540°F/Hr rates of temperature rise. For bone-dry ware or glaze, a fast firing might do, so you could set the AutoMate II's turn-up to 3.4-hours instead of 6.8. This is all very arbitrary. Keep in mind that the only reason for regulating the turn-up time is to protect the ware from steam explosions and damage due to thermal shock. It's the KilnSitter that is responsible for turning the kiln off at the point where the ware has been appropriately heat-treated.

If you know that the ware contains excess moisture and wish to boil that off before firing it, use the AutoMate II to run the kiln up to about 20% on, and hold it there for as long as you think appropriate. Most kilns have a somewhat linear relationship between the heating capacity applied and the temperature they'll level out at. For a typical kiln, 20% on will bring the kiln slowly up to about 20% of 2400°F, or about 480°F. To set the heat at 20%, turn the dial to **SET** and hold it there. The **HEATING** light will flash on and off at ten-second intervals. Each cycle turns the kiln up 10%. So, after the **HEATING** light has flashed on and off for the second time, move the dial to **HOLD**. The AutoMate II will then operate the kiln at this setting indefinitely. When ready to complete the firing, move the dial to whatever time you feel is appropriate, as outlined above.

## More Help

As already mentioned, kiln firing is a simple process, and more of an art than a science. Successful results can usually be achieved, even with very wide tolerances. Opinions abound about what works best. With experience, you will settle on a regime that works best for you.

If you need additional advice or service assistance, you'll find additional resources and contact information on the FireRight website.

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