



KilnMaster 700 Board Addendum

The New 700 KilnMaster Controller may look the same on the outside but on the inside it has a host of great new features.

Ease of Use

- Easier to read 14 segment display
- Menu Options organized for quick access.
- New Controlled Cooling with ConeFire Mode

Troubleshooting

- Current Sensing - Read voltage and amperage directly from your display without having to hire a technician or buy expensive test equipment.

Safety

- Optional 2 key press start to avoid accidental starting.
- Set max programmable temperature to help prevent overfires due to operator error.
- Configure an additional output to run an automatic dialer to call you if there is an error in the firing.

New Menu Layout

With the exception of the new green 14 segment LED display, you will notice that the board and all of the function keys look exactly the same. All of the changes have been made in the “MENU” key.

There are now 4 Option Headings under the “MENU” key. They are:

- “SET” Settings
- “dIAG” Diagnostics
- “CNFG” Configurations
- “- - - -” Other

For an overall look at the menu tree of each of these features see Appendix 1.

Since we have added a current sensor to all new KilnMaster controllers we need to show them in the wiring diagrams. Appendix 2 lists all of the new wiring diagrams. If you are adding a KilnMaster 700 Board to kiln with a previous board version you may not have access to the current sensing features.

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GENERAL PROGRAMMING TIPS

To access the Menu Headings press “MENU”.

You can toggle through the Menu Headings by continuing to press the “MENU” key. When you reach the one you wish to access press “ENTER”. This will take you to the first Option in that submenu. As before, if you want to toggle through the various Options under the selected Heading, press “MENU”. When you reach the Option you wish to access, press “ENTER”.

When you select an Option you are asked to either:

- Toggle the Option ON/OFF
- Enter a Value
- Choose a Value

To toggle Options On/Off press the “1” key. When you get to the desired setting press “ENTER”.

To enter a value such as a Delay time or an Alarm temperature, input the value and press “ENTER”.

To select a value press the “MENU” key until your selection is displayed and then press “ENTER”

WRITE YOUR OWN CONEFIRE PROGRAM

This new feature on the 700 Board allows you to utilize the cone correlation benefits of ConeFire Mode coupled with the flexibility of Ramp/Hold Mode. To use Cone Correlation to calculate your final temperature during a Ramp/Hold program press “CONE TABLE” instead of entering a temperature for your final heating segment. Enter the Cone Value you would like to correlate and press Enter.

OPTIONS

“SET”

“SET”, or Set-Up, is where all of the commonly used Options are located. The following Options are available under the “SET” Heading menu.

PRHT (Preheat)

This feature allows you to toggle the Preheat feature on and off. The Preheat feature allows you to enter an amount of time to hold at 180 °F prior to running a ConeFire Program. This feature is recommended when firing large, thick walled, or potentially damp ware. When the feature is toggled “ON”, it will prompt you to enter a hold time value after the ConeFire key is pressed.

COOL (ConeFire Controlled Cooling)

This feature allows you to add a 1 segment cooling program to the end of a ConeFire program. When it is toggled “ON” it will prompt you to enter a “Rate”, “Temperature”, and “Hold Time” after you enter the hold time for a ConeFire program. This is helpful when trying to achieve certain glaze effects.

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CHG ° (Change from Fahrenheit to Celsius Scale)

The controller can display temperature values in Fahrenheit or Celsius. If the scale is set to display in Celsius an LED dot will illuminate in the bottom right hand corner of the display. To select a new scale press "ENTER" and it will automatically toggle to the alternate scale. "°C" represents Celsius and "°F" represents Fahrenheit.

16-S (16 Segment)

This option links the Ramp and Hold programs stored in memory positions 5 and 6 to create a 16 segment program. Normally a program is limited to 8 segments. This feature will only display when a ConeFire Mode program or the number 5 user program is loaded. (See your manual for programming instructions).

dIAG (DIAGNOSTICS)

"dIAG", or Diagnostics, is where all of the diagnostic tools are located. The following Options are available under the "dIAG" menu.

ERTF (Err Temp & Time of Last Firing)

This feature will display the temperature and the point of time in the firing at which the last Error occurred. Often times this information is helpful in troubleshooting the problem which created the error. Once "ERTF" is selected it will first flash the temperature at which the error occurred and then the time into the firing it occurred. The ERTF information will also appear automatically when an error alarm sounds and the program is terminated. Pressing any key will show the temperature and elapsed time at which the error occurred.

VOLT (Voltage)

This feature is used to test the voltage supply to your kiln. It tests the voltage first with the elements off, "No Load" and then again with the kiln on, or "Full Load". Select "VOLT" from the "dIAG" menu after the "NOLd" reading is displayed press "ENTER" to receive the "FLLd" reading.

The power to the kiln will be switched on for a brief moment when the voltage under load is checked, **BE SURE THAT THE CONTROL BOX AND KILN LID ARE CLOSED BEFORE YOU USE THIS FEATURE TO AVOID ELECTRICAL SHOCK.**

Our technicians can use this information to help you troubleshoot voltage related problems over the phone. When the voltage readings appear on your display write them down. Often times voltage related problems can happen only at certain times of day so try to obtain the readings at the same general time your kiln would be firing.

AMPS (Amperes)

This is probably the most useful diagnostic tool available to you. All KilnMaster kilns produced after 2006 are equipped with a current sensor in the control box. This allows us to test the current of each output to the kiln. This is very helpful in determining if a relay or element needs replacing. **BE SURE THAT THE CONTROL BOX AND KILN LID ARE CLOSED BEFORE YOU USE THIS FEATURE TO AVOID ELECTRICAL SHOCK.**

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AMPS (Amperes) continued

When you select “AMPS” under the “DIAG” menu it will give you an ampere reading for each output of the kiln (except the accessory and safety output). Which elements these outputs control will vary by model. If your kiln uses only 1 or 2 outputs it will still give you 3 readings but the unused outputs will give a reading of zero.

LEd (LED Display)

This feature when activated lights up all of the segments in the LED display. This is helpful in locating any segments in the display that may have gone bad and may explain why some indicated readings are not correct.

bd T (Board Temperature)

The electronics on the controller’s circuit board may be damaged if the board exceeds 160 °F. This should not occur under normal conditions. However, if the kiln is located in a small enclosure with poor ventilation or in areas where the temperatures are unusually hot, it is possible. Using this feature will tell you if your controller temperature is approaching potentially harmful levels.

If you find that your board temperature is consistently over 150 °F you may want to consider improving air circulation to the kiln room.

SW V (Software Version)

At Skutt we are continually working on ways of improving our products. This feature will indicate the software version your controller is using.

OUTS (Output Test)

There are 4 outputs that can be used on the board. There are 3 designated for elements and 1 designated to run an accessory. This feature allows you to test each output individually to see if it is operating correctly.

When activated this feature will test each output beginning with output 1 and ending with output 4. It will cycle each output on for approximately 8 seconds. To see if the elements are cycling on you can place a small piece of paper on each element. If the paper is burned than the element came on.

BE SURE THAT THE CONTROL BOX AND KILN LID ARE CLOSED BEFORE YOU USE THIS FEATURE TO AVOID ELECTRICAL SHOCK.

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CNFG (CONFIGURATION)

CAUTION: BE SURE TO CONSULT WITH A SKUTT TECHNICIAN BEFORE MAKING ANY CONFIGURATION SETTING CHANGES. UNADVISED CHANGES CAN CAUSE PERMANENT DAMAGE TO YOUR KILN AND THE WARE INSIDE IT.

“CNFG”, or Configuration, is where all of the controller configuration tools are located. The following Options are available under the “CNFG” menu.

ERCd (Error Codes ON/OFF)

Error codes are designed to help protect you, your kiln, and your ware when something goes wrong with the firing. There are times however where you may wish to try a new technique which would trigger an error code under normal conditions. When error codes are turned off the following codes are disabled. For a complete list of Error Codes see Appendix 3

- Error 1 - Terminate firing when kiln temperature increasing at a rate slower than 12 °F/hr.
- Error 2 - Kiln Temperature 50 degrees above hold temperature.
- Error 3 - Kiln Temperature 50 degrees above hold temperature.
- Error 4 - Kiln Temperature 50 degrees above previous hold when ramping down.
- Error 5 - Kiln Temperature 50 degrees below traveling set point when ramping down.
- Error D - Kiln Temperature 50 degrees above traveling set point.

TCOS (Thermocouple Offset)

This feature allows you to calibrate the thermocouple when it is reading consistently and predictably incorrect. It is extremely important to consult with a Skutt technician before making thermocouple offset adjustments. Incorrect adjustments to the thermocouple offset can cause permanent damage to your kiln. Adjustments made to the thermocouple offset will affect all Ramp and Hold and ConeFire Programs.

If you are experiencing problems with ConeFire Mode, check to see if the ending temperature and hold time of the programs you are running have not been significantly altered from the factory programs before making thermocouple offset adjustments.

Access the “TCOS” setting through the “CNFG” menu. The display will flash “ °F05 “ alternately with the current offset setting. “ °F05 “ represents degrees Fahrenheit Offset. If the controller was programmed to display in Celsius the “F” would be replaced by a “C”. If there is currently an offset entered this could be the problem. To be safe make adjustments in small increments and then run a test fire with self supporting cones.

To Make The Kiln Fire Hotter

Enter “00” followed by the number of degrees you wish to offset the thermocouple. Press ENTER.

Ex: “0010” makes the kiln fire 10 degrees hotter.

To Make The Kiln Fire Cooler

Enter “90” followed by the number of degrees you wish to offset the thermocouple. Press ENTER.

Ex: “9010” makes the kiln fire 10 degrees cooler.

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ZONE (Zone Control Options)

Zone control is a feature that comes standard on the Production line of GlassMaster kilns. This line includes the following models: GM1227, GM1018, and the GM818. Zone Control is feature that allows the controller to independently fire sections on multiple section kilns to ensure even temperature top to bottom.

There are 3 optional setting configurations for Zone Control which can be accessed through the “ZONE” feature under the “CNFG” menu..

- A. “NOTC”
- B. “Pid”
- C. “SHTO”

“NOTC” (Number of Thermocouples)

Your kiln should be properly programmed for the correct number of thermocouples before it leaves the factory. A GM818 and GM1018 should be set at 2 and the GM1227 should be set at 3. All other GlassMaster kilns will be set at 1 thermocouple. You cannot set a kiln to fire in more than one zone unless it is configured in the factory as a Zone Control kiln. If you try you will receive a “FAIL” error code.

To change the number of zones on a zone control kiln access the “ZONE” setting through the “CNFG” menu then use the menu key to toggle to the “NOTC” feature and press “ENTER”. The controller will display the current “NOTC” setting. Enter the desired value and press “ENTER”.

“Pid” (Proportional Integral Derivative)

PID is a zone control setting that uses the center section elements to help the bottom and top sections when necessary. In most kilns the center section is usually the hottest section. The PID option is designed to help speed up the firing when the top or bottom section is cooler and lagging behind the other sections.

When the top or bottom section is on full power (it is lagging behind), then output 2 comes on as a percentage of output 1 or output 3. The middle section will fire hotter and help the top and or bottom section catch up. The percentage can be set from 0 (zero) to 150. It is factory preset at 85%.

“SHTO” (Shutoff)

Shut off is a zone control feature that attempts to make firings more consistent. For 2 and 3 zone controllers, when shutoff is “off”, the controller uses the average of all three thermocouples to transition from one segment to the next or to shut off the kiln. When “on” the kiln turns off, or transitions, when any one of the thermocouples reaches temperature. FOR ALL DOWN RAMPS, the controller transitions from one segment to the next as if shut off “SHTO” were turned ON, i.e., when any one section reaches the next segment temperature.

Id (Control Interface System ID)

CIS is an optional accessory that allows you to program and monitor multiple kilns from a PC. Each kiln hooked up to the CIS system needs to be identified with a unique number so the software can distinguish it from the other kilns. To set the identifying CIS number for each kiln access the “Id” setting through the “CNFG” menu, select a number between 1 and 99 and press “ENTER”.

If you are interested in purchasing a CIS system for your kiln, contact Skutt or your local distributor.

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OUT4 (Output 4 Settings)

There are 3 standard outputs, 1 safety output and one accessory output on your Skutt KilnMaster controller. The accessory output is designated as Output 4 and can control a number of optional accessories including vents, alarms and autodialers. Output 4 will cycle these accessories on and off at different times depending on the program you are running and the way you configure it under the “OUT4” feature setting. There are 5 different options for OUT4.

Note: “ALR4” is the factory default setting. When you access the Output 4 feature the feature options will appear in the order listed below. The first option listed is not necessarily the current setting.

“OP A” (Option A)

When option A is selected Output 4 will turn on during when a ConeFire Mode program is started. When the program has run and the kiln has cooled to 150 °F output 4 will turn off.

When a Ramp/Hold program is entered it will ask whether you want the fan (or other accessory) on for each segment you program. After you enter the hold time for each segment the display will show “FAN” along with the number of the segment you are programming. Alternately it will flash the current setting, either “OFF” or “ON”. To change the setting toggle it with the “1” key and press “ENTER” to select that setting.

“OP b” (Option B)

During a ConeFire program Output 4 will turn on when “START” is pressed. It will then turn off at 1450 °F. It will turn back on when the kiln is cooling and the temperature drops below 1000 °F. It will then turn off when the kiln cools to 150 °F.

When a Ramp/Hold program is entered it will ask whether you want the fan (or other accessory) on for each segment you program. After you enter the hold time for each segment the display will show “FAN” along with the number of the segment you are programming. Alternately it will flash the current setting, either “OFF” or “ON”. To change the setting toggle it with the “1” key and press “ENTER” to select that setting.

“OP C” (Option C)

When Option C is selected Output 4 does not come on during any portion of a ConeFire Mode program. When a Ramp/Hold program is entered it will ask whether you want the fan (or other accessory) on for each segment you program. After you enter the hold time for each segment the display will show “FAN” along with the number of the segment you are programming. Alternately it will flash the current setting, either “OFF” or “ON”. To change the setting toggle it with the “1” key and press “ENTER” to select that setting.

“ALR4” (Alarm 4)

This is the factory default setting. If Output 4 is not being utilized this is the setting that should be selected. This feature can also control an external alarm or autodialer to initiate if an Error Code is generated or if the internal temperature of the kiln reaches the temperature programmed for the ALARM setting of the program. To deactivate the alarm press “ENTER”.

“PCT” (Percent On)

Output 4 can be programmed to be on for a percent of the time output 2 is on. This option is used when output 4 controls floor or lid elements. To ensure output 4 stays off at all times, use this option and set the percentage to zero. The percent can be set from 0 to 150. There are currently no Skutt Kiln designs that can utilize this feature.

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MAX (Maximum Programmable Temperature)

The Maximum Programmable Temperature setting is a great feature to use when other people may be programming the kiln. It helps protect against an overfire by not allowing the programmer to input any value over the designated limit. To set your firing limit access the "MAX" setting through the "CNFG" menu, enter your desired limit and press "ENTER".

2KEY (2 Keys to Start Kiln)

The "2KEY" feature allows you to set the controller so it takes 2 key presses to start the kiln. This helps protect against accidentally starting the kiln. When activated it will be necessary to press "START" then "ENTER" to start the program. To activate this feature access the "2KEY" setting through the "CNFG" menu, use the "1" key to toggle the setting to "ON" and press "ENTER". Now when you press "START" to begin the program you will see "- - -" on the display. At this point press "ENTER" to begin the program.

dTCT (Detect Current Sensor Rating)

This feature indicates the maximum amperage rating for the current sensor installed in your kiln. The current sensor is the hardware installed in your kiln which allows the controller to read the current from the outputs. This feature should not be modified without consulting a Skutt technician. Changing this setting will alter how the board interprets the current signal and will cause the board to produce erroneous current readings.

RSET (Reset To Factory Settings)

Sometimes it is difficult to diagnose a kiln problem when factory settings have been modified. To reset the factory settings access the "RSET" setting through the "CNFG" menu and press "ENTER". The following settings will be restored.

1. Error codes on
2. TC offset set to zero
3. MGF times and temperatures set to default.
4. Firing program is set to ramp hold user 1.

" - - - - " (OTHER)

The features contained in this menu heading are accessible only through direct contact with a Skutt technician. If you change from a Type S thermocouple to a Type K thermocouple or vice-a-versa you will need to change a feature setting in this menu section.