MODEL 28 CONEPUTER®
digital kiln control

INSTALLATION AND OPERATING INSTRUCTIONS

manufactured by:

THE EDWARD ORTON JR. CERAMIC FOUNDATION
6991 OLD 3C HIGHWAY
WESTERVILLE, OH 43081

CONGRATULATIONS!

Congratulations on your purchase of the Orton Coneputer® electronic kiln control system.

The microprocessor-based Model 28 Coneputer® is an intelligent digital control system intended for the user who wants to fire to a specific temperature and then hold or soak at temperature. It is preprogrammed to automatically determine and set tuning constants. You set only limit temperature and hold time and press start - Coneputer® does the rest. You get closer control and precision results without overshoot and without tedious tuning.

Although the Coneputer® is completely automatic after start-up, never leave your kiln unattended - check it periodically throughout the heating process.

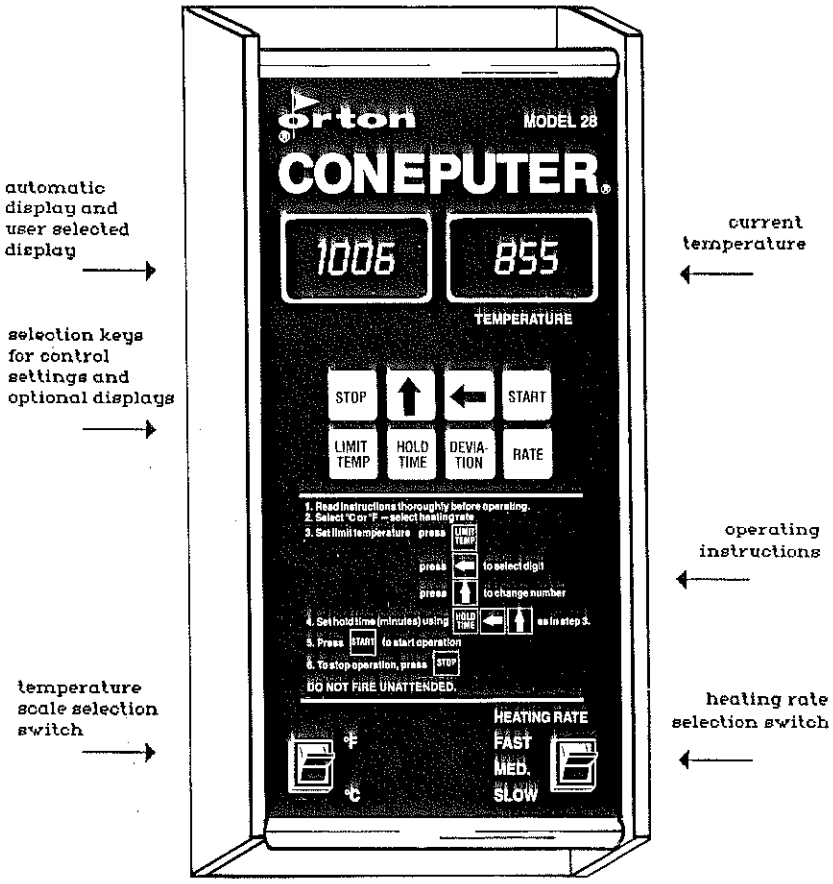
Among the special features of the Orton Model 28 Coneputer® are audible and visual alarms to alert you in case a setting error occurs, if there is a broken thermocouple, in case of overheating or if the kiln temperature does not increase after start-up. This lets you solve the difficulty and get back to work without delay. Visual displays also indicate operating status of the Coneputer® during a run. And, in addition, your Model 28 Coneputer® will automatically shut-off in case of power interruption.

The Coneputer® is easy to install as well as easy to use. This step-by-step installation and operating guide, when used with your kiln instruction manual, is important if you are to learn how to prevent accidents and get the most out of your kiln and the Coneputer®.

Please read this entire manual and become familiar with all of this material before installing, testing or operating your Coneputer®.

INDEX - MODEL 28 CONEPUTER® MANUAL

DIAGRAM – MODEL 28 CONEPUTER® FRONT PANEL



INSTALLATION INSTRUCTIONS

Before beginning to install the Coneputer®, please read these installation instructions completely.

(Note: a good ground is required for your safety and proper operation of the Coneputer®).

1. Turn off the circuit breaker for your kiln.

2. Unplug your kiln from the wall.

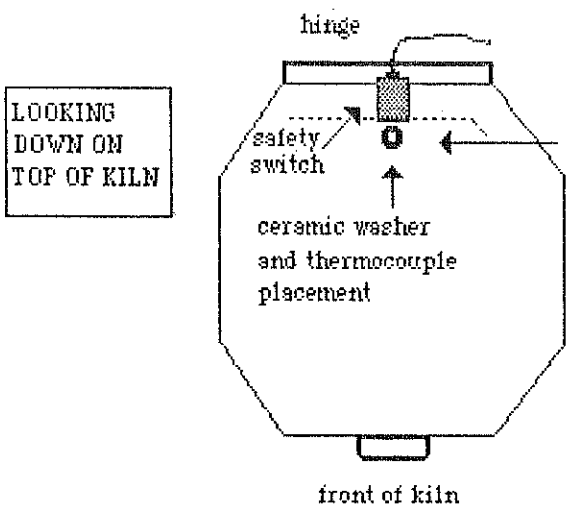
3. Attach the Coneputer® wall panel box to a wall in your kiln room using the four screws provided.
   Do not mount directly above your kiln and keep at least 2 feet away from your kiln in all directions.
   Mount at or slightly above eye level so displays are easy to read and keys are easy to reach.
   Make sure the 6 ft. power cord that is provided will reach to your intended receptacle (use the same receptacle you previously plugged the kiln into).
   Make sure your kiln power cord will reach the receptacle in the side of the Coneputer®.
   Do not actually plug in the kiln until Coneputer® installation is complete.

Note - If you have concrete block walls, install a piece of plywood to mount your Coneputer® on.

4. Mount lid safety switch and thermocouple onto your kiln lid. (See figure 1, next page).

   a. Check to make sure your kiln is level.
   b. Measure in from the edge of your kiln lid (hinged side) the thickness of your kiln wall plus 1".
   c. Drill a 1/4" hole through your kiln lid at the point you have marked.
   d. Measure the thickness of your kiln lid, if it is less than 3" thick, you will need to use the ceramic washer provided - see steps e through i. If your lid thickness is 3", skip to step j.
   e. Place the ceramic washer so the hole in it matches the hole you have drilled in your kiln lid.
   f. Trace around the washer.
   g. Clean the dust off of your kiln lid.
   h. Apply 1/8" thick cement provided to the bottom of the washer.
   i. Stick washer in place, pressing down firmly till excess cement begins to squeeze out around the edges - allow to dry 24 hours.
   j. Locate the metal lid safety switch directly behind the thermocouple so the front of the switch points towards the thermocouple, the connector plug is toward your lid hinge, and the word "rear" is up and to the back of the kiln.
   k. Mark the position of the lid safety switch.
   l. Clean the dust off of your kiln lid.
   m. Apply 1/8" thick coating of cement to bottom of safety switch.
   n. Stick switch in place and press firmly until excess cement begins to squeeze out around the edges - allow to dry 24 hours.
   o. Connect the orange wire assembly to the plug on the safety switch.
   p. Insert the thermocouple into the kiln through the hole in the kiln lid. Double check inside your kiln. The thermocouple should be located about one inch from your back kiln wall. The tip (bead on the end of the thermocouple) should protrude into the kiln about 3/4" - 1". The wires on the end of the thermocouple (bead end) should be separate and fully extended.

FIGURE 1



TO LOCATE THERMOCOUPLE AND SAFETY SWITCH

measure in from lid edge thickness of kiln wall plus 1"

drill a 1/4" hole through lid

if lid less than 3" thick, affix ceramic washer

locate safety switch directly behind thermocouple hole so the word "rear" is up and to the back of the kiln

cement lid safety swtich in place with plug toward hinge, let dry

plug in orange wire to connector on end of safety switch

insert thermocouple so tip protrudes 3/4" - 1" into kiln

5. If you have Kiln-Sitter®, place the Pyrometric Bar provided under the sensing rod . This Bar is a number 10 and it will allow the Kiln-Sitter® to serve as an extra back-up to the Coneputer®. This Bar will last many, many firings (depending on how hot you fire) before it will have to be replaced. Or, if you choose, you may remove the cone supports and block up the sensing rod with a piece of refractory material.

6. Plug your kiln into the receptacle in the side of the Coneputer® panel box.

7. Plug your Coneputer® into the wall receptacle where you previously plugged in your kiln.

Make sure none of the cords come in contact with the kiln. If necessary, loop over a hook placed in ceiling or on wall. Cords or wires should not hang above the kiln lid.

8. Set your kiln switches on high or to the highest setting they have so that the Coneputer®, rather than the switches, will control the power to the kiln.

9. Turn the circuit breaker for your kiln back on.

10. Following the operating instructions, turn the Coneputer® on.

11. Test fire your kiln and Coneputer® with the cones provided. See reference section.

IF YOU HAVE ANY QUESTIONS OR PROBLEMS INSTALLING THE CONEPUTER®, WE RECOMMEND YOU HAVE AN ELECTRICIAN OR QUALIFIED KILN REPAIR PERSON INSTALL THE CONTROL SYSTEM FOR YOU.

YOU MAY ALSO WISH TO HAVE AN ELECTRICIAN OR QUALIFIED KILN REPAIR PERSON CHECK YOUR WORK BEFORE TURNING ON ANY POWER.

TURNING ON THE CONEPUTER®

After loading your kiln, move the toggle switch located on the side of the Coneputer® to the ON position. This will supply power to your kiln and the Coneputer®.

The Coneputer® will then light up and begin temperature indication. We call this the "idle" mode. In this mode, the left display will have a bright readout and show the limit temperature setting as zero (0) when it is just turned on. The right display will have a dim readout and show the temperature inside the kiln at that time.

The Coneputer® will not read temperatures accurately below 158°F (70°C). However, it will provide accurate readings between the operating temperatures of 212°F (100°C) to the Coneputer® limit temperature.

°C/°F READOUT SELECTION

Select your preferred temperature readout (°C or °F), by moving the lower left paddle switch to the desired position. Most of us will probably select and use the same readout scale each time we fire - doing so will help us become familiar with our kiln's heating rates and firing patterns.

HEATING RATE SELECTION

Next, select your **heating rate** based on the materials and process you are using and the heat treatment desired. Choose from fast, medium or slow using the lower right paddle switch.

Fast will produce the fastest rate of increase possible for your kiln. Generally, a faster rate will reduce oxidation. Medium will produce a controlled heating rate not to exceed 5.4°F/minute (3°C/minute) or 324°F/hour (180°C/hour) up to the limit temperature. Slow will provide a controlled heating rate not to exceed 1.8°F/minute (1°C/minute) or 198°F/hour (60°C/hour) up to the limit temperature.

Note that most kilns have an ever decreasing rate of heating and slow down at higher temperatures. Most kilns will not maintain a medium rate above about 1830°F (1000°C). Most kilns will be able to maintain a slow rate throughout the firing.

For more on fast firing, temperature measurement and thermocouple performance, see page 12.

SETTING LIMIT TEMPERATURE and HOLD TIME

Next, select your limit temperature by depressing the touch sensitive **limit temp** key. Use the arrow which points left to select the digit position, and the arrow which points up to select the value of the number. If you pass by your position or value, continue to depress the arrow keys until the information you desire scrolls by again.

To set the hold time, use the touch sensitive **hold** time key and follow the procedures explained above until your desired hold time to the nearest tenth of a minute is displayed. Your soak or hold will begin when your kiln arrives at the limit temperature you have just set. If you set in a limit temperature beyond the limit of your thermocouple, the Coneputer® will automatically return your kiln to the upper limit of that thermocouple.

The limit temperature and hold time cannot be changed during the heating process. To change the limit temperature or hold time after heating starts you must wait until the heating cycle has timed out or press stop or turn the kiln off. Changing the limit temperature or hold time during set-up will not cause the kiln to operate or harm the kiln or the Coneputer®.

STARTING THE HEATING PROCESS

To start heating, depress the pressure sensitive **start** key and your Coneputer® will begin the automatic tuning sequence. You do not have to determine or set tuning constants - proportional band, rate and reset parameters will all be set automatically during the first portion of the heating cycle. You will get a precise, smooth rise and quick stabilization at the set point with no overshoot. Pressing the start key changes the right display to a bright readout which lets us know the Coneputer® is in the heating sequence. If you have an indicator light located on the front of your kiln, this light will pulse during the tuning stage, or when the slow or medium heating rate is selected,

MAKING A PERFORMANCE TEST

Prior to using your kiln, and after reading the Coneputer® operating instructions completely, we recommend you make a performance test according to the instructions in your kiln and Coneputer® manuals. Doing this will help you become familiar with the features and operation of the Coneputer® as well as verify that all equipment is functioning properly.

If you require assistance in selecting a limit temperature and hold time, see page 13.
See page 14 for information on performance testing.

DURING FIRING

Although the Coneputer® is completely automatic after start-up, you should never leave your kiln unattended during operation. Periodically check the progress of the firing to make sure it is proceeding properly.

If it is necessary to stop the Coneputer® during the firing process, allow the kiln temperature to drop several hundred degrees before pressing the start key to restart heating. Failure to do this may result in a 9_96 (failure to heat) error message.

AUDIBLE ALARM - ERROR DETECTION SYSTEM

The Coneputer® is equipped with an audible and visual alarm system to assist the operator in the case of problems requiring operator intervention or service during the heating process. This error notification system helps prevent possible damage to furnace, furnace contents and other equipment. See page 10 for alarm system reference.

DURING HOLD TIME

When your kiln reaches your limit temperature, your Coneputer® alarm will sound for 2 seconds and the left display will switch from showing the limit temperature to showing the remaining hold time. The remaining hold time will count down each 1/10 minute to zero at which time the kiln will be shut off and the alarm will sound for 5 seconds.

DURING COOLING

During cooling, the limit temperature and current temperature inside your kiln will be continuously displayed. At shut-off, the right display will change to a dim readout so you can tell at a glance that the kiln is cooling.

RESET

Your Coneputer® is designed so it will not automatically restart if you lose power. In case of shut-down due to power interruption, it will be necessary for you to restart the Coneputer® by manually reselecting your **limit temperature** and **hold time** and pressing the **start** key.

TO STOP THE CONEPUTER®

To abort or stop heating, depress the **stop** button. This stops the heating process but does not turn off the Coneputer®. The display will continue to show the temperature inside the kiln and your preset limit temperature until the power to the Coneputer® is shut off.

To turn off the Coneputer® and kiln, turn the on/off switch located on the side of the Coneputer® panel box to the **off** position. To restart the firing, turn the on/off switch to the **on** position, reselect your **limit temperature** and **hold time** and press the **start** key.

DISPLAY WINDOWS

RIGHT DISPLAY

The right display on your Coneputer® will show the current temperature of your thermocouple when the furnace is on . During the idle mode and during cooling, the right display will have a dim readout. During heating, the right display will have a bright readout. When the thermocouple circuit is broken or open, there is no display.

LEFT DISPLAY

During heat up or until the limit temperature is reached, the left display will automatically show the limit temperature. During hold or at the limit temperature, the left display will automatically show the remaining hold time in minutes to the nearest 1/10 minute (6 seconds). During cooling, the left display will automatically show the limit temperature. During all modes of operation (except alarm sequences) the left display will have a bright readout.

At any time you may also select from optional displays for the left window by depressing the appropriate key . The display will remain until the key is released.

Hold Time Key

displays hold time in minutes to nearest 1/10 minute. (Displays 0 if none in memory).

Limit Temp Key

displays limit temperature °C or °F as preselected. (Displays 0 if none in memory).

Deviation Key

displays information as follows depending on event reached in heating cycle .
A bright display indicates a plus, a dim display indicates a minus.

while heating, until hold temp reached	displays	degrees below hold temperature
during hold	displays	± deviation in degrees since hold temp reached
after hold is complete	displays	± maximum deviation in degrees that occurred during hold

Rate Key

displays information as follows depending on event reached in heating cycle.
A bright display indicates heating, a dim display indicates cooling.

during heating or cooling	displays	current heating rate in degrees/hour
during hold	displays	will fluctuate around zero
during cooling	displays	current cooling rate in degrees/hour

QUICK REFERENCE
CONEPUTER® OPERATING INSTRUCTIONS

1. Select desired temperature display °C or °F

2. Select heating rate - fast, medium or slow

3. To set or change limit temperature or hold:

   a. limit temperature: press [limit temp] then [←] to select digit position and [↑] to change value until desired temperature is reached.

   b. hold time (minutes): press [hold] then [←] to select digit position and [↑] to change value until desired hold time to nearest tenth minute is displayed.

4. To start kiln heating cycle: press [start]

5. To stop kiln heating: press [stop]

6. To turn off Coneputer® and kiln: turn on/off switch located on side of box to off position

7. After start has been pressed, limit temp or hold time cannot be changed until heat cycle has timed out or **STOP** has been pressed or unit has been switched off.

8. Power interruptions or microprocessor failure will shut down power to relays and and thus shut down kiln. Requires manual reset and restart.

QUICK REFERENCE
DISPLAY MESSAGES

DISPLAY SEQUENCE DURING OPERATION
(in order of occurence)

LIMIT DISPLAY	TEMPERATURE DISPLAY	ALARM	MEANING	ACTION REQUIRED
continuous bright (0)	continuous dim (kiln temp)	no	Coneputer® is in idle mode - unit has been off or power was interrupted	set limits as desired
continuous bright (limit temperature)	continuous dim (kiln temperature)	no	Coneputer® is still mode, but limits have been set - numbers displayed are temp inside kiln and limit temp setting	press start to begin firing
bright (limit temp)	bright (kiln temp)	no	kiln is operating in heating cycle	none
bright (remaining hold time in tenths minute)	bright (kiln temp)	yes for 2 seconds	kiln has reached limit temperature - display shows time remaining to shut-off time, changes each 0.1 minute (6 seconds)	none
bright (limit temp)	dim (kiln temp)	yes for 5 seconds	heating and hold cycle completed - numbers displayed are limit temperature and temp inside kiln	none
continuous bright (limit temp)	continuous dim (kiln temp	no	Coneputer® is cooling- numbers displayed are limit temperature and temp inside kiln	none

QUICK REFERENCE
ALARM DISPLAY

LIMIT DISPLAY	TEMPERATURE DISPLAY	ALARM	MEANING	ACTION REQUIRED
9_94 flashing on/off	flashing on/off (kiln temp)	yes for 5 seconds	furnace unable to operate or solid state relay failed in "closed" position.	Check to make sure furnace plugged into Coneputer®, Kiln-Sitter® activated and kiln switches turned on. Service may be required.
9_95 flashing on/off	flashing on/off (kiln temp)	yes for 5 seconds	solid state relay failed in "open" state or furnace lid is ajar or lid safety switch failed.	Turn on/off switch to off position. Make sure lid is closed. Make repairs if necessary. Lid safety switch may require service.
9_96 flashing on/off	flashing on/off (kiln temp)	yes intermittent	kiln temperature did not increase after start pressed	Press stop button. Turn on/off switch to off position, check heating elements. Service is required.
9_97 flashing on/off	no display	yes-loud for 5 seconds	there is a broken or open thermocouple circuit	Turn on/off switch to off. Visually examine thermocouple tip for broken wire or check for loose connection in thermocouple circuit. Service is required.
9_98 flashing on/off	flashing on/off (kiln temp)	yes loud for 5 seconds	temperature did not decrease at proper shut off time or exceeds limit temp by 54°F (30°C)	Turn on/off switch to off position. Relays failed to turn kiln off . Coneputer® requires service. (This could also occur due to unusual operating conditions. Turn on/off switch off and on and attempt to restart
9_99	flashing on/off (kiln temp)	yes intermittent	start button pressed when limit temp not in memory or temp limit is lower than present temp	Press stop button. Set limit temperature and hold time or wait until kiln cools and restart.

SERVICE

SERVICE HOT LINE

Should you get alarms and/or messages which indicate your Coneputer® requires service, please call the service hot line number listed below. Do not return any units or parts for service without first calling the hot line.

614-895-2663
(Ask for Coneputer® Service)

THERMOCOUPLE REPLACEMENT

Replacement thermocouples are available from the Orton Ceramic Foundation. To order, return your damaged thermocouple. To purchase a spare thermocouple, please provide the name and model of your kiln when ordering.

TO RETURN YOUR CONEPUTER® FOR SERVICE

To return your Coneputer® for repair or replacement:

1. Turn the on/off switch located on the side of the Coneputer® panel box to the off position
2. Turn all kiln switches to the off position
3. Unplug Coneputer® from wall
4. Unplug kiln from Coneputer®
5. Remove thermocouple from lid safety switch
6. Unscrew the four screws which hold the wall box to the wall. Do not remove the aluminum Coneputer® box from the gray wall box or black heat sink.
7. Pack Coneputer® (connected to wall box) with thermocouple carefully in a sturdy box with plenty of packing material so unit is tight in box.
8. Ship transportation prepaid to Orton with a complete description of defect and firing problem it caused, written proof of purchase and your name address and phone number.

Upon receipt by Orton, unit will be examined and any defective or damaged parts repaired or replaced. For units not under warranty an estimate will be provided upon request before repairs are made.

See warranty, page 16, for complete details.

TEMPERATURE MEASUREMEMT

While the kiln temperature is indicated on the Coneputer® display, it is actually measured at the tip of the thermocouple which is inserted through the kiln lid and protrudes 3/4" - 1" into the kiln chamber. Due to internal drafts within the kiln, the Coneputer® temperature indication at low temperatures may fluctuate.

THERMOCOUPLE PERFORMANCE

Under normal use, in an air atmosphere, the thermocouple performance will not change noticeably, even after hundreds of firings. However, the Type "S" thermocouple should not be used in contact with carbon or in a reducing (lack of oxygen) atmosphere. This will cause it to deteriorate rapidly and give very large temperature errors. The Type "S" thermocouple will also be damaged by hydrogen and metal vapors.

One wire used in making the Type "S" thermocouple is made from platinum and the other wire is made from 90% platinum and 10% rhodium. A third platinum or platinum/rhodium wire is added to your thermocouple as a ground. This ground wire permits more accurate temperature measurement.

FIRING TIMES

The total firing time for any kiln will vary depending upon:

1. The heating rate selected
2. The total weight of the ware and kiln furniture (heavier loads take longer to fire)
3. The voltage supplied by the power company (a low voltage prolongs the firing)
4. The limit temperature and hold time selected
5. The age of the heating elements (older elements fire slower)
6. The kiln venting method and procedure (increasing ventilation increases firing time)

FAST FIRING/HEATING RATE SELECTION

Fast firing may cause warping or cracking of large and/or thick-walled pieces and previously fired ware will also more readily crack when fast fired. Bodies composed of high amounts of silica will more readily crack when fast fired. Vitrified ware (porcelain and stoneware) may more readily warp. If you encounter cracking or warping, try a slow or medium firing. A slower firing will produce more uniform heat treatment, but the slower firing will use more energy.

DETERMINING LIMIT TEMPERATURE AND HOLD TIME

If you are used to working with cone numbers rather than with time and temperatures, it may be necessary for you to perform some firing tests to determine your limit temperature and hold time settings. Here are some guidelines you may follow.

First, select your heating rate (fast, medium or slow). Next, determine what cone number you would normally fire to. Then, using the temperature equivalent chart provided as a guide, find the section for Large Cones. If you are firing on a slow rate of heating, go to the column that says 108°F (60°C). If you are firing on a medium rate of heating, go to the column that says 270°F (150°C). Find the temperature equivalent of one cone number **cooler** than your normal firing cone. This will be your limit temperature setting. For this firing, set your soak time at 40 minutes.

Test fire your kiln using a series of three pyrometric cones to record the progress of the firing. (Use your normal firing cone number as the firing cone in the series.) After the firing, review the cones and adjust the temperature and time settings as follows:

If you see that the firing cone has properly deformed, you know that your temperature and time settings are correct. If you see that the guard cone began to deform you will want to reduce your limit temperature and/or hold time settings to compensate. If you see that the guard cone has completely deformed, you will want to reduce your limit temperature setting by as much as the equivalent of one whole cone number.

Conversely, if you see the firing cone has only slightly deformed, you will want to increase your limit temperature and/or hold time settings. If the firing cone has not deformed at all, you might want to increase your limt temperature setting by as much as the equivalent of one whole cone number.

While it may take some time and require some testing until you become proficient at determining limit temperatures and soak times on your own, with experience you will soon be able to estimate accurately.

MAKING A PERFORMANCE TEST

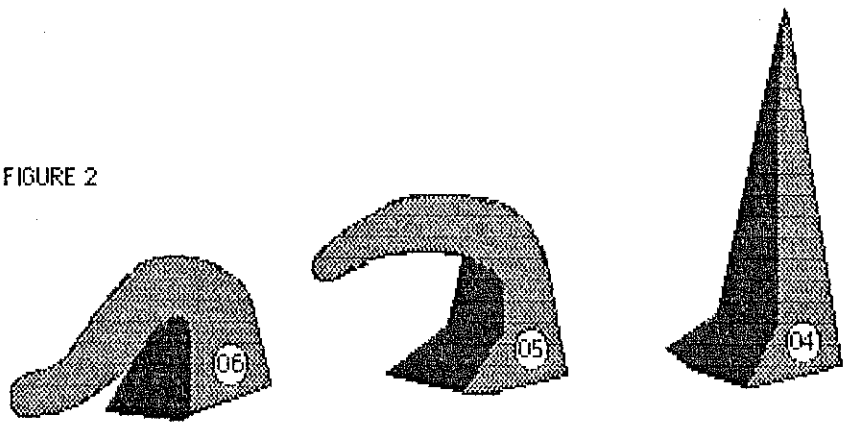
To check the performance of your Coneputer® and it's thermocouple, we recommend you test fire and use Orton Self-Supporting Cones . These easy to use cones indicate firing progress if placed where they can be observed through a peephole and accumulated sets of fired cones help determine drift in heat treatment over a period of time.

Use three cone numbers in sequence. In addition to your firing cone, use one number cooler and one number hotter than your firing cone. The cooler (guide) cone will bend first when the kiln is nearing the firing stage. The firing cone will bend next when you have reached the firing stage. The hotter (guard) cone will bend last if you are having an overfiring. We have included a set of three cones for your first test firing. These are Self-Supporting Cones numbers 05, 05 1/2, and 06.

Place these cones on the kiln shelf so they are visible through your kiln's peephole if you have one. Select a limit temperature of 1832°F (1000°C) and set your heating rate on medium. it is not necessary to enter a hold time, when none is selected, it will automatically be set at zero. Fire according to the instructions provided for your Coneputer® and kiln. Examine the cones after firing using figure 2 as a guide. The firing cone should be properly deformed and the guard cone should not have bent, however, you may see some variation in the amount of bending depending your firing conditions.

To get a picture of the heat distribution in in your kiln, place a set of cones on each shelf and test fire. Note that most kilns usually fire more uniformly at Cone 06 and hotter than they do at cone numbers cooler than 06.

FIGURE 2



After making your initial performance check, we recommend you test fire approximately every 25 firings including a set of cones of the same numbers in your firing and placing it on the same shelf and in the same general area each time and firing to the specifications above. Save these cones as records of the firing. Place them in a row on a shelf near your kiln and review them periodically to note variations or drift in successive firings.

If drift starts to occur in these single sets, we recommend you check your heat distribution by placing a set of cones on each shelf and test firing. If after firing you examine the cones and find one area of the kiln much hotter than another, it may indicate one or more heating elements are not properly functioning. This may be due to aging or there may be a loose connection.

Should your checks indicate a serious change in the amount of bending of firing cone, the most likely cause is thermocouple damage or deterioration. In that case, replace the thermocouple and retest. If replacing the thermocouple does not restore the performance to previous levels, your unit may require service. Call the service hot line.

SPECIFICATIONS - Model 28 Coneputer®

power requirements	192-250 volts AC, 50 or 60 Hz with grounding, 30 or 50 amp 96-130 volts AC, 50 or 60 Hz with grounding, 50 amp
sensor	thermocouple - accepts Type K or Type S
control action	proportional band, rate and reset with TST™ total self-tuning, no adjustments available or needed
output	hooks directly to kiln elements, drives elements
status indicators	LED displays right display - current temperature in furnace left display - user selected: hold time, limit temp, maximum control deviation, heating rate
control range	room temperature to 2300°F (1260°C) - Type K Thermocouple room temperature to 3002°F (1650°C) - Type S Thermocouple 0 to 999.9 minutes -hold time
operating ambient temp	0 - 55°C
alarms	thermocouple fail protection, overheat alarm, fail to heat alarm, begin cooling cycle, power interruption, solid state relay failure alarm, heating element fail alarm, lid ajar/open alarm, lid safety switch fail alarm
scaling	°C or °F - user selected
connections	12 pin molex plug
T/C linearized to	± 0.1 degrees C
resolution	1.0 degree
repeatability	1.0 degree
control deviation	± 2°C (normal operation @ 1832°F/1000°C)
common mode rejection	120 decibels
operator interface	8 position sealed keypad, dust and moisture resistant 2 paddle switches, 2 four digit LED displays
description	12" x 8" x 8" wall mount system with receptacle, 6 ft. power cord, 6 ft. thermocouple extension and lid switch assembly
mounting	4 screws
approx. shipping weight	25 lbs.
heat rates	fast - maximum rate possible med - 324°F (180°C) per hour limit slow - 108°F (60°C) per hour limit

LIMITED WARRANTY

The Edward Orton Jr. Ceramic Foundation warrants this Coneputer® kiln control and power switching unit to be in good working order for a period of 1 year from the date of purchase from Orton. Should this product fail to be in good working order at any time during this 1 year period, Orton will, at it's option, repair or replace this product as set forth below.

The liability of Orton is limited to replacement and/or repair of the Coneputer® at it's factory of any unit that does not remain in good working order, under normal operating conditions. Repair parts or replacement products will be furnished on an exchange basis and will be either reconditioned or new. All replaced parts and products become the property of Orton.

Limited warranty service may be obtained by delivering the unit during the 1 year warranty period to **The Edward Orton Jr. Ceramic Foundation, 6991 Old 3C Highway, Westerville OH 43081** and providing written proof of purchase and description of defect or problem. Buyer must insure the unit or assume the risk of loss or damage in transit, prepay shipping charges to the service location, use the original shipping container or equivalent, and enclose payment of $7 to cover packing and shipping charges.

Service may also be obtained on units no longer under warranty by returning unit prepaid to Orton with a description of the problem, and buyer's name, address and phone number. Buyer will be contacted with an estimate of the service charges before any work is performed.

All express and implied warranties for this product including the warranties of merchantability and fitness for a particular purpose are limited in duration to a period of 1 year from the date of purchase and no other warranty, whether expressed or implied, will apply after this period.

This warranty does not apply to the thermocouple or lid switch assembly and does not apply to any damage resulting from:

1. Overfiring (melting of materials being fired) regardless of the cause of the overfiring
2. Operation beyond electrical rating including overloading or shorts in user connected equipment
3. External sources including chemicals, heat abuse and improper use.
4. Improper or inadequate maintenance by the user
5. Parts or equipment not supplied by Orton
6. Unauthorized modification or misuse
7. Operation outside environmental specifications
8. Improper installation

Units returned for service where no defect is found will be subject to a service fee.

If this product is not in good working order as warranted above, your sole remedy shall be repair or replacement as provided above. In no event will Orton be liable to you for any damages, including any lost profits, lost savings or other incidental or consequential damages arising out of the use of or inability to use such a product even if Orton has been advised of the possibility of such damages, or for any claim by any other party.

The above limitation of liability does not apply in the event that any Orton control product is determined by a court of competent juristiction to be defective and to have directly caused bodily injury, death or property damage; provided, that in no event shall Orton's liability exceed the greater of $1000 or the purchase price of the specific product that caused such damage.

If you are not satisfied with the performance of the Coneputer® or the conditions of this limited warranty, return the Coneputer® in good working condition, transportation and insurance prepaid, within 30 days to **The Edward Orton Jr. Ceramic Foundation, 6991 Old 3C Highway, Westerville, OH 43081** and your purchase price will be refunded.