



FOR OVER 50 YEARS... THE KILN TECHNOLOGY LEADER

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## GEMINI CONTROL FOR B SERIES KILN

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### WHERE ARE THE GEMINI CONTROLS USED

The new L & L Kiln Mfg. Co., Inc. Model B kilns (with a “C” suffix in the model number) are equipped with two Gemini cone type controls. They are designed to shut off the power to the elements when a selected cone has bent at its designated temperature. For B Series kilns that have the DYNATROL electronic program control both these Gemini controls are used as back up safety controls. In B models without electronic controls (the Manual Control or the Automate II turn up control) one is used as a primary shut off control and the other one is used as a safety back up control. (It doesn’t matter which is used for which function).

The two Gemini controls are wired in series for added safety.

### GENERAL CONSIDERATIONS

The cone value used is always guess work. Keep in mind that the control will usually shut-off at a higher temperature than the cone value used.

The Gemini controls are designed with an easy to adjust calibration screw. See Fig. 7

**It is strongly recommended to perform the first firing procedure with an empty kiln.**

**The instructions should be carefully followed as it is possible that shipping may have jarred the Gemini controls out of adjustment.**

**Be sure to use the small cones not large cones.**

### CAUTIONS

#### **GENERAL**

The Gemini cone type controls are a great help in obtaining proper firing of your kiln when properly maintained and adjusted. The Gemini controls are not intended to perform as absolute fail-safe shut off devices or to cover all eventualities or hazards. The kiln should not be left unattended past the firing time. Failure of the cone devices, if not observed, may result in kiln meltdown.

#### **SOME CAUSES OF FAILURE**

1. Ware falling against the cone supporting tube end.
2. Greenware explosion with resulting particles affecting the control action.

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- Using the wrong cone.

## **SAFETY CAUTIONS**

- Use dark safety glasses to protect your eyes when looking into a peephole. Very hot air and steam may be exiting from the peephole so avoid placing your hands or other parts of your body close to the peephole.

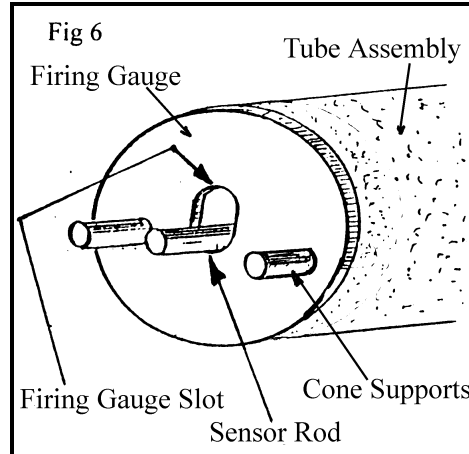
## **WHEN USING AS A SAFETY BACK UP DEVICE**

One of the Gemini controls (or both Gemini controls if you have the DYNA-TROL) will be used as a back up safety device meant only to shut off if the first Gemini or the DYNA-TROL doesn't work. USE A CONE IN THE BACK UP GEMINI(S) 2 to 3 CONES HIGHER THAN YOU INTEND TO FIRE TO. For instance, if you are firing to cone 05 put in a 03 or a 02 cone. Only if you are firing to Cone 10 (the limit of the kiln) should you use a duplicate Cone 10 in the Gemini back up. By putting in a higher cone you will avoid the kiln from shutting off prematurely before the main Gemini (in the case of the Manual control or Automate II) or the DYNA-TROL shuts down the kiln

## **TEST PROCEDURE**

**CAUTION: Always turn off switches and main power to the kiln before performing any test or any procedure any time you must place hands in the kiln or into the instrument panel. THERE IS A DANGER OF SEVERE ELECTRICAL SHOCK WHICH COULD RESULT IN DEATH OR INJURY.**

- Place firing gauge in position. The firing gauge is the round disc with three holes in it shown in figure 6. The cone support rods should be used to pin the firing gauge flush against the ceramic tube while performing this test. (**NOTE: This firing gauge is for adjusting the control only. It is not to be used when firing the kiln.**)



- Attach a light thread, such as sewing thread, to sensing rod end inside of the kiln. **DO NOT USE WIRE (BECAUSE OF ELECTROCUTION HAZARD).** The length should be long enough to allow handling the thread without placing hands into the kiln.
- Turn on power and switch your kiln on. **Electronic controls should be on if included and set to call for heat.**
- Gently pull up thread to move the sensing rod to the up position. See Figure 6B. In this position the elements should start to heat. (An audible "click" of the relays should be heard when moving the sensing rod from the up position to the down position and vice-versa).
- Allow the sensing rod to drop to the down position as shown in figure 6A. The power to the elements should then be shut off. Observe the "click".
- Adjust with calibrating screw if out of adjustment. See "Fine Calibration".
- Remove firing gauge and keep for later tests.
- TEST BOTH CONTROLS.
- Proceed with "First Test Firing" with empty kiln.

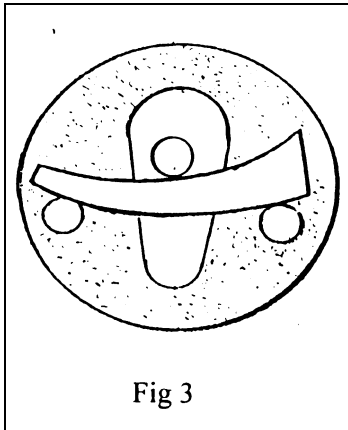
**NOTE:** If above is okay then the Gemini control is in factory adjustment but may require "Fine Calibration" to suit your needs. Need for "Fine Calibration" may be determined after firing to see if you should need "soft", (cooler), cone or "hard", (hotter), bending of your cone. This

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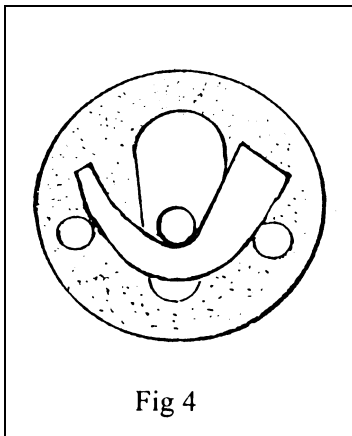
adjustment may be performed by adjusting the Calibrating Screw. (See Fine Calibrating ).

## **HOW SHOULD THE CONE LOOK AFTER THE KILN IS FIRED?**

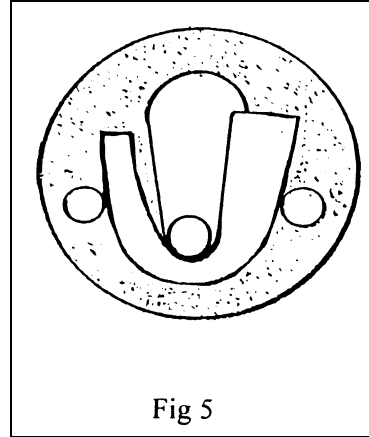
### **UNDERFIRED:**



### **CORRECT:**



### **OVERFIRED:**

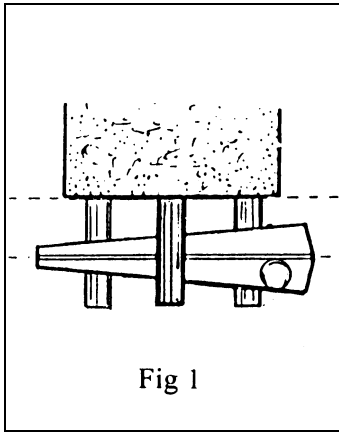


## **FIRST TEST FIRING**

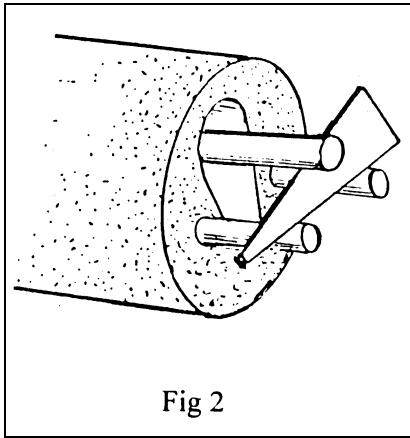
1. Remove firing gauge and keep for later use.
2. Prepare a thin solution of high fire kiln wash and store in a small bottle such as a nail polish bottle with its brush. The bottle may be cleaned with nail polish remover, (acetone). Thin kiln wash with water to the consistency of heavy cream.
3. Apply kiln wash in a thin layer onto the cone supports and on the sensing rod at points of cone contact. **Do not allow kiln wash to be placed on the ceramic tube or cone.** The purpose of the kiln wash is to prevent the cone from sticking to the cone supports and sensing rod and thus affecting the sliding action necessary when the cone is bending at its maturing point. Sticking of the cone to the cone supports will cause inaccurate, (hotter ), results and can be serious. If the cone or the rod sticks too much an overfiring could result.
4. Remove the kiln wash between firings and apply fresh kiln wash at each firing. Cone supports may be temporarily removed for this purpose.
5. Allow the kiln wash to dry and place test cone in position as shown in Fig. 1 and Fig. 2.

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## TOP VIEW:



## SIDE/FRONT VIEW:



6. It is important not to allow the cone to contact the ceramic tube, as this may result in inaccurate results.
7. Use only small cones or bars in the Gemini controls.
8. First fire should be with an empty kiln. We recommend using a witness cone placed for good visibility from a peephole. For this purpose, one 020 cone will be okay. See Fig. 8. Better are plaques of three witness cones, as in figures 8, 9, and 10.
9. Lower lid and start firing kiln following the kiln instructions.
10. Cone 020 should mature in about one hour or so. Keep track every 10 minutes or so, more often as the temperature rises. Check against test cone.
11. Observe test cone. Use dark glasses for eye protection and ability to see the

- cone. At this low level, (about 1100 F or so). clear glasses may be best.
12. Fire until kiln shuts off.
13. When kiln cools, check the cone in the Gemini to determine accuracy of firing. The cone should be bent to approximately 90°. Fig. 6B.
14. If a further adjustment is required, proceed as outlined in "Fine Calibrating".
15. NOTE: In kilns with two Gemini's, proceed as above with both units. Try to obtain the same cone bending in both Gemini's.

### **NOTE CONCERNING THE TYPE OF CONES TO USE**

Use either the small triangular cones or cone bars. Never use the large standing type cones.

## **WITNESS CONES**

1. Place firing cone in center position, a cone one value less on left of firing cone, and a cone of one value higher on right of firing cone.
2. Place where visible through peephole. Check visibility before firing. Use dark glasses for safety.
3. **CAUTION:** Use dark safety glasses to protect your eyes when looking into a peephole. Also very hot air and steam may be exiting from the peephole so avoid placing your hands or other parts of your body close to the peephole.

# **GEMINI SHUT-OFF CONE CONTROL FOR B SERIES KILNS**

## **FINE CALIBRATING**

1. For this procedure, it is not necessary to use the Firing Gauge. Your testing has determined that the Gemini is in general adjustment.
2. Turn kiln power off by disconnecting main power to avoid electric shock.
3. Remove the front/top cover of the instrument panel to access calibrating screw(s), ( Fig. 7). You may need to loosen the two screws above and below the micro switch to allow you to adjust the micro switch.
4. Assuming the Gemini has been determined to be within factory adjustment, and only fine tuning is to be performed, turn calibrating screw clockwise for hotter cone, counterclockwise for cooler cone, as desired. NOTE: Counterclockwise moves the whole micro switch down. This means it takes less travel in the cone sensing rod to turn the micro switch off (and turn the kiln off). This means it will take less of a bend in the cone to shut off the kiln and so the kiln will shut off at a cooler temperature.
5. Replace cover.
6. Perform calibration on both controls.
7. Test fire. Repeat until desired degree of cone bending is obtained.
8. NOTE: Calibrating screw action to make fine tuning adjustments requires only "micro turns". Please note that calibrating screw action includes a "dead" zone. Gently turn calibrating screw back and forth to determine the extent of this characteristic. Actual adjustment occurs only when calibrating screw is out of the "dead zone". We recommend only about 1/60th of a turn at a time between firings. Repeat until desired degree of cone bending results.

## **MAINTENANCE**

### ***GENERAL PERIODIC MAINTENANCE***

1. Check for free movement of the sensing rod between firings.
2. Pivot swivel may become clogged with kiln fume condensation and other debris and cause sluggish action. If so, replace tube assembly.
3. Check for foreign particles in the tube, restricting the action of the sensing rod. If possible, remove particles. Vacuum.
4. Replace sensing rod if bent or deteriorated.
5. Replace cone supports if deteriorated.
6. Replace snap switch if switch has failed in any way.

Note: Recalibrate after any of the above procedures.

### ***TO REPLACE SENSING ROD***

1. Detach Instrument Panel from kiln body
2. Remove Gemini control from kiln by removing mounting screw. Disconnect wires to snap switch.
3. Loosen pivot screw and remove sensing rod. Pull "hot" or "kiln" end to remove.
4. Replace with new sensing rod and firmly tighten pivot screw using 1/16 allen wrench. In installing, make sure sensing rod is above switch actuating lever. Check insertion lengths, etc.
5. Replace switch wires.

### ***TUBE ASSEMBLY REPLACEMENT***

1. Remove Gemini control from kiln by removing mounting screw, detaching wires from snap switch and pulling assembly out of control hole in kiln.
2. Loosen hose clamp enough to allow removal of tube assembly.
3. Replace with new assembly observing immersible length duplication.
4. Make certain tube assembly is in absolute vertical position. Tighten hose clamp. Check again until properly positioned.
5. Replace snap switch wires.

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6. Install into kiln and secure with mounting screw.
7. Check as in “Test Procedure”. This is very important.
8. Check as in “Calibration”. This is very important.

### ***Replacing Snap Switch***

1. Remove Gemini control from kiln by removing mounting screw, detaching wires from snap switch and pulling assembly out of hole in kiln wall.
2. Remove friction adjustment screws and washers, turn calibrating screw counter clockwise to allow removal of sliding bracket assembly from control frame.
3. Replace snap switch with new one. Tighten nuts securely.
4. Reassemble by screwing Calibrating Screw into position.
5. Replace Friction Adjusting Screw and washer.
6. Adjust Friction Adjusting Screw to provide just enough friction to allow easy movement of the Sliding Bracket assembly by turning of the Calibration Screw.
7. DO NOT ADJUST LOCK NUT ON THE CALIBRATING SCREW!
8. Check as in “Test Procedure”
9. Check as in “Fine Calibration”
10. Proceed as in “First Test Firing”