

# ELECTRICAL

## INFORMATION FOR THE KILN OWNER

Your new kiln will perform properly only if plugged into an electrical outlet with enough of the proper power. Otherwise, your first firing will be disappointing or even harmful to your kiln. If you plan to use an existing circuit, it is recommended that you consult a qualified electrician. The circuit must be large enough, correctly connected, and never used for other purposes while the kiln is firing. The decision to use an existing circuit or have a new one installed should be based on the information found in the chart on page 6. Check the chart with your electrician and have him read the instructions before installing the circuit for your kiln. This will simplify his work and assure you of having the proper electrical circuit.

Your electrical installation will be as good as the electrician you use. While all electricians must be licensed, this does not insure their competence. Beware of the electrician who wants to make changes in the kiln or the recommended installation. The kiln's wiring and switches are of ample size for the current carried, and each kiln has three complete inspections plus being actually plugged into a properly wired receptacle and heated on all switch positions before it leaves the factory.

### ELECTRICIANS TRAINED BEFORE 1965

With all due respect, electricians who have not studied changes established in 1965 will often make serious errors in connections of the nominal 120/240 volt wall receptacles. The wire connections on receptacles which are marked "W" from 1965 onward are the same connections that WERE marked "G" PRIOR to 1965. This connection of the line neutral wire must be properly made in the circuit that provides the electrical power. Failure to make the connection properly can greatly shorten the life expectancy of the elements and the switch(es) of your kiln. Please refer to page 5 showing NEMA Configurations and connection markings of receptacles manufactured after 1965.

### GOOD CIRCUIT AFFECTS TIME REQUIRED TO FIRE

All references to time required to fire in this manual and the enclosed Recommended Firing Schedule Poster are based on an evenly loaded kiln operating in still air at exactly 230 volts for a nominal 120/240 volt kiln. These conditions usually are not found in actual practice, particularly exact voltage. A good circuit will deliver almost the same voltage at the kiln that is available at the meter, but the good circuit cannot correct low or high voltage supplied by your power company. This voltage may be 10% more or less than the usual 230 volts, which in turn will vary the time required to heat your kiln to a given pyrometric cone from as little as one-half the average time to more than twice the average time. When the voltage is below the minimum operating point, the kiln will never reach full temperature and can be corrected only by having the power company adjust the voltage.

Use the enclosed Recommended Firing Schedule Poster as a guide for your first firing, but do not assume, for example, that it will take exactly 4 hours to fire just because it says so on the schedule. These times are AVERAGE times, and you could have high voltage and fast firing. Every kiln installation will fire differently, and you must experiment with switching schedules until you know exactly how to fire your kiln. Don't be afraid to change the suggested times between changes of the switch position - there is little danger in harming your kiln or your ware if you watch your pyrometric cones and don't overfire the kiln.

If your kiln fires too fast, slow it down by leaving the switch(es) on LOW heat position longer. You can speed up firing by changing the switch(es) to a higher heat position sooner.

**WARNING: The grounding (round blade) connection must be separate and apart from the line neutral connection. The proper function of the line neutral is altered if a connection is made between the line neutral and the grounding or bonding connection.**

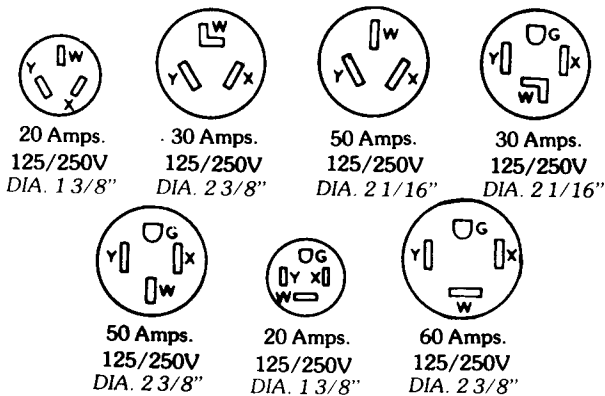
## CHECK THE ELECTRICAL INSTALLATION

Whether you use an existing circuit or have a new one installed, you should make this check of the electrical installation before the electrician leaves.

1. Open the kiln lid and engage lock-in lid support.
2. Turn all switch(es) to HIGH heat position.
3. Watch the elements. They should come up to a dull red color over a period of several minutes for most models and never less than 10 to 15 seconds.
4. Turn the switch(es) to OFF position and unplug the kiln if any element or pair of elements turn bright red within 10 to 15 seconds. Have the electrician check to be sure the line neutral wire of the circuit is connected to the proper terminal at the fuse box or the circuit breaker box and neutral terminal "W" of the receptacle.

Failure to have this connection correct causes 240 volts to be applied across the individual 120 volt elements, which can cause damages to the elements or to the switch(es).

## NEMA CONFIGURATIONS



1. With probes of voltmeter in "W" and "Y", voltage should measure **NOT LESS** than 104 volts and **NOT MORE** than 130 volts.
2. With probes of voltmeter in "W" and "X", voltage should measure **NOT LESS** than 104 volts and **NOT MORE** than 130 volts.
3. With probes of voltmeter in "Y" and "X", voltage should measure between 208 and 240 volts. Very near the total voltage in steps 1 and 2.
4. **Voltage from "G" and "W"** should be 0 volts as proof that **NEITHER** "hot" wire is connected to "G" or "W". 0 volts is **NOT** proof that the line **NEUTRAL** wire is properly connected as it must be for correct firing and long life.

- All 120/240 volt Paragon kilns use a 3-pole, single phase grounded connection with a separate equipment bond.
- All A and B series 120/240 volt kilns use 120 volt elements.

These elements operate between the line neutral (white wire) and either side of the line. The load is balanced with the switch on HIGH heat position, but when the switch is on MEDIUM heat position the line neutral and one side of the line must carry the full current. Therefore, the line neutral wire must be of the same gauge as the hot wires. The line neutral (white wire) is a grounded conductor and not a grounding (green wire) or earthing conductor.

- The **ROUND** blade (or prong) on the plug of the kiln cord set is for equipment ground (green wire) **ONLY**.

This contact provides case (metal enclosure) grounding only. The round blade must not be confused with the line neutral (white wire) connection.

- A series kilns work equally well on circuits derived from a 208 volt, three phase service and a straight 120/240 volt, single phase circuit.

The out of phase current is carried by the line neutral wire to supply a full 120 volts to each element independently.

- Full voltage at the kiln is very important.

Low voltage causes slow firing or failure to reach full temperature in the kiln. Please refer to the following table on electrical specifications for recommended wire and fuse or circuit breaker sizes. If the circuit is more than 50 feet long, use next larger gauge wire.

- If it is necessary to change the attachment cap to fit an available receptacle, be sure to connect the line neutral (white wire) in the cord to the line neutral terminal on the new cap.

Be sure to test to see that the line neutral (white wire) is correctly connected all the way through the circuit before leaving the installation. Failure to make this connection properly could cause blown fuses, damaged switch or elements, or a dangerous electrical shock hazard. No damage caused by improper electrical installation can be covered by warranty.

- Be sure to check switch controls on page 24. Kiln must be wired properly !

## ELECTRICAL SPECIFICATIONS

MODEL NO.	VOLTS	AMPS	WATTS	COPPER		RECEPTACLE OR EQUIVALENT			TYPE OF FEEDING CIRCUIT REQUIRED
				WIRE SIZE	FUSE SIZE	AH-HART	HUBBELL	RODALE	
<b>A-23B-3</b>	120/240	36.9	8861	8	40	5754	9450	1756	Electric Range*
<b>A-100B</b>	120/240	30.1	7226	6	60	9460	9460	1766	Electric Range*
<b>AA-10B</b>	120/240	14.1	3386	**					
<b>Total</b>	120/240	44.2	10612	6	60	9460	9460	1766	Electric Range*
<b>A-99B or A-24B or A-24B-3</b>	120/240	44.2	10612	6	60	9460	9460	1766	Electric Range*
<b>A-88B</b>	120/240	25.9	6226	8	40	5754	9450	1756	Electric Range*
<b>AA-8B</b>	120/240	8.2	1985						
<b>Total</b>	120/240	34.1	8211	8	40	5754	9450	1756	Electric Range*
<b>A-82B or A-82B-3</b>	120/240	30.0	7200	8	40	5754	9450	1756	Electric Range*
<b>AA-8B or AA-8B-3</b>	120/240	8.2	1985	**					
<b>Total</b>	120/240	38.2	9185	8	40	5754	9450	1756	Electric Range*
<b>A-81B</b>	120/240	30.0	7200	8	40	5754	9450	1756	Electric Range*
<b>AA-8B</b>	120/240	8.2	1985	**					
<b>Total</b>	120/240	38.2	9185	8	40	5754	9450	1756	Electric Range*
<b>A-77B</b>	120/240	18.4	4430	10	30	5744	9430	1736	Clothes Dryer*
<b>A-66B or A-66B-3</b>	120/240	15.0	3600	10	30	5744	9430	1736	Clothes Dryer*
<b>AA-6B or AA-6B-3</b>	120/240	6.6	1598	**					
<b>Total</b>	120/240	21.6	5198	10	30	5744	9430	1736	Clothes Dryer*
<b>A-55B</b>	120	20	2400	10	30	5716	9308		One 120 V., 30 A.
<b>A-28B-3</b>	120/240	46.4	11136	6	60	9460	9460	1766	Electric Range*
<b>A-11-9B or A-11-9B-3</b>	120	17	2040	12	20	5361	5361		One 120 V., 20 A.
<b>A-11-6B</b>	120	15	1800	14	15	5361	5361		One 120 V., 15 A.

\* This kiln will NOT operate properly on Low, Medium and High sequence unless the grounding (round blade) is SEPARATE AND APART from the line neutral. Improper electrical installation voids all warranties, stated or implied. Therefore, check the circuit for proper wiring (see page 5) before plugging in kiln. The metal jacket grounding on dryers and stoves is often connected to the system line neutral. This connection must never be made with a Paragon kiln!

\*\* Power for extension supplied from the kiln.

### ADAPTING WYE OR DELTA THREE-PHASE POWER SUPPLY TO THE REQUIRED 120/240 VOLT, 3-POLE, SINGLE-PHASE GROUNDED CONNECTION WITH A SEPARATE EQUIPMENT BOND

The 120/208 volt WYE system (often called 208 volt, three-phase) has three hot poles of EQUAL voltage and a line neutral pole for a total of four poles in the system. To install the required 208 volt, single-phase, 3-pole line neutral circuit for kiln operation, the electrician would need to pull any two of the three hot poles and the one line neutral pole of the single-phase circuit with line neutral to be terminated in a standard circuit breaker box. Since all hot poles in the WYE system are equal, the electrician does not need to be concerned as to which two of the three hot poles are used, but he does need to be concerned that the line neutral pole is properly connected and that the line neutral pole is NOT confused with the third hot pole, which will not be used in the kiln circuit.

The 120/240 volt DELTA system of three-phase power requires more care on the part of the electrician. The DELTA system has three hot poles of UNEQUAL voltage and a line neutral wire for a total of four poles in the system. From the DELTA system the electrician also uses two hot poles, but he *MUST* be sure that each of the two hot poles does NOT measure more than 130 volts to ground. These two hot poles and the line neutral pole makeup the single-phase, 3-pole line neutral circuit, which will be terminated in the standard circuit breaker box. If the hot pole that measures more than 130 volts to ground is used in the kiln circuit, the kiln will have very short element life, switch problems, and other problems until the error is corrected.