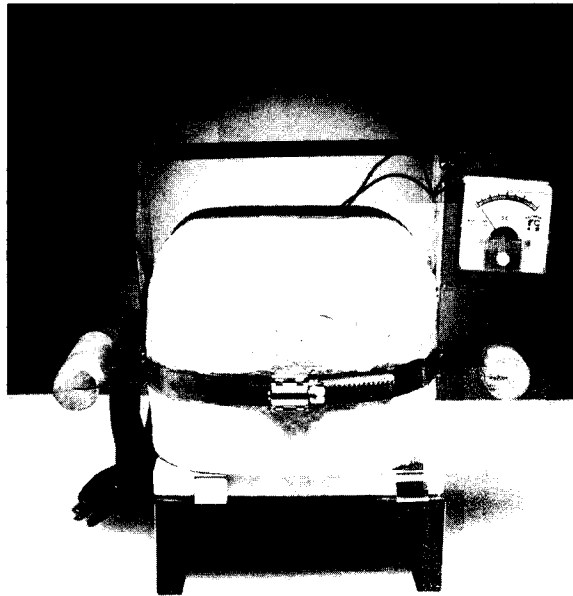


# PARAGON QUIKFIRE INSTRUCTION & SERVICE MANUAL



**You are about to enter the magical world of accelerated high temperature firing. To safely find your way around, read this manual. Save for future reference.**

# Contents

<b>FIRING ACCESSORIES</b> .....	2
<b>FIRING YOUR KILN</b> .....	3
Coating the Shelf .....	3
Vacuuming the Kiln .....	4
Venting with a 1" Post .....	4
How to Look Into a Hot Kiln .....	4
Cooling Time .....	4
<b>FIRING NOTES</b> .....	5
How to Cut and Fuse Glass .....	5
Enameling on Metal .....	6
Firing Low-Fire Greenware .....	7
Firing Low-Fire Glaze .....	7
Firing Overglaze .....	8
<b>CERAMIC &amp; GLASS TROUBLE-SHOOTER</b> .....	8
<b>MAINTENANCE</b> .....	9
Glaze Spots .....	9
Replacing the Muffle .....	9
<b>PARAGON KILN LIMITED WARRANTY</b> .....	10

## INTRODUCTION

It is easy to destroy your QuikFire if you use it without reading this manual. Follow the manual, however, and you will be delighted with your kiln's ease of operation. Damage caused by failure to follow instructions is not covered by warranty.

Read the manual straight through before you plug your kiln in. Then read it again as you fire the kiln. In addition, we have produced a QuikFire glass fusing video tape and a glass fusing pattern book. See your dealer for copies, or call 972-288-7557 or 800-876-4328 for the name of a dealer in your area.

Tremendous stresses are generated within the kiln. The insulation in the kiln expands and contracts during firing. Cracks will appear in the insulation while the kiln is cold. Do not be concerned with these; this is normal for ceramic fiber.

High temperature elements are destroyed by contact with silica or silica-bearing compounds, such as glaze, kiln wash and glass separator. **KEEP THESE AWAY FROM THE ELEMENT AND MUFFLE!** When firing glazed ceramics, make sure the glazed piece does not touch the ceramic fiber muffle.

Also, reduction firing, which removes the oxygen from your kiln, will ruin your element. The warranty does not cover elements damaged by reduction firing.

We will be glad to help you with problems and give you suggestions for better firing. However, should you have problems with your kiln, please first see the dealer who sold it to you.

Thank you for purchasing a Paragon QuikFire. We wish you much creative enjoyment with your new kiln!

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IM-110/11-95

### Important

Read each page of this manual in detail before you install or operate your kiln. Warranty does not cover damage caused by failure to follow instructions.

### Toxic Glazes and Glass

Some glazes and glass may be unsafe and toxic when used for surfaces that will be in contact with food or drink. When you make food or drink containers, select a glaze or glass that has been formulated, tested and labeled as approved for surfaces that will be in contact with food or drink. Follow the glaze or glass manufacturer's instructions exactly, without any variations.

### Essential Safety Rules

The warranty on your kiln does not cover damage from overfiring, regardless of the circumstances. It is the operator's responsibility to turn the kiln off when the firing is completed. **Never leave your kiln unattended for even a moment while firing!** This kiln is extremely safe to operate provided you follow these basic safety rules:

- 2000° F. maximum temperature! Firing hotter will void warranty.
- Use only with base provided.
- Do not touch hot sides. Keep electrical cord away from the firing chamber.
- Keep unsupervised children away.
- Place kiln on a non-combustible surface.
- Do not install closer than 12" from any wall or combustible surface.
- Fire only in a well-ventilated area.
- Dangerous voltage: Do not touch heating element with anything!
- Do not leave kiln unattended while firing.
- Wear safety glasses when cutting or chipping glass.
- Wear firing safety glasses when lifting top to look into the kiln during firing. Keep your face at least 15" from kiln when looking into the hot firing chamber.
- Wear safety glasses when around cooling or heating ware (because materials can fly apart if cooled or heated too fast).
- Make certain the ware is bone dry before placing it inside kiln. Otherwise the ware could explode during firing.
- Keep food away from your work area.
- Never fire organic materials inside your kiln, such as food.
- Unplug kiln when firing is completed.

# GETTING STARTED

## Unpacking the Kiln

Please inspect your kiln when it arrives. If the kiln is damaged, contact your Paragon dealer or call Paragon Industries, Inc. at 214/288-7557. (We're open Monday through Thursday, 7 a.m. to 5:30 p.m. Central time.) Save all packing materials for inspection by the freight claims adjuster. Refer to your packing list for more information or see your Paragon dealer.

## Where to Set Up Your Kiln

**1** Place your QuikFire on a level surface such as a work table. Lay an 18" x 18" piece of sheet metal, or other heat protective material, under the kiln. (Some people place a large kiln shelf under the QuikFire.) Keep your work area well ventilated and away from inflammable materials such as gasoline, paint or solvents.

**2** Provide a minimum of 12" clearance between the kiln and the closest wall.

**3** Keep the kiln away from curtains or other combustible materials.

**4** Keep unsupervised children away from the kiln.

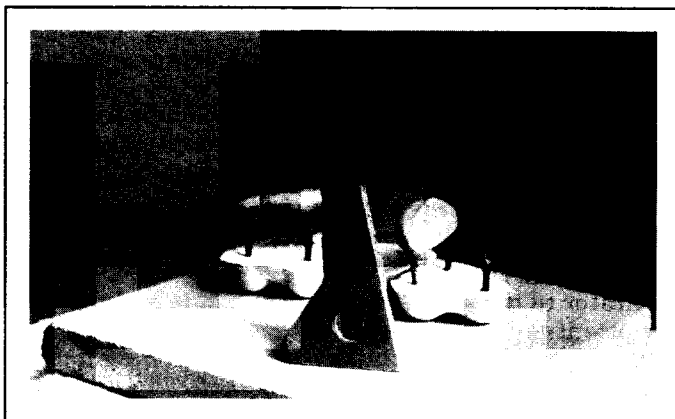
**5** Keep the power supply cord well away from the firing chamber. Check this before each firing!

# ACCESSORIES

## Pyrometric Cones

Pyrometric cones are small pyramids of clay and mineral oxide that soften and bend when exposed to heat. They indicate when your ware has fired to maturity.

Pyrometric cones come in 1 1/8" and 2 1/2" lengths. Cones mounted on the kiln shelf must be slanted 8° from vertical. They will not bend accurately if they are slanted to the wrong angle. Self-supporting large cones



A self-supporting cone and stilts on a QuikFire kiln shelf. The stilts prevent glazed ware from sticking to the shelf.

## TEMPERATURE EQUIVALENTS ORTON PYROMETRIC CONES

Cone Number	Large Cones		Small Cones
	Heated at: 108° F. per hour *	270° F. per hour *	540° F. per hour *
022	1069	1086	1165
021	1116	1137	1189
020	1157	1175	1231
019	1234	1261	1333
018	1285	1323	1386
017	1341	1377	1443
016	1407	1458	1517
015	1454	1479	1549
014	1533	1540	1596
013	1596	1566	1615
012	1591	1623	1650
011	1627	1641	1680
010	1629	1641	1686
09	1679	1693	1751
08	1733	1751	1801
07	1783	1803	1846
06	1816	1830	1873
05	1888	1915	1944

\* Rate of temperature increase during last several hundred degrees of firing.  
Tables by courtesy of The Edward Orton, Jr. Ceramic Foundation

have the correct slant built into the base. Standard cones must be mounted in a clay or wire plaque.

The chart above shows the temperatures of pyrometric cones. Since the QuikFire kiln measures temperature with a built-in pyrometer, cones are usually unnecessary. Use the cone chart to convert temperatures to cones. Remember: NEVER fire hotter than 2000° F. in the QuikFire. This is very important!

If you need to use pyrometric cones in the QuikFire, experiment with firing speed. Pyrometric cones, especially those rated in the lower temperature range, tend to bloat or distort when fired fast.

The easiest way to slow the QuikFire is with the PCB-1 Power Control. (See next page.) Experimentation will teach you how fast you can fire the QuikFire with cones. Set the PCB-1 knob to position #3 as a starting point. To slow the kiln manually, without a power control, cycle the kiln on and off using the kiln switch. If the cones distort, slow the kiln further.

You can use self-supporting cones in the QuikFire. However, small cones mounted in a plaque can be fired slightly faster, without bloating, than self-supporting cones.

## FIRING YOUR KILN



### PCB-1 Power Control

The PCB-1 slows the QuikFire with an infinite control switch. Slower firing is necessary for large, thick pieces. It simplifies enameling on metal and fusing decals to ceramics or glass.

Plug the QuikFire into the PCB-1 outlet. Then plug the PCB-1 into the wall outlet. The infinite control switch cycles the QuikFire element on and off. The higher the heat setting, the longer the element stays on during each cycle. On HIGH position, the element stays on continuously.

### Glass Separator and High Fire Kiln Wash

Glass separator and kiln wash are mixtures of finely ground minerals that will not melt and fuse together at ceramic temperatures. Mix the powder with water to the consistency of thick cream. Brush a thin, even coat on the tops of kiln shelves to prevent glaze and glass drippings from sticking permanently to the shelves. (See instructions, next column.) As a powder, glass separator and kiln wash have an unlimited shelf life. (Paragon glass separator can also be used as kiln wash.)

*Keep glass separator and kiln wash away from the element. Contact will cause the element to burn out. Never apply these mixtures to the ceramic fiber muffle or to the underside of shelves.*

### Kiln Shelves and Posts

Shelves and posts are fireclay that has been fired to a higher temperature than will be encountered in your kiln. Ware is placed on the shelf, which is placed on the kiln bottom. Firing ware directly on the ceramic fiber kiln bottom would ruin the bottom. A ceramic post is used to vent the QuikFire. (A shelf is shown on page 2; a post on page 4.)

### Stilts

Stilts are points embedded in a ceramic base. The points separate glazed ceramics from the shelf. (See page 2 stilt photo.)

### Enameling Racks

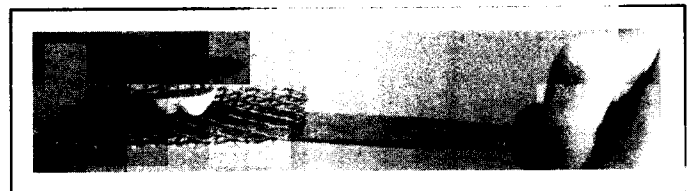
Enameling is the art of firing glass onto metal. The metal shapes are loaded onto a high temperature wire rack. The enameled pieces and wire rack are loaded into a hot kiln, fired for just a few minutes, and removed red

hot. To load and unload the racks safely, use a putty knife with a 6" long blade.

*The heating element under power is dangerous. Do not touch the element with anything! Turn the QuikFire switch off or unplug kiln before inserting the putty knife into the firing chamber.*

### Putty Knife

Use a putty knife to remove enameling racks, the venting post or shelves from the kiln while they are hot. The putty knife should be at least 6" long.



The wire mesh above is referred to as an enameling rack.

### Haik Brush

The haik brush is used to apply glass separator to the kiln shelf in a smooth, thin layer. The smoother the glass separator, the smoother the underside of the glass. See photo, next page.

### Safety Glasses

Wear clear safety glasses when cutting or chipping glass. Wear firing safety glasses when looking into a hot kiln, such as when checking on the progress of glass.

## FIRING YOUR KILN

### Coating the Shelf

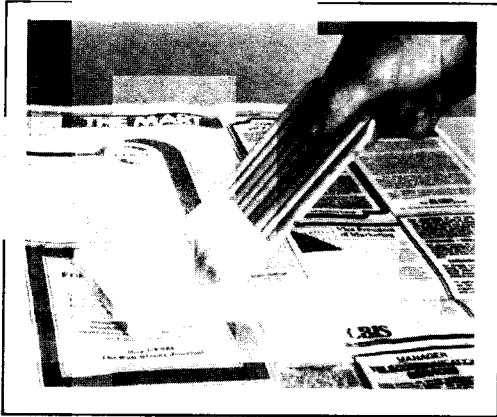
The ware is fired on a kiln shelf and not directly on the kiln bottom. Coat the shelf with glass separator or kiln wash before firing the kiln. The glass separator or kiln wash prevents glass or ceramic glaze from sticking to the shelf.

A coat of glass separator or kiln wash will usually last through several firings. When the shelf coating begins to crack or chip, apply a fresh coat.

When recoating a shelf, remove most of the old coating with grit cloth (available from Paragon). This is an abrasive-coated mesh that allows residue to pass through. Removing the old coating gives you a smooth surface to start with. Then recoat the shelf using the following directions. (Both glass separator and kiln wash will be referred to as "separator.")

**1** Mix the separator with water following the directions on the bag. Stir.

**2** Use a haik brush or a soft paint brush to apply the separator to the shelf. (The haik brush is easier to use because it lays down a more even coating.) Each time you dip your brush into the glass separator mixture, swirl the brush around the bottom of the container. This is because the separator settles quickly. Use two or three thin coats changing the direction of the brush stroke 90° with each coat.



**3** Dry the shelf before firing. You can speed drying by placing the shelf in the kiln, venting an inch with a post, and turning the kiln on for three minutes. Then unplug the kiln and leave the shelf in the warm kiln.

**4** After the separator has dried and your shelf is cool, you can smoothen the separator further by rubbing your hand lightly over the shelf. The smoother the separator, the smoother the back side of your glass.

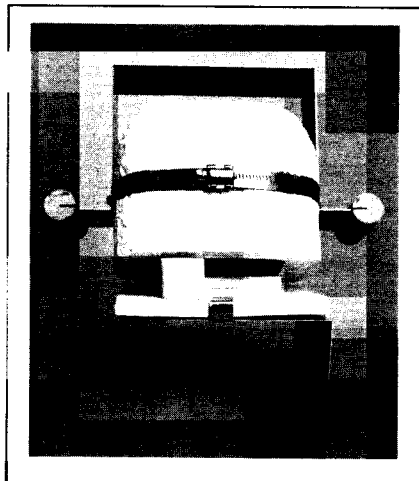
## Vacuumping the Kiln

Vacuum the kiln every few firings. Dust falling onto glazed ware or glass will cause surface imperfections.



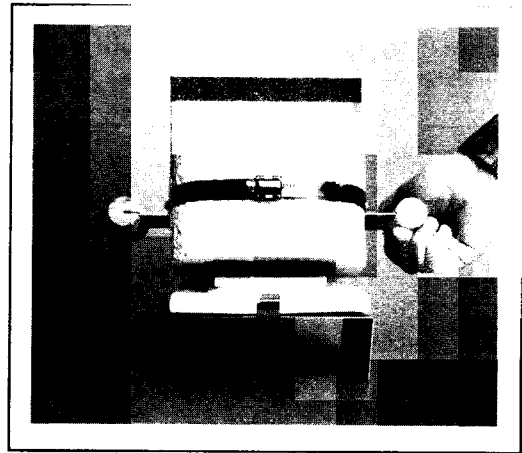
## Venting with a 1" Post

Some types of ware, such as ceramic bisque, decals, and ceramic glaze, need venting at the beginning of the firing cycle. This allows gases from burning organics to escape. Place a 1" ceramic post under the muffle (kiln top) to vent the ware.



## How to Look Into a Hot Kiln

For most ware, you will not need to look into the hot kiln to check the firing progress. The built-in pyrometer indicates when the firing is completed.



Some ware requires visual checking. Examples are glass fusing, glass sagging, and firing with pyrometric cones. To visually check the ware, tilt the muffle (kiln top) an inch or so until you can see the ware. Then close it. Tilt the top open for no more than several seconds at a time.

*When you tilt the kiln top, make sure the ware inside does NOT touch the ceramic fiber muffle. Glaze contact will ruin the heating element.*

*Always wear Paragon firing safety glasses and keep your face at least 15" away from the kiln when looking into a hot kiln! The glasses protect your eyes from the bright glare of the kiln and from the occasional ware that shatters.*

Ware that you load inside the kiln *must be bone dry!* If there is moisture in the ware, it is possible for the ware to explode during firing, ruining your kiln. To check ceramics for moisture, hold the ware against the inside of your wrist or against your cheek. If the ware feels cool, it is still too moist to fire.

When you tilt the kiln top, hot air will escape out the side of the muffle that is tilted up. Tilt the kiln top so that the hot air escapes past the front instead of past the side with the handle you are holding.

## Cooling Time

### How to Speed Cooling

To cool the kiln quickly, prop the muffle with a 1" ceramic post. For slow cooling, leave the muffle in its lowered position until the kiln reaches room temperature.

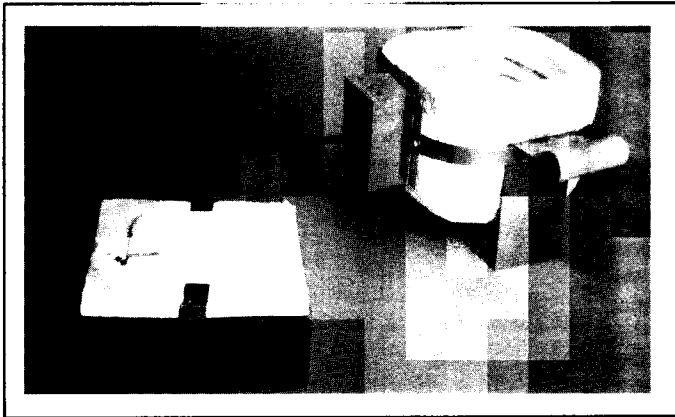
### When to Remove the Ware

You will learn from experience how long to leave the ware inside the kiln to cool. The thicker and larger the piece, the longer it must cool before you remove it from the kiln. Some large pieces, such as a ceramic cup, should stay inside the kiln until they reach room temperature. Other small, thin-walled pieces can be removed at 200 - 400° F.

## FIRING NOTES

For safest cooling, leave the ware inside the kiln until the kiln reaches room temperature. If you remove the ware too soon, the sudden temperature change can crack the piece.

To remove small pieces, such as glass jewelry, before they have cooled completely, remove the shelf also. Leave the pieces on the shelf until they reach room temperature. The heat in the shelf will help prevent them from cooling too quickly.



When the ware is cool enough to remove from the kiln, lift the muffle and place it upside down onto the protective sheet metal. Lift with both handles. If the muffle is still warm, turn it *away from your face* when you invert it.

*Do NOT lift the muffle with only one handle. Always use two handles.*

### COLOR SCALE FOR TEMPERATURES

Color	Appx. Cone	Degrees F.
Lowest visible red to dark red	022 to 019	885 to 1200
Dark red to cherry red	018 to 016	1200 to 1380
Cherry red to bright cherry red	015 to 014	1380 to 1500
Bright cherry red to orange	013 to 010	1500 to 1650
Orange to yellow	09 to 03	1650 to 2000
Yellow to light yellow	02 to 10	2000 to 2400

## FIRING NOTES

### How to Cut and Fuse Glass

Kiln-formed glass offers many possibilities. You can slump your fused piece into a mold. Or paint the glass before fusing it. You can fire to a low fuse to retain beautiful ridges in the glass surface, or fire to a high fuse for a flat surface. Overlap colors to create multiple colors, all in one piece of glass. You can pull hot glass, bend it, break it up and refire it. If you're not satisfied with a piece, slice it up and fire it again! Never throw away small scraps; you can fuse them into another piece.

### The Stages of Fusing

As you would expect, the longer you heat the glass, the more rounded it becomes. Temperatures noted for each stage are only a general reference. Visually check the progress of the glass in the kiln. That is the easiest way to judge when the glass is done. We have classified glass fusing into three stages:

**The Light or Tack Fuse** In this stage, the separate glass pieces retain their surface ridges and basic shapes. In the light fuse, you recognize when the glass is fusing by watching the edges. They change from sharp to softly rounded. Most brands of glass reach a light fuse at 1500° to 1600° F.

**The Medium Fuse** At this stage, 1600° to 1650° F., individual pieces are still distinct, yet have lost much of their original shape. Begin checking the glass after it reaches 1500° F.

**The Full or Deep Fuse** In deep fusing, the shape usually becomes rounded; the surface flattens out. Deep fuse is the most sensitive stage of all; check the glass often. It is easy to overfuse at the deep fuse temperature, 1650° to 1775° F.

### Basic Glass Tools

**Reservoir Glass Cutter** Buy a good reservoir glass cutter. A good one will last many years and is a pleasure to use. These cutters are sold by stained glass suppliers.

**Running Pliers** are used to cut large pieces of glass.

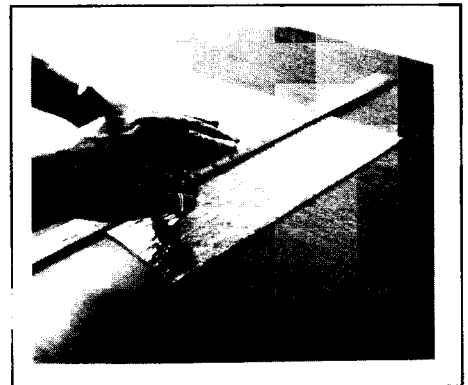
**Breaking Pliers** are for cutting small strips.

**Grozing Pliers** shape the glass by chipping away the edges. They are often used when the score line doesn't break cleanly. The rough edges will become smooth when the glass is fired to fusing temperature.

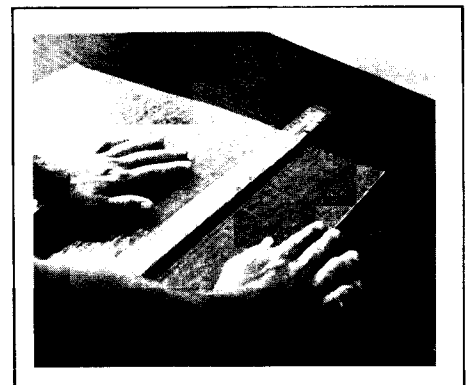
### Basic Glass Cutting

*Wear safety glasses when cutting or chipping glass.*

**1** Lay the glass on a clean surface. Mark off the cut with a grease pencil. A small mark on each end of the glass will do. Lay a wooden straight edge over the glass and line it up with the marks you just made.



**2** Hold the straight edge firmly and score the glass with the glass cutter. Press hard enough so that the scoring noise sounds steady and unbroken. But don't press harder than you need to.



**3** Place the straight edge under the glass so that an edge of the wood is lined up with the score line you just made. Press down on the glass with your hands. The glass will break cleanly.

**How to Cut Small Glass Squares** Make all your score lines first. Then turn the glass over and tap out the squares. This is an easy, fast way to cut many small pieces.

**Compatibility of Glass**

Glass expands and contracts during firing and cooling. When pieces of glass are fused together, they must expand and contract at the same rate, or the fused piece will crack. When fusing two pieces of glass, cut them from the same sheet of glass. This will guarantee compatibility. Or you can buy stained glass tested and labeled compatible.

**Annealing Glass**

The most common mistake in firing glass is in fast cooling rather than fast firing. The critical cooling period is called the annealing range. The glass must be cooled slowly through this range to remove internal stresses. Glass cooled too quickly contains stresses that can break the piece sometimes even months after firing.

**Basic Glass Fusing**

**Preparing the Glass for Firing**

**1** After cutting the glass pieces, clean them. Use window cleaner, rubbing alcohol, or even plain water. Fingerprints will etch into the glass during firing, so handle the glass by the edges after cleaning it.

**2** Lay the glass on the shelf. Hold the pieces together with white glue as you place them on the shelf. All you need is a drop or two. Glue is especially important if you're fusing copper wire into the glass. The glue prevents the glass or wire from moving out of place before they fuse. The glue disappears during firing.

Do not use glue on the coated side of dichroic glass. If you have trouble determining the coated side, then avoid using glue with dichroic.

**Firing Glass**

**1** Place the shelf on the kiln bottom. Lower the muffle onto the bottom gently to avoid disturbing the glass. Prop the muffle with a 1" ceramic post (available from ceramic dealers or from Paragon).

**2** Turn the kiln on. When the pyrometer reads 750° F., close the muffle by removing the ceramic post. A putty knife works well for removing a hot post.

**3** When the pyrometer reads 1200° F., start checking the glass. Wearing firing safety glasses, lift the front of the muffle an inch for a second or two and look inside. Keep your face 15" from the kiln. When the glass fuses to the desired degree, turn the kiln off.

**4** Immediately lift the muffle several inches by the handles to release some of the heat. After a few seconds, lower the muffle.

**5** Leave the kiln turned off after you return the muffle to the base. Prop the muffle open about an inch with a ceramic post until the glass is cool enough to touch. If your glass needs slower cooling, leave the muffle in its lowered position.

When you become more experienced, you can remove small projects and the shelf from the kiln at 200° - 400° F. The heat in the shelf will prevent the glass from cooling too quickly. Allow the shelf to cool to room temperature before removing the glass from the shelf. While the shelf and glass are cooling, you can prepare another project for the kiln on a second shelf.

**Enameling on Metal**

**Preparation of the Copper**

Enamels come in transparent or opaque. They can be purchased directly from Thompson Enamel, P.O. Box 310, Newport, Kentucky 41072. Their Lead Free Enamels come ready to use. No enamel washing is required for these enamels.

Start with one of the many pre-shaped copper forms available, or shape and trim the copper to your own design.

**1** Heat the copper on an enameling rack to about 1400° F. to burn off oil or grease. Heat the copper to just until smoke from oil or grease stops coming off the metal and its color has changed to a purple-red-pale-green iridescence that moves across the copper. This indicates that the grease has vaporized. **Do not fire the copper any longer than this point.** Otherwise excess fire scale will form, making the next cleaning step difficult.

**2** After the copper cools, brush any loose scale from it. Use a brush or paper towel, being careful not to put any grease or oil, such as fingerprints, onto the copper. Clean the copper with a 3M Scotch-Brite® pad. This pad does such a good job that in most cases no further cleaning will be required. Additional copper cleaning products are available in the Thompson Enamel Catalog, including Sparex No. 2.

It is best to clean the copper just before decorating it. If you wait too long to decorate after cleaning, the copper could get dirty again.

**Decorating the Copper**

**Counter-Enameling** Most enameled pieces should be counter-enameled on the back side. This gives the piece a more finished look, it eliminates a great deal of fire-scale cleaning, and it controls the chipping and cracking that can result from the different rates of expansion and contraction in copper and enamel after the enamel has been fired.

Counter or backing enamel, a mixture that gives a mottled effect, can be used for counter-enameling. Or you can use regular enamel. Counter enamel is applied by the sifting method described next.

When firing counter enamel, underfire it so that the fire scale on the front of the piece isn't too difficult to remove. You can purchase a masking preparation from your supplier to help prevent fire scale. You must place the piece on a stilt when firing the other (front) side of the piece. The stilt prevents the back of the counter-enameled piece from sticking to the enameling rack.

**Applying Enamels** Apply enamel over a clean sheet of paper so you can pour the excess back into the bottle for reuse. Transparent enamels should be applied in several thin coats. Transparent enamels can be mixed with fairly good results. If opaque enamels are mixed,

## FIRING NOTES

however, a grainy effect results. The two basic methods of applying enamels are sifting and spatula.

**Sifting or Dusting Enamel** Spray or brush Thompson holding agent onto the copper. Then sift a 1/32" layer of enamel onto the copper. Use a #60 mesh sifter. If the coat is too thin, you can easily add another coat after firing. But a coat that is too thick will bubble and crack. The enamel must dry completely before firing.

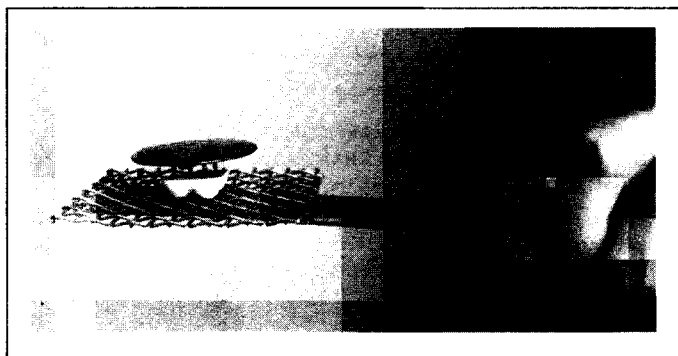
**Spatula or Inlaid Method** You can use this method to decorate a small area with many different colors. Using a diluted solution of Thompson holding agent, dampen the enamels just to the saturation point, and maintain this moisture while working with the enamels. Apply the enamels onto the copper with a small spatula, and spread them out with a spreader to a coat of about 1/32" thick. Lines of contact can be formed by the spatula blade. Then spray the enamels with the holding agent to keep the grains of enamel in place. Allow the enamel to dry completely before firing.

### Firing Enamel

To fire enamel, you will need an enameling rack and a putty knife with a 6" long blade. If the bottom of your piece is coated with enamel, you will also need a stilt. You can order stilts and enameling racks from Paragon with your credit card (214-288-7557, 7 a.m. - 5:30 p.m., Monday - Thursday Central time).

Place the enameling rack next to the kiln. Lay the copper shape on the enameling rack. If the area that touches the rack is enameled, place a stilt under the copper. Some bowls or other shapes have enameled sides that might run during firing. These should be fired with a stilt even if the piece has a plain bottom.

Turn the QuikFire on, but do not insert the enameling rack yet. You will want the kiln to reach 1450° F. for most enameling projects.



When the kiln has reached 1450° F., turn the kiln switch off, lift the kiln top a couple of inches, and insert the enameling rack with copper piece into the kiln using the putty knife. Then turn the kiln back on.

*Firing should take about three minutes at 1450° F. and requires undivided attention!*

When the copper piece appears a rosy red and the enamel is smooth, unplug the kiln. Lift the kiln top; carefully slide the putty knife under the rack and lift it out of the kiln. Place the rack on the protective sheet metal and let it cool completely. Use a protective glove and firing safety glasses when removing or inserting the rack. These are available from Paragon.

After counter enameling, you will need to clean the fire scale off the front of the piece. A 3M Scotch Brite® pad works well for this. Then clean it with Thompson Sparex No. 2.

## Firing Low-Fire Greenware

Low-fire greenware has a firing range from cone 06 to 02. However, never fire your QuikFire kiln hotter than cone 05. (Maximum temperature for this kiln is 2000° F.!)

The greenware must be bone dry before firing. Otherwise, it will crack or even explode during firing. Check for dryness by touching to cheek or against inside of wrist. Ware will be cold if it is still damp.

Low-fire greenware may be stacked so that it touches each other. Stilts are unnecessary. Ware should be fired in the position in which it will be used when finished. Pieces to be used together, such as a box with its lid, should be fired in place to ensure a good fit.

Firing low-fire greenware is simple. Just be certain the greenware is fired to the pyrometric cone recommended by the clay supplier. If the greenware is not fired hot enough, the piece will absorb moisture after it has been glaze-fired and cause the glazed surface to crack. This is called "crazing" and is most often due to underfired greenware. To help eliminate crazing, fire greenware at least one cone hotter than glaze, and even hotter if glaze can still be applied easily to the hard bisque. While glaze may be applied to greenware and fired once, separate firings produce better quality, so we do not recommend firing greenware and glaze in a single firing.

**1** Load the ware onto the shelf. Prop the muffle with a 1" ceramic post. Turn the switch on.

**2** At 500° F., remove the 1" post.

**3** At 1950° F., turn the kiln off. Cool to 1500° F.

**4** When the kiln has cooled to 1500° F., turn the kiln back on and fire to 1950° F. (Firing temperatures are for general guidance only.)

*If you use the PCB-1 Power Control, there is no need to cool the kiln to 1500° F. after reaching 1950°. Instead, fire to 1950° at a medium speed. Then turn the kiln off.*

## Firing Low-Fire Glaze

The difference between loading greenware and glazed ware is that glazed pieces must not touch each other, the floor or a shelf in your kiln during firing. If this happens they will be permanently bonded together and ruined by the melted glaze. Use stilts to support low-fire glazed ware during firing.

The shelf tops **MUST** be kiln-washed with Paragon's glass separator or high-fire kiln wash. They protect the shelves from glaze drops.

You can prevent glazed pieces from sticking to the shelf by "dry footing." To "dry foot" a piece, remove all glaze from the portion of the piece that will rest on the shelf. Using a wet sponge or a piece of grit cloth, clean off the glaze from the bottom of the ware and slightly



above the base so that it will not run down and touch the base. Dry footing should not be used for low-fire glazed pieces that will be placed in water while used or cleaned.

**1** Load the ware onto the shelf. Prop the muffle with a 1" ceramic post. Turn the switch on.

**2** At 500° F., remove the 1" post.

**3** Fire to 1900° F. (This temperature is for general guidance only.)

After firing, remove the stilts from the ware by breaking the thin film of glaze holding them. Handle with caution; the edges can cut you. Remove the sharp stilt edges by rubbing with a stilt stone, electric grinder or hand grinder.

## **Firing Overglaze**

Overglaze is decoration applied over fired glaze or polished porcelain bisque. Overglazes include china paints, gold, and luster, which fire from cone 022 to 014.

Load overglazed ware the same way you would load ceramic glaze. Use stilts and make sure ware is not touching other ware. Ware must be completely dry before firing.

China paints will crack or peel if applied heavily. Apply several light coats instead, firing between each, until you get the shade you want. Not all china paint colors reach maximum color saturation at the same temperature even when fired on the same ware. So you must know which colors you should fire first at higher temperatures to prevent burning out the original colors in later firings. For example, reds mature at a lower temperature than other colors and are fired after the other colors have been fired. Reds and yellows should not be fired side by side. Colors also mature at a lower temperature on ceramic pieces than on porcelain or hard china. Check the overglaze manufacturer's literature for information on which cone to use with each color and type of ware.

# **CERAMIC & GLASS TROUBLE-SHOOTER**

## **Ceramic Ware**

### **Bisque**

**Warped ware** can be caused by distorting upon removal of the piece from the mold, firing too close to the elements, or firing a piece in an unnatural position.

**Sagging ware** is usually the result of overfiring.

### **Glaze**

**Crazing** is usually caused by underfired bisque. Bisque should be fired to the highest temperature at which it will still take glaze. Crazed ware may be refired to the proper cone. *CAUTION: China paints and other overglazes will burn off when fired to 06.*

**Glaze too thin in spots** can be caused by uneven glazing or a "hard spot" on the bisque. Most ceramic glazes (though not all) should be applied in flowing coats, first in one direction and the next coat in an opposite direction (horizontal, then vertical or vice-versa). Allow to dry between each coat. Some glazes may require twice the recommended coats, because of thin application. "Hard spots" are sometimes the first spot where the poured slip touches the mold. Heating bisque in an oven to approximately 120° F. will help in applying glaze to hard bisque.

**Crazing immediately on removing** from the kiln can be caused by not firing the ware hot enough. Refire to the proper cone. Crazing in spots can be caused by not having mixed the glaze thoroughly before using.

**Black specks** in the ware are usually caused by organic materials not completely burned out in the bisque firing. This works its way to the surface during the glaze firing.

**Pinholes and bubbles** in glaze or glazed ware can be caused by too heavy a glaze application, by severe underfiring or by dust on the bisque. Damp bisque can reduce the number of air pockets and pinholes that may form when glaze dries too quickly. Clean bisque with tap water or use base coat of glaze thinned 3 parts glaze to 1 part water immediately before applying glaze in the usual manner to the bisque.

**Poor color** in colored glazes can be caused by too thin an application, placing ware too close to an element or to other glazed ware which may be incompatible, insufficient venting during the early stages of firing or overfiring glazes in the red family.

**Light edges** on dark glass glaze pieces may be caused by the flow of the glaze away from the edges in two directions. Try an extra coat of glaze on the edges, or apply a thin coat of underglaze in the following manner: Mix 1 part water with 2 parts of suitable dark or black underglaze and brush a thin wash coat of the underglaze over the bisque ware. Then, immediately apply the first regular coat of full strength glaze. Allow to dry thoroughly between coats. Continue with number of coats recommended by the manufacturer.

**Sagging glaze** is usually caused by applying too much glaze on a vertical surface causing the glaze to actually sag when fired.

**Crawling or bare spots** on a fired piece can be caused by applying the glaze too heavily. Oil from your skin that gets on the greenware before it is fired can also cause this. Another cause may be hard spots from too much polishing of your greenware when sponging. A few drops of vinegar in your sponging water will help alleviate this problem. Crawling may be corrected by applying more glaze to these spots and refiring.

### **Underglaze**

**Streaks** in underglaze are usually caused by not applying enough coats to the greenware. After a piece has been decorated with underglaze and fired, you can check it for streaks by submerging it in water and immediately removing it. The piece will appear glossy, just as if it had been glazed, and streaks and thin spots will show up. The weak spots can be touched up and refired. Be sure the underglaze has been fired before putting it under water. For interesting designs, underglaze colors may be applied over unfired matte or texture glazes that do not flow.

## MAINTENANCE

### Overglaze

**Breaking** in overglaze firing can be caused by poorly fired bisque. A slow bisque fire is always better for ware that is to be china painted. The greenware should be completely dry *before* being placed in the kiln.

**Purple spots in gold** are usually due to a thin application of gold or too much thinner. If gold is applied accidentally to an area, it will show purple after being fired unless cleaned with a good gold remover.

**Broken lines** in gold can be caused by overfiring or too heavy an application. However, this is can be very attractive when gold is crackled over a dark color of fired glaze.

**Peeling china paint** can be caused by applying the paint too heavily.

**Loss of color** in china painting is usually a result of overfiring or thinning your paint with too much medium when applying.

**Faded colors in overglaze decals** are a result of either underfiring or overfiring. If pinks and reds are drab, refire to a hotter cone. When used with a china paint background, apply and fire the decals first, then china paint and fire again. Check the recommendations of decal supplier. If decal was underfired, refire to proper firing cone. If decal was overfired, the design may be repainted in china paints and refired.

**Weakening of luster colors** can be caused by overfiring.

**White spots** in lusters or metals can be caused by moisture on the ware before it was placed in the kiln or from having been fired at the same time as other overglazes. *Apply lusters only on a dry day.*

**Powdering of luster colors** can be caused by too heavy an application.

## Glass

**Cracking** is usually caused by cooling the glass too fast. In the 900° - 500° F. range, glass goes through the "annealing" process where stresses are relieved. The glass is especially sensitive to cracking in this range. Glass can crack below 500° F. if it cools too quickly. The smaller and thinner the piece, the hotter it can be when you remove it from the kiln.

Cracking can also be caused by fusing incompatible glass. Purchase stained glass that has been tested for fusing compatibility.

**Glass Bubbles** These are usually caused by air, grease or dirt trapped between layers of glass, or by fusing uneven layers of glass.

When you place small glass pieces on top of a larger base piece, air pockets will sometimes rise up from under the base piece. This causes a bulge in the glass. These types of bubbles appear in single layers of glass. To avoid them, redesign the piece.

When you laminate glass between two sheets of glass, trapped air may form bubbles. To avoid these bubbles, cut the top piece of glass into several butted strips. This allows the air to escape.

**Frosty glass surface** Dust, fingerprints, or oil on the glass surface can cause frosty, permanent images. If the glass passes through the "devitrification range" too slowly, it will tend to develop a frosty surface. To cool the glass rapidly during the devitrification range, un-

plug the kiln when the firing is completed. Tilt the kiln top about an inch until the temperature drops to 1000° F. Then lower the top again. If you are not using a pyrometer, lower the top when the glass starts to lose its red appearance.

## MAINTENANCE

### Glaze Spots

Glaze spots on the ceramic fiber muffle or bottom must be removed at once. Otherwise they could remelt each time the kiln is fired and possibly spread. If glaze spreads onto an element, the element will be ruined. Simply dig out all of the material with a knife.

### Replacing the Muffle

When an element burns out, it is necessary to replace the muffle.

*CAUTION: Performing this replacement incorrectly could ruin the new element or give you an electrical shock. We suggest that only people with electrical experience replace the muffle.*

**1** Remove the red and yellow wires from the back of the pyrometer. Remove the wires from the muffle by pulling from inside the muffle.

**2** Remove the electrical box by unfastening the two screws holding it to the muffle-band.

**3** The cord wires are attached to element connectors. Hold the element connectors with pliers (preferably the locking type) and remove the screws holding the cord wires. Then remove the element connectors from the element ends by removing the other



screw. Throw the old element connectors away. Always use the new connectors furnished with the new muffle.

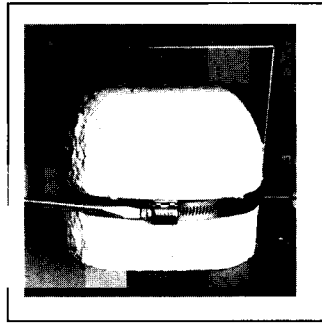
*NOTE: If the screw holding the element breaks, use wire cutters to remove the element connectors from the element.*

**4** Remove the screw holding the heat shield to the muffle-band. Save the heat shield and the porcelain insulators. They will be used on the new muffle.

**5** Remove the screws holding the muffle-hood to the muffle-band. There are two screws near each



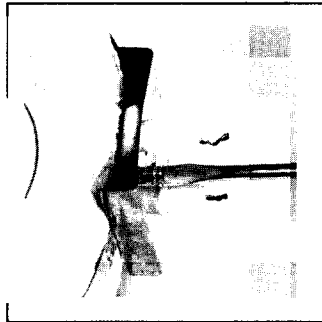
handle. Loosen the muffle-band with a screwdriver. The muffle-band loosens like a hose-clamp. Lift muffle-band and muffle-hood off the old muffle.



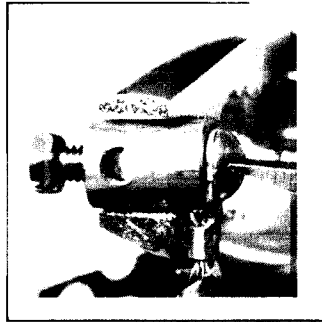
**6** Insert the red and yellow wires (also called the thermocouple) through the two small holes at the top of the new muffle.

**7** Position muffle-band and muffle-hood on the new muffle and tighten clamp screw on muffle-band. Reinstall the screws that hold the muffle-band to the muffle-hood.

**8** Slide the porcelain insulators onto the element ends. The wide end of the porcelain goes toward the muffle. Slide the heat shield over the porcelain insulators and fasten the heat shield in place with its screw.

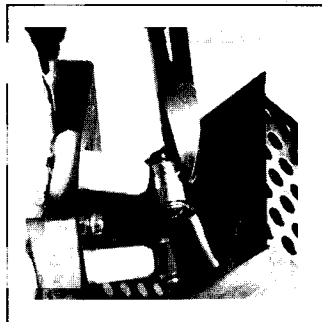


**9** Attach the white and black cord wires to the new element connectors. Use the brass screw. (The steel screw is for the element.) Tilt the wire terminal to where it will be parallel to the heat shield when in final position. (Don't let the wire terminal stick out towards the electrical box, or it could short against the box and ruin your new element!) Hold the element connector with pliers as you tighten the brass screw securely.



**10** Slide the element connectors onto the element ends. Press each element connector flush against its porcelain insulator. Then hold the element connector with pliers and tighten the steel screw. Tighten screw until it squeaks.

**11** Cut off the excess element end flush with the element connector. Leaving the element end sticking out past the element connector could short the element against the electrical box.



**12** Before going further, make sure the green grounding cord wire is securely fastened to the electrical box.

**13** Move the electrical box into place and arrange the wires inside the box so that no wire touches the heat shield or an element connector. (Wires that touch the heat shield or an element connec-

tor will burn out later.) Reattach the electrical box to the muffle-band with the two screws.

**14** Fasten the red and yellow wires of the thermocouple to the screw terminals on the back of the pyrometer. The red wire attaches to the negative terminal; the yellow to the positive.

## **PARAGON KILN LIMITED WARRANTY**

The Paragon QuikFire kilns are warranted to the original purchaser, subject to the listed exclusions below, to be free of defects in workmanship for a period of 90 days from date of original purchase from an authorized Paragon distributor or dealer.

This warranty excludes: 1) Kilns damaged by overfiring (exceeding the melting temperature of the material being fired) regardless of cause of overfiring; 2) Ware or kiln furniture damaged by overfire; 3) Kilns fired hotter than 2000° F.; 4) Kilns subjected to abuse, neglect, shipping damage or improper storage; 5) Kilns used for either reduction or salt firing; 6) Kilns damaged by improper electrical installation; 7) Kilns used for purposes other than firing ceramic or glass materials; 8) Element burnout caused by contact with foreign materials.

Paragon Industries, Inc. will repair or replace any parts that become defective under normal and proper use during the 90 day warranty, providing the kiln has not been subjected to misuse or the listed exclusions. Paragon will furnish and install replacement parts at the factory with shipping costs to and from the factory paid by the owner.

Any claim for adjustment under this warranty must include name and address of dealer from whom kiln was originally purchased. Repair or replacement of any defective parts shall fulfill all obligations of Paragon Industries, Inc. No other obligations or liabilities are assumed in connection with Paragon kilns nor does Paragon Industries, Inc. authorize its distributors or dealers to assume any other obligations or liabilities.

This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

**Paragon Industries, Inc.**

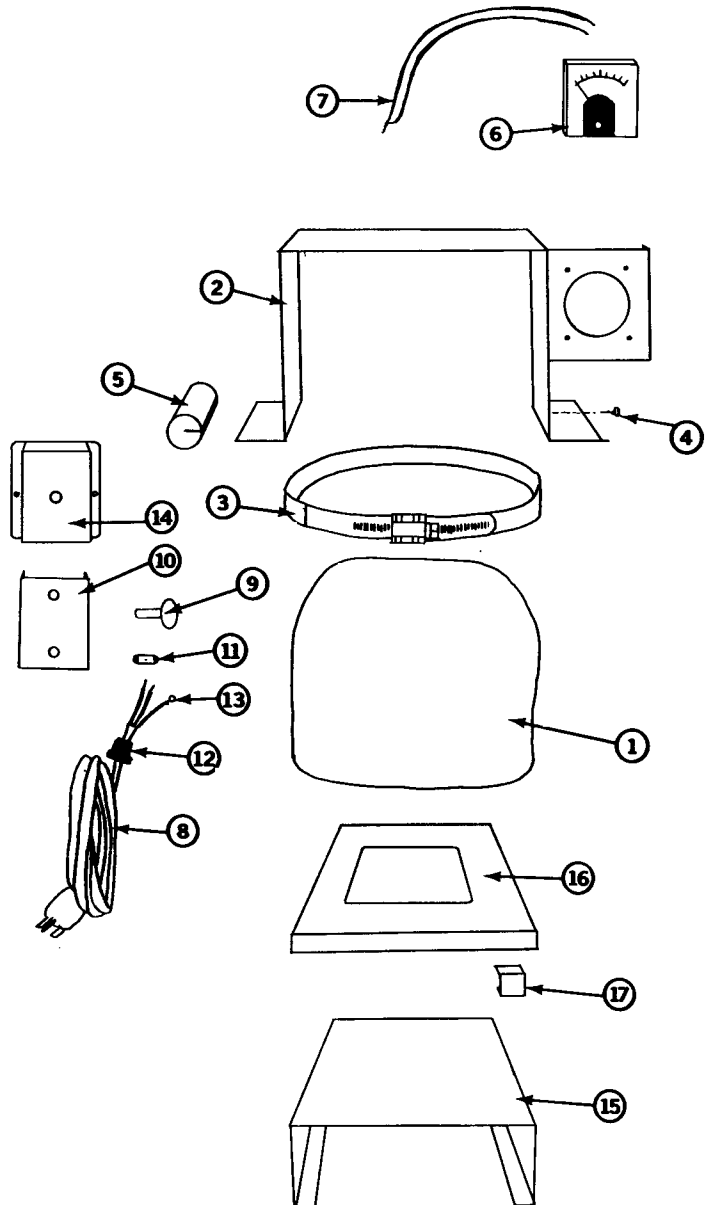
2011 South Town East Blvd.  
Mesquite, Texas 75149-1122  
972-288-7557  
Fax: 972-222-0646

# PARAGON QUIKFIRE WIRING DIAGRAM & PARTS IDENTIFICATION

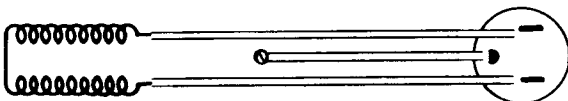
1. Specify Model Muffle (comes complete with element and element connectors)
2. Specify Model Muffle-Hood with pyrometer holder
3. Specify Model Muffle-Band
4. HW-8 #8 Screws
5. Specify Model Handle, wood
6. Specify Model Pyrometer, meter only
7. QF-4 Thermocouple Wire Set
8. Specify Model Cord Set, 3-18, 120 volt
9. MS-1 Porcelain Insulators, 1 1/8" long
10. Specify Model Heat Shield
11. MS-6 Element Connector
12. Specify Model Cord Compression Clamp
13. TR-2 Ring Terminal
14. Specify Model Electrical Box
15. Specify Model Steel Base
16. Specify Model Fiber Bottom
17. Specify Model Fiber Bottom Clamp

**When ordering parts, specify model number, reference number, part number and description.**

See your dealer for parts. If your dealer doesn't have the parts you need, call us direct. For fastest service, we will ship your order by C.O.D. or credit card. Orders shipped to one address on one order must total \$15.00 before postage and handling charges are added. We are open Monday - Thursday, 7:00 - 5:30 p.m. Central time and closed Fridays.



## WIRING DIAGRAM



**To order, call toll free  
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**Hours: Monday - Thursday  
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