MIFCO
McEnglevan Industrial Furnace Company, Inc.

Dear MIFCO Customer:

We would like to thank and congratulate you on the purchase of the McEnglevan machine and accessories, and to share with you our confidence in the quality and reliability of our equipment.

The enclosed Operating Manual and Warranty Registration Card are important to both of us for two reasons:

1. Your Registration Card, with proper serial number, will be documented in our files and your written warranty will be forwarded to you upon the receipt of this card. Please complete and mail the return card now.

2. Proper instruction on the maintenance of your machine is very important. Please read your instruction manual completely for best results and maximum machine tool life.

Should you ever need service, it is available through the distributors, our factory representatives or directly from the factory. It is the obligation of our franchised distributor who sells you this equipment to conduct field service where possible. Please contact your local distributor first and they will assist you in resolving any problems you may encounter.

We take pride along with you in your purchase of this equipment. We will be happy to assist you in any way possible to receive optimum results in its operation and use.

Sincerely yours,

Matt Walter

Matt Walter
CEO

DO NOT REMOVE THIS PAGE

In accordance with the National Electric Code, A.G.A., Canadian Standard Association, O.S.H.A., N.F.P.A., and the F.I.A. recommendations, this specification sheet must remain a part of this manual. Most of the components are U.L. and A.G.A. listed. The Control Panel wiring and Ultra-Violet Combustion Safeguard Systems are designed to conform to the specifications of the National Electric Code.

This manual contains the Electrical Wiring Schematic applicable to this particular piece of equipment. If there are any questions, contact your distributor or the factory. Only licensed electricians or qualified factory representatives should trouble shoot the electrical system of this equipment.

Purchased from _____ Date _____

City _____ State _____ Zip Code _____

Model Number _____ Serial Number _____

Electrical Service Specifications

_____ Volts _____ Phase _____ Hertz

Note: Schematic drawings showing different voltages, phase and hertz data are included in the manual.

The Drawing Number for this furnace is: _____

Note:

Maximum incoming gas pressure and required operating pressure for this unit is listed on a test tag attached to the gas gate valve of the burner system.
HIGHER PRESSURE WILL DAMAGE REGULATOR AND MODULAR VALVE SYSTEM.

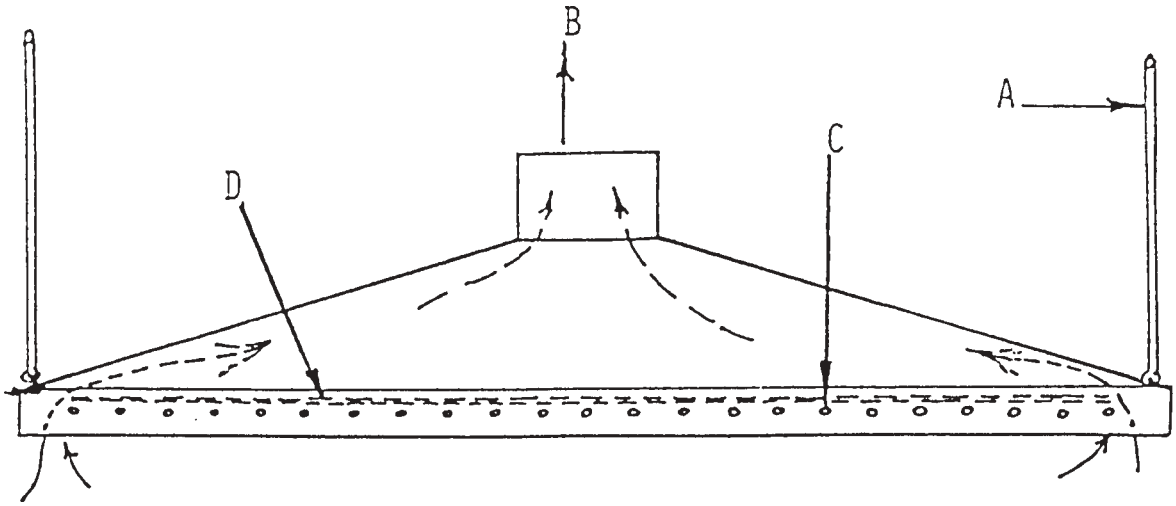
LOCATION OF FURNACE:

Locate furnace and casting area at least four feet from the wall, across the room from windows or ventilation openings. Such openings should face to the direction of the prevailing wind. As fresh air is drawn in through the ventilation openings or windows, it will sweep across the shop floor and over the casting and furnace area. It will then be drawn out with the fumes and heat through the hoods and exhaust system. NEVER LOCATE A FURNACE WHERE WORKING ROOM IS RESTRICTED OR THE AREA IS HARD TO VENTILATE PROPERLY. A ìHOT CORNERî is both dangerous and uncomfortable.

VENTILATION AND HOODS:

For ideal working conditions; it is advisable to install a hood or hoods over the entire hot work area. This includes the heat treating furnaces, melting, molding, pouring, forging and welding area. Individual hoods can be manifolded to a main exhaust system, or one main hood can cover the entire area, depending on the size of the installation.

For adequate ventilation, we suggest the exhaust system should be designed to change the total volume of air in the shop at least twenty times per hour, or the total volume of air directly beneath the hood at least twice every minute. For furnaces with BTU ratings in excess of 150,000 BTU per hour, we suggest the hood area should be a minimum of forty-eight square feet. The National Ventilating Code, requires 250 lineal feet of air flow per minute, across the total face of the hood opening. LOCAL OR AREA CODES MAY VARY, SO IT IS ADVISABLE TO CHECK WITH LOCAL OR STATE AUTHORITIES ON FINAL DESIGN AND CAPACITY. A small hood, located and sized to remove only the products of combustion from the furnace, is not adequate.



A. Rigid Hood Support Rods - 3/8" Round
B. Hood Exhaust Opening to Exhaust Fan
C. Inner Baffle Support Cross Rods - 3/8" Round
D. Galvanized 26 Gauge Sheet Baffle

Ventilation and Hoods - (cont.)

Removal of the products of combustion from the shop area is vital, BUT OF EQUAL IMPORTANCE IS THE REMOVAL OF THE FUMES AND SMOKE FORMED WHEN THE HOT METAL IS POURED INTO THE SAND MOLDS. The size of the hood should be large enough to extend over all parts of the casting area to pick up casting fumes. An alternate system is to have a casting or pouring area hooded and ventilated separately from, and in addition to, the hoods for the furnace and melting area.

A hood large enough to cover both the melting and casting areas may be too large for the capacity of the blower selected for the ventilating system. This may be corrected by baffling the center area of the hood with sheet metal so a slot with a minimum width of twelve inches around the outer edge of the hood forms the total hood opening. The smaller total hood opening area should carry the full capacity of the ventilation suction unit. By being a smaller total hood face area, there should be an increase in the air velocity or lineal flow to meet the minimum 250 lineal foot flow. SEE ILLUSTRATION ON PAGE THREE.

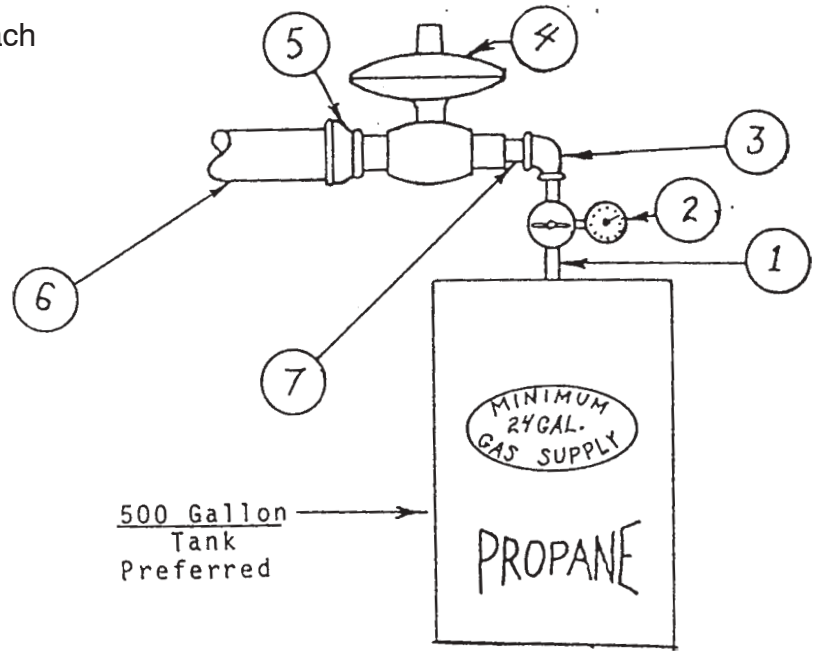
DO NOT CONNECT VENTILATING STACKS DIRECTLY TO THE EXHAUST PORT OF THE FURNACE. Furnaces capable of melting metals have an extremely high exhaust or flue gas temperature, and will cause rapid deterioration of the stack metal. By positioning the hood high enough above the melting station, the ventilating system draws additional air from the adjacent area, and will reduce the exhaust gas temperature to an acceptable, cooler level. We suggest that the hood should be suspended with rigid mounting and have at least eight feet clearance from the floor to the bottom of the hood. This will allow adequate head room for the operator to charge or draw the hot crucible from the furnace chamber, using standard crucible tongs.

GAS SERVICE LINE:

The gas connecting line should be one pipe size larger than the gas inlet size of the mixer. Main gas line shut off valves must be full flow design to insure maximum gas flow. Low gas pressure or inadequate volume will result in flame fluctuation, improper firing, and slow heating. The easiest method of determining whether or not you have sufficient gas supply to operate the furnace correctly is to operate the furnace with the blower air adjusting valve completely open. At this setting, there should be excess gas available. If excess gas is not available, the utility company may be able to increase gas line pressure, and use a step down pressure regulator at the furnace gas solenoid valve. Maximum gas pressure allowable by the solenoid valve manufacturer is 2 Ibs. THE GAS COMPANY SHOULD BE CONSULTED FOR ADEQUATE PIPE SIZING ON INITIAL INSTALLATION, or where pressure drop is a problem.

The Speedy Melt gas-air mixers will operate efficiently on natural, manufactured, or bottled fuel gas. There are no metering jets, orifices, or spuds to change or remove. When using MANUFACTURED OR BOTTLE GAS as fuel, the utility company should be advised of the furnace BTU rating, so adequate service can be installed. A HIGH FLOW GAS REGULATOR should be set to hold at least eight inches minimum W.P. with the furnace operating at minimum input.

1. 1/4" pipe from tank to regulator.
2. Tank regulator for required BTU for each furnace.
3. 1/4" to 1/2" reducing elbow
4. Regulator for required BTU for each furnace.
5. 3/4" to 1" reducing coupling.
6. 1 ì pipe 10 feet to furnace.
7. 1/2" pipe between regulators.



GAUGE SETTING:

2. Set this gauge at 4 lbs.
4. Set this regulator at pressure on furnace test tag.

RECOMMENDATIONS:

A. Propane tank should be outside of building.
B. (2) Regulator should be outside of building, covered and locked.
C. (4) Regulator should be 10 feet from furnace to protect diaphragms inside regulator from heat.

ULTRA VIOLET COMBUSTION SAFEGUARD WITH SPARK IGNITION

MIFCO COMBUSTION SAFEGUARD SYSTEM No. 4

SAFE STARTING:

1. Open the lid and swing away from the burner. (WARNING - DO NOT SWING THE HOT LID OVER BURNER EQUIPMENT.)
2. Open main gas line shut off cock leading to the furnace. This does not include the gas adjusting valve at the mixer.
3. Be sure both mixer gas and air adjusting valves are closed.

IGNITION:

4. Press the start button. This energizes the flame protection circuit.
5. There will be a 10 second self diagnostic period when the unit receives power. During this time, the unit checks all circuits for continuity before powering the blower.
6. After the blower starts, there is a 10 second purge cycle prior to the spark transformer and main gas coming on.
7. When the purge cycle is finished, the spark transformer and main gas solenoid will receive power. This will be indicated by the PILOT and MAIN indicator lights on the flame supervision chassis. At that time, you have 10 seconds to achieve ignition before the unit shuts down for flame failure. Open the gas adjusting valve slowly (smaller adjusting valve which enters the side of the mixer) until main burner ignites. When the flame is established and is being seen by the flame scanner, the FLAME indicator light on the chassis will be lit. The ignition trial period only lasts for 10 seconds, so burner flame must be established within this time.
8. Adjust the mixer to about 1/3 firing rate. Adjusting any two valve burner system is identical to adjusting an oxy-acetalyne torch. Increase the gas slightly until the flame shows a slight excess of gas, then open the air valve to form the flame cone at burner tunnel. IMPORTANT THE MAIN BURNER FLAME MUST BE HELD NEAR THE BURNER TUNNEL OPENING SO THE ULTRAVIOLET SCANNER CAN SEE THE FLAME.

ADJUSTING:

9. Close the furnace lid and continue opening the gas and air valves per step í8' until the air valve is wide open. There should NEVER BE MORE THAN 5 inches of flame coming out of the exhaust port at any time during adjustment of burner. See the Operating Manual for adjusting the atmosphere for melting.
10. To decrease heat, close the air valve until the exhaust flame at the exhaust port is about 5 inches long. Next, close the gas valve until the flame disappears into the furnace. Repeat the turn down sequence to the desired firing rate. Idle is about one fourth open.

SHUT DOWN FOR POURING OR TEMPERATURE CHECK:

11. IDLE FURNACE PER STEP í10', then press the stop button. This closes the gas solenoid shut off valve and stops the blower. DO NOT CHANGE IDLE ADJUSTMENT OF VALVES. To restart the furnace, press the start button and the furnace will re-ignite at the idle position.

SHUT DOWN TO SECURE FURNACE AT END OF MELTING PERIOD:

12. Press the stop button. Close both of the mixer adjusting valves. Close the gas line shut off cock. Close the furnace cover.

RE-IGNITION AFTER FLAME FAILURE:

a. Turn off all burner adjusting valves.
b. Press the stop button on the start-stop station.
c. Wait 50 to 60 seconds for safety timers to cool off.
d. Depress the RESET button on the flame supervision chassis.
e. Open the furnace cover. Repeat ignition steps 4 through 8.

TROUBLE SHOOTING FOR INITIAL START-UP:

A. FURNACE WILL NOT RESTART AFTER MELTING CYCLE AND SHUTDOWN: The gas valve was closed, extinguishing the flame before the stop button was pressed. This simulates a flame failure and initiates the flame failure shutdown cycle. Follow the steps in RE-IGNITION AFTER FLAME FAILURE, to restart the furnace.

B. FURNACE IGNITES SATISFACTORILY, BUT SHUTS DOWN WHEN HEATING RATE IS INCREASED: Too much gas in the mixture. The flame blows away from the burner tunnel, simulating a flame failure. Refer to the information in STEP 8 of IGNITION.

C. FURNACE SHUTS DOWN WHEN FURNACE IS ADJUSTED TO MAXIMUM FIRING: Insufficient gas supply. The excess air extinguished the flame. Have a gas utility company check the gas regulator and size of installation against the BTU rating of furnace.

D. SLOW MELTING: Insufficient gas supply. The operator should be able to open the air valve all the way and still have excess gas available. See the Operating Manual on: OPERATION.

E. FURNACE WILL NOT START AFTER FLAME FAILURE SHUTDOWN: The flame relay has not been reset. See STEP ìdî in RE-IGNITION. Insufficient waiting period for cool down of timers. See STEP ìcî RE-IGNITION.

SERVICING - TROUBLE SHOOTING:

Problems with MIFCO furnaces with Fireye Controls can be easily isolated by following the approved procedure in the sequence given below. Before starting any trouble shooting, however, make sure of the following:

1. Installation and wiring has been made in accordance with the manufacturerís instructions.
2. The Fireye Chassis is securely plugged in and the top and bottom retaining screws are tightened. The Lockout Switch (red pushbutton) is reset.

In the following list, problems are listed first, and the possible causes are listed below in numerical order. Refer to the manufacturerís instruction manual included in this operating manual for proper component and contact identification. It is necessary to have a 20,000 ohm, DC volt meter to perform signal testing. This meter, set on 150 volt AC scale, may be used to check line and load voltages at the identified terminal studs on the components.

A. FURNACE WILL NOT START:

1. No voltage at start button or at UV terminals S1 and S2:
    a. Power cord not plugged into outlet.
    b. No power at outlet, (check with meter).
    c. Disconnect switch is off that feeds outlet.

A. FURNACE WILL NOT START: - (cont.)

d. Broken wire between outlet and control box.
e. Blown fuse that feeds circuit breaker.
f. Check the 2 amp control fuse.

2. Insufficient voltage at UV terminals S1 and S2:
   a. Minimum voltage is 102 volt - 50/60 cycle.
   b. Maximum voltage is 132 volt - 50/60 cycle.

3. No voltage to coil of motor starting relay R-1:
   a. With volt-meter, check wires to relay coil from start / stop buttons.

4. Unit not properly grounded.

B. MOTOR STARTING AND HOLDING RELAY WILL NOT OPERATE:

1. No action when start button is activated:
   a. Check for voltage on either side of start button. If there is no voltage, replace the bad switch.
   b. Check relay coil, gray wire, for voltage.

C. HOLDING RELAY WORKS BUT MOTOR DOES NOT RUN:

1. Check motor overload:
   a. Check with voltmeter to see if power is passing through to motor. Check from ground to overload.
   b. Push the reset button on the motor overload.
   c. Check the heater element on the top of the motor overload to see if it is burnt in half.
   d. Examine relay contacts.

D. THE MOTOR RUNS, BUT THE SPARK DOES NOT COME ON:

1. Check the spark plug for power:
   a. Remove the spark plug cap. Hold this cap by the outside corner and hold the cap up to a metal part of the furnace and push the start button to see if there is a spark at the cap.

2. Check the air pressure switch:
   a. Remove the junction box cover on the top of the air pressure switch (004226). Place both wires inside on the same terminal, this will by-pass the switch. If you get a spark when you press the start button, you know the switch is bad.
   b. With the air switch by-passed and the motor running, check UV terminals 2 & 4 for line voltage, 120V. If no voltage is present, replace UV chassis.

3. Check the spark plug:
   a. Pull off the spark wire and hold by the outside corner of the connector cap. Hold the metal part of the cap close to the burner and press the start button. If it sparks, the transformer is OK. If not, check the spark wire connections on both ends and try again. If there is still no spark and there is 120 volts-on terminals 2 & 4, then you should replace the spark transformer.

4. The spark plug does not fire:
   a. Remove the plug and look for cracks in the porcelain insulator. If it is cracked, replace with the same electrode.

4. (cont.)
    b. If the plug is not cracked, install it back in the furnace. The gap between the wire tip of the plug and the end of the burner nozzle should be 1/16" to 1/8". This can be adjusted by bending the electrode wire, swiveling the electrode, and then tightening the clamping nut to hold it in place. Observation can be made with a mirror inside the furnace or through the UV Scanner observation port. In either case, **BE SURE THE GAS IS OFF**.

E. THE MOTOR RUNS, THERE IS A SPARK, BUT NO GAS:

1. Scanner does not see spark:
    a. Remove the scanner to see if the sight tube is blocked.
    b. Wipe off scanner bulb with soft cloth or tissue and replace.

2. Broken Scanner wire:
    a. Check for cuts or mashed conduit.

3. Ignition signal testing using a 20,000 ohm per volt DC volt meter:
    a. Connect the meter to terminals S1 & S2.
    b. Set the volt meter on the 10 volt DC scale and initiate a normal start up, but with the gas valve CLOSED. The meter should read between 41/2 and 5 volts. If the-meter goes backwards, reverse the leads. If the reading is less than 41/2 volts, the scanner needs to be replaced.

F. GAS SOLENOID WILL NOT OPEN:

1. After checking all of the above, check terminals 2 & 3 on UV Chassis for line voltage:
    a. Put the volt meter back on the AC-250 volt scale and put the leads on terminals 2 & 3. Start the furnace, and when the unit goes to Main Flame, terminal 3 should be energized, reading 120 volts. If it is not, and every thing else proves out, the chances are that the UV Chassis is bad and needs replacing.

2. Terminal 3 is powered but the solenoid still will not open:
    a. Check for broken wires or loose connections.
    b. The solenoid wires can be taken loose by a qualified electrician and powered with 120 volts to see if it will open. If it does not open, it will have to be replaced.
    c. Check to see that the gas pressure is not higher than the rating on the valve nameplate.

G. MAIN FLAME SIGNAL TESTING:

1. Same procedure as STEP îEî - ì3î.

H. MAIN FLAME DOES NOT LIGHT:

1. Gas valve shutoff someplace in building.

I. MAIN FLAME LIGHTS AND GOES OUT AFTER 10 SECONDS:

1. Flame not adjusted properly:
    a. It is best to get the furnace flame at least half way open before the spark goes off, especially on a cold start up.

J. FURNACE SHUTS DOWN WHEN IT IS ADJUSTED TO MAXIMUM FIRE:

1. Insufficient gas supply:
    a. Excess of air extinguishes the flame. Have the gas utility company check the gas pressure with the furnace running. If the pressure drops to ì0î, the gas supply is inadequate.
    b. Not enough gas in adjustment, the flame should come out of the exhaust port about 3 inches.

2. Too much gas:
    a. The flame is burning away from the burner port. The UV Scanner cannot see flame and turns off gas.

K. SLOW MELTING:

1. Insufficient gas supply:
    a. The operator should be able to open the air valve all the way and still have an excess of gas after the flame has been balanced.

2. Low service line voltage:
    a. The voltage on the service line should be 115 volts. Low voltage causes the rpm of the motor to drop, which results in a reduced volume of air.
    b. Bad bearings will also slow down a motor.

L. FURNACE WILL NOT RESTART AFTER STOPPING:

1. Gas valve was shut off before stop button was pressed:
    a. The reset has kicked out. Push the Reset Button on the UV Chassis and then restart.

2. UV Chassis may be going out.

3. Gas supply marginal and / or fluctuates:
    a. When starting with the valves in a set position and the gas supply or pressure changes, like when a boiler comes on, the valve setting would not be right and the unit would not start.

M. FURNACE WILL NOT START AFTER FLAME FAILURE:

1. Not enough time has elapsed for blower to stop spinning and allow the air switch to reset:
    a. Allow blower to stop spinning then press reset button on UV Chassis.

2. Bad UV Chassis.

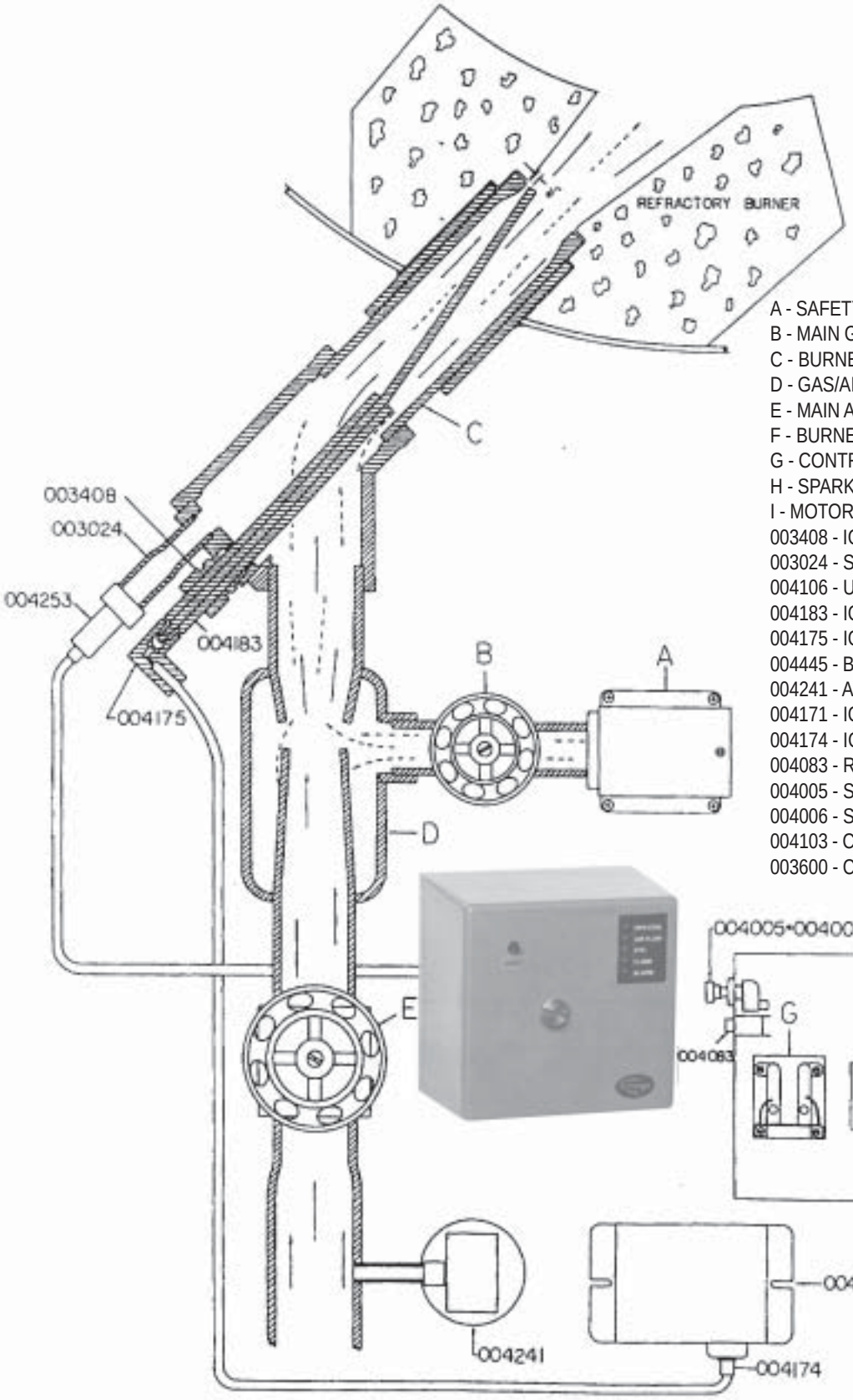
3. Bad UV Scanner.
    a. Check and replace if necessary.

N. ELECTRICAL SEQUENCE:

1. Press the start button and the system performs- self check.
2. Holding coil pulls in and motor starts.
3. Air switch closes powering terminal 6 in UV Chassis.
4. Terminals 4 and 3 powered. Ignition transformer powered and ignition timing starts. Main gas solenoid powered.

N. ELECTRICAL SEQUENCE - (cont.):

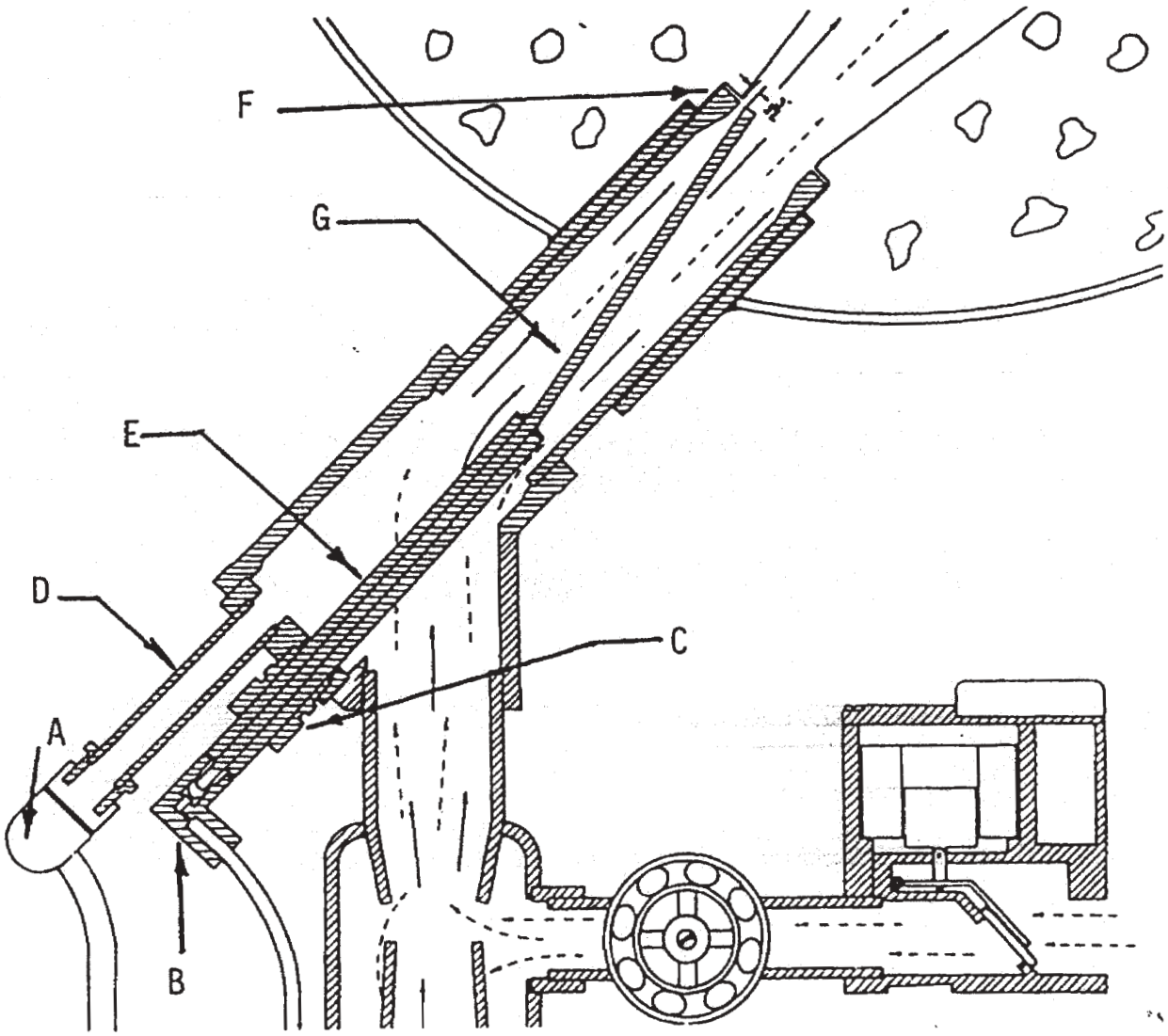
5. Gas in scanner ionized, allowing power to flow between electrodes.
6. Main flame is proven and stays on.
7. Flame failure for any reason cuts off power to terminal 4 and 3 in 3 seconds.
8. Alarm light comes on.
9. Push reset button.
10. Blower failure, air switch opens - cutting power to gas solenoid. Blower runs another 10 seconds and turns off.



A - SAFETY GAS SOLENOID
B - MAIN GAS ADJUSTING VALVE
C - BURNER NOZZLE
D - GAS/AIR MIXER
E - MAIN AIR ADJUSTING VALVE
F - BURNER CONTROL RESET BUTTON
G - CONTROLRELAY
H - SPARK IGNITER DELAY
I - MOTOR OVERLOAD RELAY
003408 - IGNITION ELECTRODE CLAMP
003024 - SCANNER ADAPTER FITTING
004106 - ULTRA VIOLET SENSING SCANNER
004183 - IGNITION ELECTRODE
004175 - IGNITION ELECTRODE ANGLE CONNECTOR
004445 - BURNER CONTROL MODULE (UV CHASSIS)
004241 - AIR PRESSURE SWITCH
004171 - IGNITION TRANSFORMER
004174 - IGNITION WIRE STRAIGHT CONNECTOR
004083 - RED FLAME FAILURE ALARM LIGHT
004005 - START PUSH BUTTON
004006 - STOP PUSH BUTTON
004103 - CONTROL BOX ENCLOSURE
003600 - CONTROL FUSE HOLDER

4 UV Safety System

Installation of Spark Electrode
4 UV Safety System



Step 1. Remove scanner shield covering burner tip assembly.
Step 2. Remove the Ultra-Violet Scanner head ìAî.
Step 3. Remove spark connector ìBî and brass electrode lock nut ìCî.
Step 4. Remove old spark electrode.
Step 5. Put a light inside the furnace chamber, at the end of the tunnel, and insert new spark electrode.
Step 6. The steel electrode ìGî is bent at an angle. Look through the scanner tube ìDî and revolve spark electrode until spark gap ìFî is 3/32" maximum. Be sure the porcelain extends beyond the brass lock nut at least an inch.
Step 7. Tighten the brass locking nut just tight enough to prevent the electrode from moving. (Tightening the nut too tightly will break the porcelain.)
Step 8. Replace spark wire to the electrode. Press the start button and observe the spark by looking through the scanner tube ìDî.
Step 9. If the spark is satisfactory, replace the scanner head ìAî, press the start button and light the furnace.

MAINTENANCE:

All MIFCO furnaces are constructed with hard, pre-burned, sectional refractory shapes. Each brick is made by air ramming the granular refractory particles into a steel mold, forming the desired shape. The shape is removed from the mold, dried to remove all moisture, then fired. Defective bricks that fail during the final burning are discarded. This assures controlled quality refractory for all MIFCO furnaces before assembly into a furnace lining.

We can control quality through the point of manufacture of the furnace, but preventative maintenance is necessary for maximum productive life of the furnace lining. The exposed surfaces of the refractory lining should be resealed when scuffing and wear takes place.

MINRO-WASH REFRACTORY SEALER FOR FURNACE LININGS:

The basic refractory used for our sealer is ground to a very fine powder. It is then mixed with a water soluble bonding agent which develops a mechanical bond to the refractory. When the furnace is fired to a high temperature, the bonding agent burns out and the refractory sealer forms a ceramic bond with the furnace lining. It is available in twenty pound bags and should be stored in a dry warm area. Prepare only the quantity to be used at one time for one application.

REFRACTORY PLASTIC PATCHING MATERIAL:

If the refractory lining has been chipped or broken, and the damaged areas are too large to be filled with refractory sealer, they should be filled with patching material. The ìplasticî patching material consists of the same refractory as the sealer, except a coarser grain size is used. It is a medium grained, heat setting mix that should be thoroughly tempered with water before use. The material not used must be discarded. Mix with water only the amount needed each time.

APPLICATION OF REFRACTORY SEALER AND PATCHING MATERIAL:

Remove all loose scale and foreign material from the surface to be sealed. Wire brush to remove flux and old loose sealer. Excessive flux and spilled metal are detrimental to refractory and should be removed. Prepare the surface by priming with a saturated solution of sodium silicate. This material is available from drug or foundry supply houses. Brush or sponge the solution liberally on the refractory.

The refractory patching material should be used at this point to fill larger holes. Saturate damaged areas with primer or water. This forms a strong bond between the refractory and patching plastic. Place a layer of patching plastic with a maximum thickness of 1/8" into the area being filled. The thin patch should be allowed to dry for one hour, then heat the area to a red temperature by using the furnace. When the furnace has cooled, add another thin layer, not exceeding 1/8" thickness over the original layer, using the above instructions for the second patch. Successive thin layers should be applied and burned until the patch conforms to the original contour of the furnace lining. If the procedure of applying and burning in the successive thin layers is not followed, and a heavy patch is used to fill the damaged area, the moisture retained in the center of the heavy patch will generate sufficient steam to cause it to rupture and peel.

APPLICATION OF SEALER AND PATCHING MATERIAL: (cont.)

After the primer has been applied, and any severely damaged sections have been repaired with plastic patching, prepare the sealer as follows:

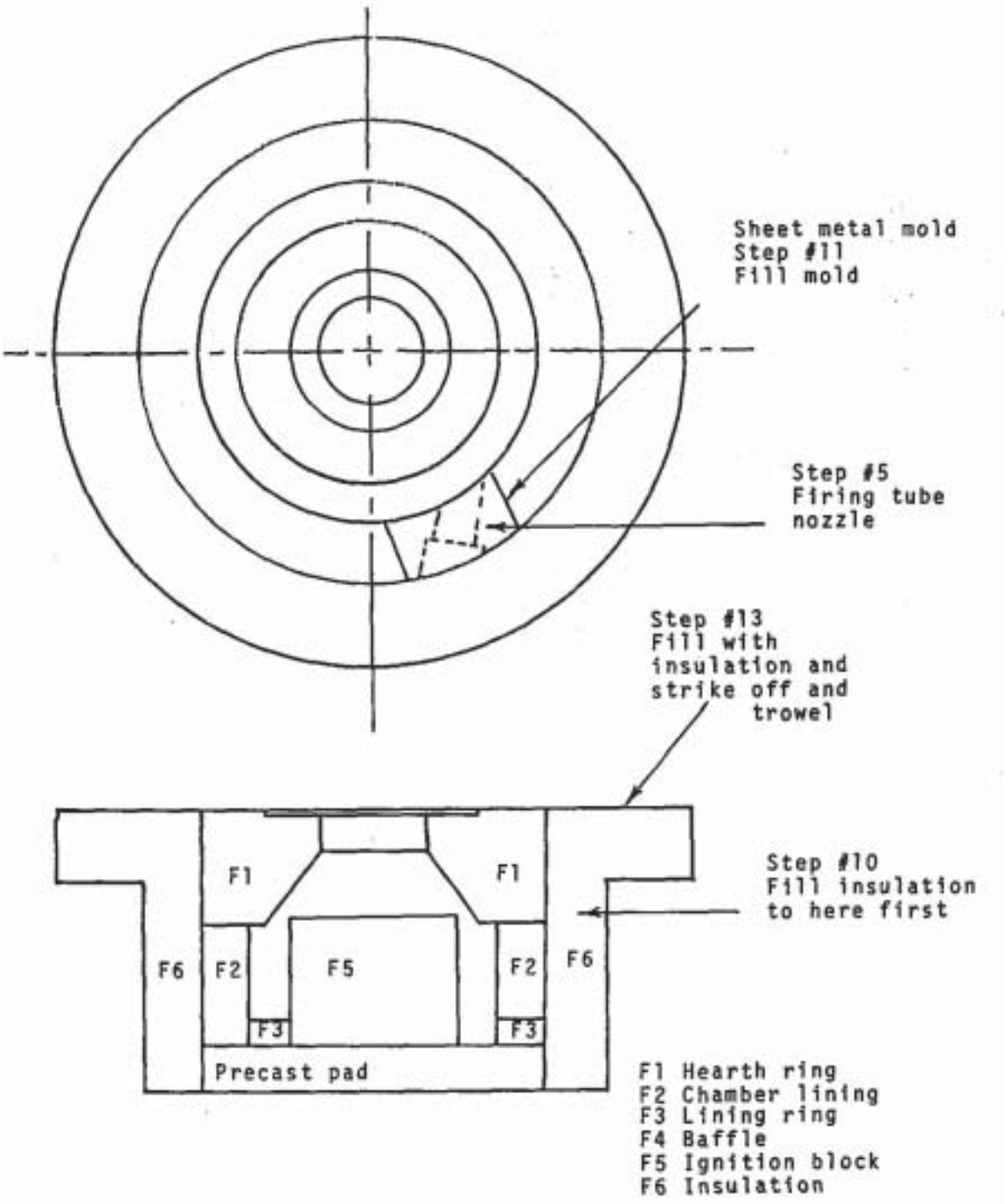
Step 1. Use one pint of warm water in a metal container.
Step 2. Sift the refractory into the water while stirring constantly.
Step 3. Allow the mixture to set overnight to completely dissolve the bonding agent.
Step 4. Remove the lid from the furnace so both the bottom and top surfaces can be sealed. With the use of a sponge, saturate exposed refractory with water and immediately brush the prepared sealer into the surface of the refractory lining and lid. Unless the refractory is pre-saturated with water, it will draw the moisture from the sealer, preventing a tight bonding action and the seal coating will peel. (LIGHT COATINGS APPLIED OFTEN, ARE MORE SATISFACTORY THAN ONE HEAVY APPLICATION.)
Step 5. Allow the furnace to dry for a period of at least two hours.
Step 6. Light furnace and fire slowly for about five minutes, then shut furnace down. (THIS PROVIDES HEAT TO EXPEL MOISTURE FROM THE PATCHING PLASTIC.)
Step 7. Allow the furnace to dry an additional hour, then light furnace and increase heat slowly to red heat. The furnace chamber should be inspected and cleaned of any accumulation of slag or spilled metal while the furnace is cold, prior to startup. Proper cleaning and the use of sealer should triple the life of the refractory in your furnace.

F-100-A Forge with 4-UV Safety System
Replacement Parts List

Part No.	Description	No. of Pieces
003987	6í Power Cord	1
003600	BS-HKP-HH Fuse Holder	1
003624	2 Amp Fuse	1
003707	Power Cord Bushing - 7/8î - SR7W2	1
004445	Fireye MC-120 Chassis with Programmer and Amplifier	1
004105	61-3060 UV Chassis Base unit	1
004106	UV-1A3 Flame Detection Scanner	1
003930	CE15ENS3AB 3 pole, 25 amp IEC Motor Contactor	1
003896	C316FNA3L Motor Overload Relay	1
004067	4 inch Spark Electrode	1
004134	F1-M Blower and Motor - 120 v. - F10-V065	1
004214	3/4î Gas Solenoid Valve	1
004226	Low Pressure Air Switch	1
003915	Ignition Transformer	1
004070	Angle Connector for Spark Electrode	1
003906	Red Indicator Light	1
003662	Black Start Switch	1
003663	Red Stop Switch	1

F-100-A Forge with 4-UV Safety System
Relining Kit Parts List

Part No.	Description	No. of Pieces
008014	4 Section Hearth - F1S	4
008050	C-10 Side Liners	3
008051	C-10 Burner Brick	1
008017	Bottom Ring	1
008018	Reflector Brick - F4	1
008020	Insulation Pad - F7	1
008245	6 x 5 Silicon Carbide Crucible Rest	1
	30 lb. Bags of Castable Insulation	2
	20 lb. Box of Refractory Sealer	1



INSTRUCTIONS FOR RELINING F-100-A FORGE

1. Clean out all old brick and Castable Insulation. Remove gas mixing and blower assembly.

2. Place precast insulating pad #1 in center on the bottom of the Furnace Shell.

3. Place the F3 brick inside of the F2 liner on the marked side of the F2 liner.

4. Place the F2 liner and the F3 bottom ring on the insulating pad, marked side down, with the nozzle in the firing hole of the F2 liner. These bricks should be in the center of the shell.

5. Place the F5 silicon carbide rest block in the hole of the F3 ring brick on the insulating pad. Be sure all the bricks are down on the pad.

6. Mix half of the Refractory Sealer as directed in the instructions for use of the Refractory Sealer.

7. Paint the inside of the F2, F3 and F5 brick. Be sure all joints are filled.

8. Place the sheet metal mold around the firing tube with the bottom side of the ìUî on the pad as shown.

9. Mix the Castable Insulation with water to moisten the mixture. Pack this around the assembly up to the mold and tamp lightly.

10. Mix the Castable Insulation with one pint or 16 ounces of water. Pack this mixture inside of the mold. Be sure that this mixture is packed well around the Burner Guide Tube. Fill the mold level with the hearth liner. Do not remove the sheet metal form.

11. Paint a heavy concentration of Refractory Sealer on the top edge of the F2 and bottom of the F1 Hearth Brick. Place the F1 on the F2 as soon as it is painted.

12. Cover the hearth shell around the F1 Hearth Brick with the Castable Insulation and strike off level with the rim and the F1. Trowel smooth, sprinkle with water, and re-trowel.

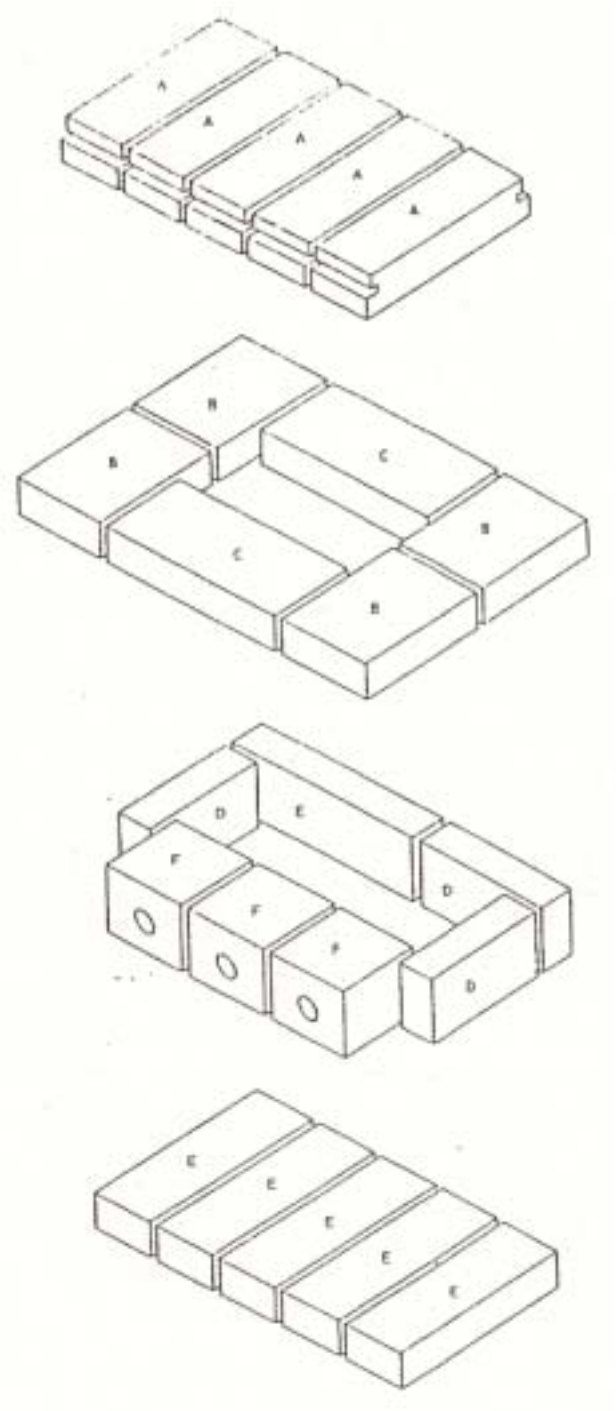
13. Firing and drying:
    Allow to set 24 hours before firing.
    a. Follow starting instructions in manual.
    b. Run 5 minutes per hour for the 1st day.

F-512, F-812, F-526, F-826 Forge with 4-UV Safety System
Replacement Parts List

Part No.	Description	No. of Pieces
003987	6í Power Cord	1
003600	BS-HKP-HH Fuse Holder	1
003624	2 Amp Fuse	1
003707	Power Cord Bushing - 7/8î - SR7W2	1
004445	Fireye MC-120 Chassis with Programmer and Amplifier	1
004105	61-3060 UV Chassis Base unit	1
004106	UV-1A3 Flame Detection Scanner	1
003930	CE15ENS3AB 3 pole, 25 amp IEC Motor Contactor	1
003896	C316FNA3P Motor Overload Relay	1
004067	4 inch Spark Electrode	1
004117	#175 Blower Motor - 1/2 hp. - 3450 RPM - 115-230v, 1ph - 56C	1
004214	3/4î Gas Solenoid Valve - For F-512, F-812 Forges	1
004215	1î Gas Solenoid Valve - For F-526, F-826 Forges	1
004226	Low Pressure Air Switch	1
003915	Ignition Transformer	1
004070	Angle Connector for Spark Electrode	1
003906	Red Indicator Light	1
003662	Black Start Switch	1
003663	Red Stop Switch	1

F-512 Forge with 4-UV Safety System
Relining Kit Parts List

Part No.	Description	No. of Pieces
008064	Burner Brick	3
008165	Clipper DP Straight Brick - 13 1/2î x 6î x 2 1/2î	2
008162	Clipper DP Straight Brick - 9î x 4 1/2î x 2 1/2î	3
008163	Clipper DP Straight Brick - 9î x 6 3/4î x 2 1/2î	4
008164	Clipper DP Straight Brick - 13 1/2î x 4 1/2î x 2 1/2î	6
008150	Greenlite 28 DP Baffle Brick - Grooved - 9î x 4 1/2î x 3î	5
008141	30 lb. Bags of Castable Insulation - Matrilite 28	4
008173	20 lb. Box of Refractory Sealer	1



A - 008150

B - 008163

C - 008165

D - 008162

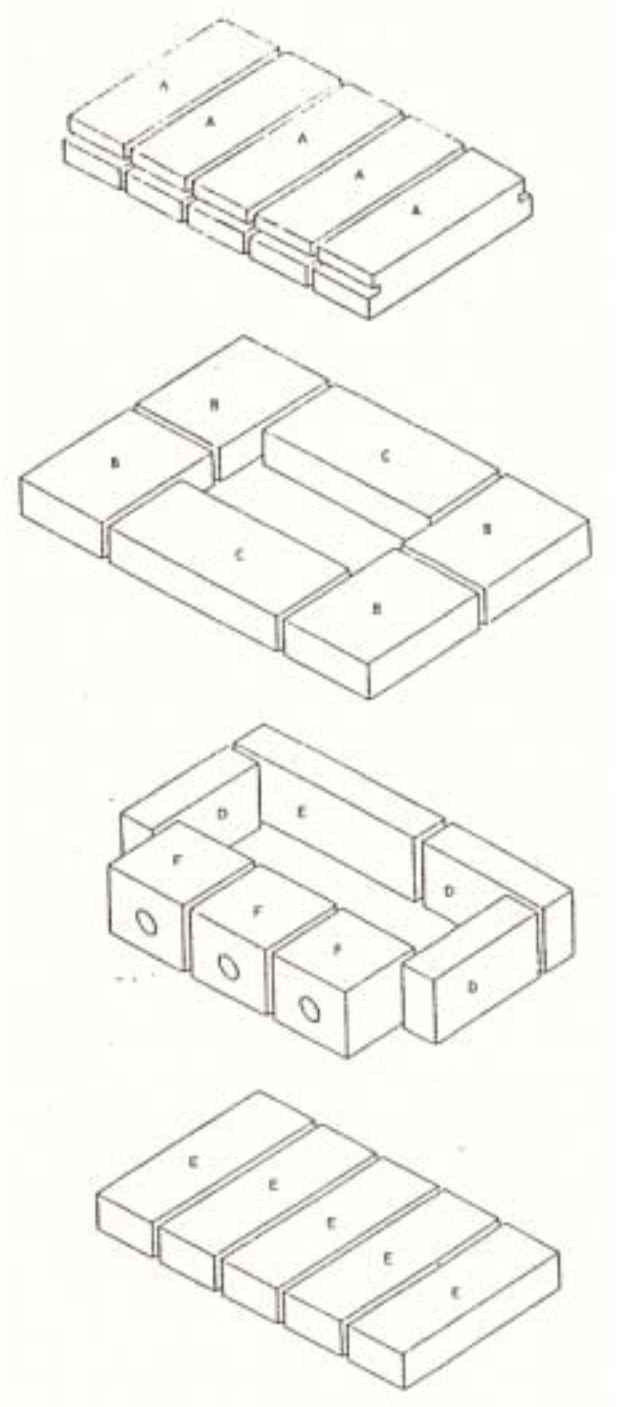
E - 008164

F - 008064

E - 008164

F-812 Forge with 4-UV Safety System
Relining Kit Parts List

Part No.	Description	No. of Pieces
008064	Burner Brick	3
008165	Clipper DP Straight Brick - 13 1/2î x 6î x 2 1/2î	2
008162	Clipper DP Straight Brick - 9î x 4 1/2î x 2 1/2î	3
008163	Clipper DP Straight Brick - 9î x 6 3/4î x 2 1/2î	4
008164	Clipper DP Straight Brick - 13 1/2î x 4 1/2î x 2 1/2î	7
008147	Greenlite 28 DP Baffle Brick - Grooved - 13 1/2î x 4 1/2î x 3î	5
008141	30 lb. Bags of Castable Insulation - Matrilite 28	5
008173	20 lb. Box of Refractory Sealer	1



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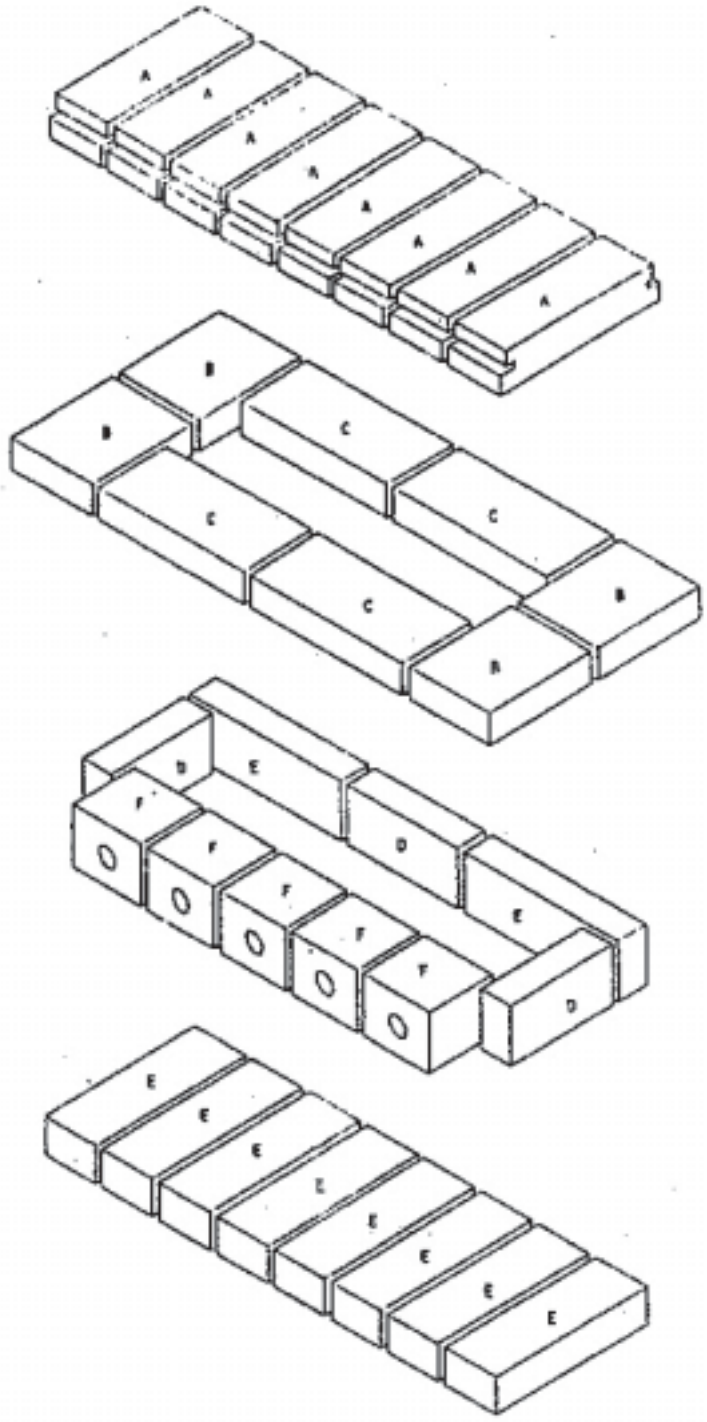
E - 008164

F - 008064

E - 008164

F-526 Forge with 4-UV Safety System
Relining Kit Parts List

Part No.	Description	No. of Pieces
008064	Burner Brick	5
008165	Clipper DP Straight Brick - 13 1/2î x 6î x 2 1/2î	4
008162	Clipper DP Straight Brick - 9î x 4 1/2î x 2 1/2î	3
008163	Clipper DP Straight Brick - 9î x 6 3/4î x 2 1/2î	4
008164	Clipper DP Straight Brick - 13 1/2î x 4 1/2î x 2 1/2î	10
008150	Greenlite 28 DP Baffle Brick - Grooved - 9î x 4 1/2î x 3î	8
008141	30 lb. Bags of Castable Insulation - Matrilite 28	6
008173	20 lb. Box of Refractory Sealer	1



A - 008150

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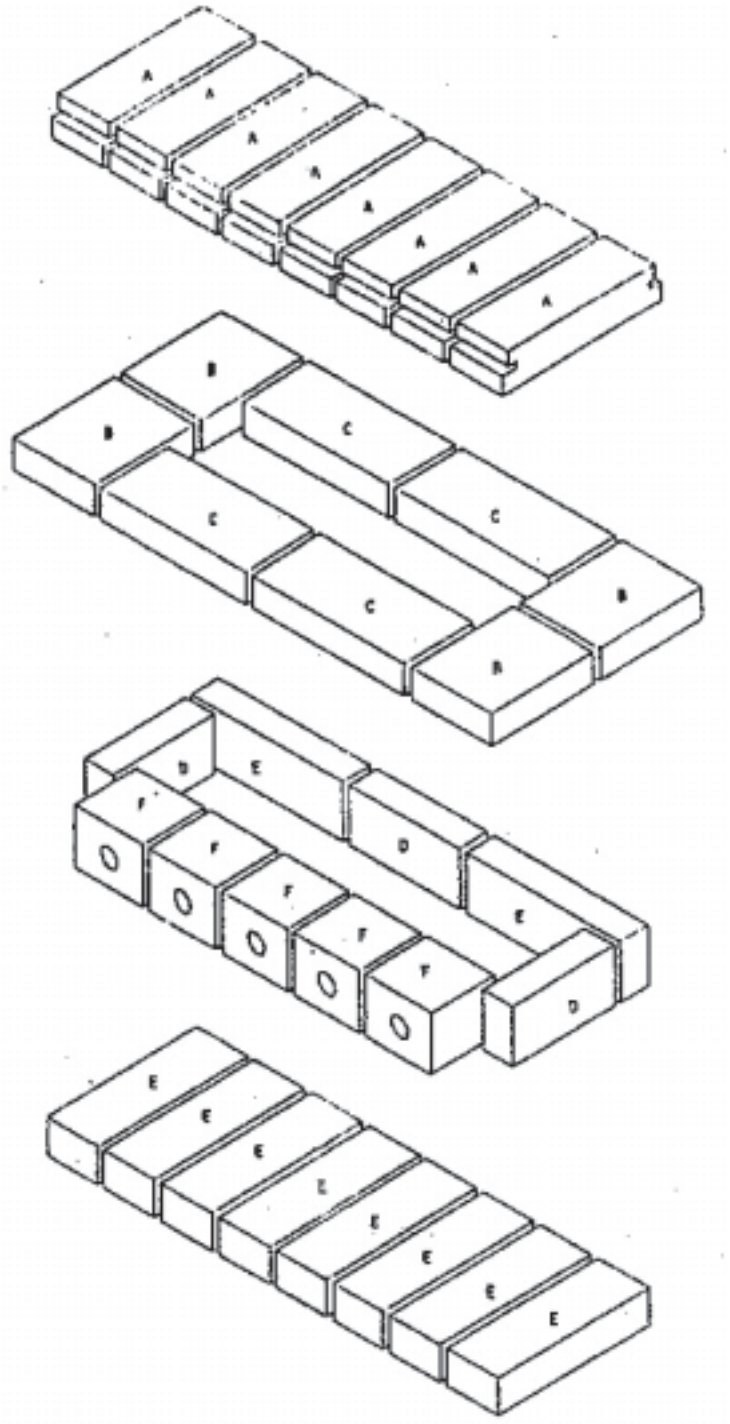
E - 008164

F - 008064

E - 008164

F-826 Forge with 4-UV Safety System
Relining Kit Parts List

Part No.	Description	No. of Pieces
008064	Burner Brick	5
008165	Clipper DP Straight Brick - 13 1/2î x 6î x 2 1/2î	2
008162	Clipper DP Straight Brick - 9î x 4 1/2î x 2 1/2î	3
008163	Clipper DP Straight Brick - 9î x 6 3/4î x 2 1/2î	4
008164	Clipper DP Straight Brick - 13 1/2î x 4 1/2î x 2 1/2î	12
008147	Greenlite 28 DP Baffle Brick - Grooved - 13 1/2î x 4 1/2î x 3î	8
008141	30 lb. Bags of Castable Insulation - Matrilite 28	6
008173	20 lb. Box of Refractory Sealer	1



A - 008150

B - 008163

C - 008165

D - 008162

E - 008164

F - 008064

E - 008164

Relining Instructions for F-512, F-526, F-812, and F-826

The MIFCO Forges have been designed so that relining is quick and easily done. Complete Relining Kits, which include all the replacement refractory shapes, Castable Insulation, and the correct type of Refractory Sealer, are available. The relining procedure is as follows:

1. Remove Burner Manifold, old castable lining, and all bricks, from the shell.

2. Prepare half of the pre-mixed Castable Insulation by adding enough water to make a stiff, mud-like mixture. (Mix up the dry Castable Insulation before dividing, as the cement tends to settle to the bottom during shipment.)

3. Mix the Refractory Sealer to the consistency of heavy cream.

4. Pour Castable Insulation into the bottom of the furnace shell and level off at the top of the two brick supports in the bottom of the furnace shell.

5. Place the 13Ωî x 4Ωî x 2Ωî standard fire bricks into the center of the furnace firebox to form the bottom of the heating chamber. Dip the mating edges of the bricks into the Refractory Sealer and push them up against each other. Work the bricks sideways to make the joints as thin as possible.

6. Pour the Castable Insulation into the area around the bottom bricks, leveling it off at the top of this layer of bricks.

7. The Burner Brick has a 4î long, oval shaped, tapered hole on one side and a stepped hole on the other side. The tapered hole goes toward the center of the furnace chamber and the stepped hole goes over the Burner Guide Tubes, which are welded into the side of the Furnace Shell. Dip the side of the Burner Brick with the stepped hole into the Refractory Sealer, so that the Refractory Sealer goes into the hole about an inch. Also, dip the bottom of the brick (which is the smooth side). Slide the stepped hole over the Burner Guide Tube and up against the Furnace Shell. The rough side will be up. Repeat this on the remaining Burner Bricks, except, also dip the side that will be up against the other Burner Bricks. Remove excess Refractory Sealer from the inside of the burner ports. If you have a piloted burner system, be sure the burner with the pilot is in the right place - (It will be the center Burner Brick).

8. Place the Side Liner Brick in place as per the Line Drawing. Use the dip joint method to mortar.

9. Mix the balance of the pre-mixed Castable Insulation as above and fill the area between the firebox and the Furnace Shell.

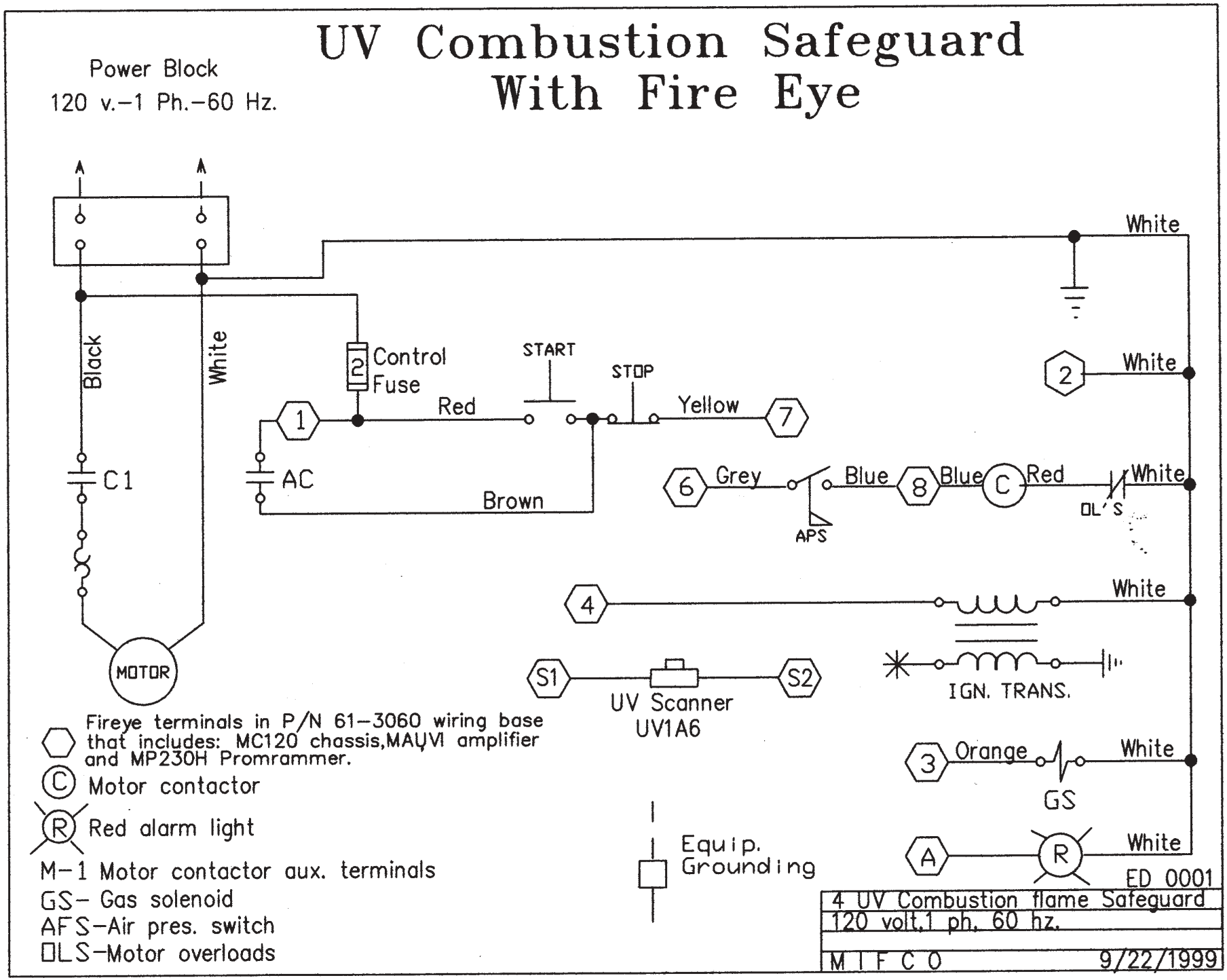
10. Put the hearth liners in place as per the Line Drawing. Use the dip joint method to mortar.

11. Mix the balance of the Refractory Sealer to the consistency of white wash and paint the inside of the firing chamber and the top of the Hearth with a thin layer. Remove all Sealer or coating from the inside of the burner tunnels so that the flame will not be impeded in any way.

12. Remove the Tie Bolt at the end of the Reflector Baffle and replace the Reflector Bricks. After replacing the bricks, replace the Tie Bolt and snug down.

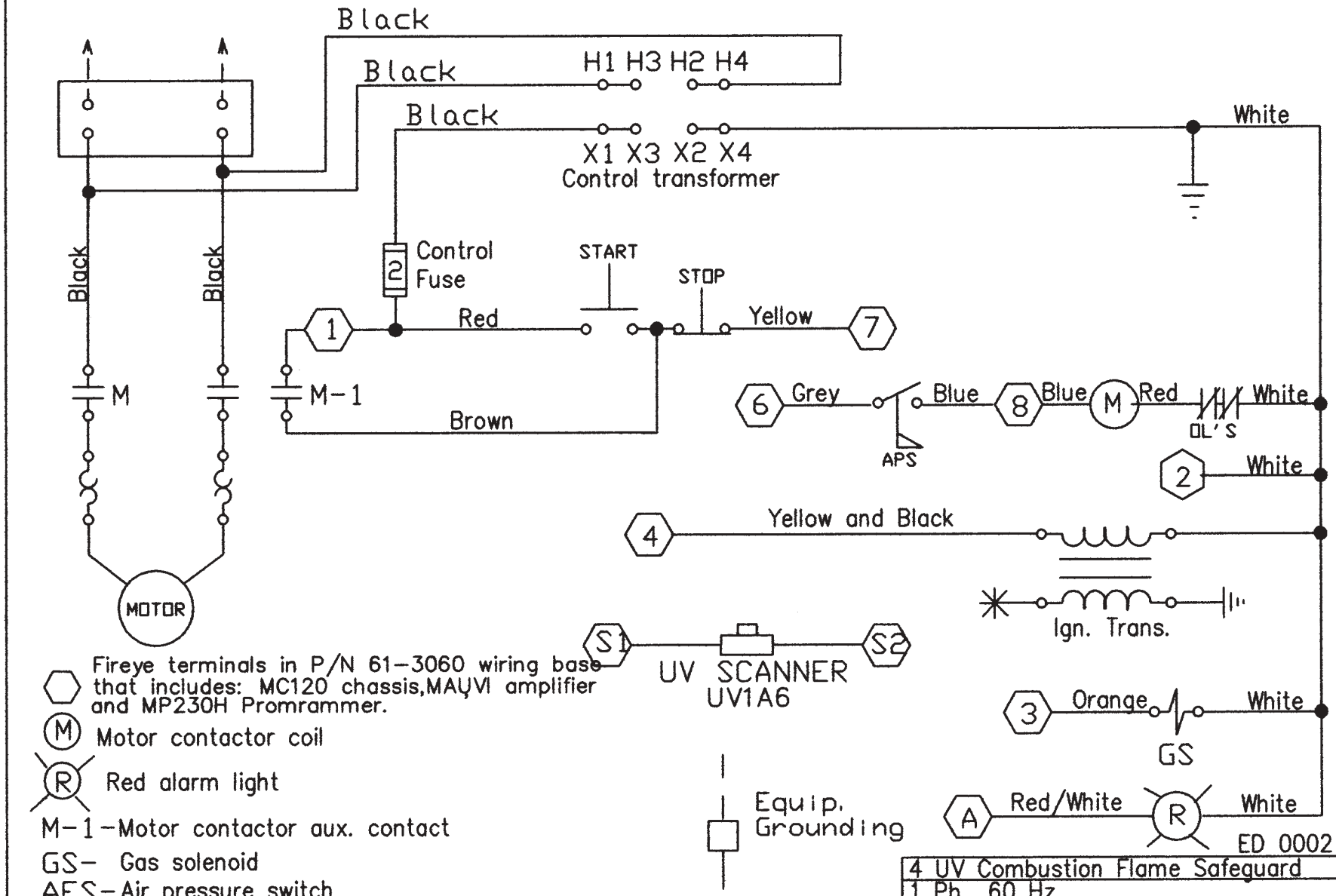
13. The furnace should sit for 24 hours to help cure the insulation. Fire the Forge at LOW FIRE for about an hour to dry the lining and insulation. The following day, fire at any desired firing rate.

UV Combustion Safeguard With Fire Eye



UV Combustion Safeguard With Fire Eye

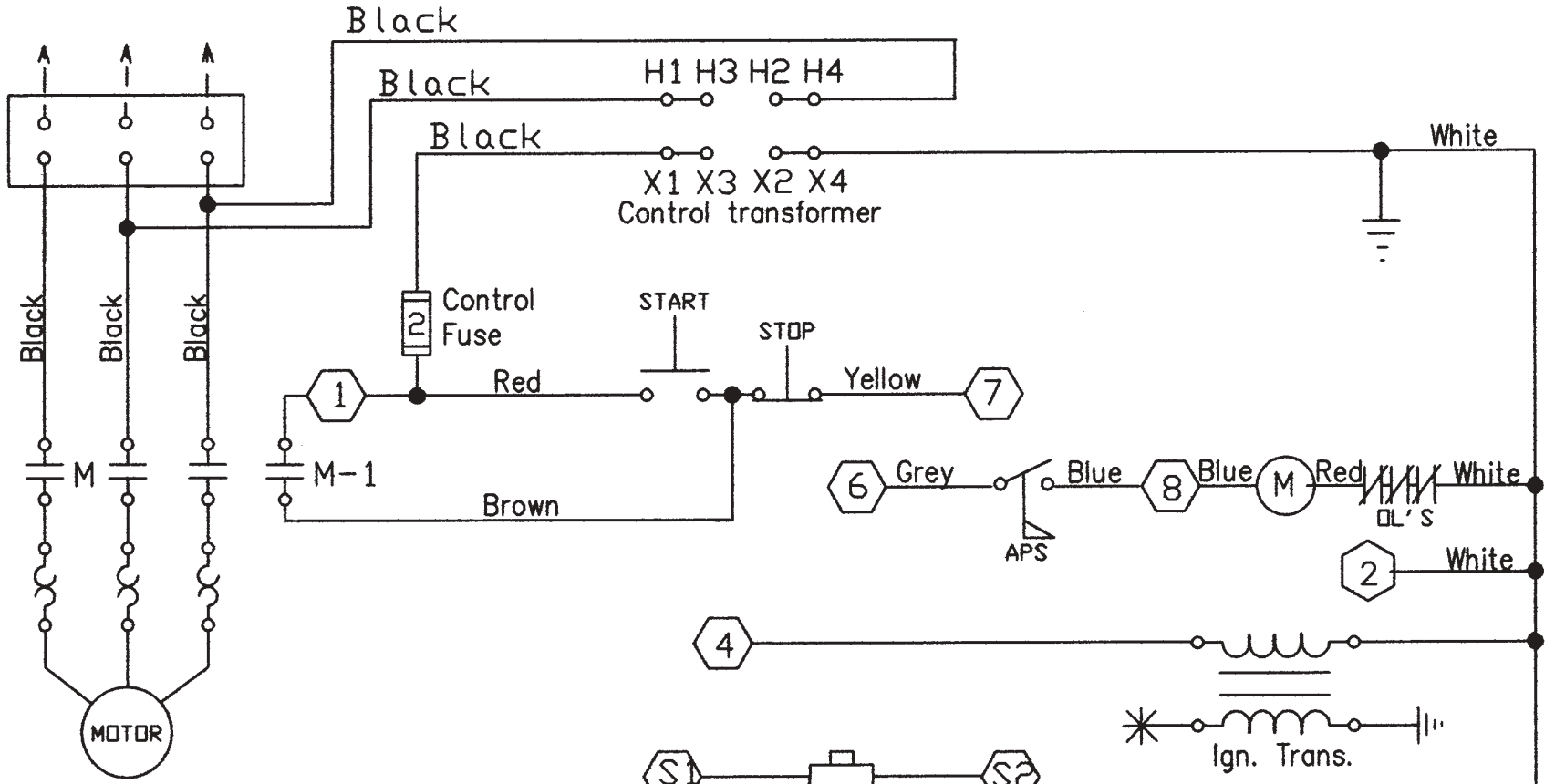
Power Block
220 V, 1 Ph., 60 Hz.



4 UV Combustion Flame Safeguard	
1 Ph., 60 Hz.	
MIFCO	9/22/1999

UV Combustion Safeguard With Fire Eye

Power Block
230 V, 3 Ph., 60 Hz.



Fireye terminals in P/N 61-3060 wiring base that includes: MC120 chassis, MAUVI amplifier and MP230H Promrammer.

(M) Motor contactor coil

(R) Red alarm light

M-1 - Motor contactor aux. contact

GS - Gas solenoid

AFS - Air pressure switch

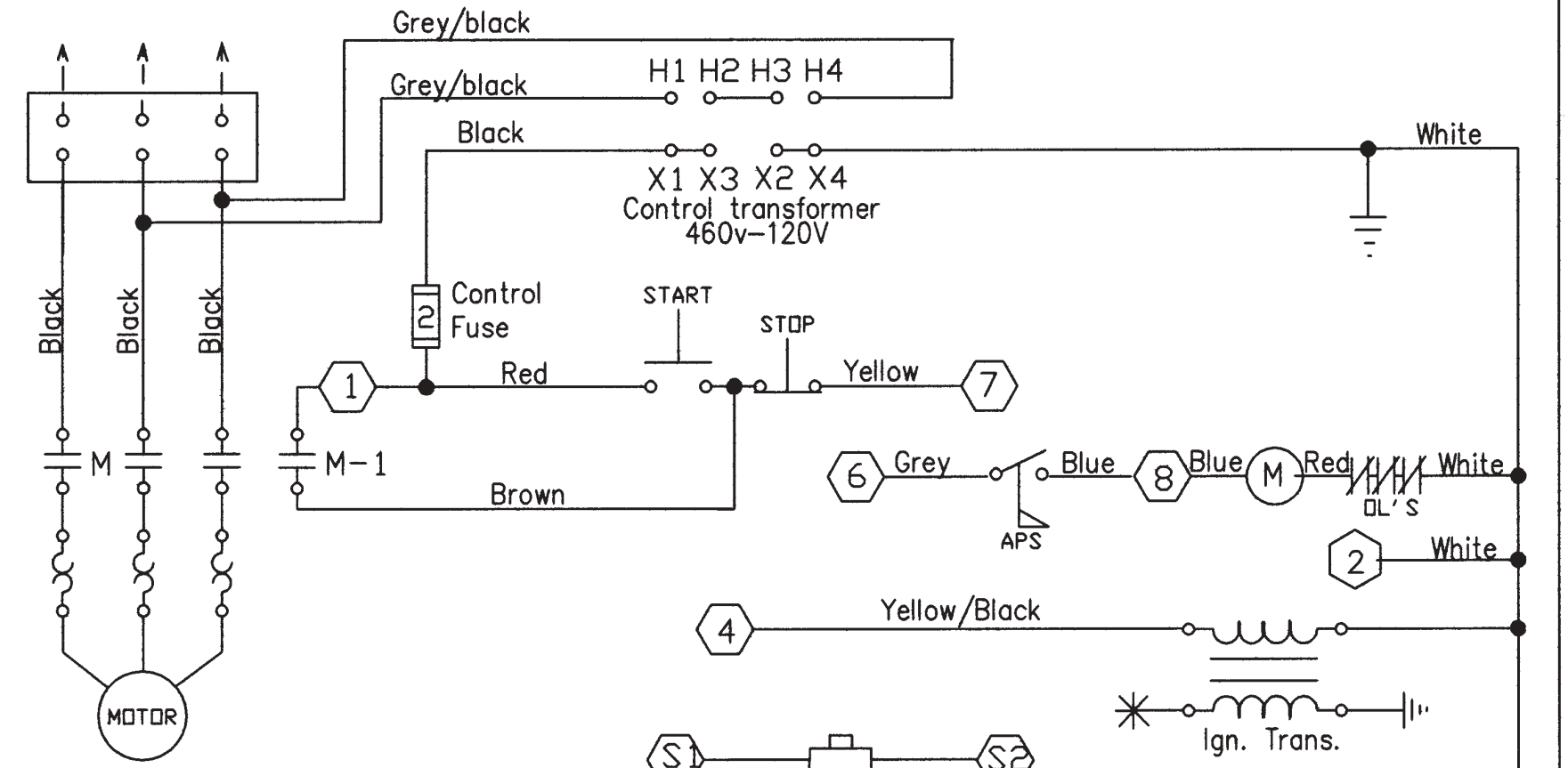
OLS - Motor overloads

ED 0021

4 UV Combustion Flame Safeguard
3 Ph., 60 Hz.
MIFCO 9/22/1999

UV Combustion Safeguard With Fire Eye

Power Block
460 V, 3 Ph., 60 Hz.



Fireye terminals in P/N 61–3060 wiring base that includes: MC120 chassis, MAUVI amplifier and MP230H Promrammer.

(M) Motor contactor coil

(R) Red alarm light

M–1 – Motor contactor aux. contact

GS – Gas solenoid

AFS – Air pressure switch

OLS – Motor overloads

4 UV Combustion Flame Safeguard
3 Ph., 60 Hz.
MIFCO 9/22/1999