



**WE HIGHLY RECOMMEND THAT A GAS PRESSURE GAUGE BE  
INSTALLED ON YOUR INCOMING GAS LINE**

**NEVER LOCATE A FURNACE WHERE WORKING ROOM IS  
RESTRICTED OR THE AREA IS HARD TO VENTILATE PROPERLY.**

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 is important. 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 our distributors or directly from the factory. It is the obligation of our 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.

## DO NOT REMOVE THIS PAGE

### **For all B, C & T series MIFCO gas fired melting furnaces and MIFCO forges:**

In accordance with the National Electric Code, A.G.A., Canadian Standard Association and O.S.H.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 the 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, please contact your distributor or the factory. Only licensed electricians or qualified factory representatives should troubleshoot the electrical system of this equipment.

**All furnace electric power must be connected to electrical disconnects.**

**All fuel lines must have manual shut off valves.**

Purchased from \_\_\_\_\_ Date \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Model Number \_\_\_\_\_ Serial Number \_\_\_\_\_

### **Electrical Service Specifications**

\_\_\_\_\_ volts \_\_\_\_\_ Phase \_\_\_\_\_ Hertz

Note: Schematic drawings showing different voltages, phase and hertz may be included in this manual.

**Maximum incoming gas pressure and required operating pressure for this unit are listed on a test tag attached to the gas gate valve of the burner system.**

**IMPORTANT NOTICE:**

**Should the spark wire and the scanner cable come within 2 inches of each other, the scanner could obtain a bad reading resulting in start failure.**

**GAS SERVICE LINE:** (updated 1/2015 with dual valve information)

The gas connecting line should be one pipe size larger than the gas inlet size of the mixer and be equipped with a gas regulator and gauge. 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, low and high pressure switch activation 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 dual safety shut off valve. Maximum gas pressure allowable by the dual safety shut off valve manufacturer is 7 lbs. THE GAS COMPANY SHOULD BE CONSULTED FOR ADEQUATE PIPE SIZING ON INITIAL INSTALLATION, or where pressure drop is a problem.

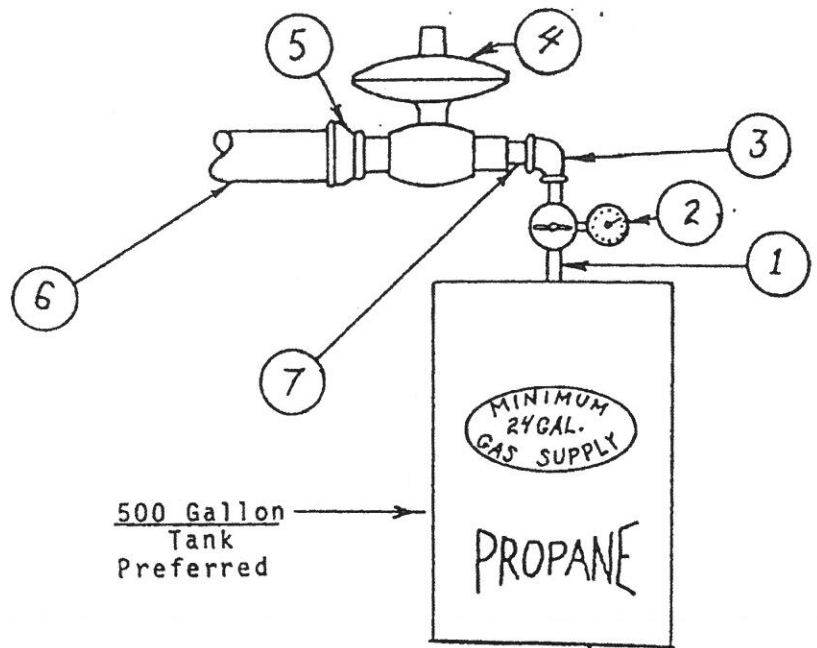
The Speedy Melt gas-air mixers will operate efficiently on natural, manufactured, or bottled fuel gas. There are no metering jets, orifices, or spuds to change or remove. When using MANUFACTURED OR BOTTLE GAS as fuel, the utility company should be advised of the furnace BTU rating, so adequate service 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.

GMH High Gas Pressure Switch      GML Low Gas Pressure Switch

(Gas pressures are preset at the factory.)

### Sample propane setup :

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" 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.



**WARNING: Installer must be trained and qualified. Follow the burner manufacturer's instructions, if supplied. Otherwise, proceed as follows:**

## **INSTALLATION OF CONTROL, SCANNERS AND FLAME DETECTORS**

### **Wiring Base**

Mount the wiring base on the burner or on a panel. The location should be free from excessive vibration and within the specified ambient temperature rating. The base may be mounted in any angular position.

All wiring should comply with applicable electrical codes, regulations and local ordinances. Use moisture resistant wire suitable for at least 90 degrees C. Good electrical wiring practice should be followed to ensure an adequate ground system. Refer to Fireye Service Note SN-100 separately and General Grounding Rules later in this document for grounding methods.

A good ground system should be provided to minimize the effects of AC quality problems. A properly designed ground system meeting all the safety requirements will ensure that any AC voltage quality problems, such as spikes, surges and impulses have a low impedance path to ground. A low impedance path to ground is required to ensure that large currents involved with any surge voltages will follow the desired path in preference to alternative paths, where extensive damage may occur to equipment.

Circuit recommendations are found on pages 38 through 43. Consult the factory for assistance with non-standard applications.



**WARNING: Controls require safety limits utilizing isolated mechanical contacts. Electronic limit switches may cause erratic operation and should be avoided.**



**Care must be taken to NOT route the high energy ignition wire in close proximity to the flame sensor wiring, particularly when using MERT amplifier.**

# ULTRA VIOLET COMBUSTION SAFEGUARD WITH SPARK IGNITION

## MIFCO COMBUSTION SAFEGUARD SYSTEM No. 4 —updated 1/2015

### 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 valve 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. Press the red reset button on the high or low pressure switch that has the light lit up on the multi valve gas valve.
5. There will be a 2 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, the OPR control and INTRLCK lights light up. There is a 30 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 PTFI indicator light 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-acetylene 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 8 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 10, 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 valve. 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 "d" in RE-IGNITION. Insufficient waiting period for cool down of timers. See STEP "c" 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 manufacturer's instructions.
2. The Fireye Chassis is securely plugged in and the top and bottom retaining screws are tightened. The Lockout Switch (white pushbutton) is reset and the high & low pressure switches have been reset and have no lights on.

In the following list, problems are listed first, and the possible causes are listed below in numerical order. Refer to the manufacturer's 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 and interlock circuit, making sure the lights on the gas pressure switches are not on.
- a. Replace the air switch. If you get a spark when you press the start button, you know the old switch is bad.
  - b. With the air switch replaced 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:

Remove the scanner to see if the sight tube is blocked.

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:

Connect the meter to terminals S1 & S2.

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 4 1/2 and 5 volts. If the-meter goes backwards, reverse the leads. If the reading is less than 4 1/2 volts, the scanner needs to be replaced.

**F. DUAL MULTI VALVE WILL NOT OPEN:**

1. Check interlock light on chassis. If it is flashing, check high & low pressure switches for light. If light is on, press switch reset button.

2. 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.

3. 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 E - 3

**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 too low, 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 low pressure switch.
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. Check for lights on high & low gas pressure switches. If lights are on, press reset button.
2. Bad UV Chassis.
3. Bad UV Scanner.
  - a. Check and replace if necessary.

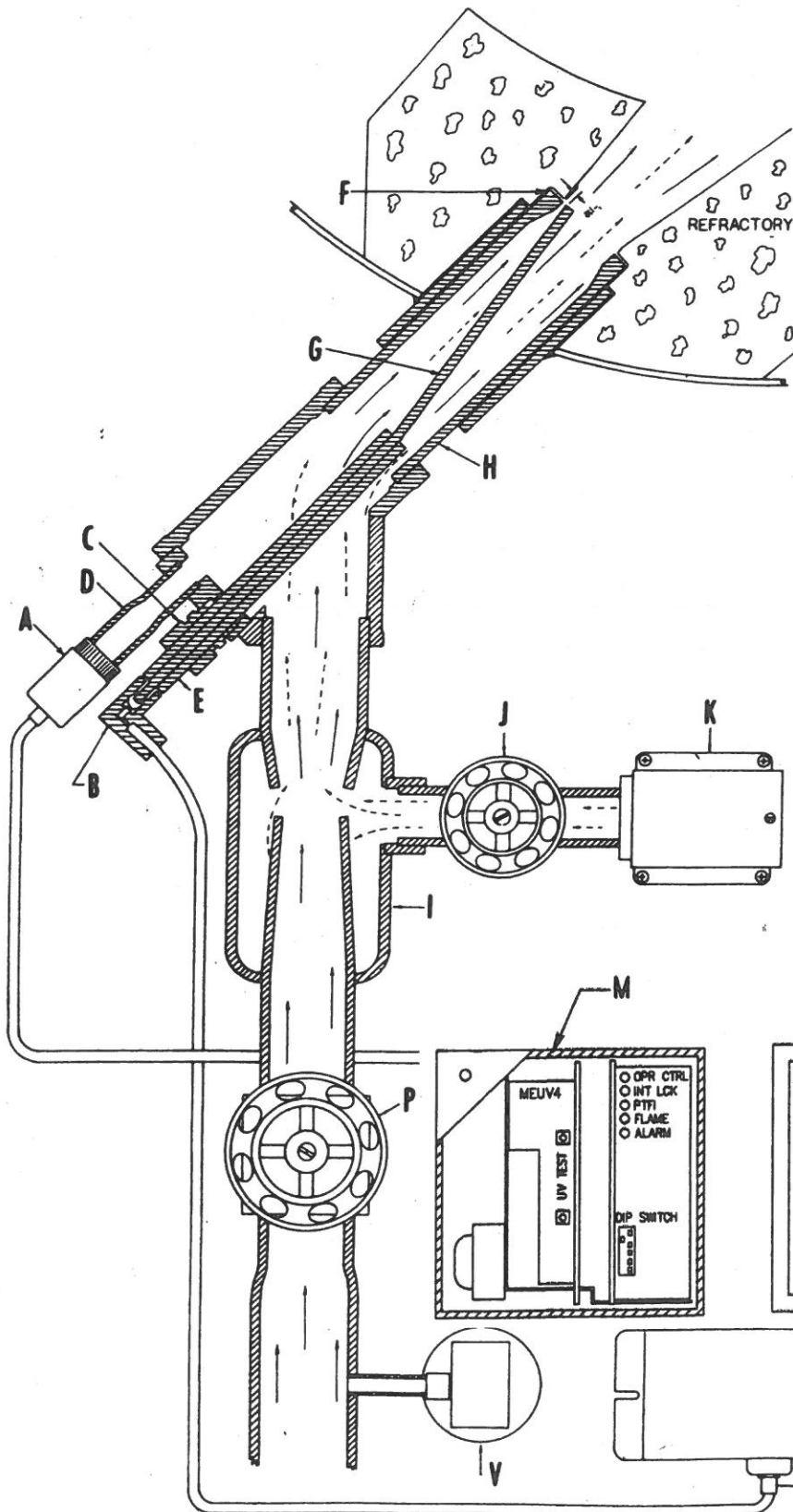
## **N. ELECTRICAL SEQUENCE:**

1. Press the start button and the system performs- self check.
2. Holding coil pulls in and motor starts.
3. Air switch closes, powering high then low pressure gas switches and then powers 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 dual multi valve. Blower runs another 10 seconds and turns off.

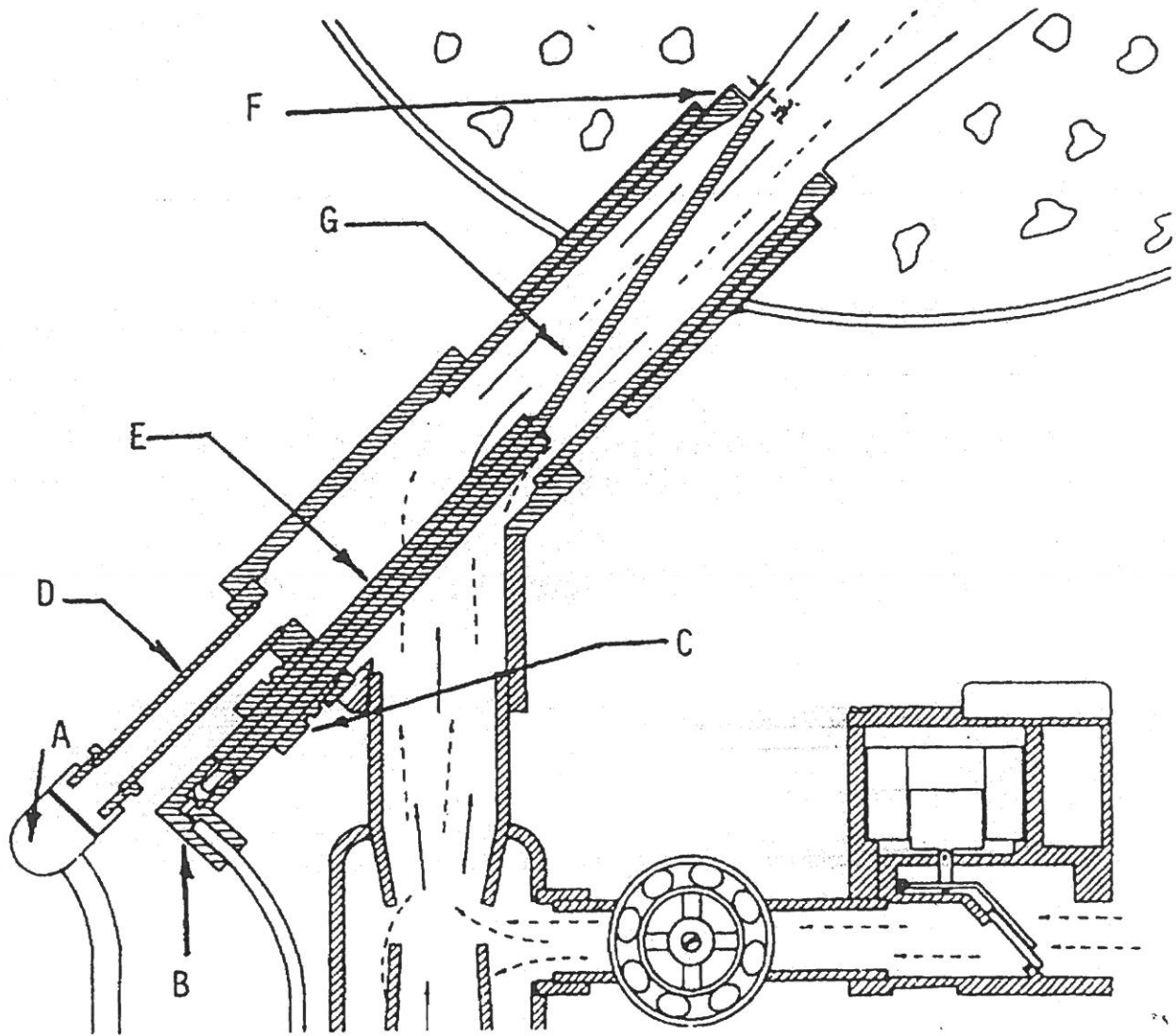
01/2017 for Forges



- A Ultra Violet Scanner
- B Ign Electrode Connector #004070
- C Ignition Electrode Clamp #003408
- D 3/8 x 1/2 Reducing Nipple #003024
- E 4" spark electrode #004067
- F Spark Electrode Gap 1/8"
- G Steel Electrode End
- H Burner Nozzle
- I Gas Air Mixer
- J Main Gas Adjusting Valve
- K Dual valve
- L Start Button #003662
- M UV Chassis #004445
- N Stop Button #003663
- O Control Box Enclosure
- P Main Air Adjusting Valve
- Q Red Flame Failure Alarm #003906
- R Control Relay
- S Contactor #003930
- T Control Fuse Holder #003600
- U Motor Overload Relay
- V Air Pressure Switch #004226
- W Ign Wire Ring Terminal #003712
- X Ignition Transformer 10000v #004300

## SAFETY SYSTEM NO. 4 UV

## 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 "A".
- Step 3. Remove spark connector "B" and brass electrode lock nut "C".
- 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 "G" is bent at an angle. Look through the scanner tube "D" and revolve spark electrode until spark gap "F" 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 "D".
- Step 9. If the spark is satisfactory, replace the scanner head "A", 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 "plastic" 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 updated 3/2015**

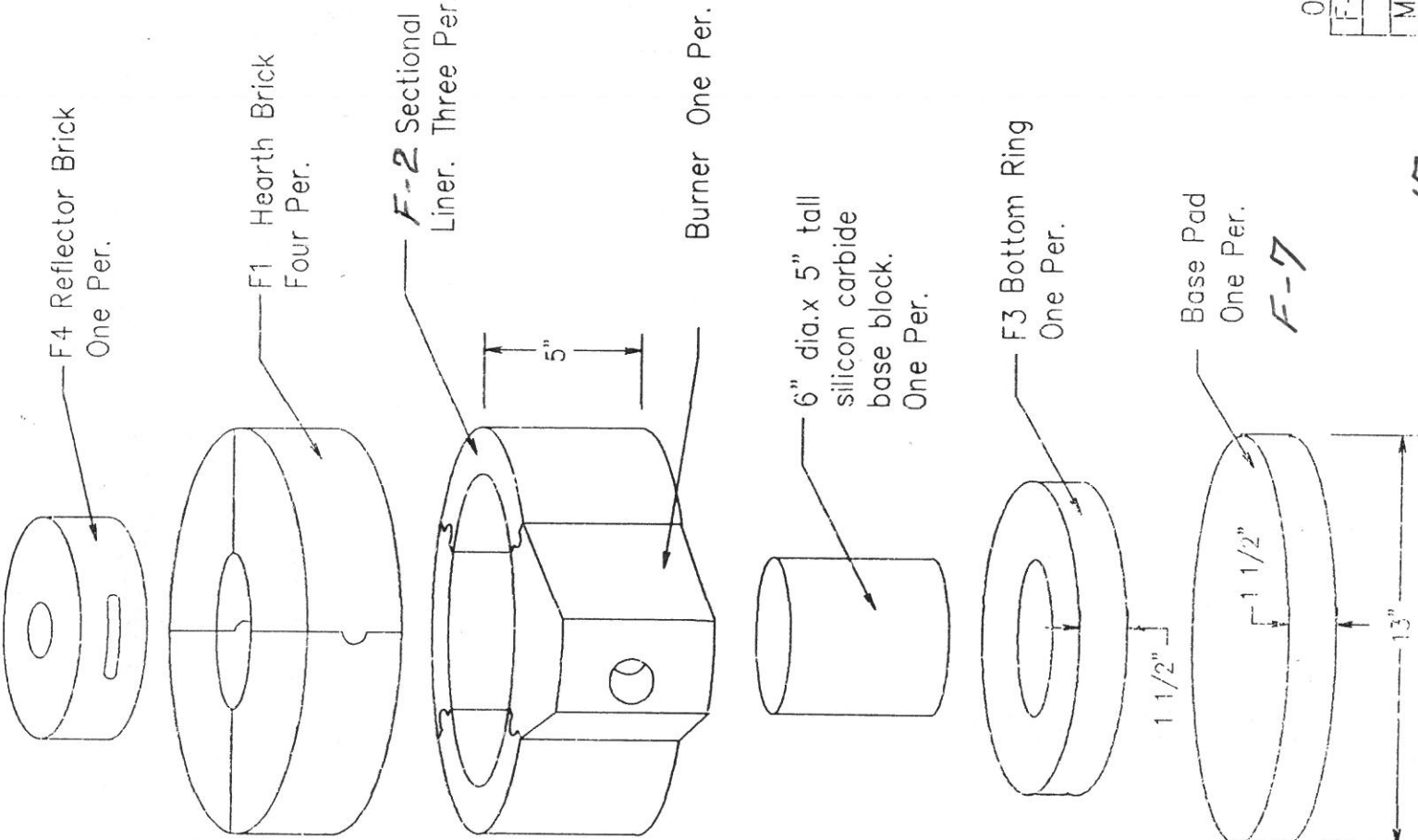
<b>Part No.</b>	<b>Description</b>	<b>No. of Pieces</b>
003987	6' Power Cord	1
003600	BS-HKP-HH Fuse Holder	1
003624	5 Amp Fuse	1
003707	Power Cord Bushing - 7/8" - SR7W2	1
004445	Fireye MEC-120 Chassis with (004102 MEP230H programmer and 004103 MEUV4 amplifier)	1
004105	61-3060 UV Chassis Base unit	1
004106	UV-1A3 Flame Detection Scanner	1
003930	XTCE025C10A Motor Contactor	1
003939	XTOB004CC1 Motor Overload Relay	1
004067	4 inch Spark Electrode	1
004134	F1-M Blower and Motor - 120 v. - F10-V065	1
004214*	3/4" Gas Solenoid Valve (units prior to year 2015)	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
006650	Burner Nozzle	1
006040	GM75 gas air mixer	1
008245	6x5 silicon base block	1

**\* Units built beginning in year 2015 have in place of 004214:**

003789	Dual multi valve	1
003836	Visual indicator for above	1
003837	Din connector for valve	1
003838	Conduit adaptor	4
004903	3/4" NPT flanges	2
003780	High gas pressure switch	1
003816	Low gas pressure switch	1

Note- Replacement motor can be ordered as:

004164            F1M motor only



032010	Drawn By Bill Walter
F-100 A Relining Kit	
Mat.	
M I F C O	5/8/61

## **Instructions for Relining of the F-100 –A Forge Furnace**

- 1. Clean out all old bricks and castable insulation from the shell.**
- 2. Remove the gas air mixer and blower assembly from the guide tube**
- 3. Place precasted insulating pad F-7 in the center of the bottom of the shell.**
- 4. Find the three solid liners F-2 and the burner brick banded together for your convenience , do not cut the bands.**
- 5. Place this ring of bricks down on top of the insulation pad placing the burner brick over the guide tube in the side of the shell.**
- 6. Check to see that the ring of bricks still remains centered in the shell.**
- 7. Place the donut brick F-3 down within your side liners.**
- 8. Place the 6" x 5" silicon carbide block F-5 down inside of the donut brick F-3.**
- 9. Mix about half of your 20# box of sealer as directed. Brush on the bricks on the inside of the chamber filling all cracks.**
- 10. To moisten your liner bricks, pour water down all around the top, then a thick layer of your sealer.**
- 11. Now place your ring of F-1 bricks down on top of your liners, twist as you press down for a good seat.**
- 12. Mix your 55# bag of Matralite 2800 insulation as instructed and cast all around the liners filling the cavity up above the F-1 top bricks.**

**Make sure the insulation is packed all around the burner brick with no air pockets. This is very important.**
- 13. After setting approx 1 hr your insulation will settle, if necessary add more. You can then take a straight edge and strike off the excess insulation as you go around the circle. Sprinkle with water if needed and trowel smooth.**
- 14. After the insulation has set up you can then dilute your sealer mixture that you have left and brush it over the entire top of the furnace.**
- 15. Now place your reflector brick, F-4 in the band and tighten the bolt to hold in place.**
- 16. Allow the unit to set for 24 hours before firing. Run unit on low fire for 5 minutes per hour for the first day.**

9/29/2016 **F826 and F526 Parts Listing**

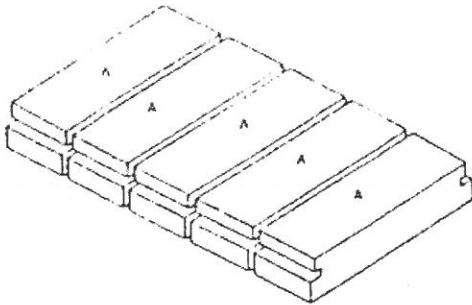
Qty	Description
1	004117 1/2 hp 3450 rpm <b>1 phase motor</b>
1	004118 1/2 hp 3450 rpm <b>3 phase motor</b>
1	004326 #175 impeller assembly
1	008612 #175 blower
1	006060 GM100 gas air mixer
5	006630 1" x 5" burner nozzle
1	004101 MEC120 chassis- Fireye
1	004102 MEP230H programmer - Fireye
1	004103 MEUV4 amplifier - Fireye
1	004105 61 3060 Base unit - Fireye
1	004106 UV1A3 flame scanner -Fireye
1	004067 4" electrode
1	004226 Dwyer air switch
1	004300 Ignition transformer 10000v
1	004215 1" Solenoid valve 20174 ( <b>prior to year 2015</b> )
1	003930 XTCE025C10A contactor
1	003662 Start switch- black
1	003663 Stop switch-red
1	003877 Power distribution block
1	003906 Red light
1	003624 5 amp fuse
1	003932 C25BN220A contactor
1	003931 XTOBO10CC1 overload relay
1	006665 1 1/2" UV plug
1	003024 Swedged nipple
1	003408 Compression fitting
1	032016 <b>F526</b> relining kit complete
1	081508 reflector baffle only -8 sections <b>F526</b>
1	032026 <b>F826</b> relining kit complete
1	081518 reflector baffle only – 8 sections <b>F826</b>
1	003836 visual indicator 217-665A
1	003780 High pressure switch Dungs# GMH-A2-4-4
1	003816 Low gas pressure switch Dungs# GML-A2-4-4
1	003790 Dual multi valve with proof of closure Dungs# DMV-D 701/622 243-76
1	003837 Connector for valve
2	003796 1" NPT flange
4	003838 conduit adaptor
1	003600 BS-HKP-HH fuse holder
1	003987 Power cord

9/29/2016 **F512 Parts Listing**

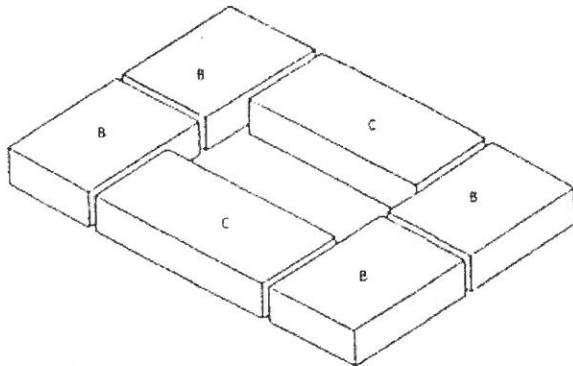
Qty	Description
1	004117 1/2 hp 3450 rpm <b>1 phase motor</b>
1	004118 1/2 hp 3450 rpm <b>3 phase motor</b>
1	004326 #175 impeller assembly
1	008612 #175 blower
1	006020 GM75-512 gas air mixer
3	006630 1" x 5" burner nozzle
1	004101 MEC120 chassis- Fireye
1	004102 MEP230H programmer - Fireye
1	004103 MEUV4 amplifier - Fireye
1	004105 61 3060 Base unit - Fireye
1	004106 UV1A3 flame scanner -Fireye
1	004067 4" electrode
1	004226 Dwyer air switch
1	004300 Ignition transformer 10000v
1	004214 3/4" Solenoid valve 20174 ( <b>prior to year 2015</b> )
1	003930 XTCE025C10A contactor
1	003662 Start switch- black
1	003663 Stop switch-red
1	003877 Power distribution block
1	003906 Red light
1	003624 5 amp fuse
1	003932 C25BN220A contactor
1	003931 XTOBO10CC1 overload relay
1	006665 1 1/2" UV plug
1	003024 Swedged nipple
1	003408 Compression fitting
1	032015 <b>F512</b> relining kit complete
1	081505 reflector baffle only -5 sections <b>F512</b>
2	003836 visual indicator 217-665A
1	003780 High pressure switch Dungs# GMH-A2-4-4
1	003816 Low gas pressure switch Dungs# GML-A2-4-4
1	003789 Dual multi valve with NO proof of closure Dungs# DMV-D 701/622,224-842
1	003837 Connector for valve
2	004903 3/4" NPT flange
4	003838 conduit adaptor
1	003600 BS-HKP-HH fuse holder
1	003987 Power cord

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

<b>Part No.</b>	<b>Description</b>	<b>No. of Pieces</b>
008064	Burner Brick	3
008165	Clipper DP Straight Brick - 13 1/2" x 6" x 2 1/2"	2
008162	Clipper DP Straight Brick - 9" x 4 1/2" x 2 1/2"	3
008163	Clipper DP Straight Brick - 9" x 6 3/4" x 2 1/2"	4
008164	Clipper DP Straight Brick - 13 1/2" x 4 1/2" x 2 1/2"	6
008150	Greenlite 28 DP Baffle Brick - Grooved - 9" x 4 1/2" x 3"	5
008141	55 lb. Bags of Castable Insulation - Matrilite 28	3
008173	20 lb. Box of Refractory Sealer	1

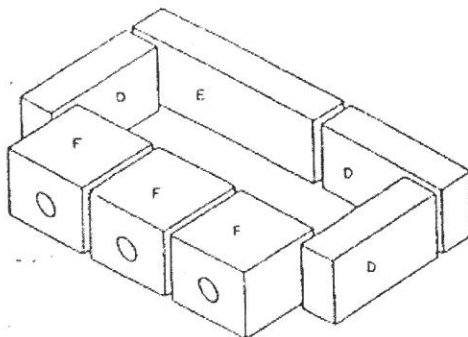


**A - 008150**



**B - 008163**

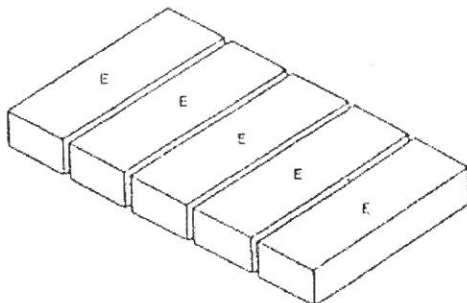
**C - 008165**



**D - 008162**

**E - 008164**

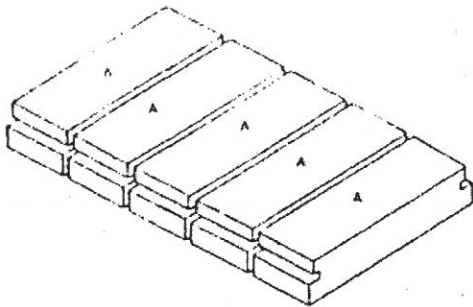
**F - 008064**



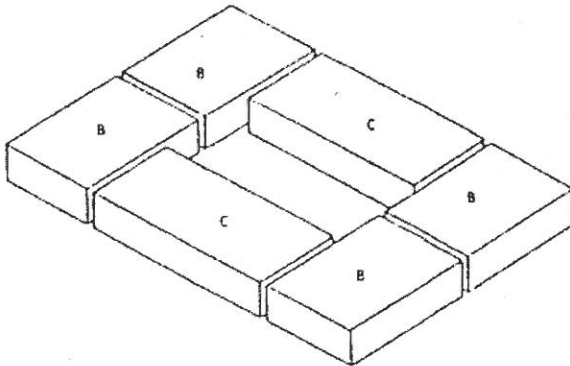
**E - 008164**

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

<b>Part No.</b>	<b>Description</b>	<b>No. of Pieces</b>
008064	Burner Brick	3
008165	Clipper DP Straight Brick - 13 1/2" x 6" x 2 1/2"	2
008162	Clipper DP Straight Brick - 9" x 4 1/2" x 2 1/2"	3
008163	Clipper DP Straight Brick - 9" x 6 3/4" x 2 1/2"	4
008164	Clipper DP Straight Brick - 13 1/2" x 4 1/2" x 2 1/2"	7
008147	Greenlite 28 DP Baffle Brick - Grooved - 13 1/2" x 4 1/2" x 3"	5
008141	55 lb. Bags of Castable Insulation - Matrilite 28	3
008173	20 lb. Box of Refractory Sealer	1

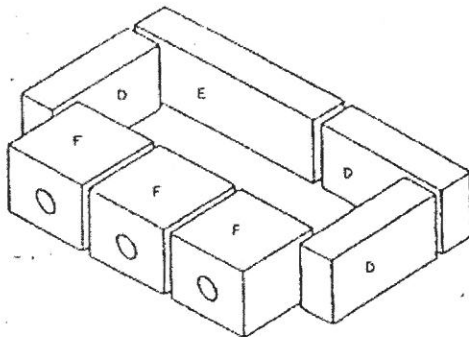


A-008147



B - 008163

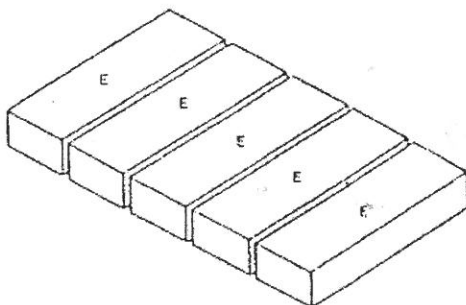
C - 008165



D - 008162

E - 008164

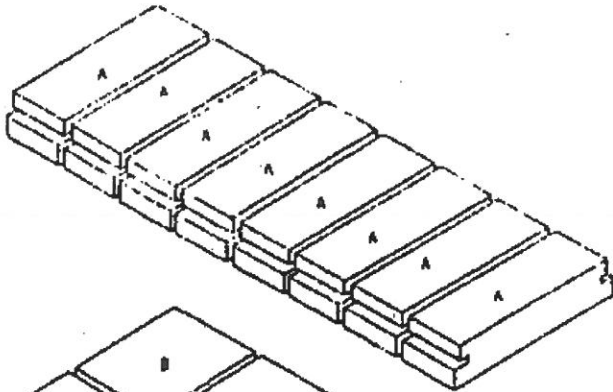
F - 008064



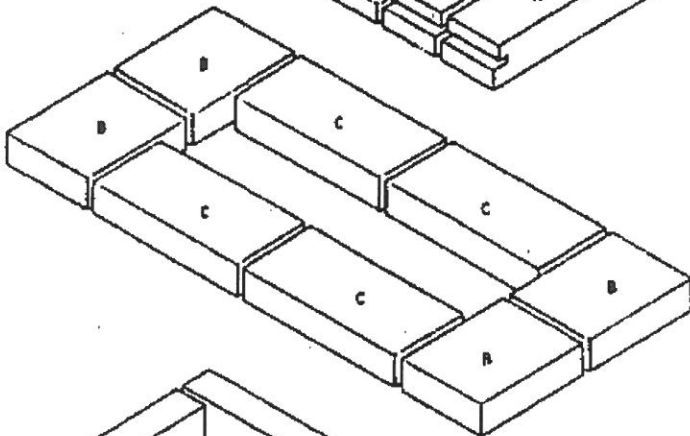
E - 008164

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

<b>Part No.</b>	<b>Description</b>	<b>No. of Pieces</b>
008064	Burner Brick	5
008165	Clipper DP Straight Brick - 13 1/2" x 6" x 2 1/2"	4
008162	Clipper DP Straight Brick - 9" x 4 1/2" x 2 1/2"	3
008163	Clipper DP Straight Brick - 9" x 6 3/4" x 2 1/2"	4
008164	Clipper DP Straight Brick - 13 1/2" x 4 1/2" x 2 1/2"	10
008150	Greenlite 28 DP Baffle Brick - Grooved - 9" x 4 1/2" x 3"	8
008141	55 lb. Bags of Castable Insulation - Matrilite 28	4
008173	20 lb. Box of Refractory Sealer	1

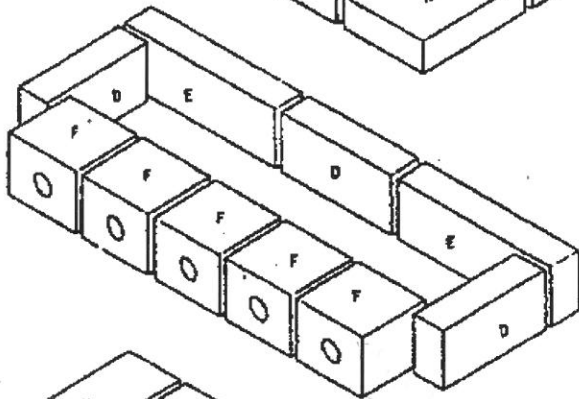


**A - 008150**



**B - 008163**

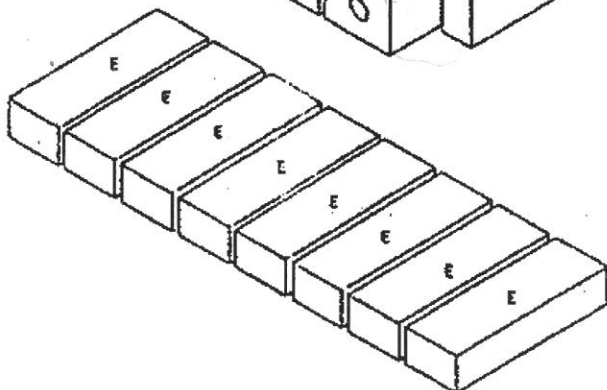
**C - 008165**



**D - 008162**

**E - 008164**

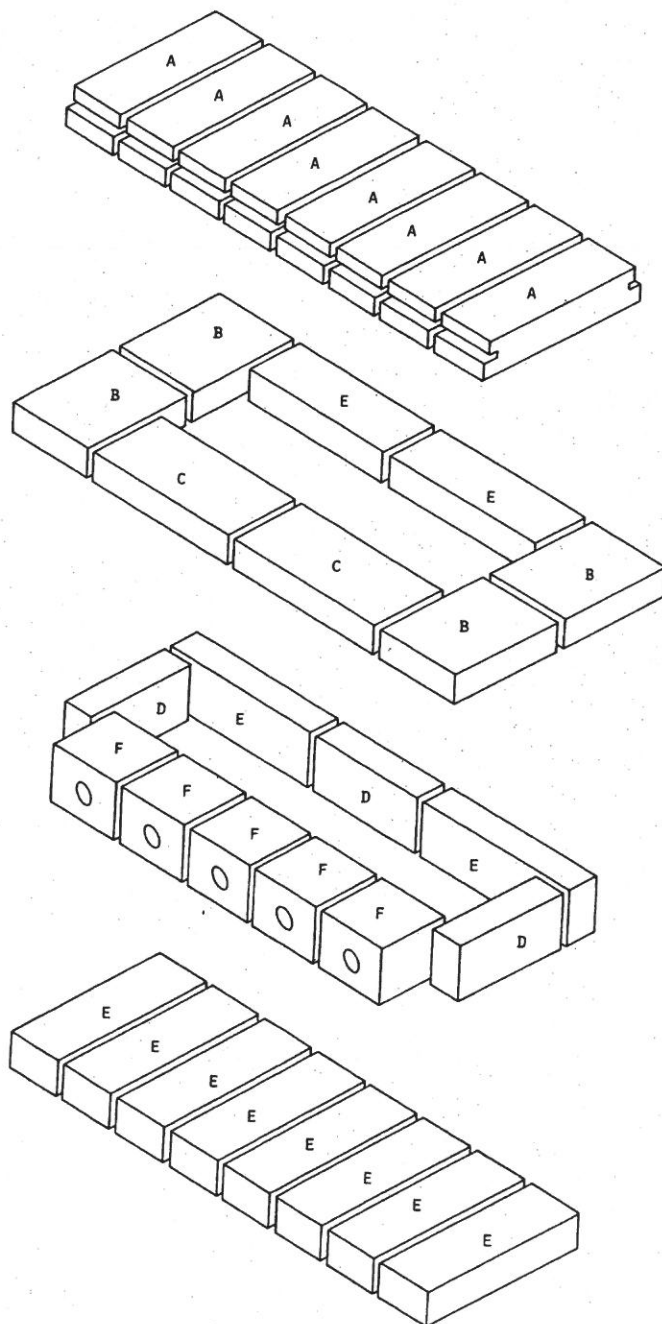
**F - 008064**



**E - 008164**

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

<b>Part No.</b>	<b>Description</b>	<b>No. of Pieces</b>
008064	Burner Brick	5
008165	Clipper DP Straight Brick - 13 1/2" x 6" x 2 1/2"	2
008162	Clipper DP Straight Brick - 9" x 4 1/2" x 2 1/2"	3
008163	Clipper DP Straight Brick - 9" x 6 3/4" x 2 1/2"	4
008164	Clipper DP Straight Brick - 13 1/2" x 4 1/2" x 2 1/2"	12
008147	Greenlite 28 DP Baffle Brick - Grooved - 13 1/2" x 4 1/2" x 3"	8
008141	55 lb. Bags of Castable Insulation - Matrilite 28	4
008173	20 lb. Box of Refractory Sealer	1



**A-008147**  
(or 081518 for a set)

**B - 008163**

**C - 008165**

**D - 008162**

**E - 008164**

**F - 008064**

**E - 008164**

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

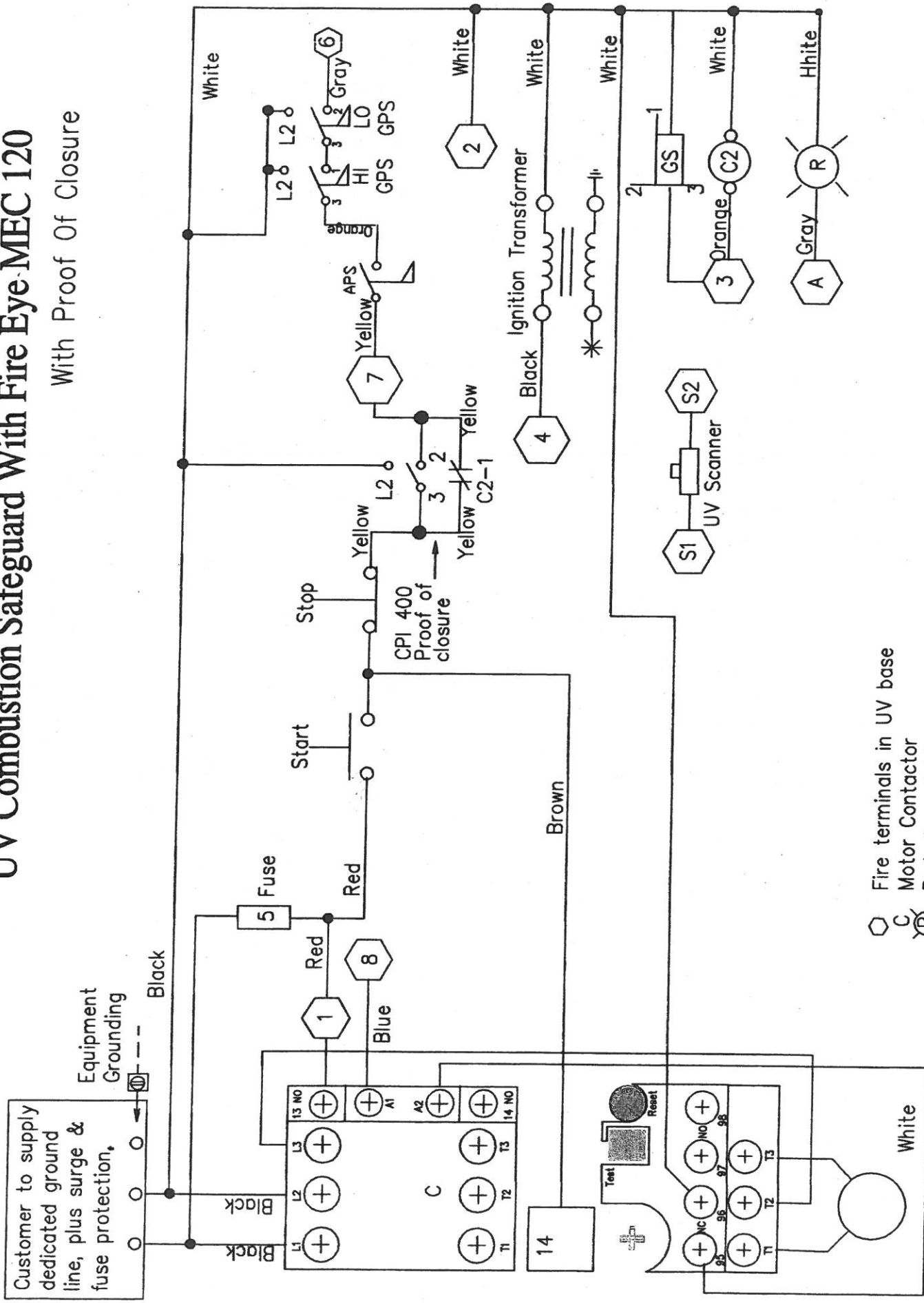
The MIFCO Forges have been designed so that relining is quick and easily done. Complete Relining Kits, which include all the replacement refractory shapes, Castable Insulation, and the correct type of Refractory Sealer, are available. The relining procedure is as follows:

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 13½" x 4½" x 2½" 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 4" 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.

120V 1Ph 60Hz

# UV Combustion Safeguard With Fire Eye-MEC 120

With Proof Of Closure



- Fire terminals in UV base
- Motor Contactor
- Red alarm light
- Dual multi valve switch
- AFS Air pressure switch

WD-0049

Drawn By Bill Walter

4 UV Combustion Safe Guard With Proof Of Closure  
120 V 1 ph-60 Hz

MIFCO

1/21/15

