



JOHNSON FURNACE INSTRUCTION MANUAL

#133 FURNACE - MANUAL TEMPERATURE CONTROL & THERMOCOUPLE SAFETY
FORMS - 275, 276-R, 274, 311-R, 277, 221, 318

INSTALLATION INSTRUCTIONS FOR #122 & #133
FORGES WITH ELECTRIC IGNITION & SAFETY EQUIPMENT.

CONSULT FORMS 221 & 274 WHILE READING THIS.

WHEN PLACING THE FORGE IN THE DESIRED LOCATION, MAKE SURE THE BACK OF THE FORGE (BURNER SIDE) IS PLACED FAR ENOUGH AWAY FROM ANY WALL SO THE LID CAN SWING AWAY FROM THE TOP SLOT OF THE FORGE AND SPACE IS SUFFICIENT FOR SERVICING. ALLOW ENOUGH SPACE AT THE FRONT OF THE FORGE FOR THE OPERATOR TO PERFORM HIS DUTIES.

TO REMOVE EXHAUST GASES AND FUMES, USE A HOOD WITH AN EXHAUST FAN. THE HOOD SHOULD BE HIGH ENOUGH SO THAT IT DOES NOT INTERFERE WITH THE OPERATOR.

IF NECESSARY, PROTECT NEARBY WALLS AND CEILINGS FROM RADIANT HEAT BY USING INSULATION BOARD, ETC.

CONNECT 115 VOLT ELECTRICAL SOURCE TO THE BLACK AND WHITE LEADS EXTENDING FROM THE CONTROL BOX AT THE FRONT OF THE FURNACE.

CONNECT GAS LINE TO GAS INLET PIPE. THE GAS PRESSURE SHOULD BE 2 to 3 OUNCES FOR NATURAL GAS AND 6 OUNCES FOR LP GAS. PRESSURE SHOULD BE CHECKED WHEN THE FORGE IS IN OPERATION AT A HIGH RATE.

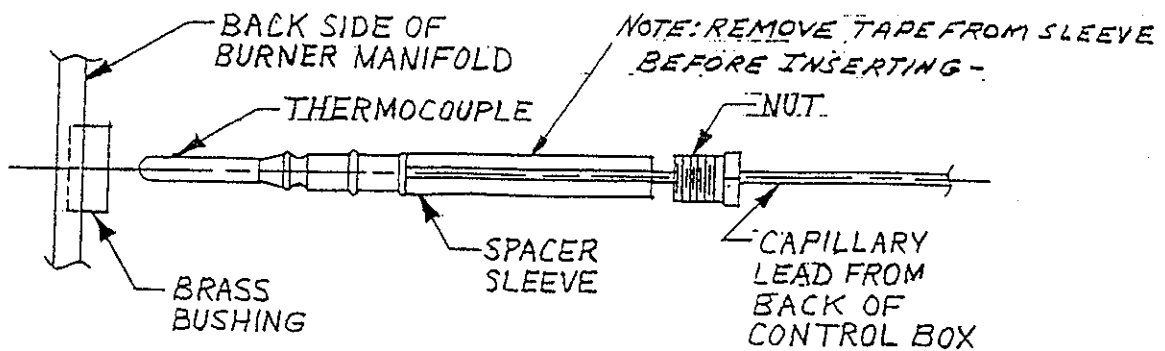
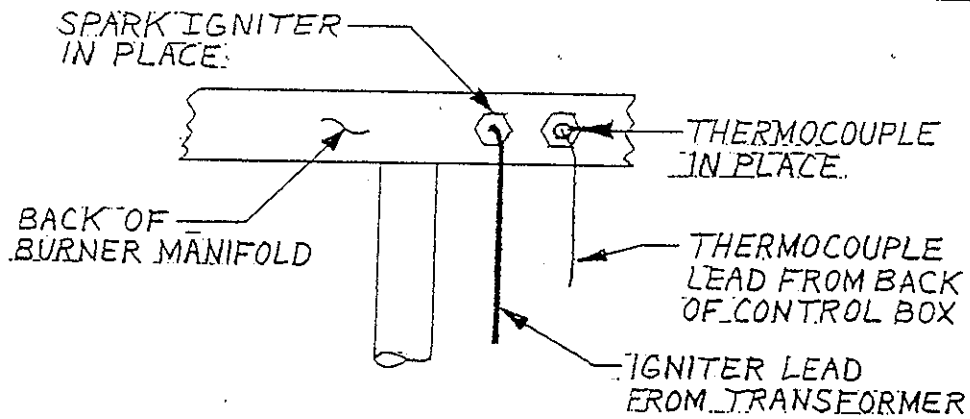
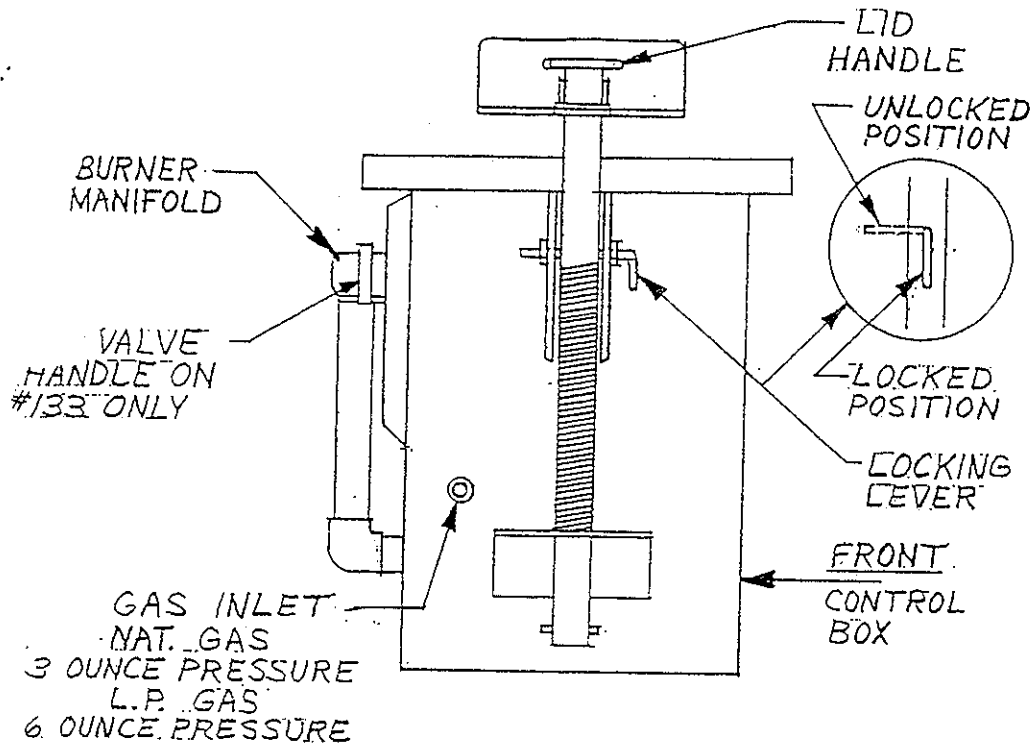
INSTALL THE HANDLE ON THE LID. (SEE FORM 221) TO RAISE OR LOWER THE LID, TURN THE LOCKING LEVER TO THE UN-LOCKED POSITION: ADJUST TO THE DESIRED HEIGHT: THEN RETURN LOCKING LEVER TO THE LOCKED POSITION. (SEE FORM 274)

INSTALL THE THERMOCOUPLE AND SPARK PLUG IGNITER IN THE BURNER MANIFOLD. (SEE FORM 274) MAKE SURE THE BRASS SLEEVE IS POSITIONED PROPERLY ON THE THERMOCOUPLE: INSERT THE THERMOCOUPLE INTO THE BRASS BUSHING: SCREW IN THE BRASS NUT AND SNUG UP THE NUT WITH A WRENCH.

INSERT THE SPARK PLUG IGNITER IN THE OPENING IN THE BACK OF THE BURNER MANIFOLD AND TIGHTEN IN PLACE WITH A WRENCH. PUSH THE CONNECTOR OVER THE END OF THE SPARK PLUG.

SEE FORM FOR LIGHTING INSTRUCTIONS.

INSTALLATION DIAGRAM FOR #133-122
FORGE WITH ELECTRIC IGNITION AND SAFETY



LIGHTING & OPERATING INSTRUCTIONS FOR
NO. 133 FORGE WITH SPARK IGNITION AND
THERMOCOUPLE TYPE SAFETY.

CONSULT FORM 277 WHILE READING THIS.

1. SET AIR CONTROL HALFWAY BETWEEN OPEN AND CLOSED POSITIONS. SET GAS CONTROL TO CLOSED POSITION.
2. SWING THE LID TOWARD THE BACK SIDE OF THE FURNACE SO THAT IT IS NOT OVER THE TOP SLOT.
3. DEPRESS AND RELEASE THE START BUTTON. THE BLOWER MOTOR SHOULD BE RUNNING AND THE RED LIGHT WILL BE ON.
4. DEPRESS AND HOLD IN THE IGNITER BUTTON. THE SOLENOID VALVE IN THE GAS LINE SHOULD BE OPEN AND THE SPARK IGNITER SHOULD BE BUZZING. SLOWLY, TURN THE GAS CONTROL TOWARD THE OPEN POSITION UNTIL THE BURNER IGNITE. THEN, TURN THE GAS CONTROL SLIGHTLY PAST THIS POSITION TO OBTAIN A STEADY ROAR FROM THE BURNERS. AFTER ABOUT TWENTY SECONDS, THE RED LIGHT WILL GO OUT AND YOU CAN RELEASE THE IGNITION BUTTON. IF THE BURNER DOES NOT COME ON MAKE SURE THE IGNITER BUTTON WAS PUSHED ALL THE WAY IN. IF THE BURNER DOES NOT COME ON WITHIN 2 OR 3 SECONDS, RELEASE THE IGNITION BUTTON, TURN THE GAS CONTROL CLOSED AND CONSULT THE INSTALLATION AND LIGHTING PROCEDURE TO MAKE SURE THE INSTRUCTIONS WERE FOLLOWED PROPERLY.
5. AFTER THE FORGE HAS BEEN STARTED, ADJUST THE GAS CONTROL TO GIVE A SHARP TAIL OF FLAME THAT EXTENDS JUST ABOVE THE TOP OF THE FORGE. WORK CAN BE PLACED IN THE FLAME. THE WORK RACK AT THE FRONT OF THE BURNER CAN BE SLID OUT TO SUPPORT THE WORK. THE LID SHOULD BE CENTERED OVER THE TOP SLOT. TO INCREASE THE AMOUNT OF GAS TURN THE GAS CONTROL TOWARD THE OPEN POSITION TO GET A HIGHER FLAME. THEN, TURN THE AIR CONTROL HANDLE TOWARD THE OPEN POSITION TO OBTAIN THE SHARP TAIL OF FLAME. REPEAT THESE STEPS UNTIL THE DESIRED OR MAXIMUM GAS INPUT IS REACHED.

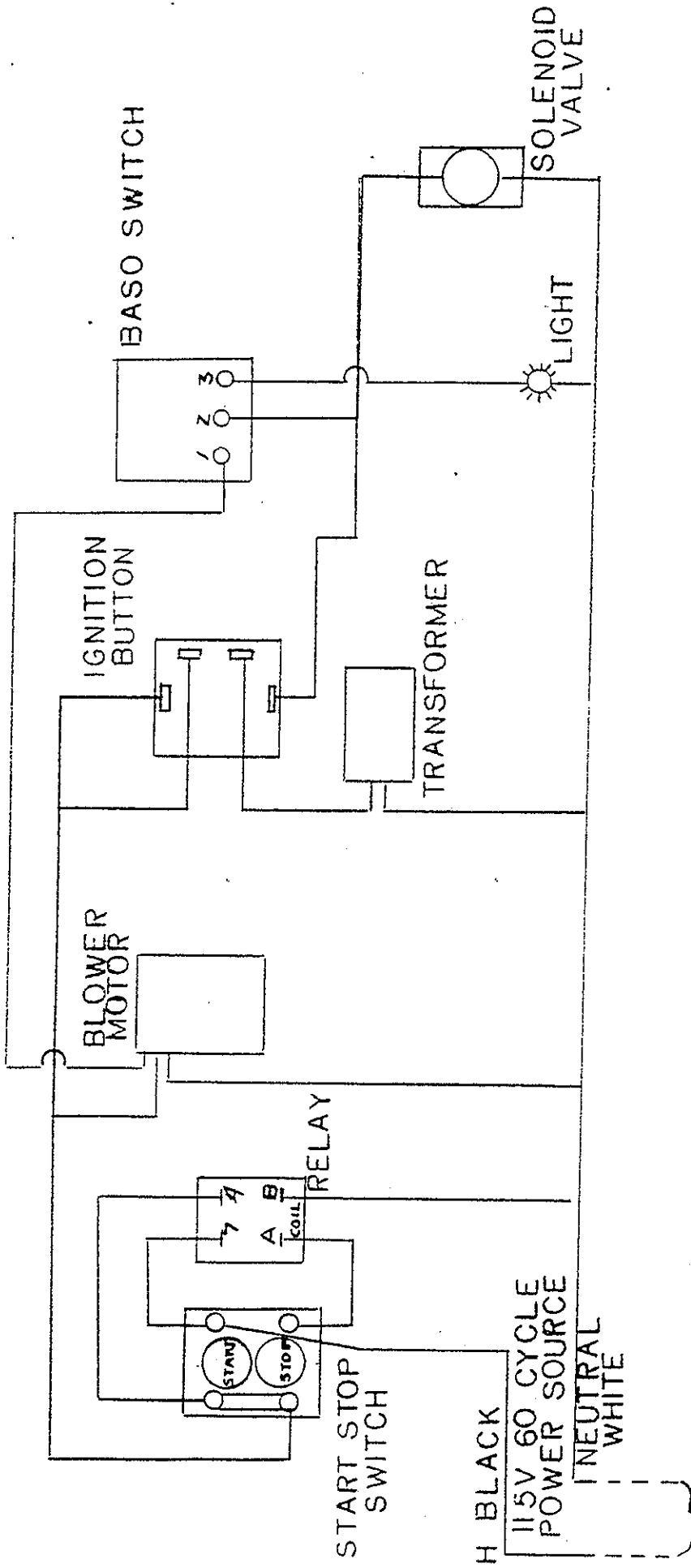
TO DECREASE THE AMOUNT OF GAS, TURN THE GAS CONTROL HANDLE TOWARD THE CLOSED POSITION UNTIL THE SHARP TAIL OF FLAME ALMOST DISAPPEARS. THEN TURN THE AIR CONTROL TOWARD THE CLOSED POSITION UNTIL THE TAIL OF FLAME RE-APPEARS. REPEAT THIS PROCEDURE UNTIL THE DESIRED OR MINIMUM GAS INPUT IS REACHED.

THE TWO OUTSIDE BURNERS CAN BE TURNED OFF BY SCREWING IN THE HANDLES AT EACH END OF THE BURNER MANIFOLD.

NOTE: IF YOU TURN THE GAS TOO HIGH AND GET A HIGH, LAZY FLAME OR TOO LOW AND GET AN INTERMITTENT FLAME, THE THERMOCOUPLE MAY COOL DOWN AND SHUT OFF THE BURNERS. TO SHUT DOWN THE FORGE, TURN GAS CONTROL TO THE CLOSED POSITION AND PUSH THE STOP BUTTON.

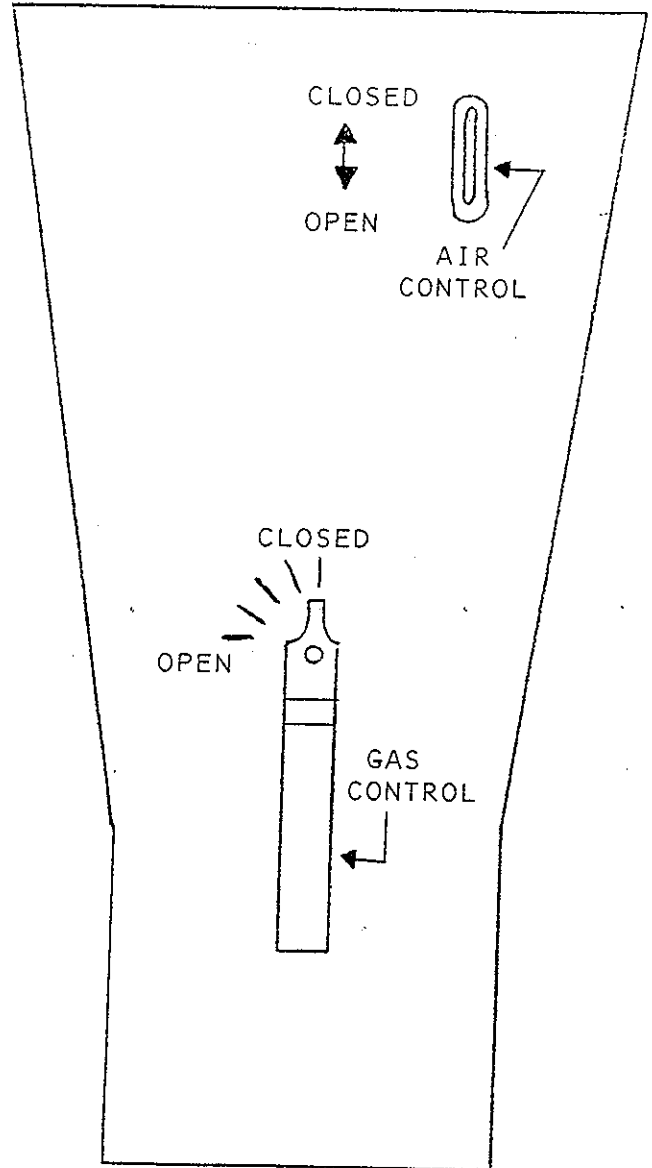
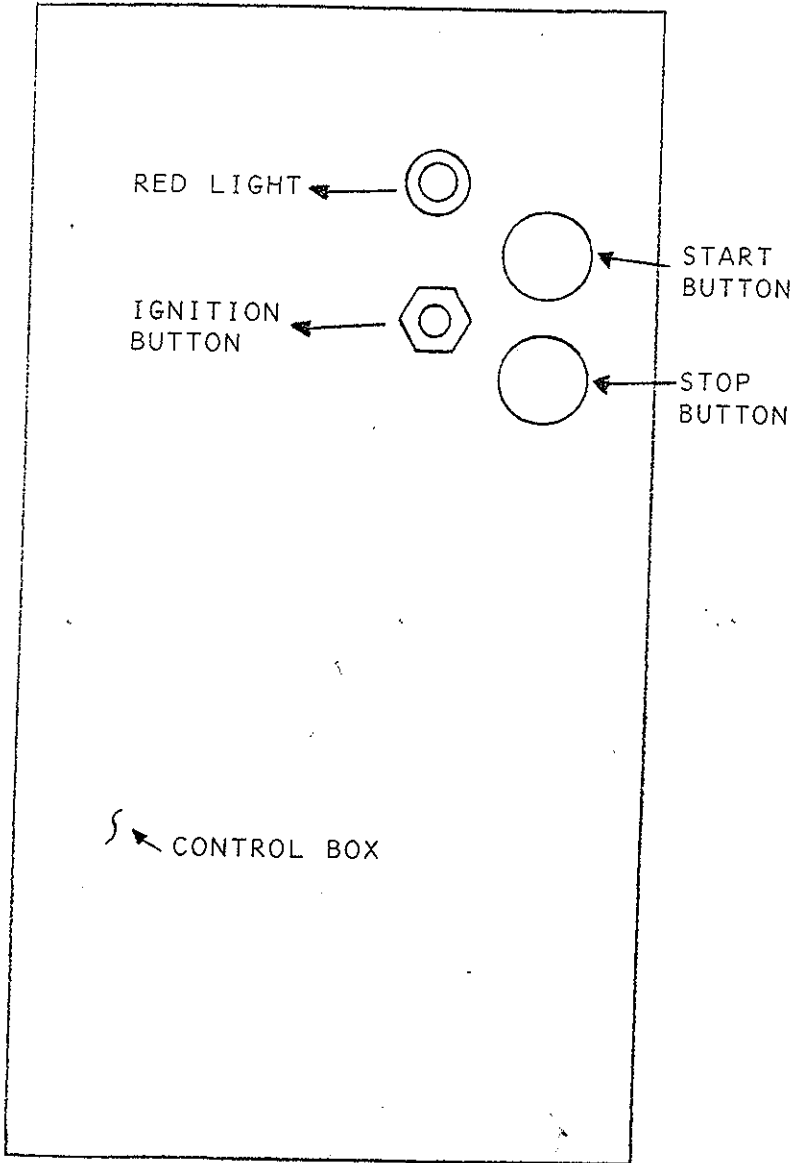
NOTE: THE WORK PIECES MUST BE LAYED ACROSS THE TOP OF THE FORGE WITH SPACE LEFT BETWEEN THEM FOR EXHAUST AREA. DO NOT COMPLETELY BLOCK THE TOP SLOT. DO NOT PUT WORK PIECES INSIDE THE COMBUSTION CHAMBER (PIT). THIS WILL CAUSE OVERHEATING AND BURN OUT THE FORGE PREMATURELY.

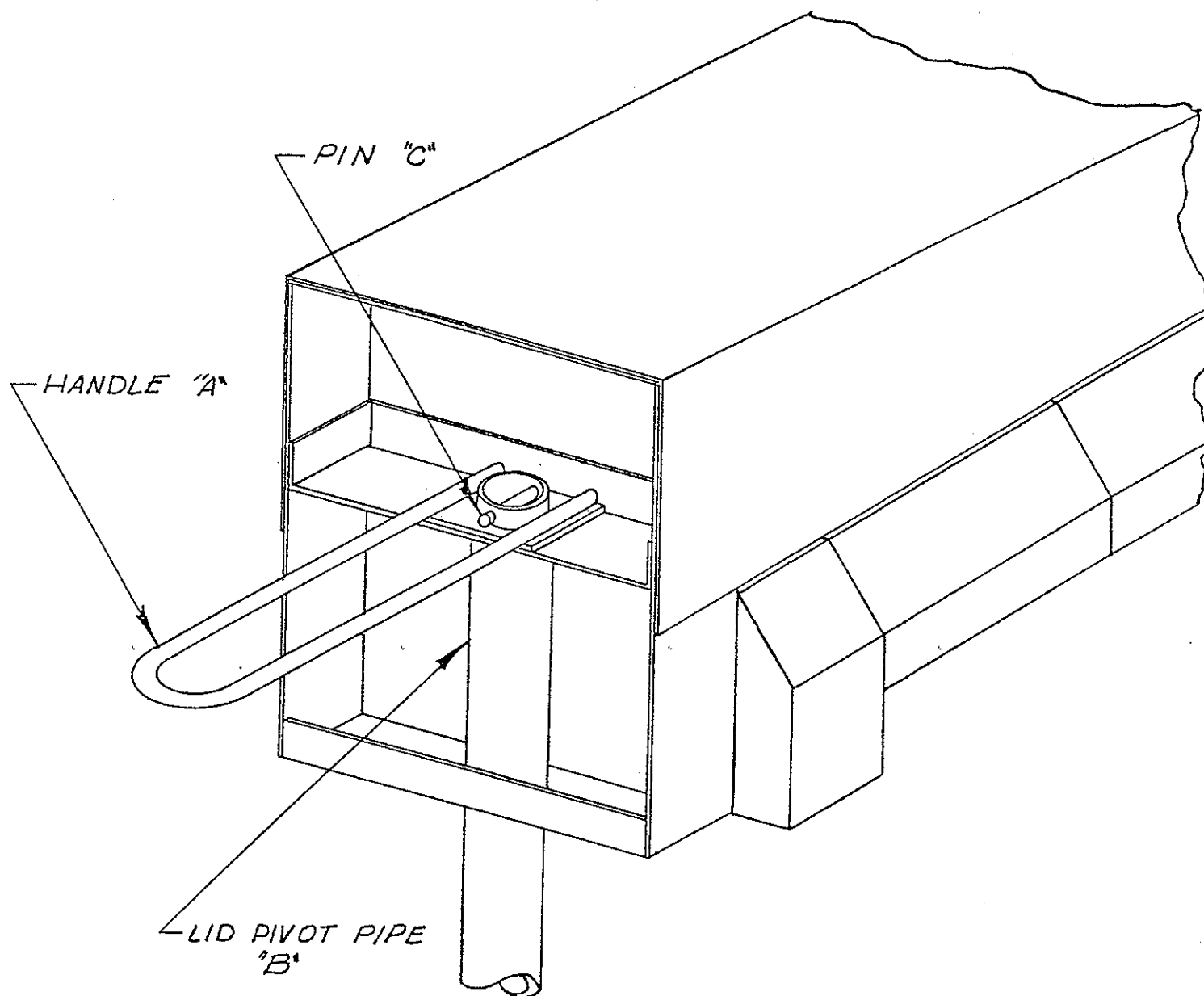
WIRING DIAGRAM FOR NO 133 FORGE WITH ELECTRIC IGNITION AND SAFETY



CUSTOMER CONNECT POWER SOURCE
TO BLACK AND WHITE LEADS EXTENDING
OUTSIDE OF CONTROL BOX ALL OTHER
WIRING IS DONE AT THE FACTORY

DIAGRAM OF CONTROLS FOR #133 FORGE
WITH ELECTRIC IGNITION AND SAFETY



INSTALLING HANDLE ON #122 & #133 FORGE LIDS

1. PLACE HANDLE 'A', PLATE SIDE DOWN, OVER TOP OF LID PIVOT PIPE 'B'.
2. DRIVE PIN 'C' THROUGH DRILLED HOLES PROVIDED.

VENTING REQUIREMENTS FOR
JOHNSON FURNACES

1. POT FURNACES, FORGES, AND MELTING FURNACES.

SINGLE UNITS OR MULTIPLE INSTALLATIONS

FOR EXHAUST HOODS APPROXIMATELY 6' 6" TO 7' ABOVE FLOOR, THE EXHAUST FAN SHOULD BE SUFFICIENT TO PROVIDE A 200 FPM FACE VELOCITY AT THE HOOD.

2. OVEN TYPE FURNACES (INCLUDES OVEN FORGES)

A. SINGLE INSTALLATIONS

FOR SINGLE INSTALLATION THE VENT REQUIREMENTS SHOULD REDUCE FLUE GAS TEMPERATURE TO 500 OR BELOW. FOR CFM REQUIREMENTS, DIVIDE BTU INPUT OF THE FURNACE BY 225. (APPLICABLE WHERE THE VENT HOOD IS 6" TO 8" ABOVE EXHAUST OPENING.)

B. FOR SINGLE OR MULTIPLE INSTALLATIONS WHEN SINGLE EXHAUST HOOD IS 6' 6" TO 7' ABOVE FLOOR, PROVIDE FOR A 200 FPM FACE VELOCITY.

MAINTENANCE INSTRUCTIONS FOR JOHNSON FURNACES

Johnson equipment is designed to give the longest possible service at the lowest maintenance cost. Due to the high temperatures reached by Johnson furnaces certain repairs are required from time to time to keep them in good operating condition. We are listing below pertinent maintenance information.

OVEN TYPE HEAT TREATING FURNACES [#70, #120, #121, #142, #143, #654, #706]

A. GENERAL MAINTENANCE:

These furnaces are lined with high temperature insulating refractory. This refractory expands and contracts as the furnace heats and cools; and cracks will appear throughout the lining. These are normal and should not be cause for alarm and should NOT be filled with cement as it will cause the brick to spall. The door brick on the #70, #120, #121 & #654 furnaces should be replaced occasionally. It is furnished with inconel screws and washers to withstand the high temperatures. The door should NOT be used as a shelf or parts dragged across the door brick in the process of removing parts from the furnace. Also, avoid striking the sides of the furnace with tongs. The hearth plate will require replacement occasionally, as will the front and back hearth rests on which the plate is set. The hearth plate must be used with the channel edges up. Parts to be heated should be pre-heated or brought up to temperature with the furnace when possible; avoid placing a cold piece on a hot hearth plate. When the gas is turned off to the furnace, turn off the blower at once so the lining will cool gradually.

B. FURNACE RELINING AND FURNACE EXCHANGE:

The furnace should be used until the complete lining is considerably deteriorated. It should then either be replaced with a new lining or new furnace body from the factory. Complete sets of fire brick linings with special shapes to fit the furnace and cement for sealing the brick are available with easy-to-follow installation instructions. Many operators, however, prefer to take advantage of the special price on replacement furnace bodies. Check our repair parts list for prices. This method is popular because it insures an expertly relined furnace in operation at all times; it eliminates the time and trouble of relining the furnace in the customer's shop; and it eliminates the "down" time for returning to the factory for relining. WHEN ORDERING, SPECIFY IF FURNACE IS TO HAVE SAFETY PILOT PORT INSTALLED. FOR ADDITIONAL INFORMATION ON SAFETY EQUIPMENT SEE PAGE 3.

PYROMETER EQUIPMENT:

Occasional replacement must be made of the thermocouple elements, the protection tubes or of the complete thermocouple assembly. We carry replacement parts in stock for immediate delivery.

POT TYPE FURNACES [#920, #950, #568, #580, #565, #565A, #521, #575, #575A, & #575B]

A. FURNACE RELINING:

These furnaces are lined with a high-quality, wear-resistant, castable lining poured with molds used in our factory. These linings are very rugged, and the furnaces should be used until the linings are considerably deteriorated, and then replaced with new furnace bodies. The new bodies are furnished complete less blower equipment and pots or crucibles. Prices for the new bodies are given on the repair parts list. With this method the customers are assured of an expertly lined furnace; and they are never without a furnace to use in their shops. If the lid lining needs replacement before the furnace body, material can be supplied to be mixed with water and molded into the furnace lid or a refractory lid can be supplied.

B. FURNACE RELINING #900 CRUCIBLE FURNACE:

This furnace is lined with a precast lining that can be replaced in the shop or a new replacement body can be supplied.

C. USE OF POTS:

DO NOT use a pressed steel pot for melting aluminum. A graphite crucible is used in the crucible furnaces. A cast iron pot is also suitable when contamination of aluminum by the cast iron is not objectionable.

To extend pot life carry a neutral or slightly reducing flame [more gas than air]. A flame that is too blue is oxidizing and will cause rapid scaling of the pot.

Avoid infiltration of cyanide or other salts into the combustion chamber. If seepage or splashing is occurring, place a ring of dry, powdered fire clay under the flange of the pot.

Turn the pot a little each day so that a different part is exposed to the hottest gases.

Remove sludge or sediment from pot at least once a day. This acts as an insulator, causing local overheating of pot.

Remove the pot at regular intervals and thoroughly clean the inner surface. Also hammer off thin scale that forms on outside.

D. USE OF CRUCIBLES:

Crucibles should be kept in a warm, dry area. Before using a new crucible anneal it by placing it in a warm furnace and gradually raising the temperature at about five minute intervals over a period of forty five minutes until the crucible becomes red.

BLOWER MOTORS:

Motors on the blowers should be oiled occasionally. The brushes should be checked and replaced periodically to avoid wear on the armature.

FORGE FURNACES [#122 & #133]

The forge furnaces are lined with hard firebrick on all wearing surfaces. Individual firebricks can be easily replaced when desired. Lining for the lid or complete lining can be replaced when necessary. Sets of linings are furnished with simple instructions for installation.

SOFT METAL MELTING FURNACES [#379, #313 & #616]

A. FURNACE RELINING:

These furnaces can be relined with brick and castable material supplied by our Company. An instruction sheet accompanies the shipment.

B. GENERAL MAINTENANCE:

Avoid permitting metal to solidify in the pots. If the metal does "freeze" in the pot, turn one burner only on until the metal melts slowly; do not turn all burners on at once or the pot will crack. When melting metal, let small amount of metal form a molten pool before adding additional metal.

SMALL BENCH FURNACES [#101, #112, #108 & #118]

The burner tubes on these furnaces are slotted on the ends to retain the flame, and care should be taken about striking the ends with soldering irons. These tubes are made of cast iron and will give long service, but when the slots are knocked off, the tubes should be replaced to insure good combustion. The #108 and #118 furnaces are equipped with individual valves for each burner. The #101 and #112 furnaces are equipped with double valves. After considerable use the valve plugs will tighten causing the valves to "freeze". When this happens the complete valve will should be replaced as prompt replacement of the complete valve will avoid gas leakage. Linings for all these furnaces are carried in stock. Lining sets are supplied for those in which both hood and bottom are lined. This set consists of material to be molded in to the furnace body and includes a new angle iron.



Form = A-2086

APPROVED COMPONENTS FOR INDUSTRIAL FURNACES

Approved components used on our industrial furnaces and power burners with flame rod or thermocouple safety and ultra-violet safety.

JOHNSON PARTS	APPROVAL		
	UL	CSA	OTHER
Baso Switch	√		
Baso Valve		√	AGA
Baso Thermocouple			AGA
Baso Pilot w/Orifice		√	AGA
Air Switch	√		
ITT Solenoid Valve	√		Factory Mutual
Transformer	√	√	
Lock Out Light	√		
Ignition Burton	√	√	
1/30 Motor Bodine	√	√	
1/7 Carter Motor	√		
1/3 Motor w/ back Contact	√		
P & B Relay	√	√	
Speed Control Switch	√	√	
Start - Stop Switch			Top/Application Only
Ignition Wire	√		
All Other Wire	√		
3/4 Gas Pressure Regulator			AGA
OJ21 Ignitor Plug	√		
Gas Adjustment Valve	√		
Fireye Control	√		
Flame Rod 12"	√		
Scanner	√		

NOTE: All Johson Gas Industrial Furnaces are factory tested for proper function of all systems and all piping is leak tested.

JOHNSON GAS APPLIANCE COMPANY • 520 E AVENUE N.W. • CEDAR RAPIDS, IOWA 52405

1-800-553-5422 • 319-365-5267 • FAX 319-365-6282

Manufacturers since 1901 / Heat Treating Furnaces / Industrial Gas Burners / Stock Tank Heaters / Concrete Curing Systems



Johnson

WARRANTY

We warrant our equipment to be free of workmanship or material defects. Should any material prove defective within one year after shipment due to faulty material or improper workmanship we will furnish without charge to the original purchaser, replacement or repair of said defective part or parts returned freight prepaid to Johnson Gas Appliance Company, Cedar Rapids, Iowa. The foregoing shall not apply to equipment that has been altered or repaired after shipment to you by anyone except our authorized employees, and the Company will not be liable in any event for alterations or repairs except those made with its written consent. On material not of our manufacture, the manufacturer's guarantee to us is extended. This paragraph does not cover ordinary wear and tear, corrosion or improper handling or storage after leaving our point of shipment. If inspection by the Company does not disclose any defect in workmanship or material, the Company's regular charges will apply. Any refractories supplied with this order will be warranted as to quality and will be selected in accordance with good practice for the service intended. The foregoing obligations are in lieu of all other obligations and liabilities including negligence and all warranties, or merchantability or otherwise, express or implied in fact or by law, and state our entire and exclusive liability and buyer's exclusive remedy for any claim or damages in connection with the sale or furnishing of goods or parts, their design, suitability for use, installation or operation. We will in no event be liable for any special or consequential damages whatsoever, and our liability under no circumstances will exceed the contract price for the goods for which liability is claimed.

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