JOHNSON FURNACE INSTRUCTION MANUAL

#900SS FURNACE - MANUAL TEMPERATURE CONTROL - NO SAFETY

FORMS - 821, 232, 800, 822, 820, A-2076, 315, 318, A-2076

INSTALLATION INSTRUCTIONS FOR F-900 FURNACE WITH SPARK IGNITION

(Consult Form No. 232 While Reading This)

POSITION FURNACE AND CONSOLE IN DESIRED LOCATION. THE BACK OF THE FURNACE (SIDE LID LIFT IS ON) SHOULD BE AT LEAST 20" AWAY FROM THE NEAREST WALL. ANY WALLS, CEILING OR FLOORS MADE FROM COMBUSTIBLE MATERIALS THAT ARE SUBJECTED TO THE RADIANT HEAT SHOULD BE PROTECTED WITH INSULATION BOARD OR SIMILAR MATERIAL. ON INITIAL HEATUP, NEARBY WALLS, ETC., CAN BE CHECKED TO SEE IF THEY NEED PROTECTION.

THE FRONT OF THE FURNACE SHOULD BE LEFT CLEAR, SO THAT THE OPERATOR HAS ENOUGH ROOM TO MOVE ABOUT.

FOR EXHAUSTING FUMES AND EXHAUST GASES, A METAL HOOD WITH AN EXHAUST FAN CAN BE USED. THE HOOD SHOULD BE HIGH ENOUGH THAT IT DOES NOT INTERFERE WITH THE OPERATOR.

A METAL TRAY OR POT CAN BE PLACED BENEATH THE PLUGGED OPENING. IF A CRUCIBLE BREAKS INSIDE THE FURNACE, THE PLUG CAN BE REMOVED WITH TONGS AND THE METAL CAUGHT IN A TRAY.

ASSEMBLE THE LID LIFT BY FOLLOWING INSTRUCTIONS ON FORM 800. CONNECT THE FLEXIBLE METAL HOSE BETWEEN THE FURNACE BURNER PORT CASTING AND THE OUTLET PIPE FROM THE CONSOLE BY USING THE UNION FITTING. DO NOT ADD ANY ADDITIONAL PIPE OR FITTINGS BETWEEN THE CONSOLE AND THE FURNACE!

SCREW THE SPARK IGNITER INTO THE PORT CASTING. CONNECT THE CABLE FROM THE CONSOLE TO THE SPARK IGNITER.

CONNECT THE GAS LINE TO THE CONSOLE GAS INLET. WHEN FURNACE IS IN OPERATION, THE PRESSURE SHOULD BE 4" TO 14" ON NATURAL GAS AND 11" ON LP GAS.

CONNECT 115 VOLT POWER SOURCE TO THE BLACK AND WHITE LEADS EXTENDING FROM THE CONSOLE

SET CRUCIBLE INSIDE FURNACE ON CRUCIBLE REST. LOWER LID ONTO FURNACE.

TURN "ON" MAIN GAS AND POWER SUPPLY. SEE FORM #820 FOR LIGHTING THE FURNACE.

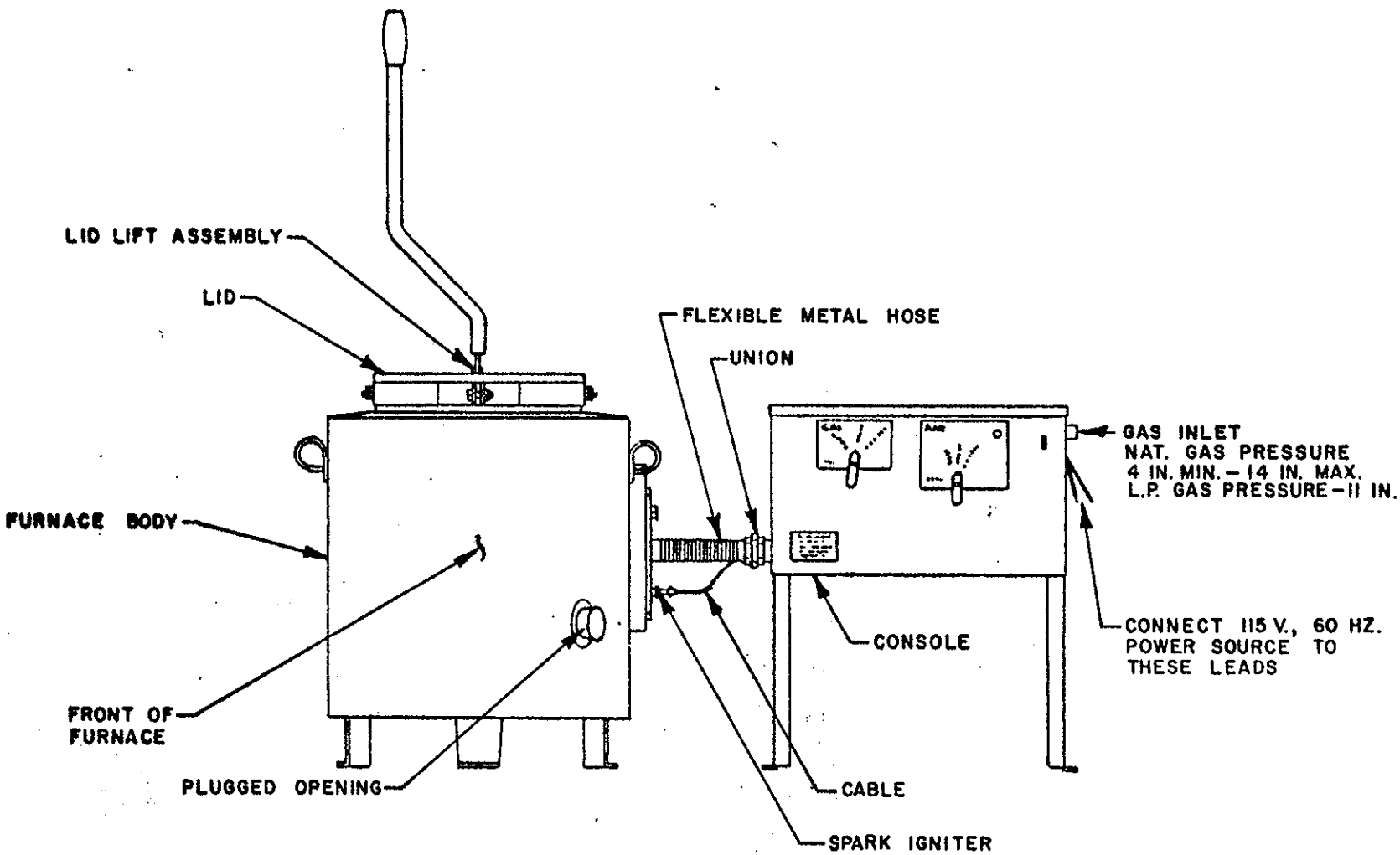
LONG HANDLED TONGS CAN BE USED TO PLACE THE METAL THRU THE OPENING IN THE LID. NOTE: THE PIECES SHOULD BE SMALL ENOUGH TO PASS THROUGH THE HOLE IN THE LID WITHOUT BLOCKING TOO MUCH.

NOTE: AFTER FURNACE HAS BEEN HEATED UP AND COOLED, YOU WILL NOTICE CRACKS APPEAR IN THE LID REFRACTORY AND IN THE FURNACE LINING. THIS IS NORMAL, DUE TO THE EXPANSION AND CONTRACTION OF THE REFRACTORY AND WILL NOT AFFECT THE PERFORMANCE OF THE FURNACE.

ON FIRST HEATUP, THE FURNACE SHOULD BE ALLOWED TO RUN ABOUT TWO (2) HOURS SO THAT THE LINING CAN BE DRIED. YOU WILL NOTICE WATER DRIPPING FROM THE FURNACE.

IT IS EXPECTED THAT THE MORTAR JOINTS BETWEEN THE PRECAST REFRACTORY SECTIONS WILL CRACK. THIS IN NO WAY IMPAIRS THE OPERATION OF THE UNIT!

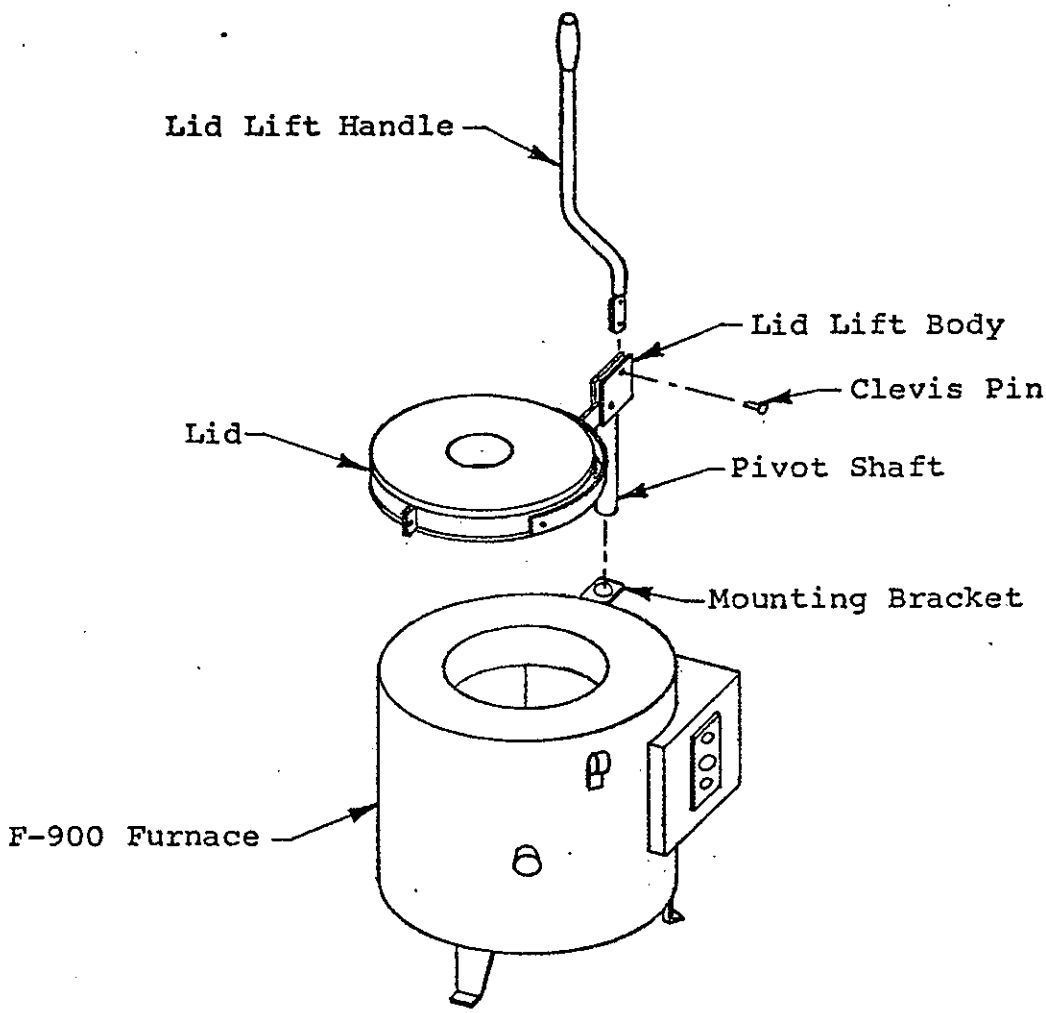
INSTALLATION DIAGRAM FOR F-900 FURNACE WITH MANUAL CONTROL AND SPARK IGNITION



JOHNSON GAS APPLIANCE CO.
CEDAR RAPIDS, IOWA 52405

FORM 232
6-11-71

LID LIFT ASSEMBLY INSTRUCTIONS FOR F-900

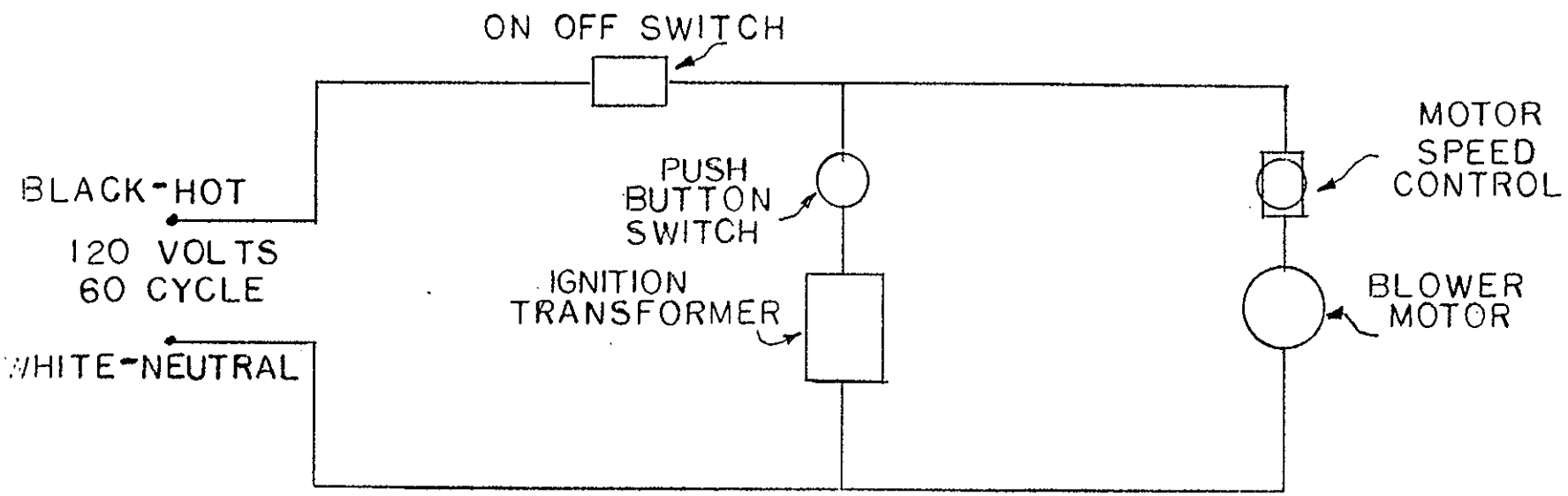


1. SET LID ON TOP OF FURNACE WITH PIVOT SHAFT OF LID LIFT BODY GOING THROUGH HOLE IN TOP OF MOUNTING BRACKET AND FITTING OVER PLUG ON BOTTOM BRACKET.

2. LID LIFT HANDLE SLIPS BETWEEN SIDES OF LID LIFT BODY AND IS SECURED WITH A ½" DIA. X 1" CLEVIS PIN AND COTTER PIN.

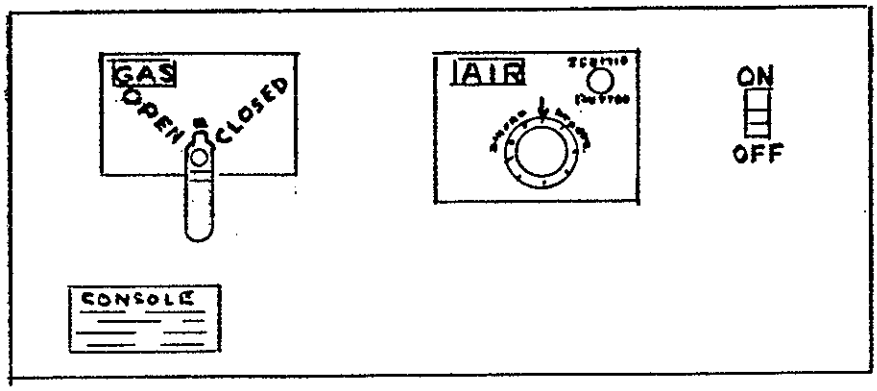
NOTE: HANDLE IS OFFSET AWAY FROM BURNER PORTION OF FURNACE BODY.

WIRING DIAGRAM FOR NO. 900 FURNACE WITHOUT SAFETY EQUIPMENT



CUSTOMER CONNECT 120 VOLTS 60 CYCLE POWER SOURCE TO BLACK AND WHITE LEADS EXTENDING FROM CONSOLE

LIGHTING INSTRUCTIONS FOR F-900 FURNACE WITH SPARK IGNITION



1. MAKE SURE THE "GAS CONTROL HANDLE" IS IN THE "CLOSED" POSITION.

2. TURN THE "AIR CONTROL KNOB" COUNTER-CLOCKWISE PAST #10 TO THE "STOP" POSITION. THIS IS THE MAXIMUM BLOWER SPEED SETTING.

3. TURN THE "ON-OFF" SWITCH TO "ON" AND THE BLOWER MOTOR SHOULD RUN.

4. DEPRESS AND HOLD IN THE "IGNITION BUTTON". THE SPARK IGNITER WILL COME "ON" AND IF THE ROOM IS NOT TOO NOISY, YOU WILL HEAR A "BUZZING" SOUND.

5. GRADUALLY TURN THE "GAS CONTROL HANDLE" TOWARD THE "OPEN" POSITION JUST TO THE POINT WHERE THE BURNERS IGNITE. MAKE MINOR ADJUSTMENTS TO THE GAS CONTROL HANDLE TO OBTAIN A STEADY LOUD BURNER ROAR.

6. AFTER THE FURNACE HAS RUN ABOUT 10 MINUTES, ADJUST THE "GAS CONTROL HANDLE" TO GIVE A SHARP TAIL OF FLAME OUT THE CENTER HOLE IN THE LID. IF YOU HAVE NO FLAME, INCREASE THE AMOUNT OF GAS. IF YOU HAVE A HIGH, LAZY FLAME, DECREASE THE AMOUNT OF GAS.

7. IF YOU DESIRE TO DECREASE THE AMOUNT OF GAS, TURN THE "GAS CONTROL HANDLE" TOWARD THE "CLOSED" POSITION UNTIL THE TAIL OF FLAME DISAPPEARS. THEN, TURN THE "AIR CONTROL KNOB" CLOCKWISE UNTIL THE TAIL OF FLAME RE-APPEARS. REPEAT THIS PROCEDURE UNTIL THE DESIRED OR MINIMUM GAS INPUT IS REACHED.

8. TO SHUT DOWN THE FURNACE, TURN THE "GAS CONTROL HANDLE" TO THE "CLOSED" POSITION. THEN, TURN THE "ON-OFF" SWITCH TO "OFF".

HINTS FOR MAXIMUM CRUCIBLE LIFE

DO NOT:

. Drop crucible - it will break like a dish

. Drop metal into crucible when charging

. Wedge charging metal into crucible

. Use excessive amounts of flux

. Melt half a crucible of metal; "short heats" reduce crucible life

. Use the same crucible for different kinds of metal or alloys

. Allow metal to solidify in the crucible

DO:

. Anneal graphite crucibles before charging the first time unless crucibles have been stored in a warm, dry place.

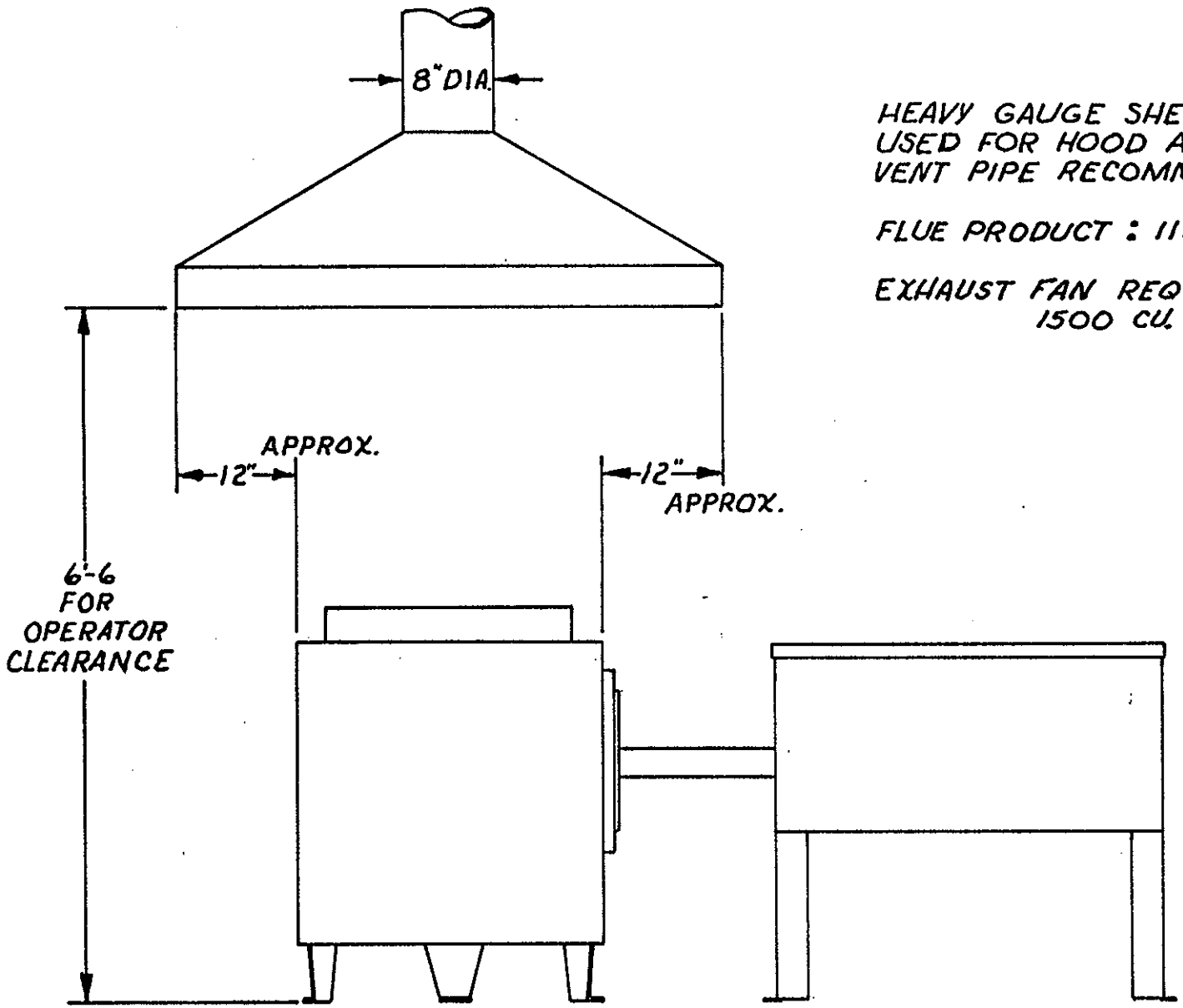
. Use cardboard between base block and crucible to prevent their sticking together.

. Handle hot crucibles with correctly fitting tongs and pouring shanks.

. Empty extra metal into ingot molds.

. Scrape inside of crucible carefully while it is still hot.

SUGGESTED METHOD OF VENTING JOHNSON #900 FURNACE



HEAVY GAUGE SHEET METAL SHOULD BE USED FOR HOOD AND STACK. CLASS "A" VENT PIPE RECOMMENDED.

FLUE PRODUCT : 115 CU. FT./MIN. @ 2000°

EXHAUST FAN REQUIREMENT : 1500 CU. FT./MIN.

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 EXAUST FAN SHOULD BE SUFFICIENT TO PROVIDE A 200 FPM FACE VELOCITY AT THE HOOLD.

2. OVEN TYPE FURNACES [INCLUDES OVEN FORGES]

   A. SINGLE INSTALLATIONS:

   FOR SINGLE INSTALLATIONS 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.

HINTS FOR MAXIMUM CRUCIBLE LIFE

DO NOT:

. Drop crucible - it will break like a dish

. Drop metal into crucible when charging

. Wedge charging metal into crucible

. Use excessive amounts of flux

. Melt half a crucible of metal; "short heats" reduce crucible life

. Use the same crucible for different kinds of metal or alloys

. Allow metal to solidify in the crucible

DO:

. Anneal graphite crucibles before charging the first time unless crucibles have been stored in a warm, dry place.

. Use cardboard between base block and crucible to prevent their sticking together.

. Handle hot crucibles with correctly fitting tongs and pouring shanks.

. Empty extra metal into ingot molds.

. Scrape inside of crucible carefully while it is still hot.

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.

Johnson

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.

	APPROVAL		
JOHNSON PARTS	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 Button	√	√	
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

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