

**SAVE THESE INSTRUCTIONS**

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**OWNERS INSTRUCTIONS**

**FOR**

**BRUNCO MODELS 120/150/190 WARM AIR FURNACE**

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**"ALL INSTALLATIONS MUST BE IN ACCORDANCE WITH LOCAL  
AND STATE CODES WHICH MAY DIFFER FROM THIS MANUAL"**

**Manufactured by:**

**L.B. Brunk & Sons, Inc.  
10460 S.R. 45 N  
Salem, OH 44460**

# Brunco Furnace

## General Instructions

The Brunco hot air furnace has been designed for use as either an independent forced air furnace or as a supplemental heater to the safety tested and labeled by Arnold Green Testing Laboratories, Natick existing forced air furnace using wood or coal fuel. The Brunco furnace has been properly, Massachusetts. The testing and evaluation was to industry safety standard for solid fuel furnaces as established by U.L., CSA-B351 and ETLM-78-1.

**Safety Notice: If this Brunco furnace is not properly installed, a house fire may result. For your safety, follow the installation directions. Contact local building or fire officials about restrictions and installation inspection in your area.**

### A. Check List of Parts: 120, 150, & #190 Models

- |                                   |                                    |
|-----------------------------------|------------------------------------|
| 1. Front Shaped Brick (150 & 190) | 11. 2E232 Fan & Limit              |
| 2. Front Heat Shield (120)        | 12. Painted Jackets                |
| 3. 1 ½ x 4 ½ x 9 Firebrick        | 13. Blower Guard                   |
| 4. Rear Cast Iron Brick           | 14. Smoke Apron                    |
| 5. Damper Rod w/Nuts              | 15. Gasket Strip                   |
| 6. Shaker Handle                  | 16. Wiring Harness                 |
| 7. Pkg. of Misc. Screws           | 17. Filter Box Assembly            |
| 8. Circulation Blower             | 18. Replaceable Filter ( 16 x 20 ) |
| 9. 4C440 Draft Fan                | 19. Owners Instructions            |
| 10. 2E158 T-Stat                  |                                    |

### B. **Assembly of Furnace:**

1. Remove the shipping box and the parts from inside the furnace and check them with the above parts list. Hang the doors in place using the hinge pins provided.

2. 120 / 150 / 190 - Install the special cast iron firebrick in the back of the furnace firebox. Center it so that the side brick will clear both sides.

WC90 – (2) shaped firebricks cover the back of the furnace, and are held in place with the side brick.

3. Remove the regular firebrick from the ash pan and install them in place on the sides of the furnace by simply setting them in the recessed area provided.

4. Install the front firebrick in the 150, 190 and WC90 by placing the top edge under the retainer lip and slipping the bottom edge in place. Bolt the front heat shield in the model 120 using the same two screws that hold the ash lip. **Note:** Be sure that all the brick clear the moving grate system.

5. Install the damper rod by sliding it through the hole above the loading door. Screw one nut on the threaded end of the rod. Place the end of the rod through the hole in the sliding baffle bracket and secure in place using the self-locking nut. Be sure that the baffle slides back and forth freely. The spring handle will then protrude out the front of the furnace just above the loading door. The WC90 model is equipped with a stationary baffle that needs no adjustment.
6. Remove the hot air jackets from the box and place the sides into position by sliding the bottom retainer bracket over the up-turned lip at the base of the furnace. The jacket with the hole punched for the controls should go on the left side facing the front of the furnace. Next lay the top jacket with the air outlet hole on the top of the furnace overlapping the side jackets, this will hold them in position. Then screw the eight (8) self-tapping screws into the four corners of the jacket through the holes provided. **Note:** Your furnace may have been shipped with these jackets already in place.
7. A duct Adaptor is optional, and available from your dealer, for converting the 20 x 20 top to a 12' round. In some installations the 12" round is easier to work with. The WC90 furnace comes standard with the 12" round outlet.
8. Install the circulation blower to the lower back of the furnace over the open air hole using the screws provided in the bolt package. The WC90 blower is a single speed motor and is controlled by the fan control switch. The model 120 blower is a high-low two speed that is controlled by a switch on the wire harness junction box. High speed is recommended for best circulation and airflow. The 150 and 190 model has a larger blower that is static pressure sensitive and compensates automatically to each ducted system.
9. Assemble and install the cold air filter system on the back of the furnace as shown in Diagram A and B. It will be necessary to drill the holes in the furnace jacket to install the self-tapping screw that fasten the filter assembly to the furnace. The filter system is optional for the WC90.
10. Install the Dayton 4C440 Draft Fan over the round opening between the furnace doors using the bolts provided. Use the gasket strip between the fan and the furnace body to insulate and reduce vibration noise. See Diagram C. The WC90 uses a Condar bi-metal control on the loading door that is attached with the screw provided. Be sure that the insulation strip is used but does not hinder the draft flap from free movement.
11. The fan and limit control is to be placed on the upper left side of the furnace with the sensor arm through the hole provided. Use sheet metal screws to fasten securely in place. See Diagram C.
12. Mount wire harness as shown in Diagram C. Then make wire connections as illustrated in Diagram D. The WC90 model has the fan control attached to the blower. After installing the blower then the fan control assembly should be attached to the rear of the furnace near the flue outlet by using the self-tapping screw in the hole provided. The 110 Volt supply line then attaches to the two leads in the junction box on the blower. The fan control is factory set and has no adjustment.
13. The blower guard is for the protection of the draft fan and is designed to mount on two bolts extending out the front of the furnace. Loosen these bolts and slip the slotted grooves behind the bolt head, and retighten. See Diagram C.

14. Hang the smoke apron on the two hooks provided inside the top of the loading door. This will swing free when wood is fed into the furnace. It helps reduce smoke leakage when the door is open in a poor draft condition.

15. Use the shaker handle to roll the grates back and forth, making sure that they are operating freely. Shaker handle should be removed when not in use.

### **C. Installation of Furnace:**

1. The Brunco furnace should always be installed on a concrete floor.

2. Install 24" from combustible wall on rear and sides of furnace. Maintain 24" clearance from ceiling. Closer clearance may be achieved by use of approved non-combustible wall protectors of brick. Your local dealer will be able to assist you with these specifications.

3. Connect only to 8" or larger Class A masonry chimney or all fuel factory built chimneys that are approved by Underwriters Laboratories. Use of aluminum type B gas vent for solid fuels is unsafe and prohibited by the National Fire Protection Association Code. The chimney should extend at least two feet above the nearest point of roof within 10' of the chimney. The wall thimble or chimney connection must comply with local building and fire codes and should be of approved material and safety inspected by your local authorities. A maximum draft of .05 water inches should be used.

4. Use at least 24gauge black pipe inside the room with at least 18" vertical and 20" horizontal clearance to combustible material on wall or ceiling. It is not recommended to use more than one elbow in the stovepipe. The chimney connection pipe should extend at least 2" into the chimney but not so far that it blocks the airflow. Note that the smoke collar is designed for the pipe to fit inside. All connections should be made this way so that condensation or creosote will not drip out the joints of the flue pipe. Drip free elbows are also recommended. Each joint should be drilled and sheet metal screwed. A barometric draft regulator is recommended in the smoke pipe approximately 1 - 2' above the furnace when bituminous coal fuel is used. This will help control the draft of the flue pipe so that overheating does not occur. A draft that is too low will often cause the stove to smoke. A long pipe length and a larger number of elbows will give a greater chance of dangerous creosote and ash build-up. The Brunco will achieve maximum heat output without lengthy pipes. All horizontal pipes should be tilted at least ¼" per foot upward toward chimney.

5. When the Brunco is used as a furnace supplement it will perform best when setting beside or near the existing furnace and within 3 - 4' of the chimney. The hot air duct should be connected to the warm air plenum of the existing furnace. The use of a baffle or an elbow inside the plenum may be desired to eliminate back draft from the furnace blower on manual if additional airflow is needed. Care should be taken that the flow of air is sufficient so that the duct pipes do not become excessively hot. It is advisable to install a warm air furnace in a central location in relation to the outlet registers and to use large warm air ducts, for improved heat distribution during electrical power failures.

5. It is normal for the cold air supply for the circulation blower to come from the basement. A **separate** cold air duct may be supplied to the furnace by using a 12" duct into the filter box on the Brunco. The filter should be replaced as needed. It is important that the airflow be adequate to keep the warm air plenum from becoming too hot. Warm air in the plenum should not exceed 180 - 200° during normal operation. A temperature of 140 - 170° is considered good.

#### **D. The First Fire:**

1. Blowers and controls should be wired to a 115 volt power supply as shown in the enclosed wiring Diagram C. Use #12 Bx cable or conduit and #12 wire. Keep wiring as far away from hot areas as possible. Check the operation of the blowers before building fire. The rear circulation blower should run when fan limit control is turned to manual. The front draft blower should run when the upstairs thermostat is turned to a setting above room temperature. It is common for temperatures to vary a few degrees with a hand-fed burner.

2. Burn a small newspaper fire in the furnace to check the draft of the chimney. A poor drafting chimney may cause the furnace to smoke. If this should be the case, necessary steps should be taken to improve the chimney draft.

3. Build a wood fire in the furnace and fire up slowly so that paint and stove can cure properly. Build several small fires with each one becoming hotter. There will be some smoke smell during the first several fires as the paint on the stove cures from the heat.

4. Always use leather gloves when servicing an operating stove.

#### **E. Operation:**

1. Build your solid fuel fire on top of the grates. A small bed of ash on top of the grates will improve the length of burning time and efficiency. Too many ashes will block the draft air and may cause the fire to burn too slowly.

2. A coal fire should not be built above the top of the firebrick. The grates will need to be kept free of dead ash to gain maximum heat efficiency with coal. A wood fire may be built to the center of the door but not allowing the hot burning coals to build up above the firebrick.

3. When using wood for fuel, a hardwood that is 6 - 8 months cured will give your stove the best heat output and performance. Wet or green wood causes more creosote and produces less heat. Never store fuel within 24" of the heater or in the space required for charging or ash removal.

4. Ash pan should be emptied on a regular basis so that no ashes build up to the bottom of the grates. If ashes touch the grates it reduces draft efficiency and could cause the grates to burn out. Ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be placed on a non-combustible floor or on the ground, well away from all combustible materials, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have thoroughly cooled.

5. Never use gasoline, gasoline type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or freshen up a fire in this heater. Keep all such liquids away from the heater while it is in use.

6. The thermostat on the wall, controls the draft fan of the 120 / 150 / 190 models on the front of the Brunco furnace. This acts as a draft control to the fire, regulated by room temperature. When the thermostat is above room temperature then the draft fan is on and when the thermostat is below room temperature the draft is shut off. The small flap on the side of the draft blower may be opened or closed to allow the desired amount of draft to match the chimney draw and type and dryness of fuel. The spinner on the loading door may be opened to allow secondary combustion air above the fire for coal efficiency and to control the fire when wood ashes are left on top of the grates for slower burning. The WC90 furnace has dual draft controls. A spin knob on the ash door allows direct primary air flow into the fire to give a good clean

burn. The loading door has a bi-metal Condar control to regulate the secondary air flow. The secondary air supply allows a good control of the fire as well as creating a cleaner fire without causing the fire to burn excessively hot. Regulate both of these controls to give the desired heat output and combustion control.

Allow enough combustion air both above and below the fire to insure a clean burn. A small intense fire is preferable to a large smoldering one in the amount of creosote produced. At no time should the stove be operated to such an extent that any part becomes "red hot".

7. **CAUTION** - In the event of a power failure it is necessary that care is taken to keep the furnace or the hot air ducts from overheating. When operating as a gravity unit, wood fuel should be used only as it is more easily controllable than coal. 1) Do not fill above the firebrick level; using only 2 - 3 logs. It is better to fire more often with small amounts of fuel. This will reduce overheating. 2) Remove the fan and limit control switch from the side of the furnace, ( be sure to disconnect the power supply first ) to keep the heat sensitive coil from becoming distorted. 3) Open the draft flap on the combustion blower wide open or as needed. 4) Turn the top knob open a maximum of one (1) complete revolution only. 5) Open all heat duct registers and watch closely that the duct pipes themselves do not become excessively hot. 6) At no time should the flu temperature exceed 600 or 700 degrees.

8. When bituminous coal is used it is recommended that the top sliding damper be left in the out or open position until the impurities from the coal are burned off. This will help to avoid a puffing back condition. After the loading of coal begins to burn then the sliding damper should be placed in the pushed in (closed) position for best efficiency and performance. The WC90 model is equipped with a stationary baffle that needs no adjustment.

9. The fan and limit control is designed to activate the circulation factory set for the blower to come on at 120 degrees and off at 90 degrees with the high limit set at 200 degrees. Change in the temperature setting can be made to get the best balance of heat output.

10. Open the secondary smoke bypass damper to clear the smoke before opening the loading door by pulling the spring and rod away from the face of the furnace. Turn off the draft fan switch during loading to reduce smoke escape out the door.

**NOTE:** Remember to switch the draft fan back on after loading with fuel. Open the door slowly to give time for smoke to escape out the flue. The secondary bypass damper may be operated in any position in order to give the best draft and heat control. It is not recommended to leave the stove unattended with the doors open. **DO NOT** leave the ash door open at any time except to remove ashes. The WC90 model is equipped with a stationary baffle that needs no adjustment.

**NOTE:** Establish a routine for the storage of fuel, care of the unit and firing techniques. Check daily for creosote build-up until experience shows how often cleaning is necessary. Be aware that the hotter the fire, the less creosote is deposited and weekly cleanings may be necessary in mild weather even though monthly cleanings may be enough in the coldest months. Have a clearly understood plan to handle a chimney fire. When wood is burned slowly, it produces tar and other organic vapors, which combine with expelled moisture to form creosote. The creosote vapors condense in the relatively cool chimney flue of a slow burning fire. As a result, creosote residue accumulates on the flue lining. When ignited, this creosote makes an extremely hot fire. When coal is burned, the products of combustion combine with moisture to form a soot residue, which accumulates on the flue lining. When ignited, this soot makes an extremely hot fire. The chimney connector and chimney should be inspected at least once every two months during the heating season to determine if a creosote or soot build-up has occurred.

If creosote or soot has accumulated, it should be removed at once to reduce the risk of a chimney fire. In the event of a soot or creosote chimney fire all drafts on the furnace should be closed immediately and the fire department notified. Dousing the fire with one quart of water will help also to slow down a chimney fire until the fire department arrives.

**F. Further Information:**

For further information on using your heater safely, obtain a copy of the National Fire Protection Association Publication "Using Coal & Wood Stoves Safely", NFPA No. HS-8-1974, Batterymarch Park, Quincy, MA 02269.

**G. Recommended Fuel:**

This wood / coal heater requires the use of solid wood fuel, bituminous stove size coal or chestnut size anthracite coal.

**H. Warning:**

The installation of this stove must comply with state and local requirements and be inspected by the state or local building inspector as required.

**DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.**

**I. NOTE:** This stove is not approved or recommended for use in mobile homes.

**J.** Enjoy the warmth and beauty of your new Brunco furnace and use wisdom and common sense in the operation of the solid fuel heater.

**CHECK LIST**

1. \_\_\_\_\_ Have you read all instructions?
2. \_\_\_\_\_ Is your chimney clean and of approved style?
3. \_\_\_\_\_ Do you have proper draft on the flue?
4. \_\_\_\_\_ Is the furnace installed to code?
5. \_\_\_\_\_ Do you have proper wall and floor clearance?
6. \_\_\_\_\_ Are the pipe joints screwed together?
7. \_\_\_\_\_ Are you burning the proper fuel?
8. \_\_\_\_\_ Is your wood well cured?
9. \_\_\_\_\_ Are all electrical connections correct and protected from hot areas?
10. \_\_\_\_\_ Have you sent in your warranty card?

PARTS LIST FOR BRUNCO #120 FURNACE

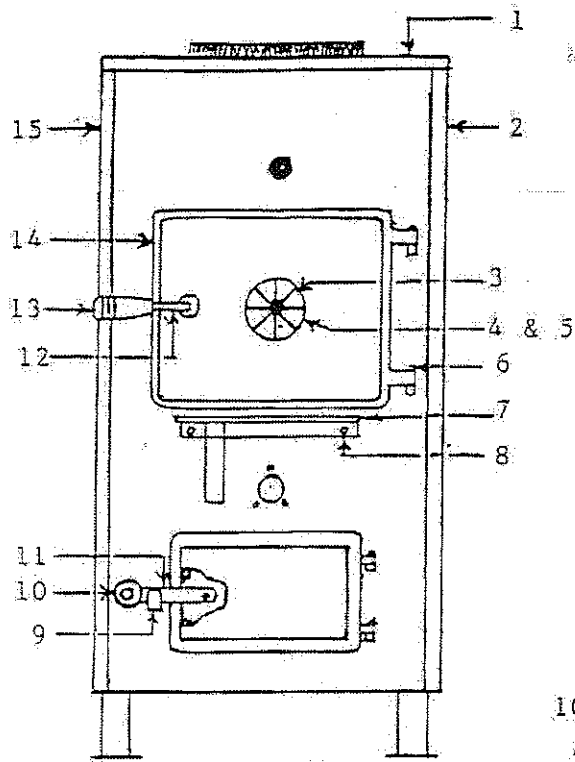


Figure #1

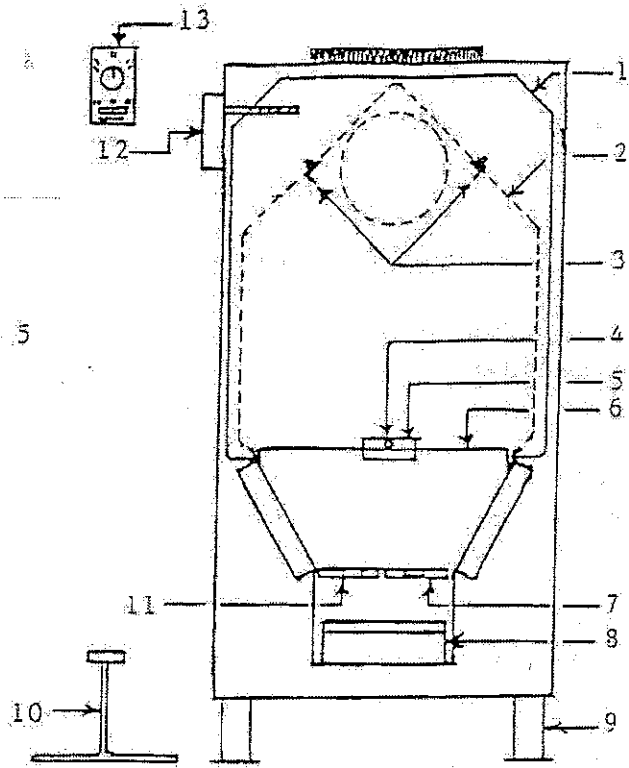


Figure #2

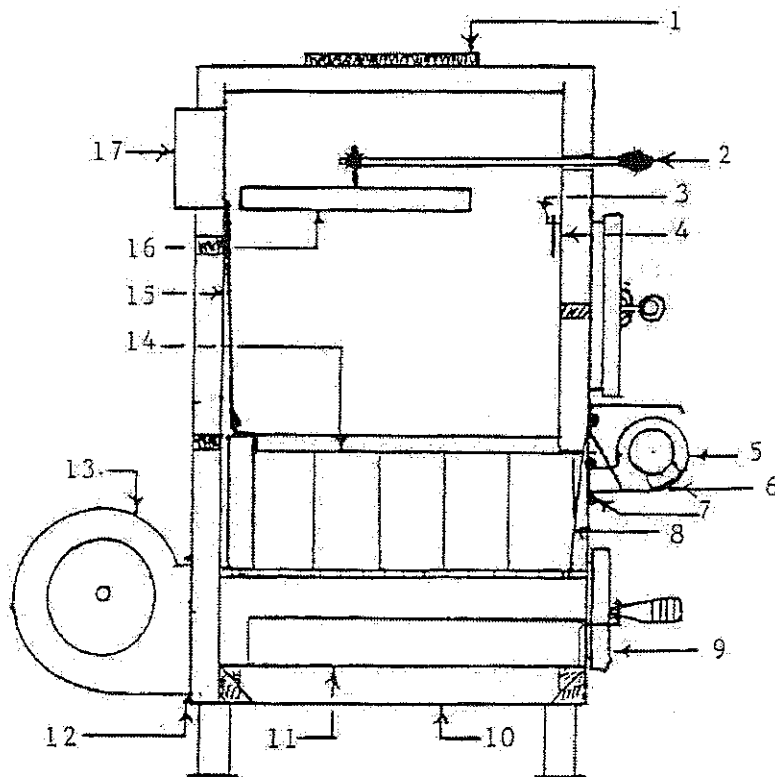


Figure #3



## PARTS LIST FOR BRUNCO #120 FURNACE

### FIGURE #1

1. 1B5322 Top Jacket (1)
2. 1B5324 RH Side Jacket (1)
3. 1B5060 Cast Iron Spin Dial (1)
4. 1B5204 Bolt for Spin Dial (1)
5. Nut for Spin Dial (1)
6. 1B5382 Door Hinge Pin (2)
7. Draft Blower Guard (1)
8. 12B Heat Shield Bolts & Nuts (2 ea.)
9. 120LC Latch Catch (Welded) (1)
10. 6B Wood Door Handle (1)
11. 7B Handle Bracket (1)
12. 1590DL Door Latch (Welded) (2)
13. 6B Wood Door Handle (1)
14. 1590T Cast Iron Loading Door (1)
15. 120LH Side Jackst (1)

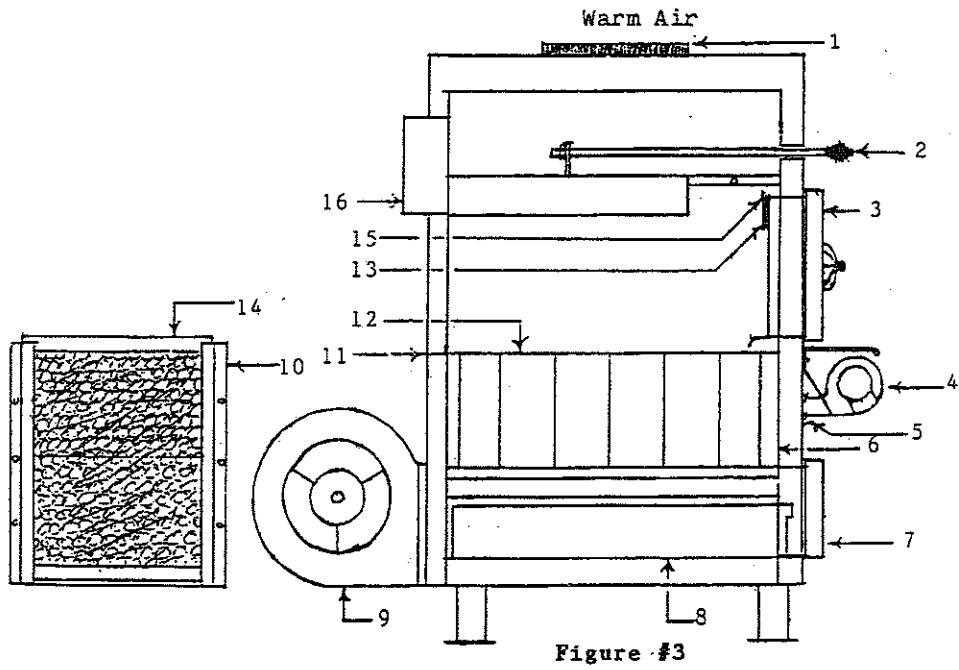
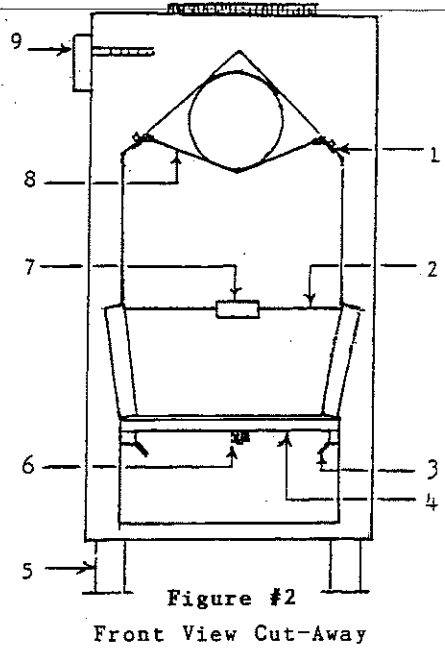
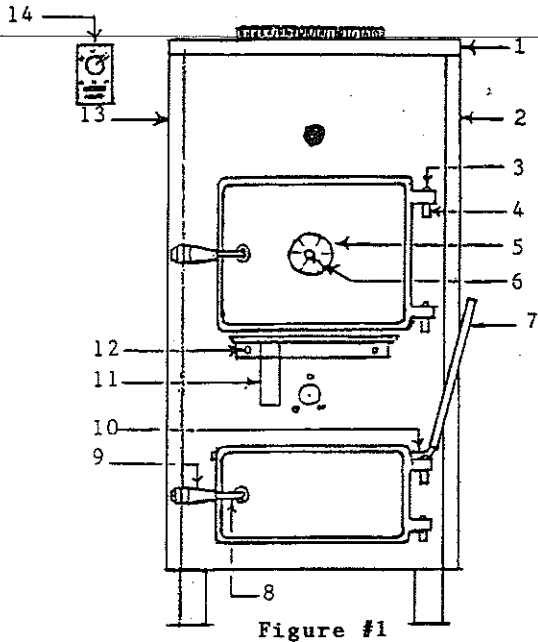
### FIGURE #2

1. 120F Heat Exchanger Front (Welded) (1)
2. 120UF Upper Firebox (Welded) (1)
3. 120BR Bolt In Baffle Rails (2)
4. 120RB Rear Brick Retainer Bolt (1)
5. 1590RBR Rear Brick Retainer (1)
6. FBR Cast Iron Rear Furnace Brick (1)
7. 110R Cast Iron Grate (1)
8. 110AP Ash Pan (1)
9. 16B Furnace Legs Welded (4)
10. 120SH Shaker Handle (1)
11. 110L Cast Iron Grate (1)
12. 2E232 Fan Limit Control (1)
13. 2E158A Line Voltage Thermostat (1)

### FIGURE #3

1. 5B 12" Galvanized Starting Collar (1)
2. 120DR Damper Rod with Spring Handle & Two Nuts (1)
3. 13B Smoke Apron Hooks (Welded) (2)
4. 9B Smoke Apron (1)
5. 4C440 Draft Blower (1)
6. 1X878 On-Off Switch (1)
7. 15B Blower Mounting Bolts (3)
8. HS6 Cast Iron Heat Shield (1)
9. FD20 Cast Iron Ash Door (1)
10. 120BP Bottom Panel (Welded) (1)
11. 120LF Lower Firebox (Welded) (1)
12. 15B Blower Mounting Bolts (4)
13. 4C589 Circulation Blower (1)
14. 110FB 1½" x 4½" x 9" Firebrick (10)
15. 120B Heat Exchanger Back (Welded) (1)
16. 120SB Sliding Baffle Plate (1)
17. 120SPC Smoke Pipe Collar (Welded) (1)

**PARTS LIST FOR BRUNCO #150 & #190 FURNACES**



## PARTS LIST FOR BRUNCO #150 & #190 WOOD/COAL FURNACES

### FIGURE #1

1. 150T or 190T Top Jacket 20 x 20 Outlet (1)
2. 150RH or 190RH Side Jacket (1)
3. 1590P Door Hinge Pin (4)
4. 1590H Hinge (Welded) (4)
5. 2B Cast Iron Spin Dial (1 ea.)
6. 3B Bolt & Nut For Spin Dial (1 ea.)
7. 1590RSH Removable Shaker Handle (1)
8. 1590DL Door Latch (Welded) (2)
9. 6B Wood Door Handle (2)
10. 1590SR Shaker Rod (1)
11. 10B Draft Blower Guard (1)
12. 12B Blower Guard Bolts (2)
13. 150LH or 190LH Side Jacket (1)
14. 2E158A Line Voltage Thermostat (1)

### FIGURE #2

1. 150BR or 190BR Bolt in Baffle Rails (2)
2. FBR Cast Iron Rear Furnace Brick (1)
3. Grate Support (Welded)
4. G40S Cast Iron Grates (Model #150 requires 5 - Model #190 requires 6)
5. 16B Furnace Legs (Welded) (4)
6. Grate Linkage
7. 1590 RBR Rear Brick Retainer (1)
8. 150SB or 190SB Sliding Baffle (1)
9. 2E232 Fan & Limit Control

### FIGURE #3

1. Optional 20 x 20 Square to 12" round Furnace Adaptor
  2. 150DR or 190DR Damper Rod With Spring Handle and 2 Nuts (1)
  3. 1590T Cast Iron Loading Door (1)
  4. 4C440 Draft Blower (1)
  5. 15B Blower Mounting Bolts (3)
  6. 1590FSB Front Shaped Furnace Brick (2)
  7. 1590B Cast Iron Ash Door (1)
  8. 150AP or 190AP Ash Pan (1)
  9. 4C590 1500 C.F.M. Circulation Blower (1)
  10. 1590 Filter Box (1)
  11. 1590S Spacer (Welded) (4)
  12. 1-1/2" x 4-1/2" x 9" Firebrick (150 Requires 12, & 190 Requires 14)
  13. 1590SA Smoke Apron (1)
  14. 16 x 20 Disposable Filter (1)
  15. 1590SH Smoke Apron Hooks (Welded) (2)
  16. 1590 SPC Smoke Pipe Collar (Welded) (1)
- 1590GR 1/2" Fiberglass Door Seal (Not Shown)  
Loading Door Requires 4-1/2' Ash Door Requires 4'

**WIRE HARNESS INSTALLATION  
MODEL # 120, #150 & #190**

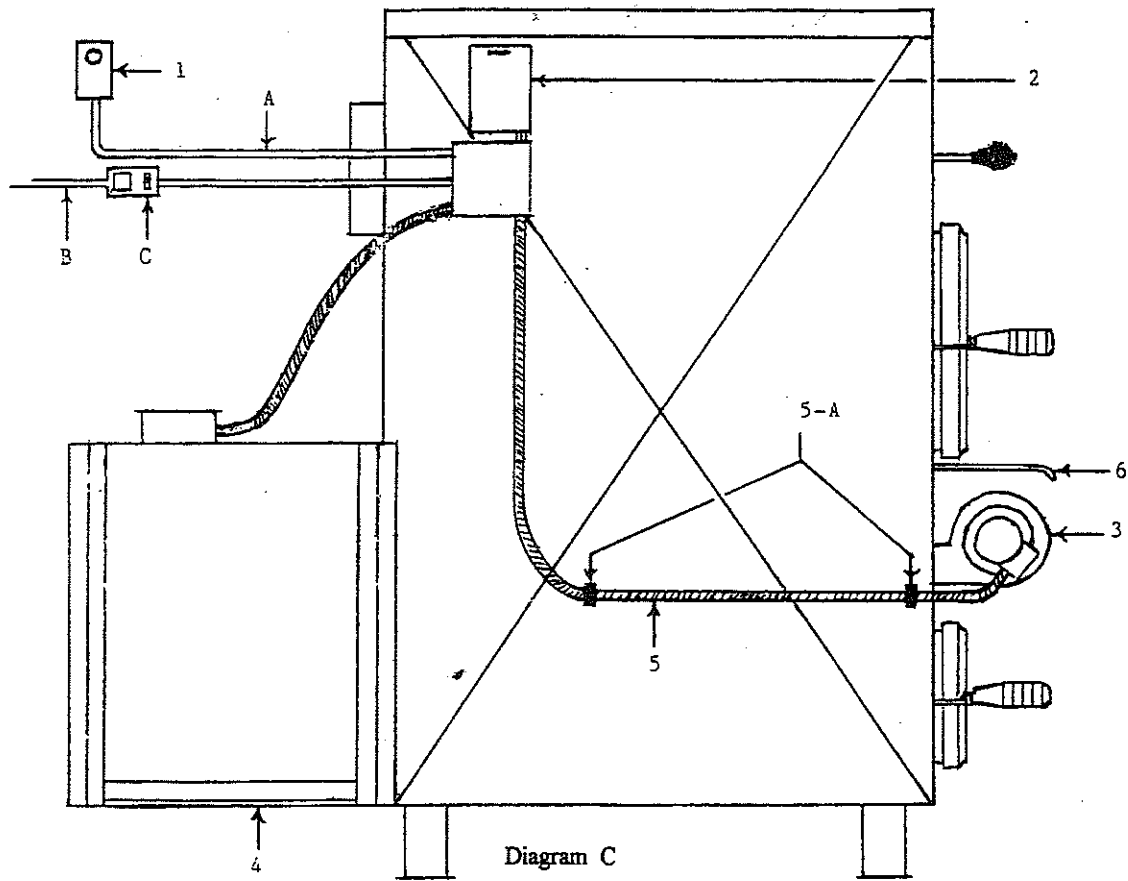


Diagram C

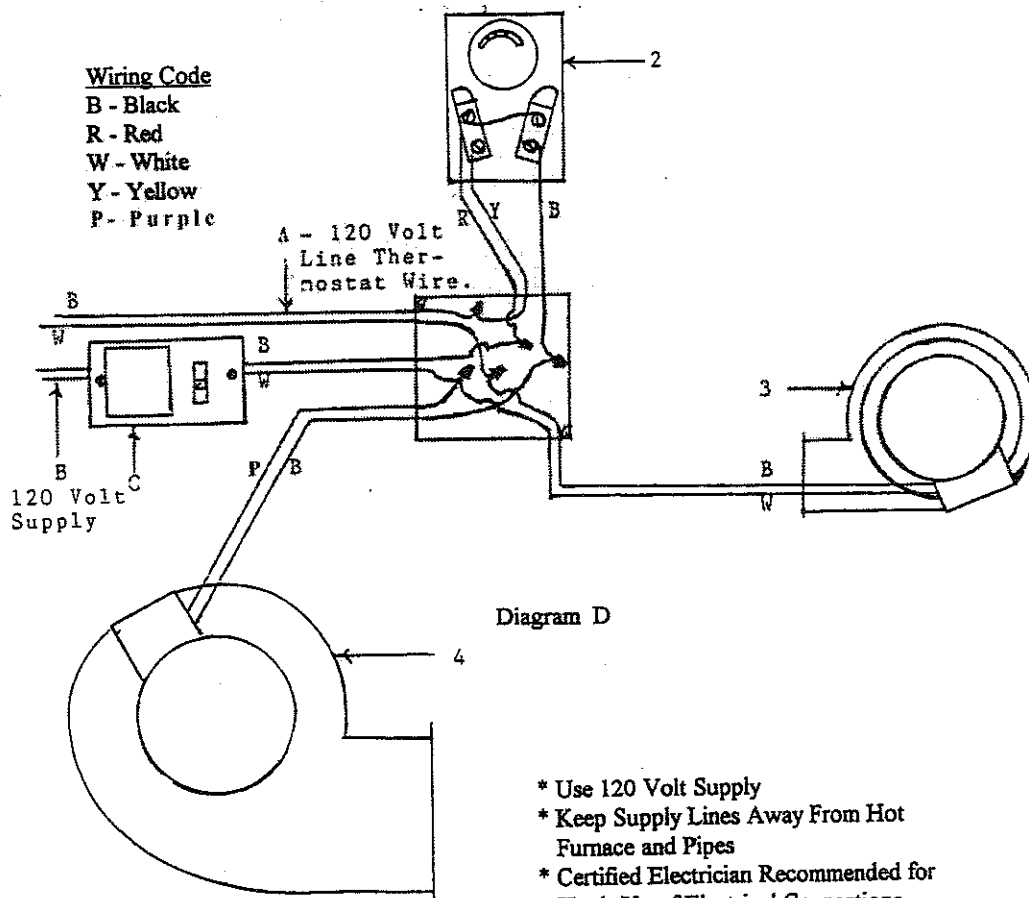
**Standard Parts with Furnace**

1. 120 Volt in line thermostat (1)
2. fan & limit control (1)
3. draft blower (1)
- Circulation Blower (1)  
(Not Shown)
5. Wire Harness
- 5.A-Conduit Clips & Screws  
(Included W/Harness) (2 ea.)
6. Blower Guard

**Parts not Provided with Wire Harness**

- A. #14-2 thermostat cable
- B. #12 THHN or equivalent wire 120 volt  
electrical supply line in conduit 4.
- Leading To (Recommended) Part C In  
Line fused Switch
- C. In Line Fused Switch

**BRUNCO FURNACES - MODELS #120, 150 & 190  
WIRING DIAGRAM**



**Wiring Code**  
 B - Black  
 R - Red  
 W - White  
 Y - Yellow  
 P - Purple

A - 120 Volt Line Thermostat Wire.

120 Volt Supply

Diagram D

- \* Use 120 Volt Supply
- \* Keep Supply Lines Away From Hot Furnace and Pipes
- \* Certified Electrician Recommended for Hook-Up of Electrical Connections
- \* Check Local Electrical Codes for Requirements in Your Area Before Installation

**NOTE:** Make All Wire Connections Inside 4 x 4 Junction Box

## Assembly Instructions for #120 & #150 & 190

### Filter Box

**Step 1.** - Position part #1 on a flat surface with flanges up. Fasten part #2 to the inside of part #1 flange as shown in drawing.

**Step 2.** - Fasten parts #3 and #4 to inside of flanges on part #1 and outside of flanges on part #2 as shown. **NOTE:** filter may be placed on left side if needed by reversing parts #3 & #4.

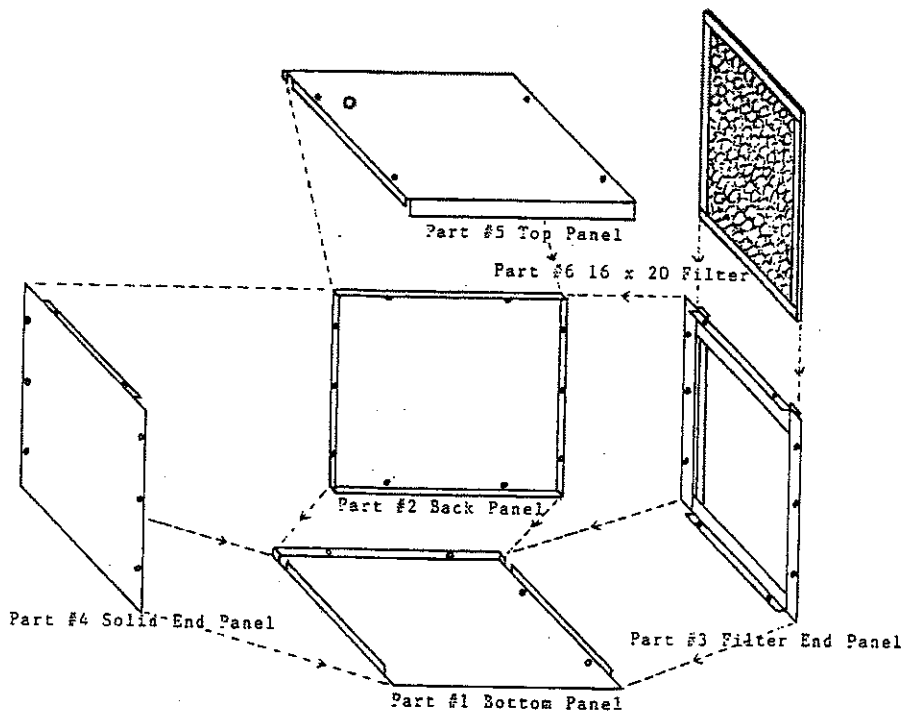
**Step 3.** - Fasten part #5 with flanges down overlapping parts #1, #3 & #4.

**Step 4.** - Position completed box so that the bottom panel (part #1) is lapping under the bottom of furnace and side panels (Part #3 & #4) are overlapping sides of furnace so that top panel (Part #5) is tight against the back of furnace. Drill thru holes provided and fasten filter box onto sides of furnace with screws provided.

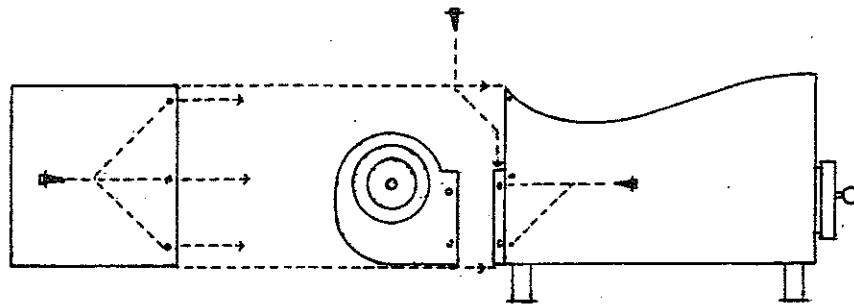
**Step 5.** - Complete blower wiring thru the hole provided in top panel of filter box (as shown in the electrical wiring diagram C) and insert filter into filter end panel.

### Parts Included

- 1 Pkg. Screws
- 1 Part #1 Bottom Panel
- 1 Part #2 Back Panel
- 1 Part #3 Filter End Panel
- 1 Part #4 Solid End Panel
- 1 Part #5 Top Panel
- 1 Part #6 16 x 20 Filter



**DIAGRAM A**



**DIAGRAM B**