

# Installation Instructions



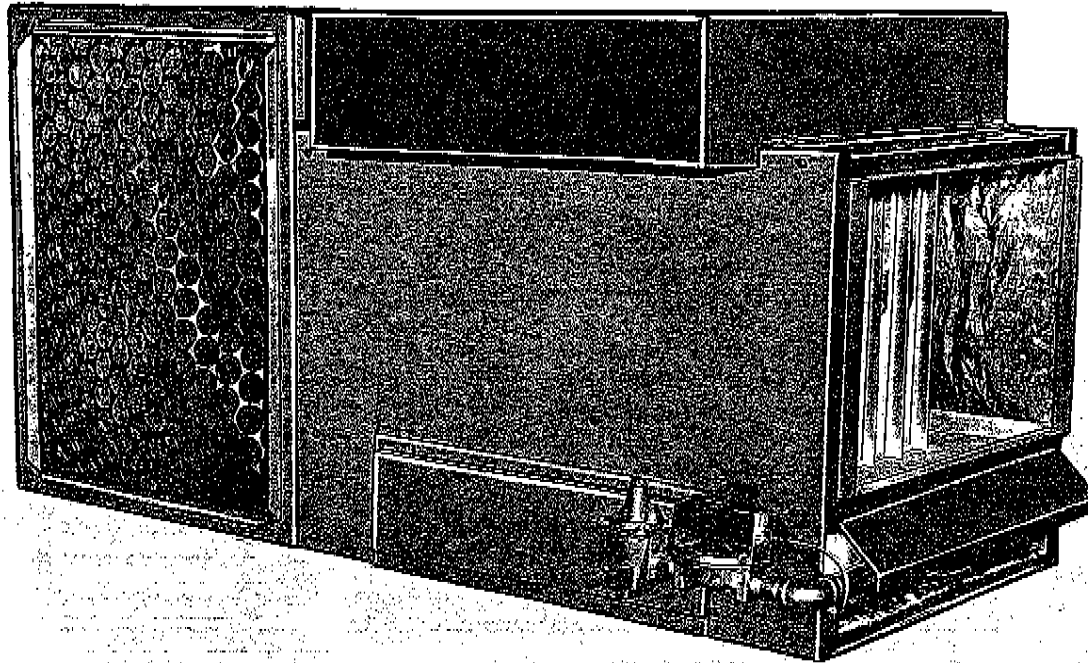
## 348

Series E

### GAS-FIRED HORIZONTAL FURNACE

### bryant

39348D6 Rev 1  
7/15/68



Model 348 with  
Natural Gas Controls  
D4

**FILE  
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DO NOT  
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The Bryant Model 348 gas-fired forced air horizontal furnace is certified by the American Gas Association for attic installation.

Install in accordance with the requirements of the local utility or authority having jurisdiction.

The installer is referred to the American Standard "Installation of Gas Appliances and Gas Piping, ASA Z21.30-1964, as a sound and practical guide.

#### GAS CONTROL OPTIONS

D4 - Natural Gas  
Bryant Gas Control Valve  
Bryant Automatic Pilot  
Combination Regulator, Main and  
Pilot Gas Supply Valves

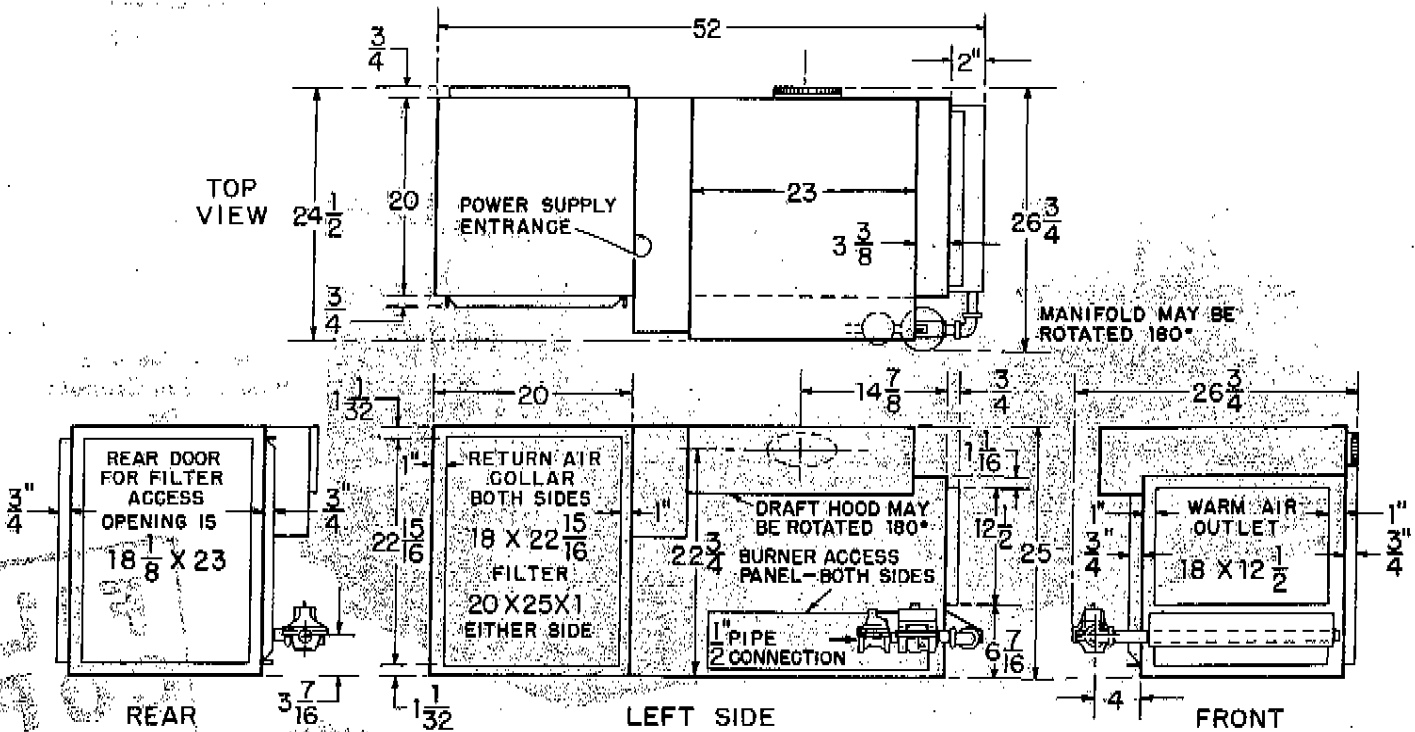
D5 - Natural Gas - 100% Shut-off  
Bryant Gas Control Valve  
Thermocouple Automatic Pilot  
Pilot Gas Valve  
Gas Regulator  
Main Gas Shut-off Valve

D2 - Propane Gas - 100% Shut-off  
Bryant Gas Control Valve  
Thermocouple Automatic Pilot  
Pilot Gas Valve  
Main Gas Shut-off Valve

#### INSPECTION

The furnace is shipped with controls fully assembled. Note that natural gas units are equipped with a combination regulator and main manual shut-off. As assembled, the valve handle is on the underneath side. When handle is parallel with direction of gas flow, the valve is open; when handle is at right angles to direction of gas flow, the valve is closed.

# DIMENSIONS



All sizes have the same dimensions.  
 NOTE: Flue is 5" for sizes 80 & 100;  
 Flue is 6" for size 125 & 145.

# RATINGS AND CAPACITIES

MODEL NO.	AGA RATINGS* BTU/HR		GAS CONNECTION SIZE		BUILT-IN FILTER	FLUE SIZE	APPROX. SHIPPING WT.
	INPUT	OUTPUT	NAT.	PROP.			
80-348	80,000	64,000	1/2	1/2	20 x 25 x 1	5	165
100-348	100,000	80,000	1/2	1/2	20 x 25 x 1	5	175
125-348	125,000	100,000	1/2	1/2	20 x 25 x 1	6	185
145-348	145,000	116,000	1/2	1/2	20 x 25 x 1 †	6	185

\*For elevations up to 2000 ft.; for higher altitudes, reduce ratings 4% for each 1000 ft. above sea level.  
 †On size 145 permanent type filter is supplied as standard equipment. See note concerning air flow under Table II, this instruction.

## SPECIAL LOCATING INFORMATION

Also see the following section on mounting the unit.

For special cases, refer to paragraphs 3.4.2 and 3.4.3, American Standard "Installation of Gas Appliances and Gas Piping," ASA Z21.30-1964.

1. Do not install unit in closet or alcove.
2. A.G.A. certified clearances from combustible material:

	<u>Attic Furnace</u>
From Draft Diverter	6" *
From Casing Surface	Line Contact Allowed
From Base	0"

\*When the furnace is installed in space large in comparison to the furnace, reduced clearances are permissible when combustibles in question are adequately protected.

3" clearance permitted when 28 gauge sheet metal or 1/4" asbestos millboard is applied to the combustible material and covers all combustible surfaces within 6".

2" clearance permitted when 28 gauge sheet metal spaced out 1" (spacers of non-combustible material) is applied to the combustible material and covers all surfaces within 6".

Other methods of protecting the combustible material are described in Table 10, American Standard "Installation of Gas Appliances and Gas Piping," ASA Z21.30-1964.

3. Service Access: Leave as much clearance as possible for service. The following is considered minimum:

25" at filter end to replace filter  
6" at top for cleaning heat exchanger

4. Location with respect to cooling equipment:

Install parallel with, or on the upstream side of the cooling unit to avoid condensation in the furnace heating element. When installed parallel with a cooling unit, dampers or other means used to control the flow of air must be adequate to prevent chilled air from entering the furnace. If the dampers are manually operated, they must be equipped with means to prevent operation of either unit unless the

damper is in the full heat or full cool position.

5. The unit should be located centrally with respect to the air distribution system. Choose a location that will be as near the chimney as possible.

6. For flexibility in selecting location of unit, the draft hood may be rotated 180 degrees. The manifold may also be rotated 180 degrees. The controls may then be on either side of the furnace. They may also be in the vertical plane - leading up or down from the manifold.

7. The wiring box is mounted externally alongside the draft hood. The wiring box is designed for field mounting on either side of the unit without breaking wiring connections.

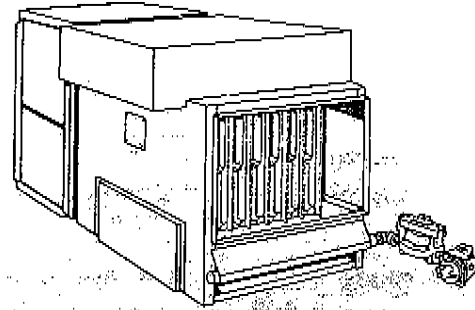
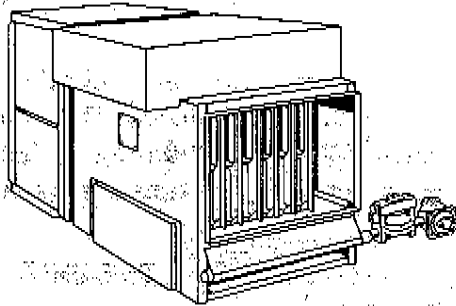
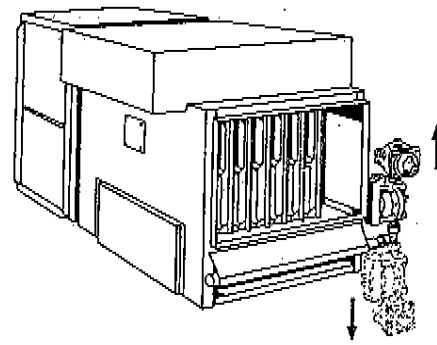
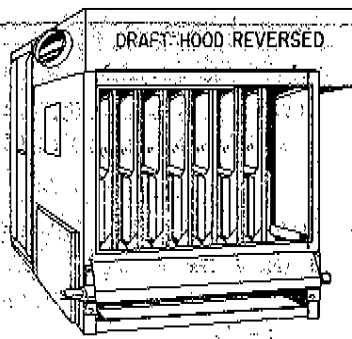
## MOUNTING THE UNIT

The unit may be placed directly on a combustible floor. All clearance requirements listed should be observed.

Note: The Model 348 is A.G.A. certified for point or line contact with combustible material above floor level, except draft hood must be at least 6" from any combustible material. More than point or line contact is not approved. If an installation conflicts with A.G.A. approval, consult local codes for protective insulation requirements. See American Standard "Installation of Gas Appliances and Gas Piping," ASA Z21.30-1964.

The draft hood may be reversed. The manifold may be reversed. The controls may be horizontal or vertical. See page 4.

If the unit is mounted so as to require shims (uneven floor or crawl space) it must be supported as shown in Figure A. When unit is suspended, the same kind of support is required. Bryant supplies as optional equipment a suspension kit as pictured in Figure B. The two channels should be placed under the furnace as shown in Figure D. The support for the blower compartment is fastened to the channel and then bent around and fastened to the other end of the channel as shown in Figure C. This in effect makes a support extending out under the blower compartment. Note: the hanging rods for the suspension bars must be supplied by the installer. See page 5.



## ELECTRICAL CONNECTIONS

All electrical connections are to be made in accordance with the National Electric Code and local codes governing such wiring.

It is recommended that a separate electrical circuit be supplied for the unit. This should be a permanent, live, fused electric circuit. A manual switch should be provided for this circuit. Connect furnace to a 115 volt, 60 cycle, single phase alternating current power supply. For furnaces with 3/4 HP motors, a 230 volt power supply is recommended.

The heat anticipator on thermostat should be set at 0.8 amps.

The room thermostat should be located where it will be in the natural circulating path of room air. Avoid locations where the thermostat would be exposed to cold air infiltration, drafts from windows, doors, or other openings leading to the outside; or exposure to air currents from warm or cold air registers; or to exposure where the natural circulation of the air is cut off such as behind doors, above or below mantels, shelves, etc.

The thermostat should not be exposed to heat from nearby radiators, fireplaces, radios, lamps, rays of the sun. Nor should the thermostat be mounted on a wall containing pipes or warm air ducts, or a flue or vent which

could affect its operation and prevent it from properly controlling the room temperature. Any hole in the plaster or panel through which the wires pass from the thermostat should be adequately sealed with suitable material to prevent drafts from affecting the thermostat.

## CONTROLS

Thermodisc Limit Switch - Non-adjustable

Thermodisc Auxiliary Limit Switch -  
Non-adjustable

Limit Control - This control functions to shut off the gas and energize the blower motor if the furnace becomes overheated.

The recommended method of checking the limit control is to gradually block-off the return air after the furnace has been operating for a period of at least five minutes. As soon as the limit has proven safe, the return air opening should be unblocked to permit normal air circulation. By using this method to check the limit control, it can be established that the limit is functioning properly and will "fail safe" in case of motor failure.

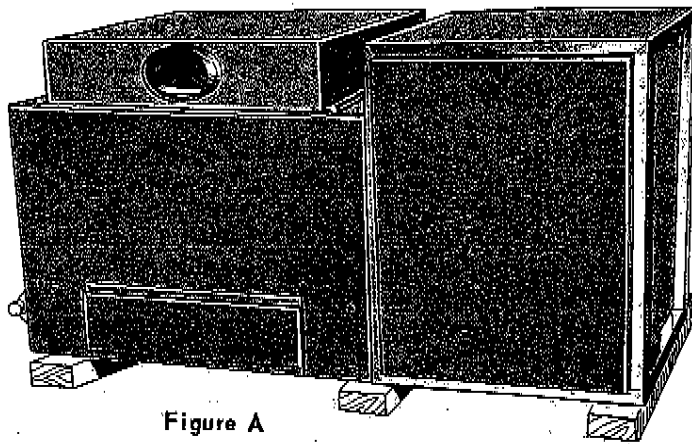


Figure A

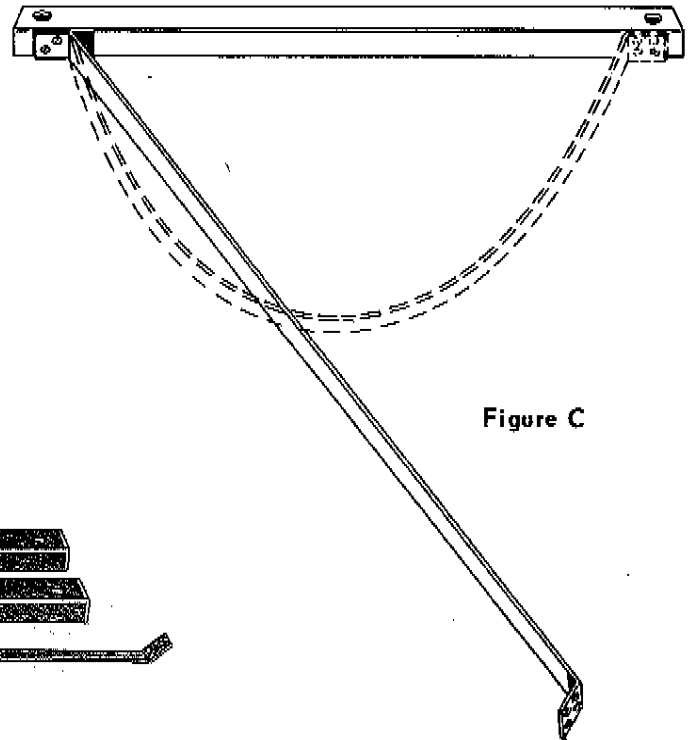


Figure C

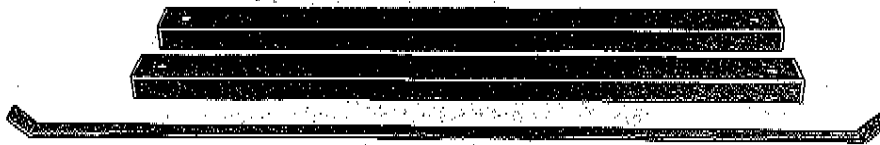


Figure B

### Controls (continued)

The 348 Series E furnace is equipped with an adjustable fan control switch. This control is a single pole, single throw line voltage switch actuated by a heat motor.

The fan control adjusting lever is factory-set at the center position and should give optimum performance in most installations. However, on unusual installations, or where the line voltage is considerably above or below the rated output, it may be necessary to increase the length of time the blower remains on. For longer blower operation, move the adjusting lever toward the "MAX OFF" position. In this position, the control line switch makes contact sooner and takes the maximum time to break contact. For shorter blower operation, move the lever in the opposite direction.

**Bryant Gas Control Valve** - if not already checked when lighting the main burner, check the proper operation of this valve by moving the room thermostat pointer above and below room temperature and observe that the main burners light on call for heat and go off when the pointer is moved below the room temperature.

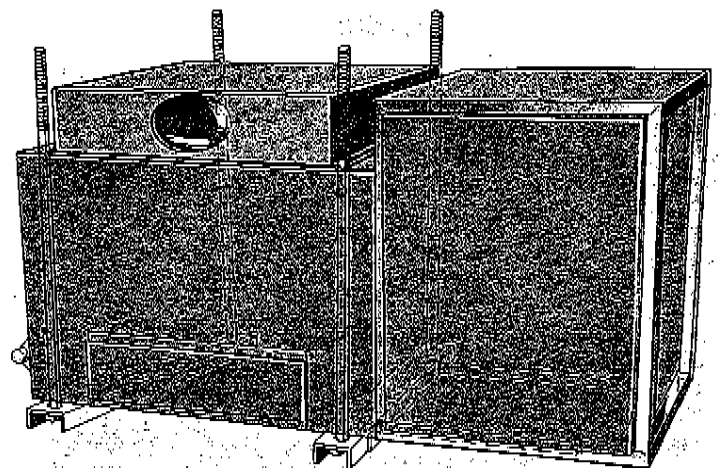


Figure D

**Automatic Pilot** - Check the shut-off feature of the automatic pilot as follows:

1. Set the room thermostat on call for heat.
2. Close main manual gas shut-off valve and the manual pilot shut-off valve.
3. Pilot must break the electric circuit within three minutes after the gas is shut off. In the case of the 100% shut-off control, listen for a click in the automatic shut-off valve. The 24-volt circuit is not interrupted but the 100% shut-off valve should click within 3 minutes.

**Controls (continued)**

**Blower Adjustment** - If the blower speed is not correct, the fan control switch may not operate correctly. If an adjustable fan switch is used with the unit, do not attempt to adjust this switch until the blower performance has been checked as described below.

The temperature rise across the furnace should be between 70F and 100F. The blowers are set at the factory to give approximately 85F temperature rise. Check this setting by inserting one thermometer in the return air duct at the unit and another thermometer in the plenum. Be sure the thermometer does not "see" the heat exchanger. The effect of radiant heat will give false readings. Allow the unit to operate until the readings on both thermometers have stabilized. If the temperature rise is too little or too great, adjust blower as described under section on blowers. Under no circumstances should the temperature rise be allowed to exceed 100F.

**FILTERS**

One - 20 x 25 x 1 throw-away type supplied with sizes 80, 100 and 125. A permanent type filter is supplied with the size 145.

**BLOWERS**

**Direct Drive**

Adjustment of Blower Speed

To change motor speed taps, remove the motor tap lead and relocate it on the desired terminal on the plug-in terminal block/speed selector located in the blower compartment. See table.

**Caution:** When adjusting the blower speed make certain the temperature rise across the heat exchanger does not exceed that specified on the rating plate.

Size	HP	Heating type 'w'		Heating/cooling type 'e'	
		Connect motor lead:		Connect motor lead:	
				Heating	Cooling
80	1/8	yellow tap 3			
80	1/4			red tap 4	black tap 1
100	1/8	black tap 1			
100	1/3			yellow tap 3	black tap 1
125	1/3			yellow tap 3	black tap 1
145	1/3			blue tap 2	black tap 1

**Color Code for Speed Taps**

- Common (white) . . . . . #C tap
- Hi Speed (black) . . . . . #1 tap
- Med Speed (blue) . . . . . #2 tap
- Med Lo Speed (yellow) . . . . #3 tap
- Lo Speed (red) . . . . . #4 tap

**Important:** It should be noted that air delivery rate will vary with applied voltage at the blower motor. If there is any doubt about the value of fluctuation of the supply voltage, consult your local electric utility.

**Belt Drive**

The 125 and 145 sizes belt drive units are equipped with dual voltage motors wired at the factory for a 220-volt power supply. They may be re-wired in the field for 115-volt operation. See wiring.

The drive pulley setting made at the factory is 2-1/2 turns open. This setting will provide approximately 1260 cfm air delivery against a static pressure of 0.40" w.c. At this setting the temperature rise across the heat exchanger is 73 degrees F for the size 125 and 85 degrees F for the size 145.

If it is required to change the air delivery rate, simply loosen the set screw with an Allen wrench. Screw the adjustable half of the pulley clockwise to close and counter-clockwise to open. Once positioned, tighten the screw on the flat.

**INSTALLING THE UNIT**

The furnace is factory assembled. The order to be followed in setting the unit in place and making all necessary connections (gas, electric, venting, ductwork, etc.) is left to the discretion of the installer. Recommendations listed on pages 3 to 6 of this instruction should be followed. Connection to gas main supply is made with a union supplied by installer. Wiring should be accomplished in accordance with the applicable wiring diagram.

Remember to check for correct wiring on the multi-tapped motors. In making up the low voltage circuit on 100% shut-off controls, the thermocouple pilot and automatic shut-off

valve are independent of the 24-volt circuit. The shipping bolt should be removed from the belt drive blower in accordance with label instructions on the blower.

Remove the burner shipping wire after the furnace has been set in place. It is recommended that flexible fireproof connections be made from the unit to ductwork. Insulate all ducts in attics and other cold areas.

## CLEANING THE FURNACE

Burner shipping wire should have been removed when furnace was first installed.

1. Shut off all electric and gas supply to the furnace.
2. Remove burner access panel (2 screws). There is a panel on each side; either or both may be used.
3. The burner with pilot is located on either the left or right end of the manifold.

After removing either or both side access panels, the burners may be removed in any order with the burner with pilot being removed first or last.

a. Burners that do not have the pilot attached:

- a-1. Lift upward out of back holding slot.
- a-2. Push burner to rear to disengage from manifold spud.
- a-3. Withdraw burner through access opening.

b. Burners that have the pilot attached:

b-1. Disconnect electric leads at pilot by removing wire nuts. This applies only to Bryant pilot.

b-2. Disconnect pilot gas supply tube at the pilot valve.

Disconnect pilot bleed line at the Bryant valve.

On 100% shut-off controls, disconnect thermocouple at automatic shut-off valve.

b-3. Straighten all tubing disconnected in (2) above so that it sticks straight out towards the manifold end of furnace.

b-4. Lift burner upwards out of holding slot, disengage from manifold spud, and then rotate the burner with attached pilot and tubing so that the pilot is on the top side.

b-5. Remove entire assembly through the access opening.

4. Disconnect vent pipe at draft hood.

5. Remove draft hood assembly.

6. Remove flue baffles from heat exchanger.

7. Use a flexible handled steel cleaning brush to loosen scale and soot. Remove these scrapings from bottom of combustion chamber.

8. Re-assemble furnace.

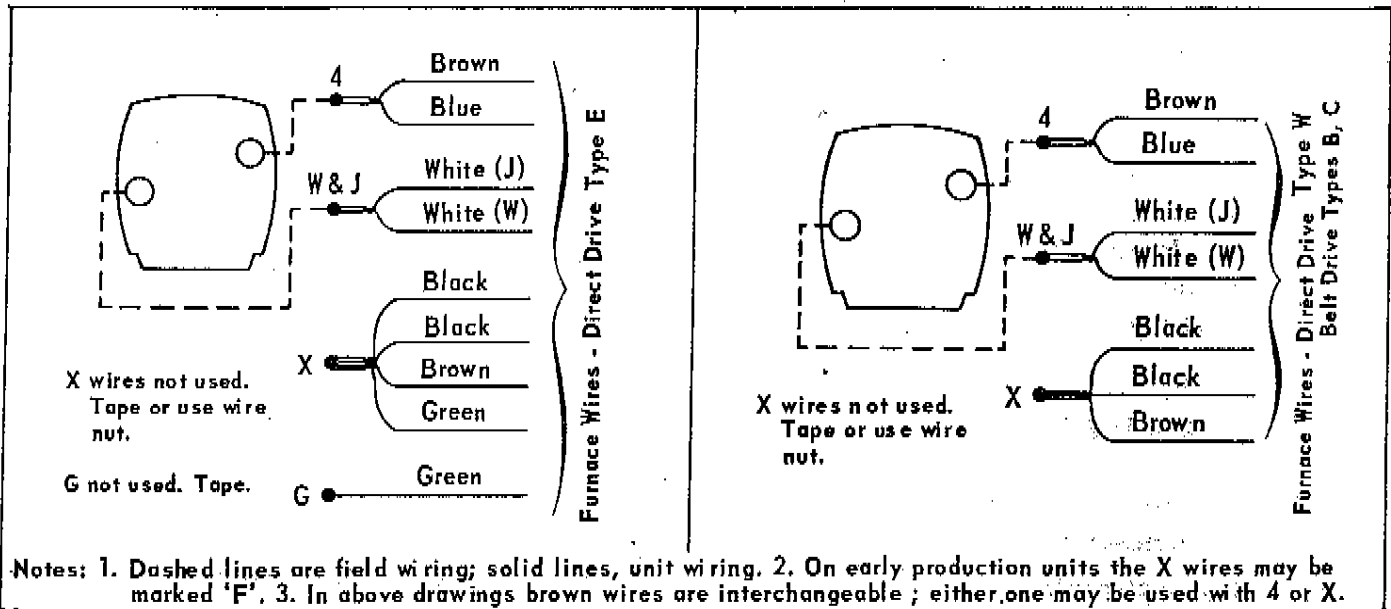
## CARE AND MAINTENANCE

Care of Blowers: Motors on the belt drive blowers are provided with oil wells, and should be oiled at least twice a year with a good grade of SAE 30 oil. The motors on the direct drive blowers are sealed units and do not require the addition of oil.

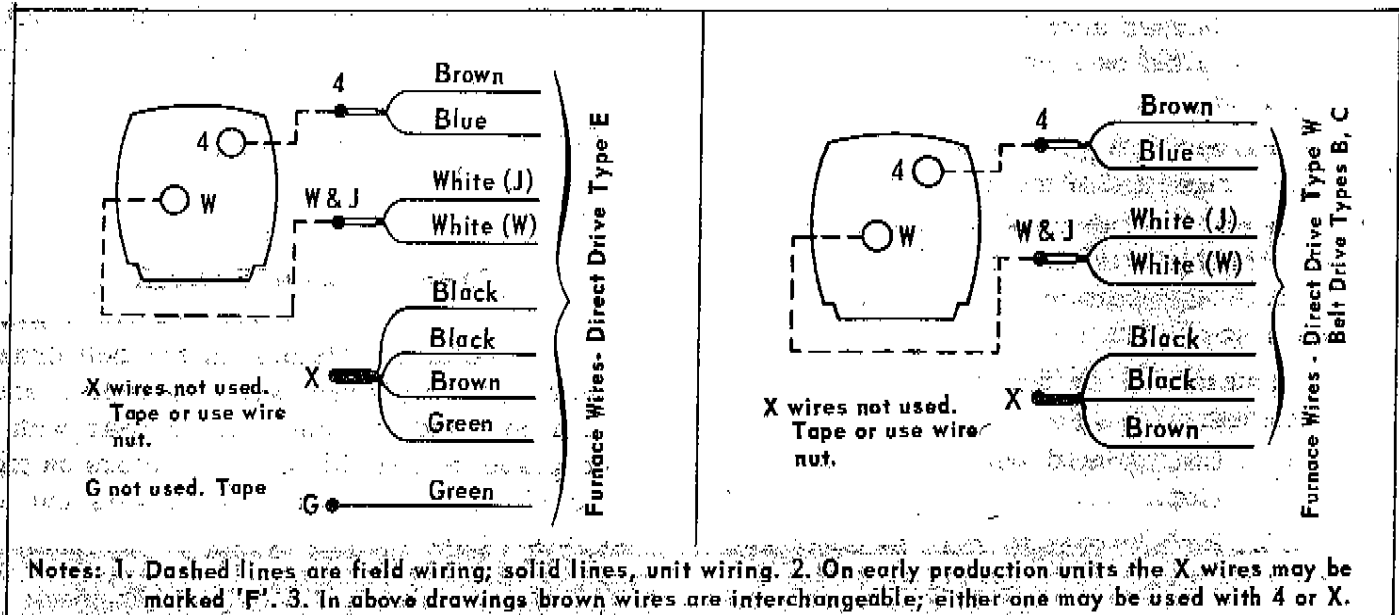
Blower bearings are semi-permanently lubricated. This lubrication is normally good for 3 to 5 years. When necessary to add lubricant, use "Gulf Plastic E".

Filters:—Filters should be examined frequently for clogging due to dirt. The disposable filters should be replaced when they become dirty. Permanent type filters may be cleaned using clear water; coat the filter with water soluble oil after cleaning.

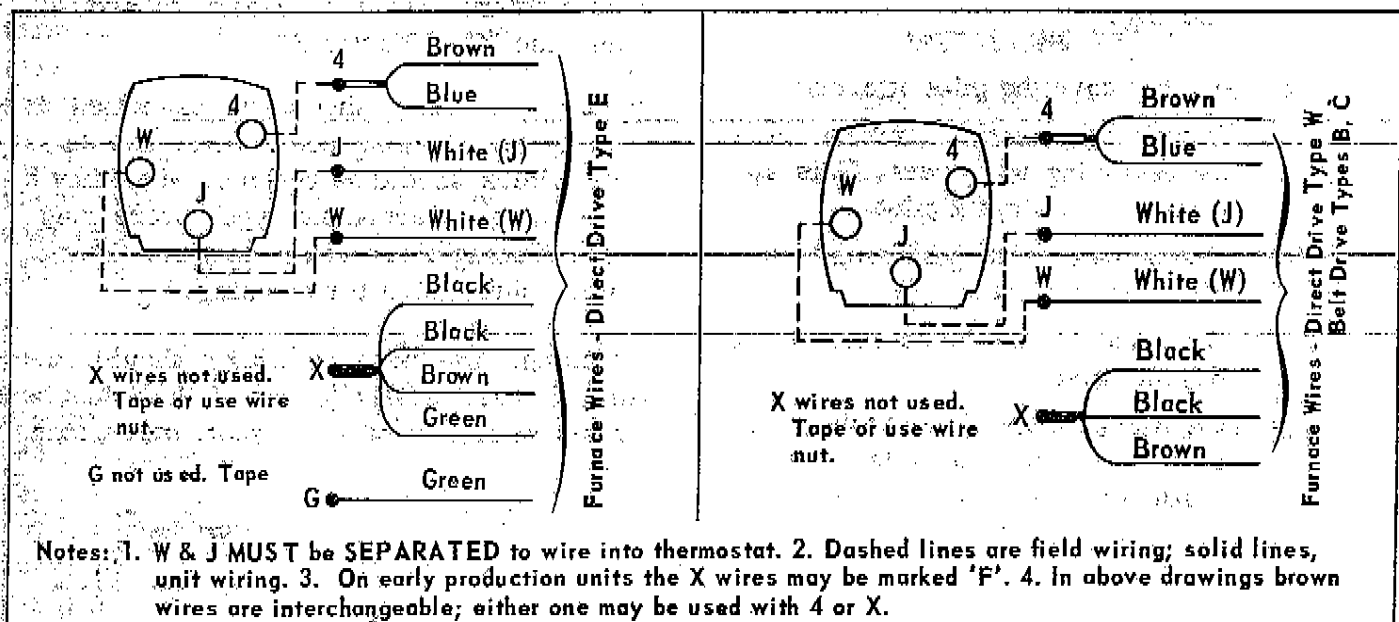
Cleaning: The heat exchanger should be examined periodically to see if there has been an accumulation of rust, soot, etc. Clean as required.



**HEATING ONLY - Thermostat P/N 34427D35**



**HEATING ONLY - Model 883 or 884 Thermostat & Sub-base**



**HEATING ONLY with ON-OFF FAN - Model 885 Thermostat P/N 34427D33 OR Thermostat P/N 34427D35 with Sub-base P/N 34427D36.**