

## Service and Maintenance Instructions

For Sizes 060-100, Series 100


**NOTE:** Read the entire instruction manual before starting the installation.

### SAFETY CONSIDERATIONS

Installing and servicing heating equipment can be hazardous due to gas and electrical components. Only trained and qualified personnel should install, repair, or service heating equipment.

Untrained personnel can perform basic maintenance functions such as cleaning and replacing air filters. All other operations must be performed by trained service personnel. When working on heating equipment, observe precautions in the literature, tags, and labels attached to or shipped with the unit and other safety precautions that may apply.

Follow all safety codes, including NFPA 54/ANSI Z223.1-1988, National Fuel Gas Code. Wear safety glasses and work gloves. Have a fire extinguisher available during start-up and adjustment procedures and service calls.

Recognize safety information. This is the safety-alert symbol . When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal word—DANGER, WARNING, or CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which will result in severe personal injury or death. WARNING signifies hazards that could result in personal injury or death. CAUTION is used to identify unsafe practices, which would result in minor personal injury or product and property damage.

### WARNING

Never store anything on, near, or in contact with the furnace, such as:

1. Spray or aerosol cans, rags, brooms, dust mops, vacuum cleaners, or other cleaning tools.
2. Soap powders, bleaches, waxes or other cleaning compounds, plastic or plastic containers, gasoline, kerosene, cigarette lighter fluid, dry cleaning fluids, or other volatile fluids.
3. Paint thinners and other painting compounds, paper bags or other paper products.

Failure to follow this warning can cause corrosion of the heat exchanger, fire, personal injury, or death.

### CARE AND MAINTENANCE

For continuing high performance and to minimize possible equipment failure, it is essential that maintenance be performed annually on this equipment. Consult your local dealer for maintenance and the availability of a maintenance contract.



Fig. 1—Model 58VUA Upflow Furnace

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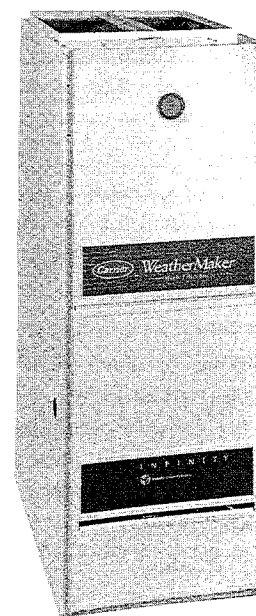


Fig. 2—Model 58VCA Downflow Furnace

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### ⚠ WARNING

The ability to properly perform maintenance on this equipment requires certain expertise, mechanical skills, tools, and equipment. If you do not possess these, do not attempt to perform any maintenance on this equipment other than those procedures recommended in the User's Manual. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN POSSIBLE DAMAGE TO THIS EQUIPMENT, SERIOUS PERSONAL INJURY, OR DEATH.

### ⚠ WARNING

Turn OFF the gas and electrical supplies to the unit before performing any maintenance or service. Follow the operating instructions on the label attached to the furnace. Failure to follow this warning could result in personal injury.

The minimum maintenance that should be performed on this equipment is as follows:

1. Check and clean or replace air filter each month or as required.
2. Check blower motor and wheel for cleanliness and lubrication each heating and cooling season. Clean and lubricate as necessary. (See Step 2.)
3. Check electrical connections for tightness, and controls for proper operation each heating season. Service as necessary.
4. Check for proper condensate drainage; clean as necessary.
5. Check for blockages of combustion-air and vent pipes.

### ⚠ CAUTION

As with any mechanical equipment, personal injury could result from sharp metal edges, etc. Be careful when removing parts.

#### Step 1—Air Filter Cleaning and Replacement

The air filter arrangement may vary depending on the application.

### ⚠ CAUTION

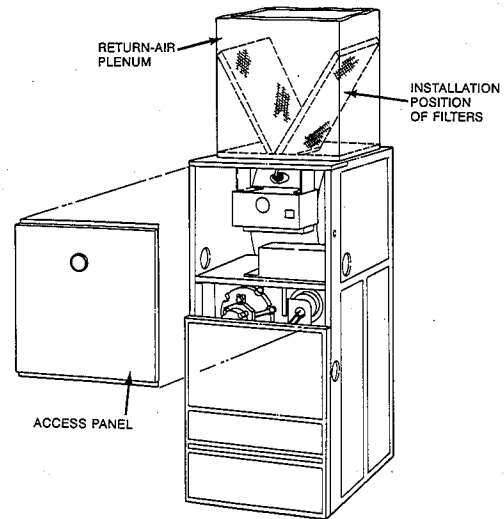
Never operate unit without a filter or with filter access door removed. Failure to follow this warning could result in a fire or personal injury.

**DOWNFLOW FURNACES ONLY** — Each furnace accommodates 2 filters which are installed in the return-air duct. (See Fig. 3.) To clean or replace the filters, proceed as follows:

1. Turn OFF electrical supply to unit.
2. Remove blower access door.
3. Reaching up behind top plate, tilt filters toward center of return-air plenum, remove filters, and replace or clean as needed.
4. Furnaces are equipped with permanent, washable filters. Clean these filters by spraying cold tap water through filter in opposite direction of airflow.
5. Rinse filters and let dry. Oiling or coating of filters is not recommended.
6. Reinstall filters with cross-mesh binding facing blower.
7. Replace access door.
8. Turn ON electrical supply to furnace.

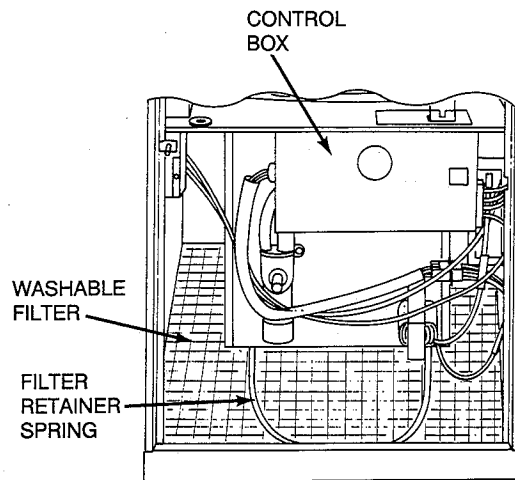
**UPFLOW FURNACES ONLY** — To clean or replace the air filter, proceed as follows:

1. Turn OFF electrical supply to unit.



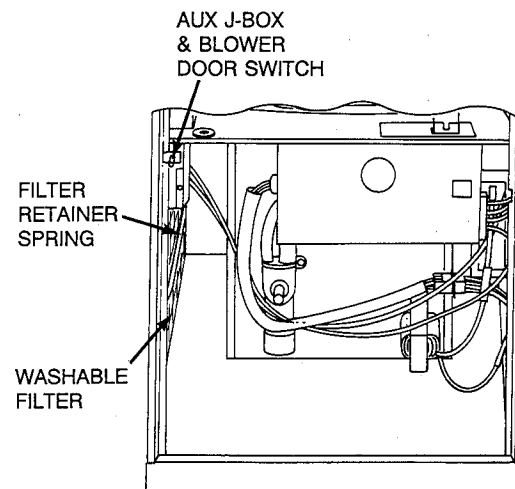
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Fig. 3—Position of Filters in Downflow Furnace



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Fig. 4—Filter Installed for Bottom Inlet



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Fig. 5—Filter Installed for Side Inlet

2. Remove access doors.
3. Release filter retainer spring from behind flange of furnace casing. (See Fig. 4 and 5.)
4. Slide filter out.

5. Furnaces are equipped with permanent, washable filters. Clean filter by spraying cold tap water through filter in opposite direction of airflow.
6. Rinse filter and let dry. Oiling or coating of filter is not recommended.
7. Place filter in furnace with cross-mesh binding either up or facing blower.
8. Replace access doors.
9. Turn ON electrical supply to furnace.

### Step 2—Blower Motor and Wheel Maintenance

For long life, economy, and high efficiency, clean accumulated dirt and grease from blower wheel and motor annually.

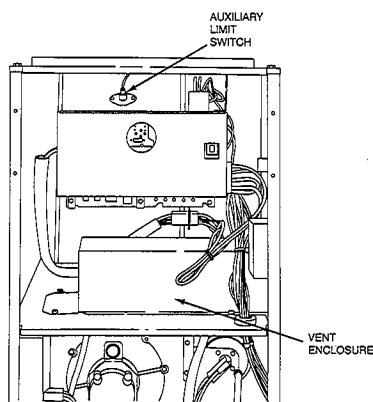
The following items should be performed by a qualified service technician:

Some motors have prelubricated, sealed bearings and require no lubrication. These motors can be identified by the absence of oil ports on each end of the motor. For motors with oil ports, lubricate as follows:

Lubricate motor every 5 years if motor is used for intermittent operation (thermostat FAN switch in AUTO position), or every 2 years if motor is in continuous operation (thermostat FAN switch in ON position).

Clean and lubricate as follows:

1. Turn OFF electrical supply to unit.
2. Remove access doors.
3. Upflow furnaces only—remove drain trap and control box:
  - a. Remove control box from bottom side of blower shelf and position to 1 side.
  - b. Disconnect 9-circuit connector PL-13 from blower housing.
  - c. Using backup wrench, disconnect drain pipe at coupling in blower compartment.
  - d. Loosen hose clamp and remove 7/8-in. diameter drain hose from drain trap.
  - e. Loosen hose clamp and disconnect 5/8-in. diameter drain hose at bottom of inducer housing located under blower shelf.
  - f. Remove screw securing drain trap assembly.
4. Downflow furnaces only—disconnect vent pipe, elbow, and auxiliary limit switch. (See Fig. 6.)
  - a. Remove control box from top plate and position to 1 side.



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Fig. 6—Downflow Furnace Blower Compartment

- b. Disconnect 9-circuit connector PL-13 from blower housing.

- c. Disconnect wires from auxiliary limit on blower housing.
  - d. Remove vent pipe enclosure from top side of blower shelf and position to 1 side.
  - e. Loosen hose clamps on outlet elbow and remove elbow.
  - f. Loosen hose clamp on extension pipe outside of furnace and remove pipe.
  5. Remove screws securing blower assembly to blower shelf and slide blower assembly out of furnace.
  6. Squeeze side tabs of connector PL-13 and pull from blower housing bracket.
  7. Mark blower wheel location on shaft before disassembly to insure proper reassembly.
  8. Loosen setscrew holding blower wheel on motor shaft.
- NOTE:** Mark blower mounting arms and blower housing so each arm is positioned at the same hole location during reassembly. This will insure that oilers point up.
9. Remove bolts holding motor mount to blower housing and slide motor and mounts out of housing.
  10. Lubricate motor (when oil ports are provided).
    - a. Remove dust caps or plugs from oil ports located at each end of motor. If motor does not have these caps or plugs, bearings are sealed and need no further lubrication.
    - b. Use a good grade of SAE 20 nondetergent motor oil and add 1 teaspoon (5 cc, 3/16 oz, or 16 to 25 drops) in each oil port. The use of other types or grades of oil will damage the motor. Excessive oiling can cause premature bearing failures.
    - c. Allow time for total quantity of oil to be absorbed by each bearing.
    - d. After oiling motor, wipe excess oil from motor housing.
    - e. Replace dust caps or plugs on oil ports.
  11. Remove blower wheel from housing:
    - a. Mark blower wheel orientation and cutoff plate location to insure proper reassembly.
    - b. Remove screws securing cutoff plate and remove cutoff plate from housing.
    - c. Remove blower wheel from housing.
  12. Clean blower wheel and motor using a vacuum with soft brush attachment. Be careful not to disturb balance weights (clips) on blower wheel vanes. Do not drop or bend wheel, as balance will be affected.
  13. Reassemble blower by reversing items 11.a. through 11.c. Ensure wheel is positioned for proper rotation.
  14. Reassemble motor and blower by reversing items 6 through 9. If motor has ground wire, be sure it is reconnected.

### ⚠ CAUTION

Ensure the motor is properly positioned in the blower housing. The motor oil ports must be at a minimum of 30° above the horizontal centerline of the motor after the blower assembly has been reinstalled in the furnace.

15. Reinstall blower assembly in furnace.
16. Upflow furnaces only—reinstall drain trap and control box:
  - a. Inspect drain trap and hoses to ensure they are not blocked or restricted. Reinstall drain trap and hoses. Be sure to tighten hose clamps.
  - b. Using backup wrench, attach drain pipe and tighten compression coupling.

- c. Reinstall control box on bottom side of blower shelf.
- 17. Downflow furnace only—reconnect vent pipe, elbow, and auxiliary limit switch.
  - a. Reinstall outlet elbow and extension pipe. Be sure connections are tight and leak proof.
  - b. Reinstall vent pipe enclosure.
  - c. Reconnect red wires to auxiliary limit switch.
  - d. Reinstall control box on top plate.
- 18. Connect 9-circuit connector PL-13 to blower harness. Note that connections are polarized for correct assembly—**do not force**.
- 19. Turn ON electrical supply and check for proper rotation and speed changes between low- and high-heat and cooling. Operate unit 10 minutes and carefully check for condensate leaks.

### Step 3—Cleaning Heat Exchangers

The following items should be performed by a qualified service technician:

If it becomes necessary to clean the heat exchanger because of carbon deposits, soot, etc., proceed as follows:

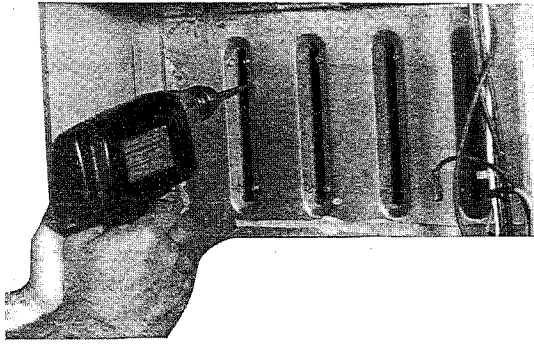
**NOTE:** Deposits of soot and carbon indicate a problem exists that needs to be corrected. Action must be taken to correct the problem.

1. Turn OFF gas and electrical supplies to furnace.
2. Remove control and blower access doors.
3. Loosen hose clamps on combustion-air pipe and move air pipe aside.
4. Using backup wrench, disconnect gas supply at ground joint union. Remove gas pipe from valve.
5. Disconnect pilot leads at 3-circuit connector outside of burner enclosure.
6. Disconnect high-voltage lead at spark generator.
7. Disconnect gas valve leads at 6-circuit connector on top of valve.
8. Disconnect pressure tubing from right side of burner enclosure and outlet end of gas valve.
9. Remove burner enclosure front.
10. Remove diffuser from inside top of burner enclosure. Remove screws that secure burner enclosure to cell panel. These screws are located inside the burner enclosure.
11. Using care not to damage cell inlet panel gasket, remove gas control assembly from furnace.
12. Remove vent pipe and drain.
  - a. Upflow furnace only:
    - (1.) Loosen hose clamps at vent pipe connection; disconnect vent pipe and position to 1 side.
    - (2.) Loosen hose clamp and remove drain tube from inducer outlet box.
  - b. Downflow furnace only:
    - (1.) Remove vent pipe enclosure.
    - (2.) Loosen hose clamps at vent pipe connection.
    - (3.) Loosen hose clamp and remove drain tube from inducer outlet elbow.
13. Upflow furnace only—remove main control box.
  - a. Disconnect 15-circuit connector from main control box at blower shelf.
  - b. Remove screws securing main control box to blower shelf and position control box to 1 side.

14. Loosen hose clamp and remove drain tube from inducer housing.
15. Disconnect both 6-circuit connectors from electronically commutated motor (ECM) inducer controller mounted on left side of furnace.
16. Remove screws securing ECM inducer controller to mounting plate attached to left side of furnace.
17. Disconnect 6-circuit connector from pressure switches.
18. Remove mounting screws securing inducer assembly to collector box and coupling box; remove inducer assembly and remove all old sealant from parts.
19. Remove coupling box(es).
  - a. Upflow furnace only:
    - (1.) Remove screws securing coupling box and remove from furnace. Remove all old sealant from parts.
  - b. Downflow furnace only:
    - (1.) Remove screws securing intake (upper) coupling box and remove box from furnace. Remove all old sealant from parts.
    - (2.) Remove screws securing primary (lower) coupling box and remove box. Clean old sealant from parts.
20. Loosen hose clamp and remove 7/8-in. drain tube from trap.
21. Place bucket under 7/8-in. drain tube.
22. Using garden hose, flush each cell of the condensing heat exchanger with water. Use care not to spray water onto interior surfaces of control compartment. Dry all surfaces. Be careful **not** to remove sealant around cell openings in cell panel.
23. Using field-provided small wire brush, steel spring cable, reversible electric drill, and vacuum cleaner, clean primary heat exchanger cells. **Do not use wire brush or other sharp object to clean condensing heat exchanger.** Failure of the condensing heat exchanger will occur—flush with water only.
  - a. Assemble wire brush and steel spring cable.
    - (1.) Use 4 ft of 1/4-in. diameter high-grade steel spring cable (commonly known as drain cleaning or Roto-Rooter cable).
    - (2.) Use 1/4-in. diameter wire brush (commonly known as 25-caliber rifle cleaning brush).

**NOTE:** The materials required above can be purchased at local hardware stores.

- (3.) Insert twisted wire end of brush into end of spring cable, and crimp tight with crimping tool or strike with ball-peen hammer. *Tightness is very important.*
- (4.) Remove metal screw fitting from wire brush to allow insertion into cable.
- b. Clean each primary heat exchanger cell:
  - (1.) Attach variable-speed, reversible drill to end of spring cable (end opposite brush).
  - (2.) Insert brush end of cable into upper opening of cell and slowly rotate with drill. **Do not** force cable. Gradually insert at least 3 ft of cable into 2 upper passes of cell. (See Fig. 7.)
  - (3.) Work cable in and out of cell 3 or 4 times to obtain sufficient cleaning. **Do not** pull cable with great force. Reverse drill and gradually work cable out.
  - (4.) Insert brush end of cable in lower opening of cell, and proceed to clean 2 lower passes of cell in same manner as 2 upper passes.



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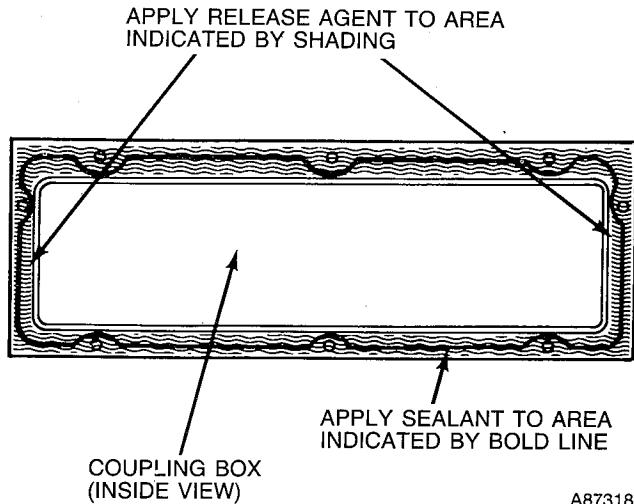
**Fig. 7—Cleaning Primary Heat Exchanger Cell**

- (5.) Repeat procedures (previous) until each furnace cell has been cleaned.
- (6.) Using vacuum cleaner, remove residue from each cell.
- (7.) Using vacuum cleaner with soft brush attachment, clean burner assembly.

**Step 4—Reassemble Furnace (After Cleaning Heat Exchangers)**

1. Reinstall coupling box(es):

- c. Apply sealant releasing agent (Pam) to coupling box flange and cell panel where coupling box flange matches. (See Fig. 8.)

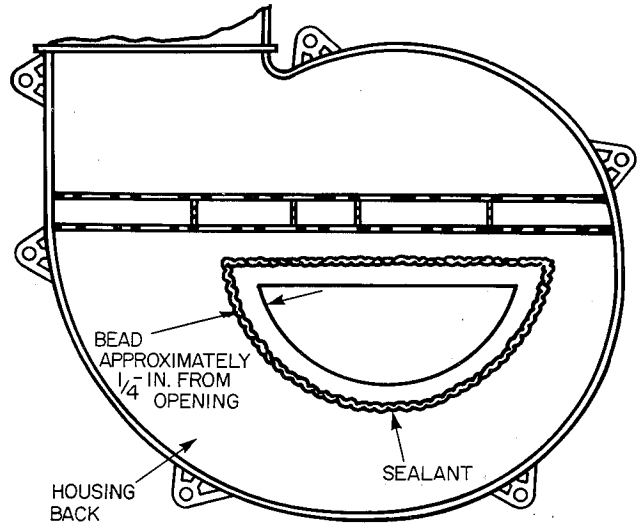


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**Fig. 8—Inside View of Coupling Box**

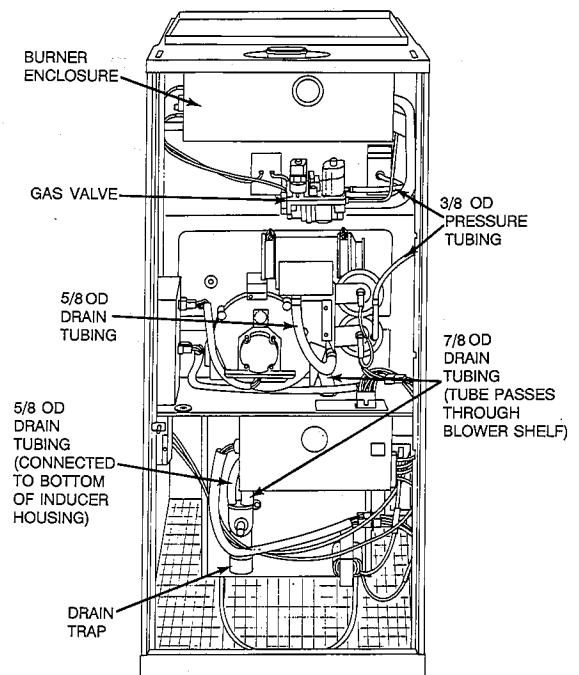
- d. Apply a generous bead (3/16-in. diameter) of G.E. RTV 122, 162, or Dow-Corning RTV 738 sealant (**NO substitute is permissible**) to flange of coupling box. (See Fig. 8.) Your distributor/dealer should have G.E. RTV 122, 162, or Dow-Corning RTV 738 sealants in stock.
  - e. Being careful not to smear sealant, position coupling box so that slot in insulation is on left side and install coupling box.
2. Reinstall inducer assembly.
- a. Upflow furnace only — Be sure small round gasket(s) is in place between blower shelf and inducer housing.
  - b. Apply sealant releasing agent (Pam) to collector box.
  - c. Apply 1/8-in. diameter bead of G.E. RTV 122, 162, or Dow-Corning RTV 738 sealant to back of inducer housing. Apply sealant around inlet air opening. (The sealant should be about 1/4 in. from the edge of the inlet air opening.) (See Fig. 9.)

- d. Install inducer assembly on collector box and support bracket to coupling box.
  - e. Connect 6-circuit inducer motor connector to inducer controller. Reconnect 6-circuit connector from pressure switches to main harness. (See Fig. 18.)
  - f. Reconnect pressure tubes to pressure switch. (See Fig. 10 or 11.)
3. Connect small drain tube from top of trap to fitting on bottom of inducer housing. (See Fig. 10 or 11.)
  4. Connect 7/8-in. drain tube to trap and collector box; tighten hose clamps. (See Fig. 10 or 11.)



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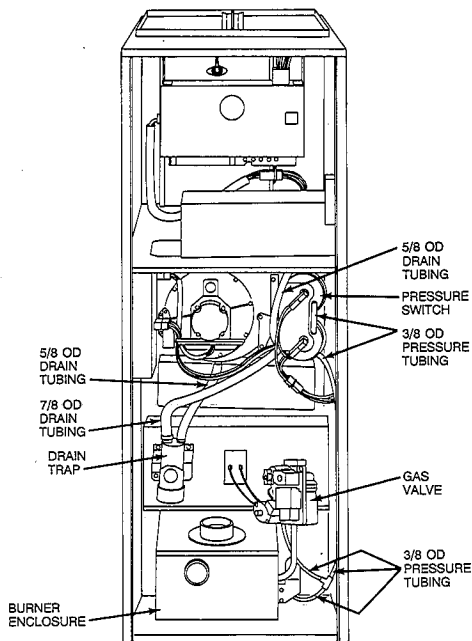
**Fig. 9—Back of Inducer Assembly Housing**



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**Fig. 10—Upflow Furnace Pressure and Drain Tubing Diagram**

5. Reinstall vent pipe and drain tube.
  - a. Upflow furnace only:
    - (1.) Reconnect vent pipe. Be sure clamps are tight.



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**Fig. 11—Downflow Furnace Pressure and Drain Tubing Diagram**

(2.) Connect drain tube from collector box to inducer outlet box.

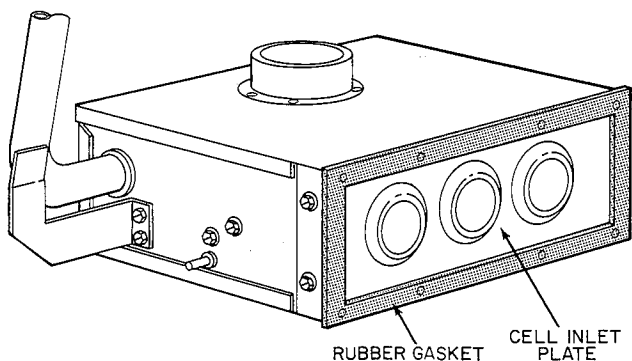
b. Downflow furnace only:

- (1.) Reconnect vent pipe. Be sure clamps are tight.
- (2.) Reinstall vent pipe enclosure.
- (3.) Connect drain tube from collector box to inducer outlet elbow.

6. Upflow furnace only—reinstall main control box.

- a. Reinstall main control box on blower shelf.
- b. Reconnect 15-circuit connector at main control box on blower shelf.

7. Check condition of gasket on cell inlet panel of burner enclosure. Replace gasket if necessary. (See Fig. 12.)

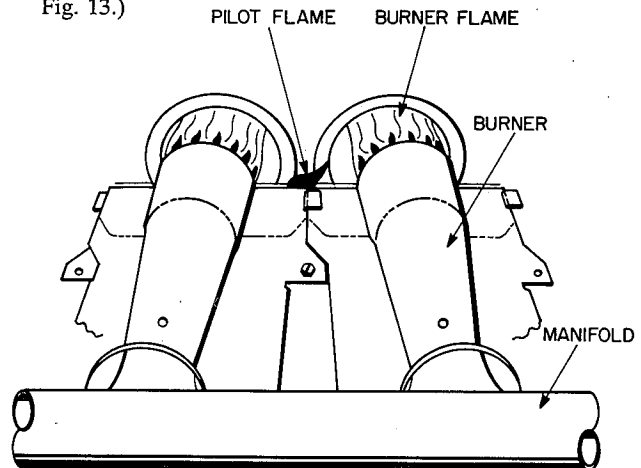


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**Fig. 12—Burner Enclosure**

8. Install gas control assembly in furnace.
9. Install diffuser and burner enclosure front.
10. Reconnect pilot leads at 3-circuit connector.
11. Reconnect high-voltage lead to spark generator.
12. Reconnect gas valve leads at 6-circuit connector.

13. Reconnect pressure tubes to gas valve and burner enclosure. Be sure tubes are not kinked.
14. Using a backup wrench, install gas pipe in gas valve.
15. Reconnect gas pipe at ground joint union.
16. Reconnect combustion-air pipe. Tighten hose clamps.
17. Replace blower door only.
18. Turn ON gas and electrical supplies.
19. Check furnace operation through 2 complete operating cycles. Look through sight-glass in burner enclosure to check burners. Burner flames should be clear blue, almost transparent. (See Fig. 13.)



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**Fig. 13—Burner Flame**

**⚠ WARNING**

Never use matches, candles, flame, or other sources of ignition to check for gas leakage. Use a soap-and-water solution. Failure to follow this warning could result in a fire, personal injury, or death.

20. Check for gas leaks.
21. After condensate starts to drain, check for condensate leaks.
22. Replace control door.

**Step 5—Clean Condensate Drainage System**

1. Disconnect 5/8-in. drain tube from bottom of inducer housing. (See Fig. 10 or 11.)
2. Disconnect 7/8-in. drain tube from collector box. (See Fig. 10 or 11.)
3. Disconnect condensate drain line from drain trap at compression fitting.
4. Remove 1/4-in. screw(s) securing strap on drain trap.
5. Remove drain trap/hose assembly from furnace and flush with water until clean.
6. Flush external condensate drain line with water until clean.
7. Reassemble condensate drainage system by reversing items 1. through 5.

**Step 6—Pilot Assembly**

Check the pilot assembly and clean if necessary at the beginning of each heating season. The pilot flame should be high enough for proper impingement of the safety element and to light the burners. Remove any accumulation of soot and carbon from the safety element. Check spark electrode gap. (See Fig. 14 for proper spark gap and Fig. 15 for correct pilot location.)

**Step 7—Electrical Controls and Wiring**

**NOTE:** There may be more than 1 electrical supply to the unit.

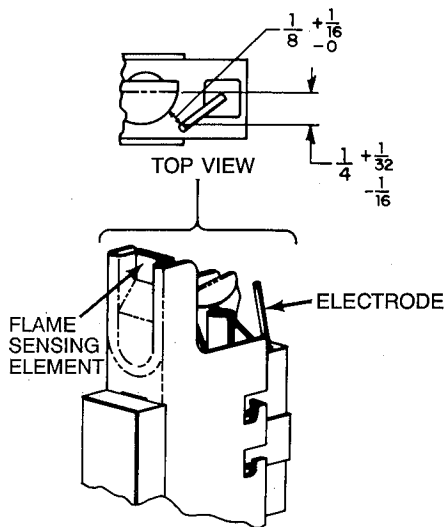


Fig. 14—Position of Electrode to Pilot

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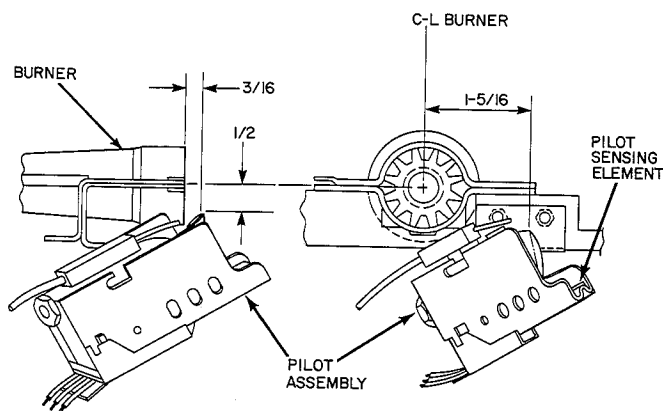


Fig. 15—Pilot/Burner Positions

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With power disconnected to the unit, check all electrical connections for tightness. Tighten all screws on electrical connections. If any smokey or burned connections are found, disassemble the connection, clean all parts, strip wire, and reassemble properly and securely.

Reconnect electrical power to the unit and observe unit through 1 complete operating cycle. Electrical controls are difficult to check without proper instrumentation.

**ELECTRICAL NOISE AND INTERFERENCE** — This equipment generates and uses radio frequency energy and, if not installed and used properly (in strict accordance with the manufacturer's instructions), may cause interference with radio and television reception. The unit has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of Federal Communications Commission (FCC) Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in an installation. If this equipment does cause interference to radio or television reception (which may be determined by turning the equipment off and on), the user is encouraged to try correcting the interference by 1 or more of the following measures:

- (1.) Reorient receiving antenna.
- (2.) Relocate receiver with respect to equipment.
- (3.) Move receiver away from equipment.

(4.) Plug receiver into different outlet so that equipment and receiver are on different branch circuits.

(5.) Slide Ferrite core electrical noise suppressor over thermostat wire.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The following booklet prepared by the FCC may be helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

**SERVICE DIAGNOSTICS** — This furnace has a light emitting diode (LED) display to aid the installer, homeowner, or service technician in installing or servicing the unit. (See Fig. 17.) The display can be seen through the view port provided in the blower door. To decipher the meaning of the display, refer to Fig. 17 or the fault code label inside the control access door.

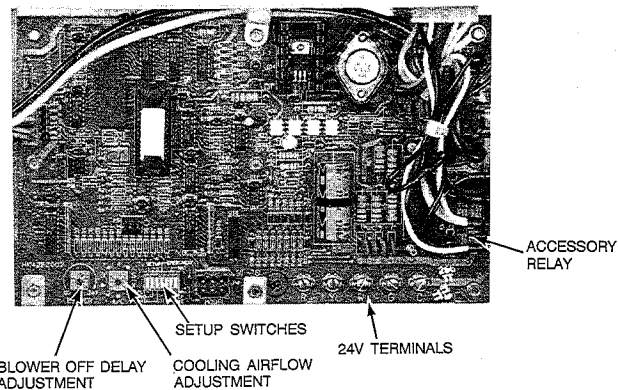


Fig. 16—Microprocessor Control Center

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View the display through the port provided in the blower door. If YEL LED 3 is lit continuously, the furnace is operating in the high-heat mode. If GRN LED 4 is lit continuously, the furnace is operating in the low-heat mode. If the lower RED LED 1 is lit continuously, the furnace is operating in the emergency-heat mode. If the upper RED LED 2 is lit continuously, the microprocessor has malfunctioned.

**DO NOT REMOVE THE BLOWER DOOR IF LED's ARE FLASHING;** the fault code will be lost.

Alternate flashing of the YEL and GRN LED's indicates that a fault has occurred during operation. Count the number of times the YEL LED flashes and then count the number of times the GRN LED flashes. Once the fault code has been determined, refer to Table 1 or the fault code label inside the control access door to decipher the meaning of the display.

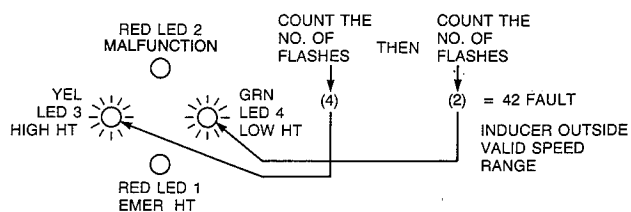


Fig. 17—Fault Code LED's

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When power is turned ON at the main disconnect, a microprocessor self-test sequence will be completed in approximately 20 sec. During this period the GRN LED will light for 12 sec, followed by lighting of the YEL and GRN LED's for 1 sec. After this period, the unit will operate if a thermostat signal is initiated.

**Table 1—Fault Code Descriptions**

CODE	DESCRIPTION
11	No faults in history display
12	Blower calibration lockout
13	High limit lockout
14	Pilot proving lockout
21	Invalid model selection
22	Set-up error
23	Cooling capacity error
24	Illegal thermostat input
31	High-pressure switch fault
32	Low-pressure switch fault
33	High limit fault
34	Pilot proving fault
41	Blower outside valid speed range
42	Inducer outside valid speed range
43	Rpm ratio out of range
44	Blower calibration fault

**Fault Code Descriptions:**

Code 11—No fault in recent history display.

Indicates no faults have occurred within last 5 cycles.

To read recent fault history, put setup switch SW-1 in the ON position.

To clear recent fault history, put setup switch SW-1 in the ON position and jumper R, W, and Y simultaneously until a code 11 is flashed.

Return setup switch SW-1 to the OFF position when complete.

Code 12—Blower calibration lockout.

Indicates rpm calculated for low heat is less than 300 rpm or greater than 1300 rpm on 2 successive attempts.

Check the following before referring to the trouble-shooting guide:

1. Excessive high- or low-static pressure could be caused by dirty filters or undersized ductwork.

Code 13—High-limit lockout.

Indicates the occurrence of 10 successive limit trips during high fire or 3 successive limit trips during low fire.

Check the following before referring to the trouble-shooting guide:

1. Improper or misaligned limit and/or limit shield.
2. Improper high- or low-gas input adjustment.
3. Stuck high-fire solenoid in gas valve.

Code 14—Pilot-proving lockout.

Indicates pilot failed to prove in 5 minutes on 2 successive cycles. It can also indicate the pilot was proven at the *start* of 2 successive cycles.

Check the following before referring to the trouble-shooting guide:

1. Gas valve is turned OFF.
2. Main shutoff valve is turned OFF.
3. Wet pilot.
4. Restricted pilot orifice.
5. Open pilot circuit.
6. No spark at pilot.
7. Stuck pilot solenoid in gas valve.

Code 21—Invalid model selection.

Indicates personality connector is missing or incorrect.

See wiring diagram for correct connector jumper location.

Code 22—Setup error.

Indicates setup switch SW-1, SW-2, or SW-3 is positioned improperly.

The following combinations will cause the fault:

1. Thermostat call with SW-1 ON.
2. SW-2 and SW-3 ON together.
3. SW-1 and SW-2 ON together.
4. SW-1 and SW-3 ON together.
5. SW-1, SW-2, and SW-3 ON together.

Code 23—Cooling capacity error.

Indicates improper A/C switch setting.

The 060-size furnace can deliver 1-1/2 to 3 tons of cooling airflow. The 080-size furnace can deliver 1-1/2 to 3-1/2 tons of cooling airflow. The 100-size furnace can deliver 2 to 5 tons of cooling airflow.

If fault is flashing, unit will operate, but it will default to the closest allowable airflow.

Code 24—Illegal thermostat input.

Indicates thermostat terminals Y and W are both energized; unit will default to cooling operation.

Code 31—High-pressure switch fault.

Indicates high-pressure switch is closed at "call for heat," is closed in low-fire operation, fails to close after "call for heat," or opens in high-fire operation.

Check the following before referring to the trouble-shooting guide:

1. Plugged condensate drain.
2. Water in vent piping (possibly sagging piping).
3. Pressure switch wiring or tubing connections incorrect.
4. Failed or out-of-calibration pressure switches.
5. Pilot flame adjustment.
6. Failed or out-of-calibration pilot.

Code 32—Low-pressure switch fault.

Indicates low-pressure switch is closed at "call for heat," fails to close after "call for heat," or opens during operation.

Check the following before referring to the trouble-shooting guide:

1. Plugged condensate drain.
2. Water in vent piping (possibly sagging piping).
3. Pressure switch wiring or tubing connections incorrect.
4. Failed or out-of-calibration pressure switches.

Code 33—High-limit fault.

Indicates the high limit is open or the unit is operating in high-heat only mode due to 2 successive low-fire limit trips.

Check the following before referring to the trouble-shooting guide:

1. Improper or misaligned limit and/or limit shield.
2. Improper low-gas input adjustment.
3. Stuck high-fire solenoid in gas valve.

Code 34—Pilot-proving fault.

Indicates pilot failed to prove within 5 minutes, the pilot opened during the cycle, or the pilot was proven at the *start* of the cycle.

If this fault does not progress to a fault code 14, check the following. Otherwise, refer to fault code 14:



1. Combustion box diffuser plate missing or backwards.
2. Pilot flame adjustment.
3. Recirculation of combustion products at vent termination.

Code 41 – Blower outside valid speed range.

Indicates blower is not operating at the calculated or default rpm.

If this fault occurs in conjunction with fault code 44, check wiring to motor—otherwise refer to the troubleshooting guide.

If this fault occurs by itself, check torque taps on motor. Normal settings are White on pin-1, Black on pin-10, and Red on pin-11 unless used with a variable-speed cooling system.

Code 42 – Inducer outside valid speed range.

Indicates inducer is not operating at the calculated rpm or has not started within 10 sec after a “call for heat.”

Check the following before referring to the troubleshooting guide:

- i. Continuous pilot spark.
2. High-tension lead too close to wiring harness.

Code 43 – Inducer rpm ratio outside valid range.

Indicates the low- and high-pressure switch “make” points during purge are not within the calibration range.

Check the following before referring to the troubleshooting guide:

1. Plugged condensate drain.
2. Water in vent piping (possibly sagging piping).
3. Pressure switch wiring or tubing connections.
4. Failed or out-of-calibration pressure switches.

Code 44 – Blower calibration fault.

Indicates calculated blower speed is below 300 or above 1300 rpm. Unit will default to either mode if possible.

If this fault occurs in conjunction with fault 41, check wiring to motor. Otherwise, refer to troubleshooting guide.

If this fault occurs by itself, check for excessive static pressure caused by dirty filters or undersized ductwork.

Using these fault codes, the owner may save the expense of a service call by following the procedures provided in the User’s Manual. A service technician can follow the steps furnished in the appropriate section of the trouble-shooting guide when correcting the problem.

**NOTE:** If the fault history is not cleared during servicing, the microprocessor will clear it internally after 5 heating cycles have been successfully completed without the fault occurring. This is done to prevent the storage of useless fault codes in the service history.

#### Step 8—Winterizing

### ⚠ CAUTION

The unit must not be installed, operated, and then turned off and left off in an unoccupied structure during cold weather when the temperature drops to 32° F and below. Freezing condensate left in the furnace will damage the equipment.

If the furnace will be off for an extended period of time in a structure where the temperature will drop to 32° F or below, winterize as follows:

1. Mix a solution of equal amounts of ethylene glycol (Prestone II antifreeze/coolant or equivalent) and water.
2. Turn OFF electrical supply to furnace.
3. Remove control access door.
4. Disconnect drain tube from bottom of inducer outlet box/el-bow.
5. Insert funnel in drain tube and pour antifreeze/water solution into furnace until it is visible at point where condensate enters open drain.
6. Reconnect drain tube to outlet box.
7. Replace control access door.

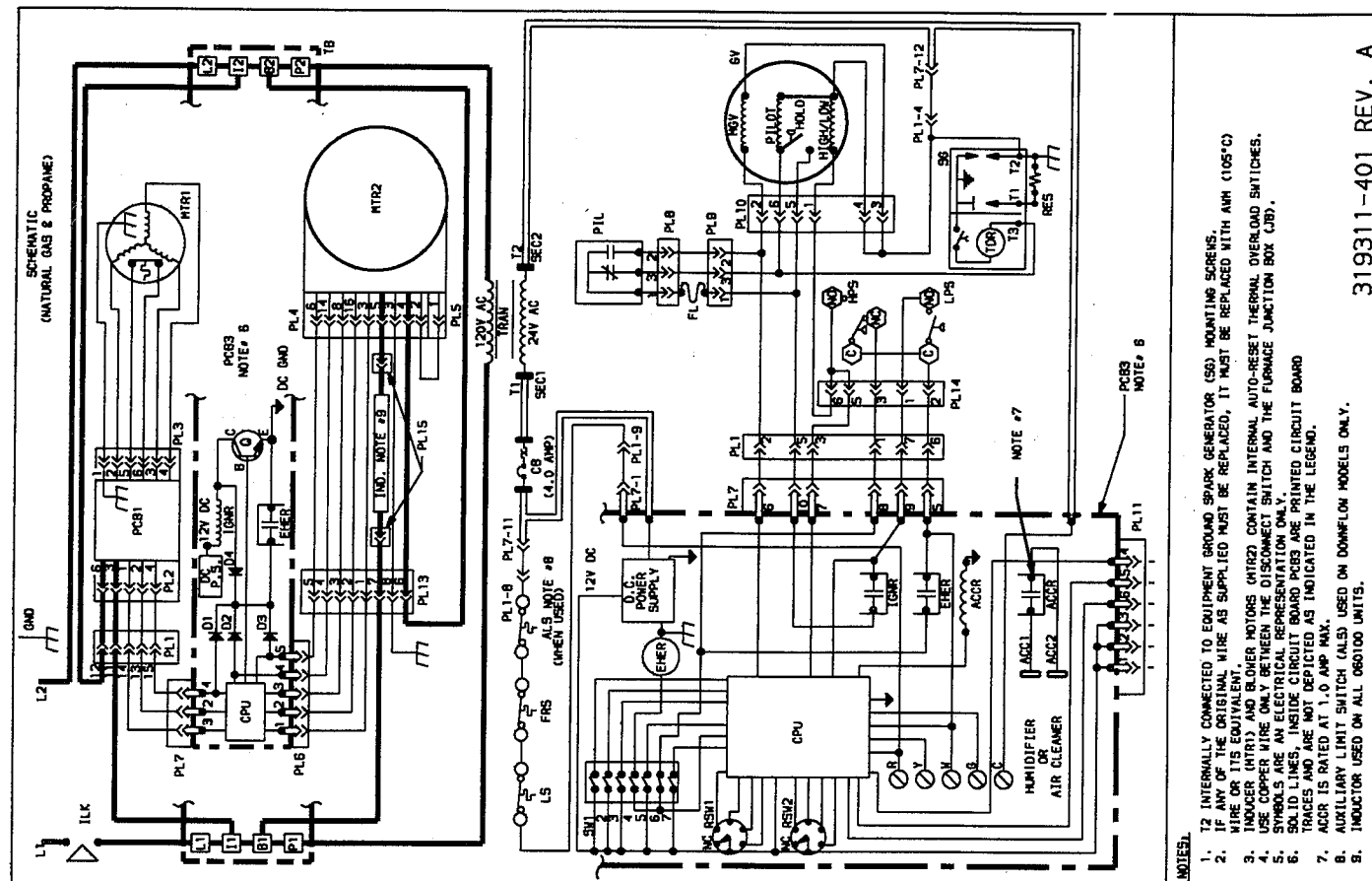


Fig. 18—Wiring Diagram

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