

# Service Guide



## Induced-Combustion Horizontal Furnaces

PG8HAA  
Series B


**NOTE:** Read the entire instruction manual before performing any service and maintenance.

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### 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, on tags, and on labels attached to or shipped with the unit and other safety precautions that may apply.

Follow all safety codes. In the United States, follow all safety codes including the National Fuel Gas Code (NFPA No. 54-1996/ANSI Z223.1-1996 and the Installation Standards, Warm Air Heating and Air Conditioning Systems (NFPA 90B) ANSI/NFPA 90B. In Canada, refer to the current edition of the National Standard of Canada CAN/CGA-B149.1- and .2-M95 Natural Gas and Propane Installation Codes (NSCNGPIC). Wear safety glasses and work gloves. Have 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 furnace and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, and 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 a hazard which 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. NOTE is used to highlight suggestions which will result in enhanced installation, reliability, or operation.


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

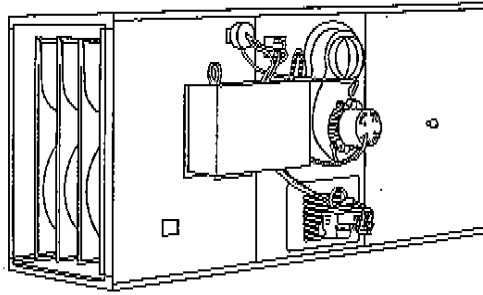
1. Spray or aerosol cans, rags, brooms, dust mops, vacuum cleaners, or other cleaning tools.
  2. Soap powders, bleaches, waxes or other cleaning compounds, plastic or plastic containers, gasoline, kerosene, cigarette lighter fluid, dry cleaning fluids, or other volatile fluids.
  3. Paint thinners and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

 **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.**

### 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.

 **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 or death.



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→ Fig. 1—Model PG8HAA Horizontal Furnace

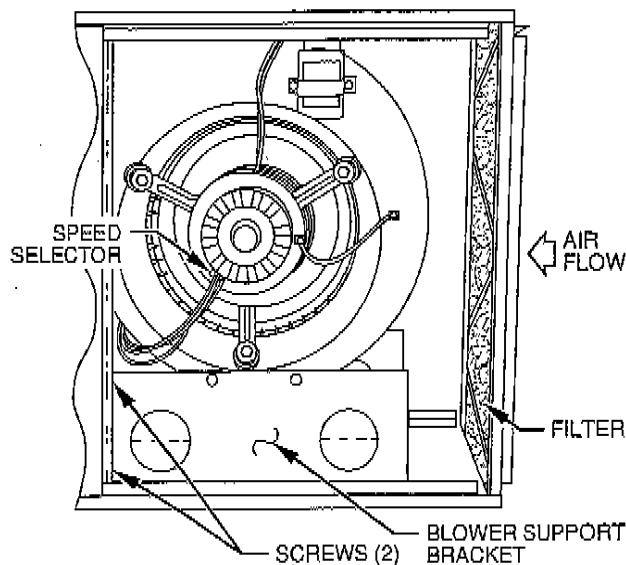
The minimum maintenance that should be performed on this equipment is as follows:

1. Check and clean or replace air filter each month, or as required. (See Procedure 1, Air Filter Cleaning and Replacement.)
2. Check blower motor and wheel for cleanliness and lubrication each heating and cooling season. Clean and lubricate as necessary. (See Procedure 2, Blower Motor and Wheel Maintenance.)
3. Check electrical connections for tightness and controls for proper operation each heating season. Service as necessary.
4. Check heat exchanger, gas burners, and venting system each year, prior to heating season.

**⚠ CAUTION:** As with any mechanical equipment, personal injury could result from sharp metal edges, etc. Be careful when removing parts, panels, or components.

#### PROCEDURE 1—AIR FILTER CLEANING AND REPLACEMENT

The air filter arrangement may vary depending on application. The filter is normally located in return-air plenum opening in front of blower. (See Fig. 2.)



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Fig. 2—Blower Compartment

Table 1—Horizontal Furnace Filters

| UNIT SIZE | FILTER QTY AND SIZE (IN.) | FILTER TYPE |
|-----------|---------------------------|-------------|
| 036050    | (1) 13 X 23 X 1/2         | Cleanable   |
| 036075    | (1) 13 X 23 X 1/2         | Cleanable   |
| 048075    | (1) 13 X 23 X 1/2         | Cleanable   |
| 048100    | (1) 16-1/2 X 23 X 1/2     | Cleanable   |
| 060100    | (1) 16-1/2 X 23 X 1/2     | Cleanable   |
| 060125    | (1) 20 X 23 X 1/2         | Cleanable   |

**⚠ 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.

If the permanent, washable filter and wire filter retainer option has been installed, clean or replace the filter as follows:

1. Turn off electrical supply to unit.
2. Remove blower access door located at inlet (return air) end of furnace by removing 4 screws.
3. Bend wire filter retainer until it clears furnace flange and swing flange toward the blower.
4. Remove filter from furnace. If filter is torn, replace it.
5. Clean permanent, washable filters by spraying cold tap water through filter in opposite direction of airflow. A mild liquid detergent may be used if necessary.
6. Rinse filters and let dry. Oiling or coating of filters is not recommended or required for factory-supplied filters.
7. Reinstall filters with cross-mesh binding facing blower.
8. Replace blower access door and reinstall 4 screws.
9. Turn on electrical supply to furnace.

## PROCEDURE 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 motor. For motors with oil ports, lubricate motor every 5 years if motor is used for intermittent operation (thermostat FAN control set to AUTO), or every 2 years if motor is in continuous operation (thermostat FAN control set to ON).

Clean and lubricate as follows:

1. Turn off electrical supply to unit.
2. Remove blower access door by removing 4 screws.
3. Remove blower assembly.
  - a. Remove 4 screws securing front blower support bracket and remove bracket. (See Fig. 2.)
  - b. Reach through 4-in. diameter holes in rear blower support bracket and remove 2 screws securing bracket to blower shelf using a 3/8-in. ratchet with a 3-in. extension. (See Fig. 2.)
  - c. Disconnect motor leads from motor speed selector. (See Fig. 2.)
  - d. Remove blower assembly from unit.
4. Mark blower wheel location on shaft before disassembly to ensure proper reassembly.
5. Loosen setscrew holding blower wheel on motor shaft.
6. Disconnect ground wire from blower housing.
7. Remove bolts holding motor mount to blower housing and slide motor and mount out of housing.
8. 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 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.
9. Remove blower wheel from housing.
  - a. Mark blower wheel orientation and cutoff plate location to ensure proper reassembly.
  - b. Remove screws securing cutoff plate and remove cutoff plate from housing.
  - c. Remove blower wheel from housing.
10. 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.
11. Reassemble blower by reversing items 9a through 9c. Ensure wheel is positioned for proper rotation.
12. Reassemble motor and blower by reversing items 3 through 7. Reconnect motor ground wire.

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

13. Reinstall blower assembly in furnace.
14. Connect electrical leads to motor speed selector. DO NOT force leads.

15. Turn on electrical supply and check for proper rotation and speed changes between heating and cooling.

### PROCEDURE 3—CLEANING HEAT EXCHANGERS AND BURNERS

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

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

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

1. Turn off gas and electrical supplies to furnace.
2. Disconnect gas supply at ground joint union. Remove gas pipe from gas valve using a backup wrench.
3. Disconnect electrical wiring from gas valve.

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**⚠ CAUTION:** Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

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4. Remove burner/manifold assembly.
  - a. Remove air inlet plate/burner removal cover.
  - b. Remove manifold retention plate from front of unit.
  - c. Loosen screws in manifold retention plate at rear of unit.
  - d. Remove burner/manifold assembly from unit.
5. Place burner/manifold assembly on flat work surface and clean burner ports. Use a soft brush to loosen dirt, then vacuum.
6. Gently tap each burner opening with a small rubber mallet to loosen any debris in heat exchanger cells.
7. Brush each heat exchanger cell with a nylon heat exchanger brush with a long, flexible handle.
8. Vacuum each heat exchanger cell and burner box with a crevice tool attachment.
9. Check position and alignment of pilot assembly to burners. (See Fig. 3.)
10. Reinstall burner/manifold assembly and front manifold retention plate.

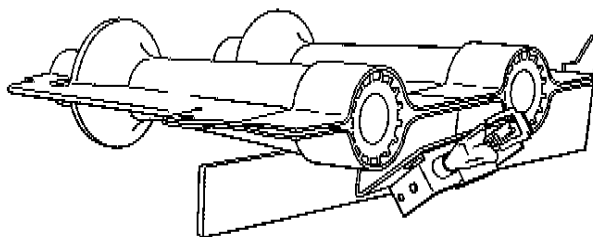


Fig. 3—Position of Pilot Assembly to Burners

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11. Tighten screws securing rear manifold retention plate.
12. Reinstall air inlet plate/burner removal cover.
13. Reconnect wiring to gas valve using wiring diagram. (See Fig. 7.)
14. Apply joint compound (pipe dope) sparingly to male ends of gas pipe and reinstall gas pipe in gas valve.

**NOTE:** Joint compound must be resistant to the action of propane gas.

15. Reconnect ground joint union.
16. Turn on gas and electrical supplies to furnace.
17. Check gas supply line for leaks.

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**⚠ 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.

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18. Check furnace operation through 2 complete operating cycles. Look through vent openings in burner enclosure to check burners. Main burner flames should be clear blue, almost transparent. Pilot flame should be soft blue in color, well defined, and must provide good impingement on flame sensor. Pilot flame should extend above burner carryover port to provide proper burner ignition. (See Fig. 3, 4, and 5.)

### PROCEDURE 4—PILOT ASSEMBLY

Check pilot assembly and clean if necessary at beginning of each heating season. The pilot flame should be high enough for proper impingement on flame sensing rod and to light burners. Remove any accumulation of soot and carbon from flame sensing rod. (See Fig. 3, 4, and 5.)

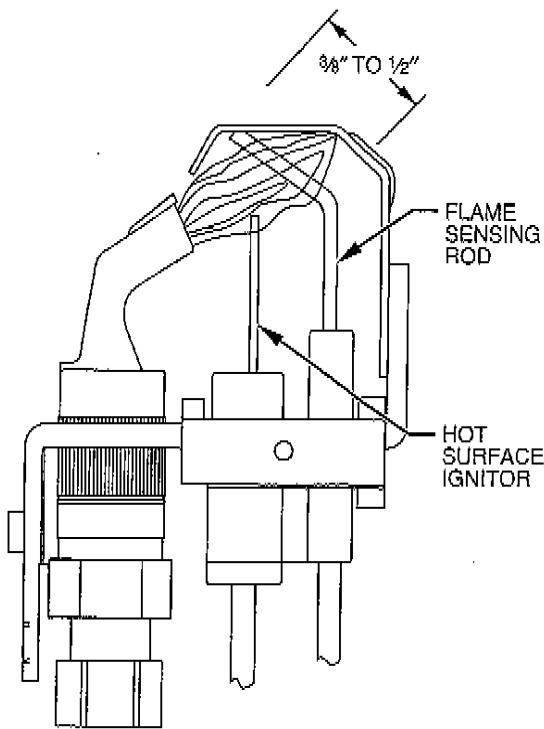


Fig. 4—Position of Pilot to Hot Surface Ignitor and Flame Sensing Rod

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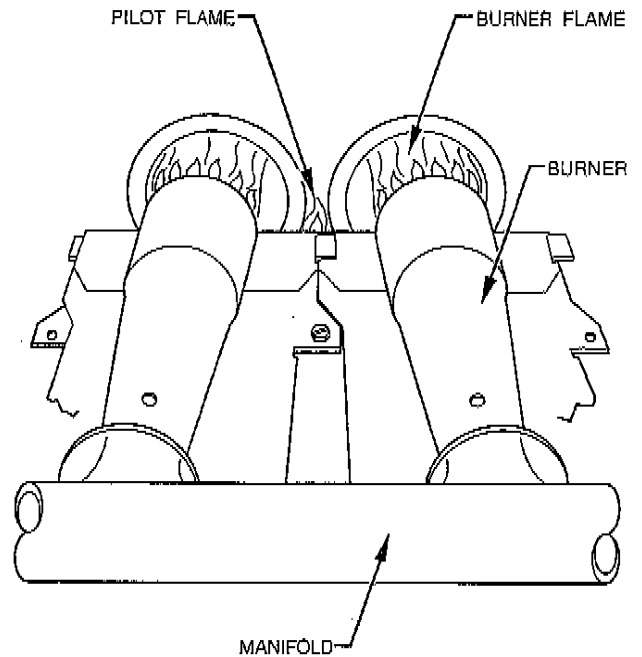


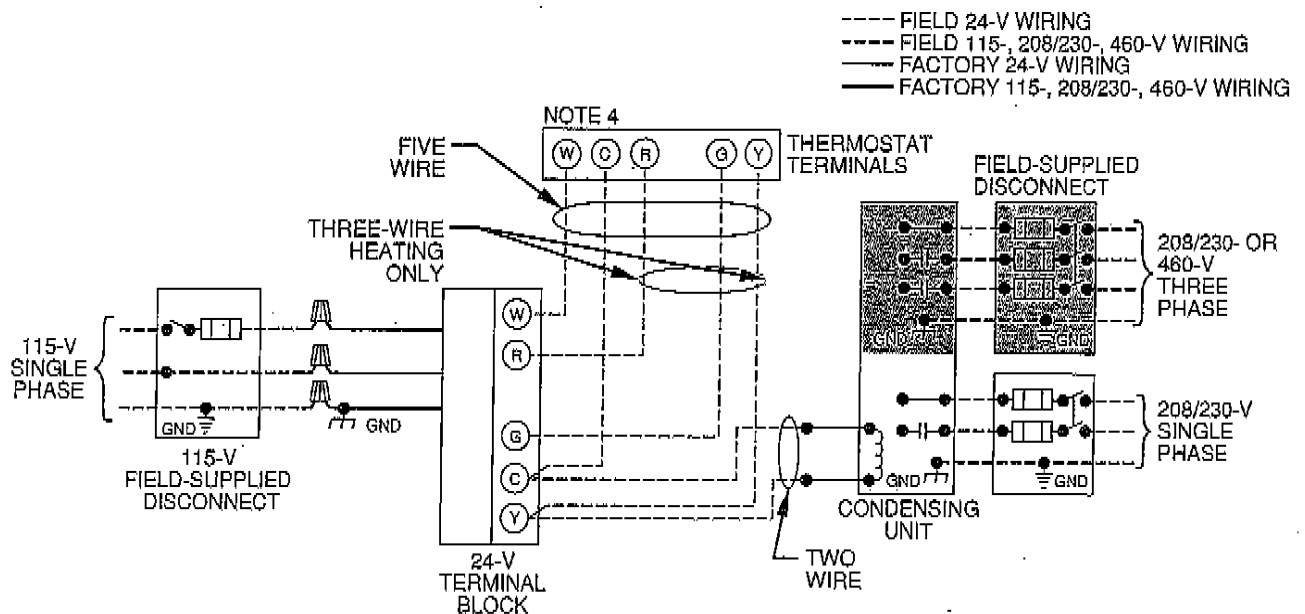
Fig. 5—Pilot and Burner Flames

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**PROCEDURE 5—ELECTRICAL CONTROLS AND WIRING**

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

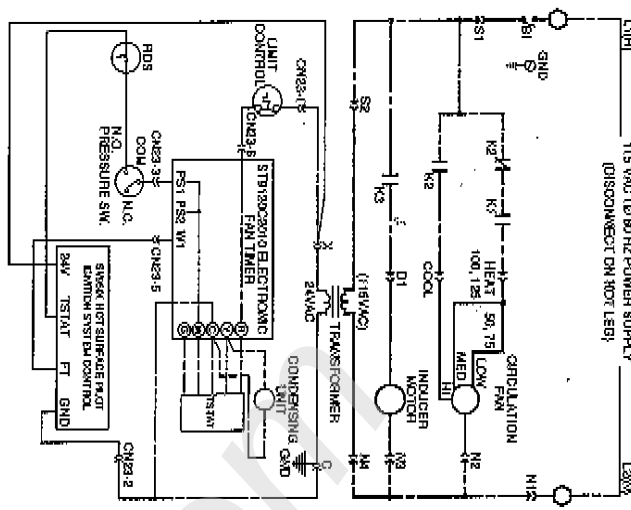
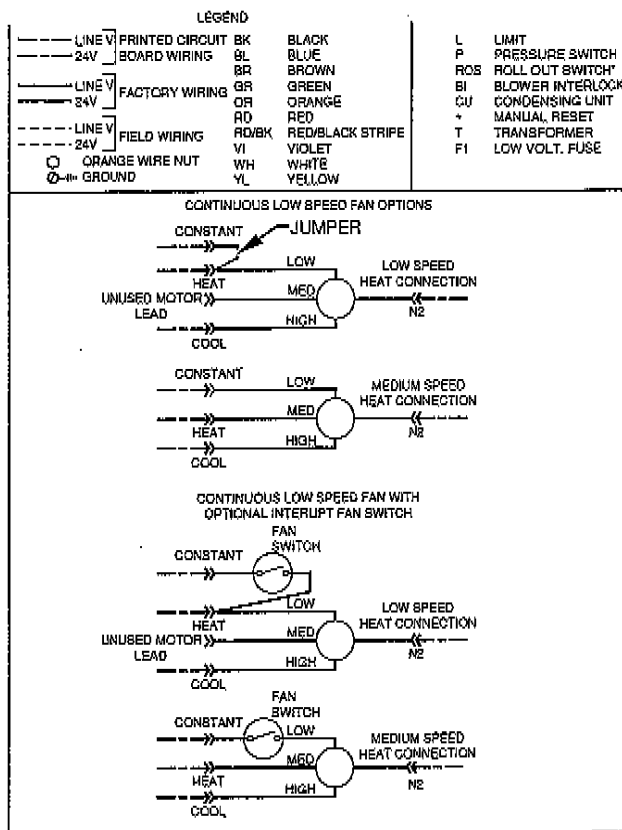
Refer to Fig. 6 for field application wiring and Fig. 7 for unit wiring. With power disconnected to unit, check all electrical connections for tightness. Tighten all screws on electrical connections. If any smoky or burned connections are found, disassemble connection, clean all parts, strip wire, and reassemble properly and securely.



- NOTE :**
1. Connect Y-terminal as shown for proper cooling operation.
  2. If any of the original wire, as supplied, must be replaced, use same type or equivalent wire.
  3. Proper polarity must be maintained for 115-v wiring.
  4. Some thermostats require a "C" terminal connection as shown.

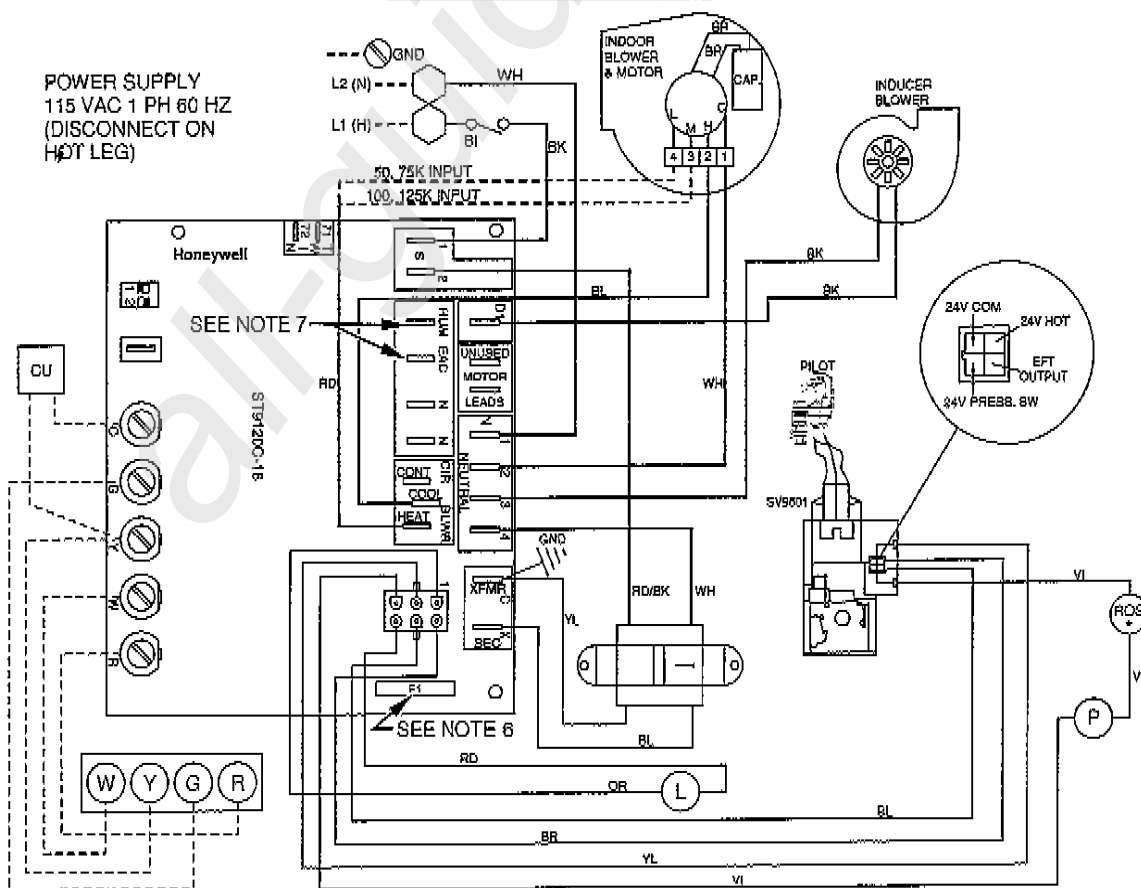
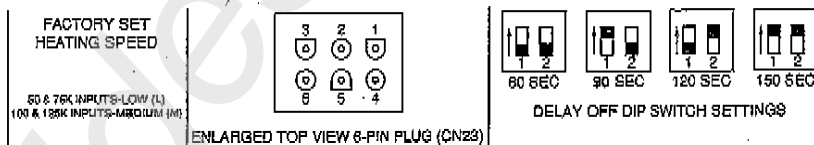
→ Fig. 6—Heating and Cooling Application Wiring Diagram

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**NOTES:**

1. Make field power supply connections to black and white wires capped with orange wire nuts.
2. **WARNING**—unit must be grounded. Wiring must conform to NEC and local codes.
3. If any of the original wire, as supplied with the furnace, must be replaced, it must be replaced with wiring material having a temperature rating of at least 105°C and be a minimum of 16 gage AWG copper strand wire.
4. Connect required motor lead to heat terminal on circuit board to deliver a temperature rise within the range specified on the rating label. Connect unused leads to the unused motor leads.
5. Set the heat anticipator on the thermostat at .40 amps.
6. Low voltage fuse 5 amp automotive type littlefuse 257005 or buss ATCS.
7. Both EAC and HUM terminals are 115v.



HORIZONTAL GAS FURNACE WITH HONEYWELL ST9120C FAN TIMER & SV9501 SMART VALVE

→ Fig. 7—Wiring Diagram

Reconnect electrical power to the unit and observe unit through 1 complete operating cycle. Electrical controls are difficult to check without proper instrumentation. A good voltmeter is needed to check for correct operation of controls and wiring.

### PROCEDURE 6—TROUBLESHOOTING

If furnace fails to operate, check the following items before calling for service:

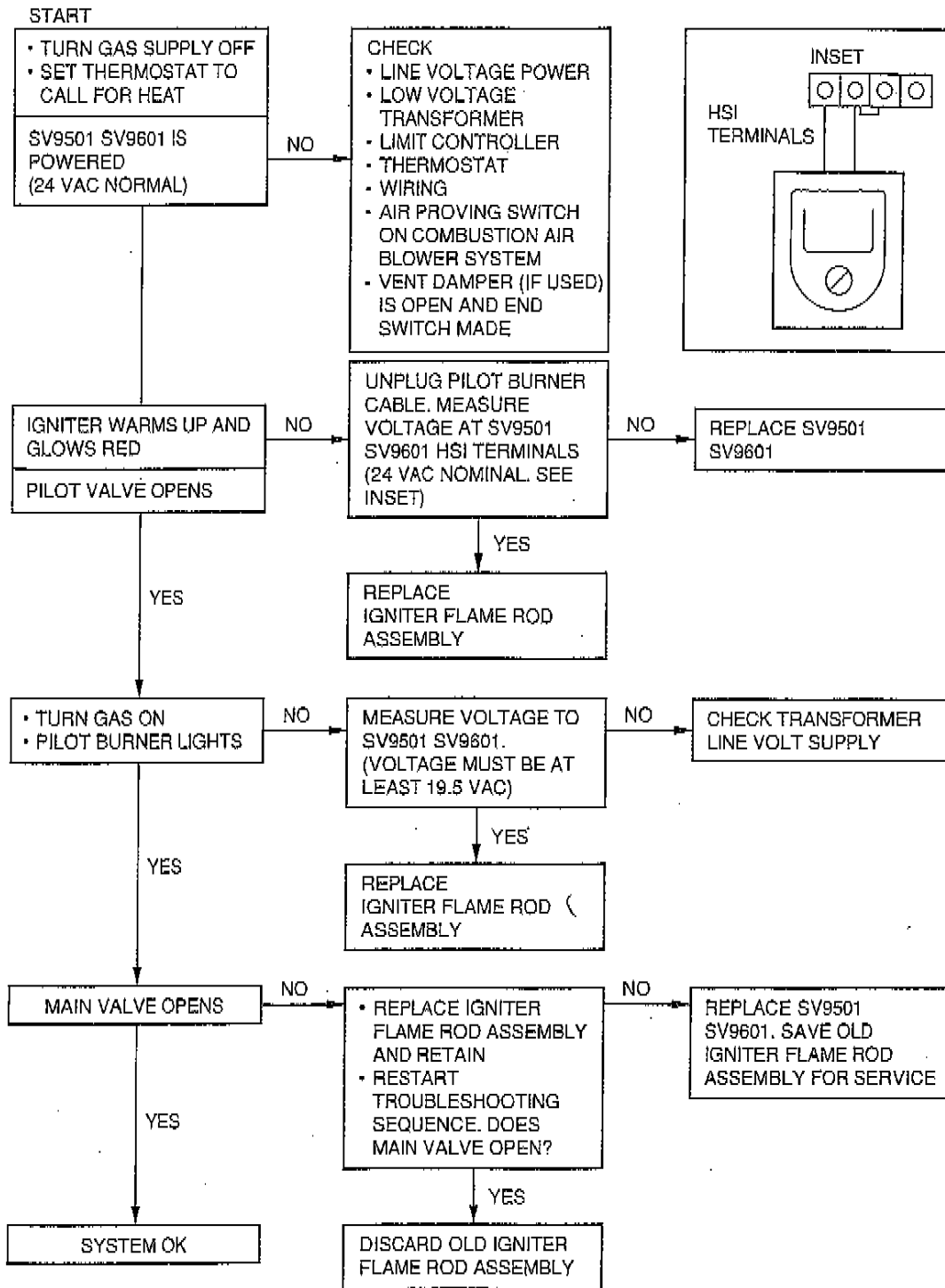
1. Is thermostat set correctly to call for heat?
2. Are electrical and gas supplies on?
3. Are filters clean?

Refer to the Trouble Analysis Chart and SmartValve System Troubleshooting Sequence Flow Chart in this manual for further information.

→ Trouble Analysis Chart

| SYMPTOM                                          | PROBABLE CAUSE                                          | REMEDY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pilot will not light.                            | No power to SV9501 control/valve                        | <ul style="list-style-type: none"> <li>• Check 115-v electrical supply to furnace.</li> <li>• Check draft inducer motor. Repair as necessary.</li> <li>• Check pressure switch; contacts must be closed (vent piping must be free from obstructions). Check for kinks or obstructions in pressure tubing.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  |
|                                                  | Problem with SV9501 control/valve                       | <ul style="list-style-type: none"> <li>• Check for accumulation of moisture or dirt on flame sensing rod; clean if necessary.</li> <li>• Check for cracked hot surface ignitor; replace ignitor/flame rod assembly if necessary.</li> <li>• Check for loose or broken wiring at and between control module (on gas valve) and ignitor/flame rod assembly.</li> <li>• Check for 24-v electrical supply to ignition control module. If 24v are supplied to module, and above steps have been completed, replace gas valve/ignition module assembly.</li> <li>• See also SV9501 instructions supplied with furnace and SmartValve System Troubleshooting Sequence Flow Chart.</li> </ul> |
|                                                  | No gas at pilot assembly.                               | <ul style="list-style-type: none"> <li>• Check if pilot gas valve is opening.</li> <li>• Check for broken or loose wiring connections.</li> <li>• If no deficiency is found, replace gas valve assembly.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Burners will not ignite.                         | No 115-v electrical supply to furnace.                  | • Check fuse, circuit breaker, and wiring.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                  | No 24-v electrical supply to control circuit.           | • Check transformer; replace if necessary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                  | Miswired or loose connections.                          | • Check all wiring and connections; repair as necessary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                  | No gas at main burners.                                 | <ul style="list-style-type: none"> <li>• Check if main gas valve is opening.</li> <li>• Check for broken or loose wiring connections.</li> <li>• If no deficiency is found, replace gas valve assembly.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                  | Flame rollout or blocked vent shutoff switch activated. | • Check heat exchanger venting system for blockage; correct improper venting condition.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                  | Dirty pilot (yellow flame).                             | • Clean pilot orifice.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Inadequate heating.                              | Problem with SV9501 control/valve                       | • See SV9501 instructions supplied with furnace and SmartValve System Troubleshooting Sequence Flow Chart.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                  | Gas input to furnace too low.                           | • Check gas pressure at manifold. Clock gas meter for input. If too low, increase manifold pressure and/or replace orifices with correct size.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                  | Limit switch cycles main burners.                       | <ul style="list-style-type: none"> <li>• Dirty air filters; clean or replace.</li> <li>• Blower speed too low; adjust to higher speed.</li> <li>• Restricted supply- or return-air duct work or registers; repair as necessary.</li> <li>• Incorrect heat anticipator setting; determine proper setting and adjust as necessary.</li> </ul>                                                                                                                                                                                                                                                                                                                                           |
| Aldehyde odors (CO), sooting, or floating flame. | Furnace undersized for application.                     | • Replace with properly sized furnace.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                  | Incomplete combustion (poor flame characteristics).     | <ul style="list-style-type: none"> <li>• Check all screws around flue outlet and burner compartment; tighten as necessary.</li> <li>• Lack of combustion air; see Installation Instructions.</li> <li>• Overfired furnace; reduce input or replace orifices.</li> <li>• Check vent piping for restriction; clean as necessary.</li> <li>• Cracked heat exchanger; replace.</li> </ul>                                                                                                                                                                                                                                                                                                 |

SMARTVALVE® SYSTEM TROUBLESHOOTING SEQUENCE  
 NOTE: BEFORE TROUBLESHOOTING, FAMILIARIZE YOURSELF WITH THE  
 STARTUP AND CHECKOUT PROCEDURE.



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