

# ***hydro flame corp.***

A HAWKEYE GROUP COMPANY

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## **SERVICE MANUAL BOOKLET**

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**7200 SERIES**

**7600 SERIES**

**7700 SERIES**

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**EFFECTIVE 1986**

4. If sparking is audible immediately after thermostat contacts close, but there is no ignition, check the high tension lead for continuity, grounding and good connection. Repair if defective.
5. Make sure the electrode is not grounded. The gap should be  $\frac{1}{8}$ " and the ceramic insulator should not be cracked, broken or sooted. Adjust, clean or replace. (See Figure 1 on Page 3.)
6. Sparking is not audible, remove the DSI module cover and observe if the neon bulb on circuit board is flashing during the trial for ignition period. Remove the white plastic connector from the DSI module board. Clean the board terminals with a soft rubber eraser. Check the terminals in the plastic wire connector for good contact. If tube still does not flash, replace the DSI control module.
7. Check for voltage at the gas valve during the trial for ignition period. If "0" VDC and connections are good, replace the D.S.I. board.
8. If the gas valve does not open with voltage to it, replace the gas valve.
9. Electrode sparking, valve open, but the burner will not light. Check the gas supply, proper vent installation, low voltage to furnace and sparking gap and spacing as per figure.

**B. Burner on – fan will not come on**

1. Check all wiring for correct polarity (refer to wiring diagram) in this section.
2. After burner has been on for five minutes, check for completed circuit through fan switch. If circuit not completed, replace fan switch.
3. Check for voltage at motor leads. If voltage is present and blower wheel is not obstructed, replace motor.

**C. Burner ignites but shuts off**

1. Check sensor adjustment. (See Figure 1)
2. Check the electrode assembly mounting screws and all ground terminals for tightness.
3. Check continuity through the DSI module to sensor lead.
4. The flame detector circuit uses the ionized gas flame to conduct the flame safe signal. To check, shut off the power, remove the lead from the sensor and insert a 0-50 micro amp meter in series with the sensor wire. Attach "Plus" terminal of meter to sensor wire and the "Negative" terminal to sensor electrode. Energize the igniter. The reading should be 5 micro amps or higher. (If "0," reverse the leads.) Adjust or replace the electrode if reading is below 5.

**D. Main burner will not shut off**

1. Make sure the thermostat contacts are open.
2. Check voltage at valve terminals, voltage should be "0" volts.
3. Disconnect the leads from the valve. If the valve does not shut off, replace the valve.

## SERVICE GUIDE

### FA-72 SERIES DSI MODEL

#### Sequence of Normal Operation

Each step in this operation must be completed in the sequence listed below before the next function will occur. To properly diagnose a malfunction and correct it, it must be determined at what step of the operation the furnace failed.

1. When the temperature drops to a set temperature, the wall thermostat contacts close.
2. Current is supplied through a temperature limit switch to the D.S.I. control module.
3. The D.S.I. Module supplies a high voltage spark through the high tension lead to the igniter.
4. The gas valve opens.
5. The burner ignites.
6. The sensor signals the presence of a flame and sparking stops. (If a flame is not established within 7 seconds, the system closes the gas valve and locks out.)
7. The fan switch closes on temperature rise. Blower starts circulating warm air flow.
8. The gas valve closes when either the limit switch or thermostat contacts open.
9. The blower motor STOPS when fan switch or manual reset limit opens.

#### GENERAL

All electrical components can be checked or replaced while the furnace is installed. Do not use a battery charger to power or test furnace as this could damage the control module or thermostat.

All testing and repairs should be done by qualified personnel only.

Do not use a screwdriver or other metal tool to touch any part of the electrode assembly while the furnace is running.

Do not attempt to operate furnace with the high tension lead wire disconnected or electrode assembly removed from the burner plate.

Do not perform any high potential test on these furnaces.

#### **A. Burner does not light when thermostat calls for heat**

1. Check for possible air in gas lines. Reset thermostat and cycle furnace several times to bleed system.
2. Check gas supply pressure while in operation. Supply 11" W.C. pressure to the furnace. Make sure the valve knob is in the "on" position, the switch on the side of the junction box is on, and the circuit breaker is pushed in. Check manual reset switch located on the side of the blower housing.
3. Check for voltage at the terminals of the control module (D.S.I. Board; refer to wiring diagram). If "0" VDC, check thermostat wires, manual and high limits. Power should be present between all of these components and ground.

## SERVICE GUIDE

### FA-72 Series Pilot Model

Problem	Cause	Solution
Pilot will not light.	<ol style="list-style-type: none"><li>1. No fuel.</li><li>2. Blocked fuel lines.</li><li>3. Plugged pilot orifice.</li><li>4. Regulator out of adjustment.</li><li>5. Bad pilot adjustment.</li><li>6. Regulator freezing.</li><li>7. Inoperative control valve.</li></ol>	<p>Check fuel supply. Check for kinks or other blockage and replace. Clean with air pressure or replace. (Check for spider webs in pilot or pilot orifice.) Adjust regulator to 11" Water Column with furnace operating. Check pilot adjustment screw. Insert ½ cup methylhydrate into empty gas bottle. Replace control valve.</p>
Pilot will not stay lit when knob has been released.	<ol style="list-style-type: none"><li>1. Loose thermocouple at control valve.</li><li>2. Dirty thermocouple connection.</li><li>3. Partially plugged pilot orifice.</li><li>4. Bad adjustment at pilot and/or regulator.</li><li>5. Faulty thermocouple.</li><li>6. Faulty valve.</li></ol>	<p>Tighten thermocouple finger tight plus ¼ turn. Clean with emery paper and replace. Clean with air pressure or replace. Check and adjust.  Check for millivolt out-put and replace if faulty. MIN. 5 MV closed circuit, 13 MV open circuit.</p>
Main burner will not fire.	<ol style="list-style-type: none"><li>1. Dirty orifice.</li><li>2. Regulator freezing.</li></ol>	<p>Clean with air pressure or replace.  Insert ½ cup methylhydrate into empty gas bottle. NOTE: If bottle is full, insert a few drops of methylhydrate into line at P.O.L. fitting.</p>
Main burner will not fire.	<ol style="list-style-type: none"><li>1. Pilot knob not at ON position.</li><li>2. Toggle switch OFF.</li><li>3. Manual reset limit switch open.</li><li>4. High limit switch faulty.</li><li>5. Inoperative control valve with 12 VDC at valve.</li><li>6. Bad thermostat.</li><li>7. Circuit breaker out and/or faulty.</li><li>8. Manual reset out.</li><li>9. Broken wire to thermostat.</li><li>10. Poor connection in wiring harness.</li></ol>	<p>Turn pilot knob to ON position. Turn toggle switch to ON position. Check voltage at valve. Push to reset limit (right side of blower housing). Check voltage at valve. Replace if continuity test shows faulty. Check voltage at valve. Replace control.  Replace thermostat. Reset and/or replace. Push to reset. Replace wire. Check connections to make sure they are tight.</p>

### E. Continuous sparking

1. Continuous sparking is caused by separations in the high tension lead wire or poor terminal connections. Repair or replace.

### F. Erratic blower and/or thermostat operation

1. Check the wiring to the furnace.
2. Check for shorts and open circuits in wiring.
3. Disconnect leads to the gas valve, if furnace runs properly with the leads removed. Replace the gas valve.

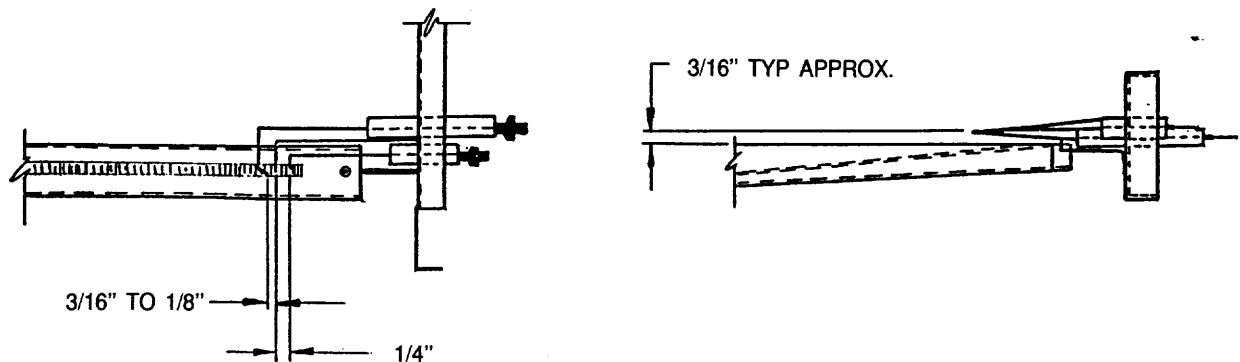
### G. Repeated control module failures

1. Check to be sure that the igniter or the high tension lead is not sparking to the sensor or the lead wire.
2. Check the voltage from the coach converter. If over  $14\frac{1}{2}$  VDC output is present, adjust or replace the converter.

### H. Blower is noisy

1. Check for debris in the wheel or damage or looseness. Remove debris, and tighten wheel properly. If damaged, replace.
2. Check for excessive voltage, and correct.
3. Check polarity. If reversed, the motor will whine and run backwards.
4. The wheel may be hitting housing; adjust wheel position with allen wrench.
5. Check for loose motor mounts and retighten.

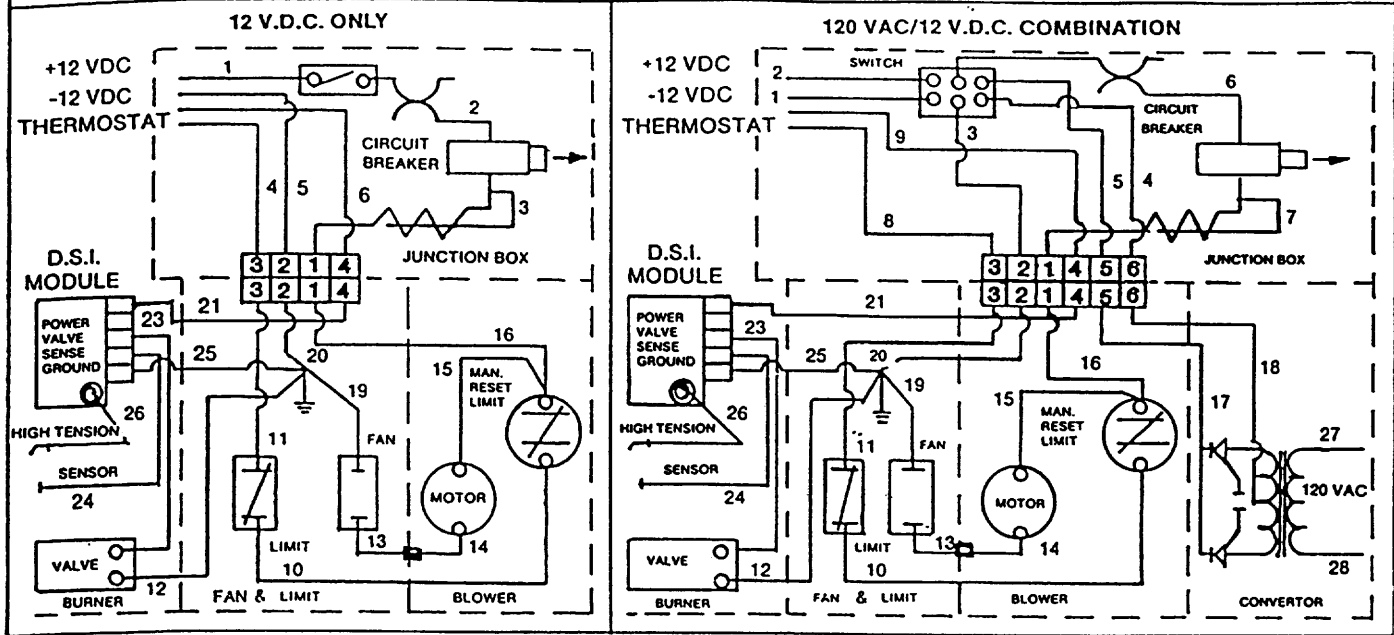
ELECTRODE ADJUSTMENT  
FIGURE #3



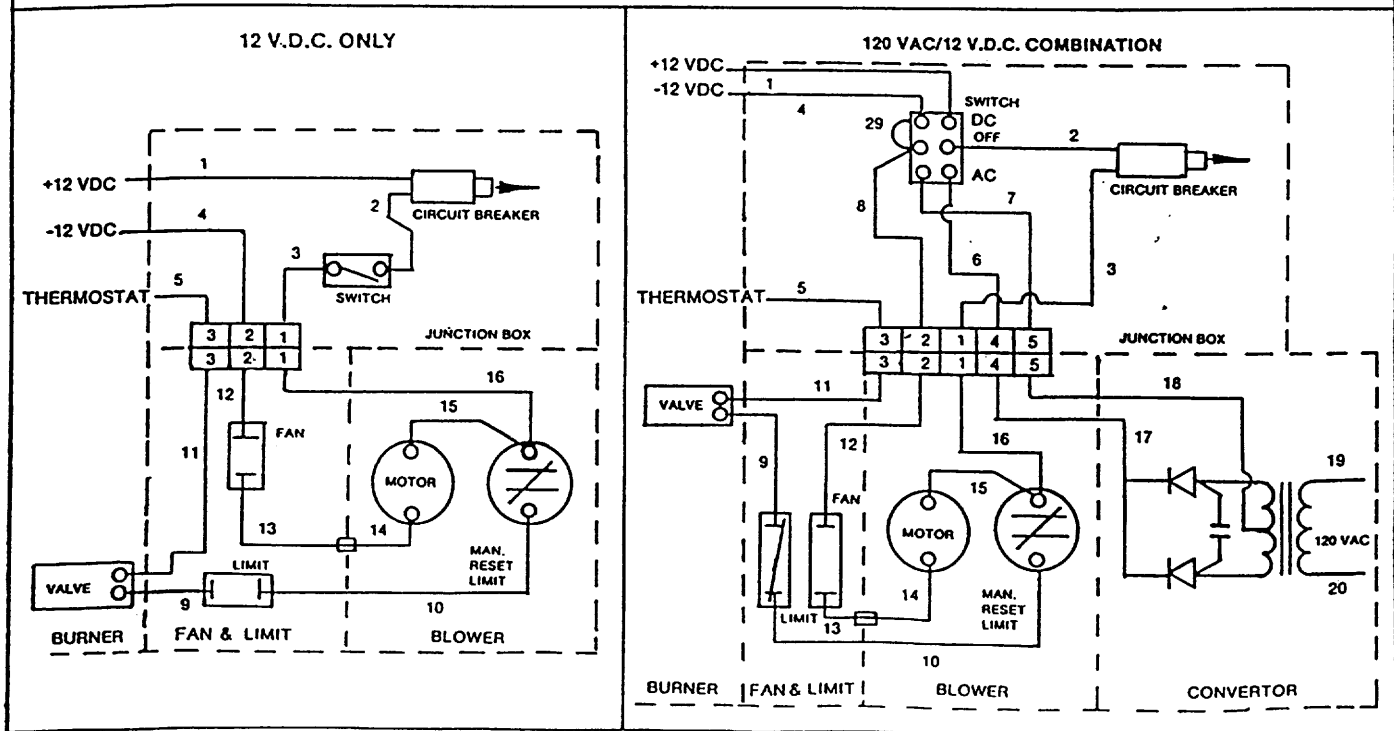
<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
Main burner will not shut down.	<ol style="list-style-type: none"> <li>1. Short in thermostat wire.</li> <li>2. Thermostat mounted in cold location.</li> <li>3. Operative control with no voltage at valve.</li> </ol>	<p>Replace thermostat wire. Relocate.</p> <p>Replace control.</p>
Fan will not come on.	<ol style="list-style-type: none"> <li>1. No 12 volt power to motor.</li> <li>2. Faulty 115° fan switch.</li> <li>3. Seized or burned out motor.</li> </ol>	<p>Check 12 volt power to motor. Replace fan switch. Replace motor.</p>
Fan will not shut off.	<ol style="list-style-type: none"> <li>1. Faulty 115° fan switch, will not open.</li> <li>2. Obstructed ducting.</li> <li>3. Obstructed return air.</li> </ol>	<p>Replace fan switch. Check for obstruction and clean.</p>
Furnace fails to operate with wall thermostat.	<ol style="list-style-type: none"> <li>1. Short in wire to wall thermostat.</li> <li>2. Control hooked to 12 volt power.</li> <li>3. Faulty wall thermostat.</li> </ol>	<p>Check by unhooking W.T. wires at control and use jumper wire. If furnace ignites, replace wire. Replace control. Check by crossing wires at W.T.</p>
Blower noisy.	<ol style="list-style-type: none"> <li>1. Debris inside blower wheel.</li> <li>2. Motor mounts loose.</li> <li>3. Blower wheel loose on shaft.</li> <li>4. Reversed motor polarity, motor running backwards.</li> <li>5. Loose blower assembly.</li> <li>6. Blower wheel out of balance.</li> </ol>	<p>Remove debris and clean wheel. Retighten. Adjust and tighten. Wire for correct polarity.</p> <p>Tighten screws between blower housing and fan support wall. Replace wheel.</p>
Leaking valve.	<ol style="list-style-type: none"> <li>1. Overfilled gas bottle.</li> <li>2. Valve subjected to high pressure test.</li> </ol>	<p>Replace valve. Check bottle. (Not covered by warranty.) Replace valve. (Not covered by warranty.)</p>
Odors	<ol style="list-style-type: none"> <li>1. Obstructed vent.</li> <li>2. High pressure gas.</li> </ol>	<p>Check for obstruction. Check gas pressure setting.</p>
Humming noise.	Convertors on AC units.	This is normal.

NOTE: Model numbers are shown on the lighting instruction plates. Serial numbers are located on the Underwriters Laboratories plate or Agency listing label.

### FA-72 SERIES WIRING DIAGRAM FOR DSI MODELS



### FA-72 SERIES WIRING DIAGRAM FOR PILOT MODELS



## SERVICE GUIDE

### Furnaces with Direct Spark Ignition (DSI)

#### Sequence of Normal Operation

Each step in this operation must be completed in the sequence listed below before the next function will occur. To properly diagnose a malfunction and correct it, it must be determined at what step of the operation the furnace failed.

1. When the temperature drops to the thermostat set temperature, the wall thermostat contacts close.
2. The fan relay coil is energized, completing the circuit to the blower motor. Note: (some models have a 5 to 20 second time delay after the thermostat contacts close).
3. The motor starts, turning the combustion and circulating air blower wheels.
4. When the blower reaches the necessary RPMs to close the air operated sail switch (approximately 1 to 2 seconds), current is supplied through a temperature limit switch to the D.S.I. control module.
5. When energized, this DSI module has a built-in 15 second delay to purge the combustion chamber.
6. The D.S.I. Module supplies a high voltage spark through the high tension lead to the igniter.
7. The gas valve opens.
8. The burner ignites.
9. The sensor signals presence of a flame and sparking stops. (If a flame is not established within 7 seconds, the system closes the gas valve and locks out.)
10. The fan switch closes on temperature rise. (Not applicable to time delay models.)
11. The gas valve closes when either limit switch or thermostat contacts open.
12. The Blower motor stops when the fan switch or time delay relay opens.

#### GENERAL

Most electrical components, except the motor and sail switch can be checked or replaced while the furnace is installed. Do not use a battery charger to power or test furnace. This could damage the control module or thermostat.

All testing and repair should be done by qualified personnel only.

Do not use a screwdriver or any other metal tool to touch any part of the electrode assembly while the furnace is running.

Do not attempt to operate the furnace with the high tension lead wire disconnected or the electrode assembly removed from the burner plate.

**DO NOT PERFORM ANY HIGH POTENTIAL TEST ON THESE FURNACES.**

#### **A. Thermostat is calling heat, but blower does not run**

1. Check for 12 volts D.C. at the furnace connection. Correct power source if found to be below 10.5 volts or above 14.5 D.C. (DC Units only.)
2. Check the circuit breaker. The reset button protrudes  $\frac{1}{4}$ " in the operating (closed) position. When tripped (open), it protrudes  $\frac{1}{2}$ ". Check for shorts and excessive voltage and correct problems. Push "IN" to reset.



**SERVICE GUIDE****Furnaces with Direct Spark Ignition (DSI)****Sequence of Normal Operation**

Each step in this operation must be completed in the sequence listed below before the next function will occur. To properly diagnose a malfunction and correct it, it must be determined at what step of the operation the furnace failed.

1. When the temperature drops to the thermostat set temperature, the wall thermostat contacts close.
2. The fan relay coil is energized, completing the circuit to the blower motor. Note: (some models have a 5 to 20 second time delay after the thermostat contacts close).
3. The motor starts, turning the combustion and circulating air blower wheels.
4. When the blower reaches the necessary RPMs to close the air operated sail switch (approximately 1 to 2 seconds), current is supplied through a temperature limit switch to the D.S.I. control module.
5. When energized, this DSI module has a built-in 15 second delay to purge the combustion chamber.
6. The D.S.I. Module supplies a high voltage spark through the high tension lead to the igniter.
7. The gas valve opens.
8. The burner ignites.
9. The sensor signals presence of a flame and sparking stops. (If a flame is not established within 7 seconds, the system closes the gas valve and locks out.)
10. The fan switch closes on temperature rise. (Not applicable to time delay models.)
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12. The Blower motor stops when the fan switch or time delay relay opens.

**GENERAL**

Most electrical components, except the motor and sail switch can be checked or replaced while the furnace is installed. Do not use a battery charger to power or test furnace. This could damage the control module or thermostat.

All testing and repair should be done by qualified personnel only.

Do not use a screwdriver or any other metal tool to touch any part of the electrode assembly while the furnace is running.

Do not attempt to operate the furnace with the high tension lead wire disconnected or the electrode assembly removed from the burner plate.

**.DO NOT PERFORM ANY HIGH POTENTIAL TEST ON THESE FURNACES.**

**A. Thermostat is calling heat, but blower does not run**

1. Check for 12 volts D.C. at the furnace connection. Correct power source if found to be below 10.5 volts or above 14.5 D.C. (DC Units only.)
2. Check the circuit breaker. The reset button protrudes  $\frac{1}{4}$ " in the operating (closed) position. When tripped (open), it protrudes  $\frac{1}{2}$ ". Check for shorts and excessive voltage and correct problems. Push "IN" to reset.

3. Check all wiring for correct polarity (refer to wiring diagram), loose connections and possible shorts.
4. Check the wall thermostat and wiring for continuity.
5. After correcting above listed problems, check for voltage at the orange or red motor lead connection. If "0" VDC, replace relay.
6. If voltage is present at motor lead terminal and the blower wheel is not obstructed and all wiring is good, replace the motor.

**B. Blower is noisy**

1. Check for debris in wheel or looseness. Remove debris, and tighten the wheel properly. If damaged, replace.
2. Check for excessive voltage, and correct.
3. Check polarity. If reversed, motor will whine and run backwards. Air delivery may be too low to close the sail switch.
4. Wheel may be hitting the housing. Adjust the wheel with an allen wrench.

**C. Blower runs but burner does not light**

1. Check for possible air in gas lines. Reset thermostat and cycle the furnace several times to bleed the system.
2. Check gas supply pressure while in operation. Supply 11" W.C. pressure to the furnace on all propane units with all gas appliances operating. Make sure the valve knob is in the "ON" position.
3. Check wiring for polarity and continuity.
4. Check for lint and dirt in blower wheel or restrictions in return air passages. Correct or clean.
5. Check for voltage on both sides of limit switch. If there is voltage on one side of the switch but not on the other, replace switch. If there is voltage on both sides of limit switch, proceed to step 6.
6. Observe if sail switch moves forward or up and down (to close contacts) when the blower reaches full RPM. If sail switch is immobile or voltage is not present at both terminals when in closed position, replace the sail switch.

7. Check for voltage at power terminals on control module (refer to wiring diagram). If "0" voltage, check wire from sail switch, for continuity.
8. If sparking is audible approximately 15 seconds after blower starts, but no ignition, check the high tension wire for continuity, grounding and good connections. Repair if defective.
9. Make sure electrodes are not grounding, the gap is  $\frac{1}{8}$ " and the ceramic insulators are not cracked, broken or sooted. Adjust, clean or replace.
10. If sparking is not audible, remove DSI module cover and observe if the neon bulb on circuit board is flashing during the trial for ignition period. If not, remove the white plastic connector from the circuit board. Clean the board terminals with a soft rubber eraser. Check the terminals in the plastic connector for good contact. If tube still does not flash, replace control module.
11. Check for voltage at the gas valve during the trial for ignition period. If "0" VDC and connections are good, replace the module.
12. If the valve does not open with voltage to valve, replace valve.
13. Electrode sparking, valve open, but the burner will not light. Check the gas supply, vent and air tube installation and blockage. Check for rupture in combustion air hose, loose hose clamps, loose blowers, and voltage to furnace.
14. Check burner adjustment as shown in each series sections.

#### **D. Burner ignites but shuts off**

1. Check sensor adjustments as shown on Page 14, Figure 2.
2. Check the electrode assembly mounting screws and all ground terminals for tightness.
3. Check continuity through the DSI module to sensor lead.
4. The flame detector circuit uses the ionized gas flame to conduct the flame safe signal. To check, shut off the power, remove the lead from the sensor and insert a 0-50 micro amp-meter in series with the sensor and the sensor wire. Attach "PLUS" terminal of meter to sensor wire and "NEGATIVE" terminal to sensor electrode. Energize the igniter. The reading should be 5 micro amps or higher. (If "0," the leads are reversed.) Adjust or replace the electrode if reading is below 5.
5. If reading is 4 micro amps or above and lockout still occurs, replace the DSI module.

#### **E. Main burner will not shut off**

1. Make sure the thermostat and the relay contacts are open.
2. Check voltage at the valve terminals. There should be "0" volts.
3. Disconnect leads from the valve. If the valve does not shut off, replace the valve.

#### **F. Continuous sparking**

1. Continuous sparking is caused by separations in the high tension lead wire or poor terminal connections. Repair or replace.

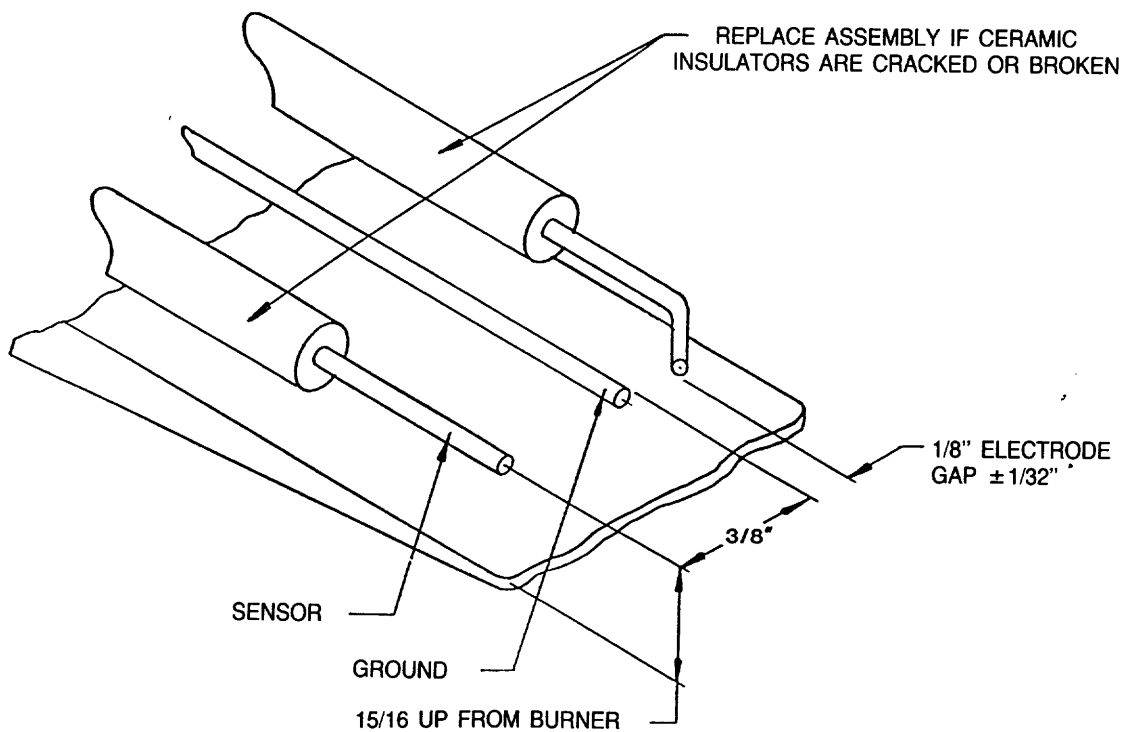
### G. Erratic blower and/or thermostat operation

1. Check all wiring to the furnace.
2. Check for shorts in the main wiring.
3. Disconnect leads to the gas valve, if the furnace runs properly with leads removed, replace the gas valve.

### H. Repeated control module failures

1. Check to be sure that the igniter or the high tension lead is not sparking to the sensor or the lead wire.
2. Check the voltage from the coach convertor. If over  $14\frac{1}{2}$  VDC output is present, adjust or replace the convertor.
3. Check to insure that the furnace return air ways and the warm air ducts are not restricted or blocked and the minimum required return air is provided.

ELECTRODE ADJUSTMENT  
FIGURE #2



## SERVICE GUIDE

### Furnaces with Piezo Igniters and Pilot, Thermocouple Systems

#### Sequence of Normal Operation

Each step in this operation must be completed in the sequence listed below before the next function will occur. To properly diagnose a malfunction and correct it, it must be determined at what step of the operation the furnace failed.

1. When the temperature drops to a set temperature, the wall thermostat contacts close.
2. The fan relay coil is energized, after a 15 to 20 second delay, completing the circuit to the blower motor.
3. The motor starts, turning the combustion and circulating air blower wheels.
4. When the blower reaches the necessary RPM to close the air operated sail switch (approximately 1 to 2 seconds), current is supplied through a temperature limit switch to the gas valve.
5. The gas valve opens.
6. The pilot flame ignites burner.

#### GENERAL

Most electrical components, except the motor and sail switch, can be checked or replaced while the furnace is installed. All testing and repair should be done by qualified personnel only.

##### A. Thermostat is calling for heat, but blower does not run

1. Check for 12 volts DC at the furnace connection. Correct power source if found to be below 10.5 volts DC or above 14.5 volts DC. (Units are DC only.)
2. Check the circuit breaker. The reset button protrudes 1/4" in the operating (closed) position. When tripped (open), it protrudes 1/2". Check for shorts, excessive voltage and correct problems. Push "IN" to reset.
3. Check all wiring for correct polarity (refer to wiring diagram located within each section for your series unit), loose connections and possible shorts or open circuits.
4. Check the wall thermostat. Wiring should not show continuity with thermostat open. Note: Wires installed with staples are subject to shorts.
5. After correcting above listed problem, check for voltage at orange or red motor lead connection. If "0" VDC, replace relay.
6. If voltage is present at motor lead terminal and the blower wheel is not obstructed, all wiring is good, replace the motor.

### **B. Blower is noisy**

1. Check for debris in the wheel or damage or looseness. Remove debris and tighten wheel properly. If damaged, replace.
2. Check for excessive voltage, and correct.
3. Check polarity. If reversed, the motor will whine and run backwards. Air delivery may be too low to close the sail switch.

### **C. Blower runs but burner does not light**

1. PILOT MODELS ONLY: check for gas in gas system. Reset thermostat and light pilot.
2. Check gas supply pressure while in operation. Supply 11" W.C. pressure to the furnace on all propane units with all appliances operating. Make sure the valve knob is in the "ON" position.
3. Check the wiring for polarity and continuity.
4. Check for lint and dirt in blower wheel or restrictions in return air passages. Correct or clean.
5. Check for voltage on both sides of limit. If there is voltage on one side of the switch but not on the other, replace switch. If there is voltage on both sides of limit switch, proceed to step 6.
6. Observe if sail switch moves forward or up and down (to close contacts) when the blower reaches full RPM. If sail switch is immobile or voltage is not present at both terminals when in closed position, replace the sail switch.
7. If the valve does not open with voltage to valve, replace valve.
8. If valve opens, but the burner will not light, check the gas supply, vent and air tube installation, check for rupture in combustion air hose, loose hose clamps, loose set screws on combustion air wheel or low voltage to the furnace.
9. Check main burner orifice.
10. Check for proper burner adjustment. See Figure 9 & 10.

### **D. Main burner will not shut off**

1. Make sure the thermostat and relay contacts are open.
2. Check voltage at valve terminals. There should be "0" volts.
3. Disconnect the leads from the valve. If the valve does not shut off, replace the valve.
4. Check continuity between furnace thermostat leads and thermostat. There should be no continuity when contact points on thermostat are open.

### **E. Erratic blower and/or thermostat operation**

1. Check the wiring to the furnace.
2. Check for shorts and open circuits in the wiring.

#### F. Pilot will not light

1. Disconnect piezo lead, hold 3/16" from ground, depress plunger, check for spark. If none exists, replace piezo assembly. If spark is visible, remove pilot or burner assembly and adjust the igniter. (Refer to Figure 3.)
2. Set the thermostat to turn blower on to purge the combustion chamber. Light the pilot.
3. If pilot goes out when the valve knob is turned from "PILOT" to "ON" repeat step 2.
4. If the pilot goes out when the main burner ignites, adjust pilot and check for malfunctioning sail switch.
5. If the main burner will not come on. See sections A, B, and C.
6. Main burner will not shut "OFF." See section D.

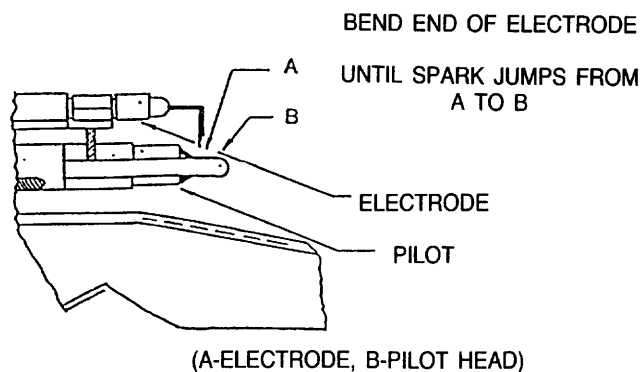
#### G. Pilot will not stay lit

1. Check the vent installation.
2. Cut off rain deflector from back of the air box, see HF 77 Series, Figure 11, Page 21.
3. Check thermocouple for proper millivolt reading.
4. Check burner plate for lost mica or holes. Seal all holes in the burner plate. Make sure gas pressure is between 10½ to 11" W.C.

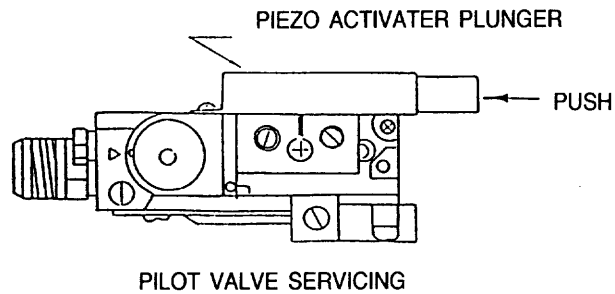
#### H. Burner pops when lighting

1. Check adjustment gap between electrode and thermocouple as shown below.
2. Adjust burner head as shown in each series section of this manual.

PILOT ELECTRODE ADJUSTMENT  
FIGURE #3



PIEZO IGNITER  
FIGURE #4



**A. Pilot model valve gas adjustment**

1. Remove pilot adjustment cover screw (see Figure #7) and turn pilot adjustment screw to produce non-blowing blue flame covering top 1/4" of thermocouple tip. Replace cover screw.

**B. Pressure regulator adjustment**

1. To adjust regulator, remove pipe plug (see Figure #7) from 1/8" NPT pressure tap near valve outlet and install pressure measuring device. Remove cover screw (see Figure #7) to uncover regulator adjustment screw. Adjust pressure to valve stamped on valve. Replace cover screw.
2. If valve fails to hold open within 60 seconds after a satisfactory pilot flame is established, check with millivoltmeter or: (1) check appearance and adjust pilot flame, (2) tighten "G" bushing, as shown in Figure #5 and make connection to millivoltmeter, (3) substitute new thermocouple, (4) replace gas valve.

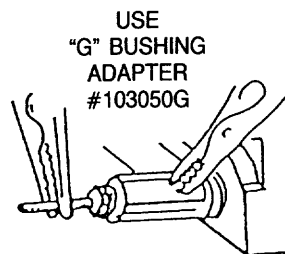
**C. Millivoltmeter test**

1. Use 0-50 millivolt scale. Place meter test probes as shown below. If meter needle moves to the left of the zero or no reading is indicated, reverse probes. Take all readings with pilot burning and thermostat contacts closed. If reading is less than 7 millivolts: (1) adjust pilot gas, (2) clean primary air holes, (3) clean pilot burner orifice, (4) replace thermocouple.
2. If reading is 7 millivolts or more and thermomagnet will not hold open, replace valve.

**D. Lighting procedure**

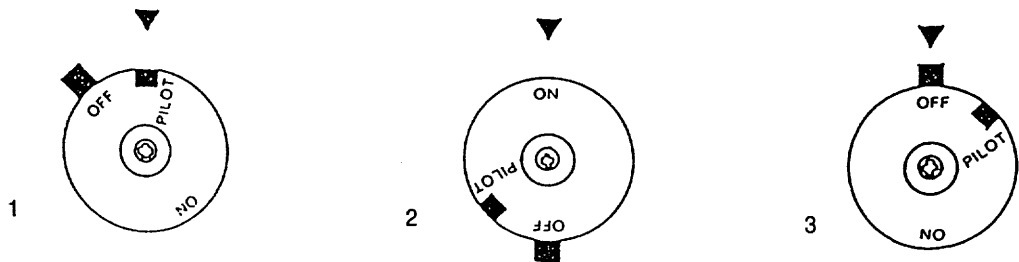
1. Turn to PILOT. Press knob in and light pilot. Hold for 60 seconds and release.
2. Turn knob counterclockwise to "ON." Use this position for main burner-on control.
3. For complete shutdown turn knob clockwise to PILOT, press knob in and turn to "OFF." Use this position when complete shutdown is necessary. (Use PILOT position for temporary shut-down.) See Figure #6.

TEST LEAD CONNECTION  
FIGURE #5

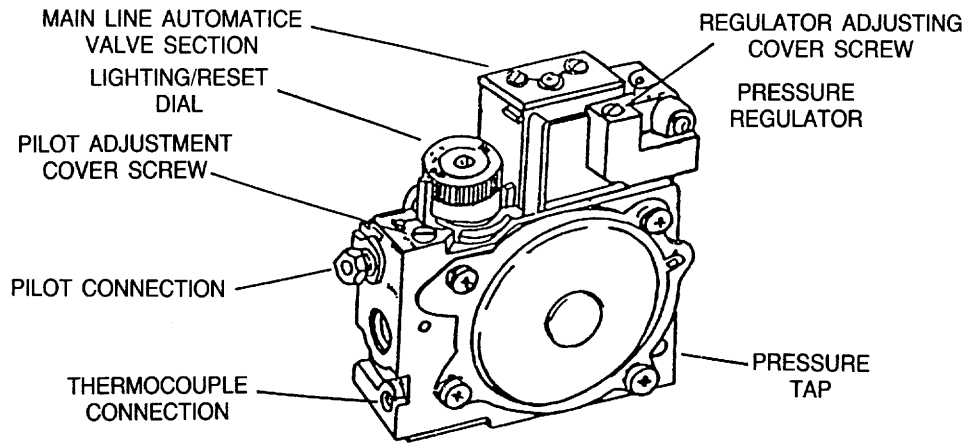




VALVE KNOB POSITIONS  
FIGURE #6



VALVE  
FIGURE #7



**WARNING**

**DISASSEMBLY, REASSEMBLY OR INTERNAL ADJUSTMENT WITHOUT FACTORY TEST MAY RESULT IN HAZARDOUS CONDITION. IF CONTROL DOES NOT OPERATE PROPERLY AFTER FOLLOWING THE INSTALLATION AND SERVICE INSTRUCTIONS, COMPLETE CONTROL MUST BE REPLACED BY QUALIFIED PERSONNEL.**

## SERVICE SUGGESTIONS

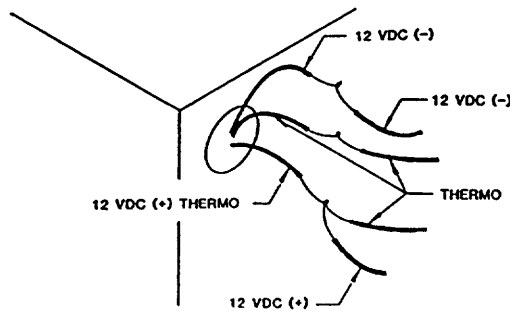
Trouble	Possible Cause	Remedy
Pilot will not stay open after carefully following lighting instructions.	Pilot flame too small or yellow in color due to restricted pilot line, dirt in primary air opening or burner head, wrong orifice in pilot, drafts deflecting pilot flame.	Clean pilot line, primary line opening and burner head . . . Change pilot orifice. Eliminate source of draft.
	Loose or dirty thermocouple connection.	Disconnect thermocouple from valve, clean contact with fine sandpaper. Tighten finger tight plus 1/8 turn.
	Thermocouple producing insufficient millivoltage.	Check with millivoltmeter, replace if necessary.
Pilot burns, thermostat set to call for heat, main valve will not open.	Defective valve. Main valve assembly damaged. Plugged burner orifice.	Replace valve.
Valve leaks or will not close.	Valve assembly damaged.	Replace valve.

## VENTS

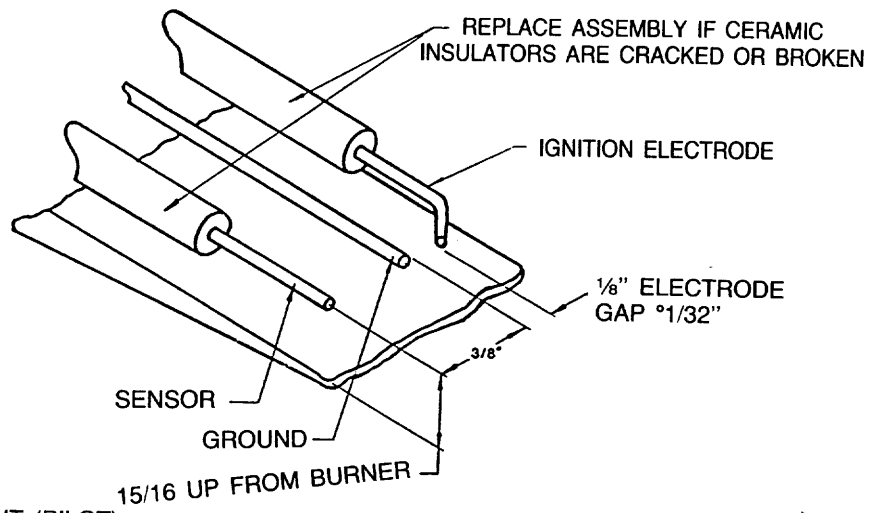
Schematic Number	Order Number Old	Order Number New	Exhaust Tube No.	Air Box No.	Vent Kit No.	Model No.	"A" Dimension Min./Max. Length
38A	F-26	76A	1649	1651	2012	FA-76 &	0" - 4 1/2"
38B	F-30	76B	1648	1650	2013	HF-77	4 1/2" - 7 1/2"
*****	*****	*****	*****	*****	*****	*****	*****
229A	D-24	79A	1680	1677	2150	FA-79 &	0" - 3 1/2"
229B	D-28	79B	1679	1676	2151	HF-80	3 1/2" - 7 1/2"
229C	D-32	79C	1678	1675	2145		7 1/2" - 11 1/2"
*****	*****	*****	*****	*****	*****	*****	*****

"Minimum to maximum lengths are taken from back of furnace to outside of coach."

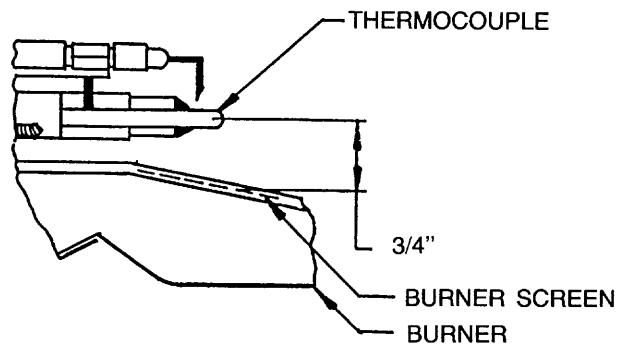
HF-77 ELECTRICAL CONNECTION  
FIGURE #8



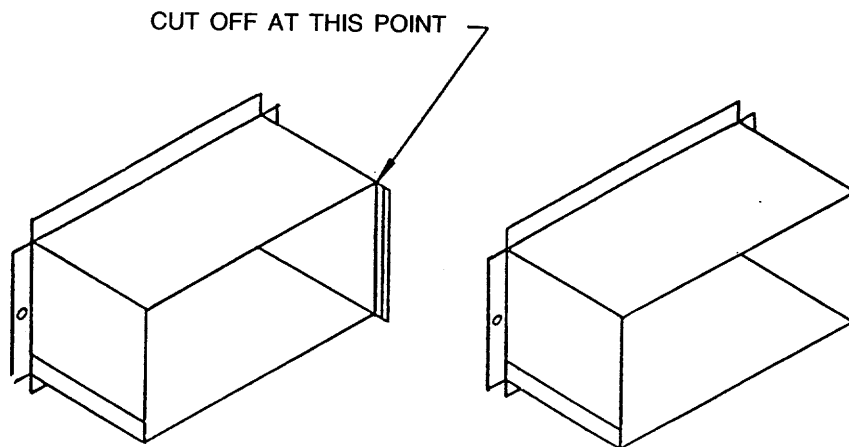
HF-77 BURNER ADJUSTMENT (DSI)  
FIGURE #9



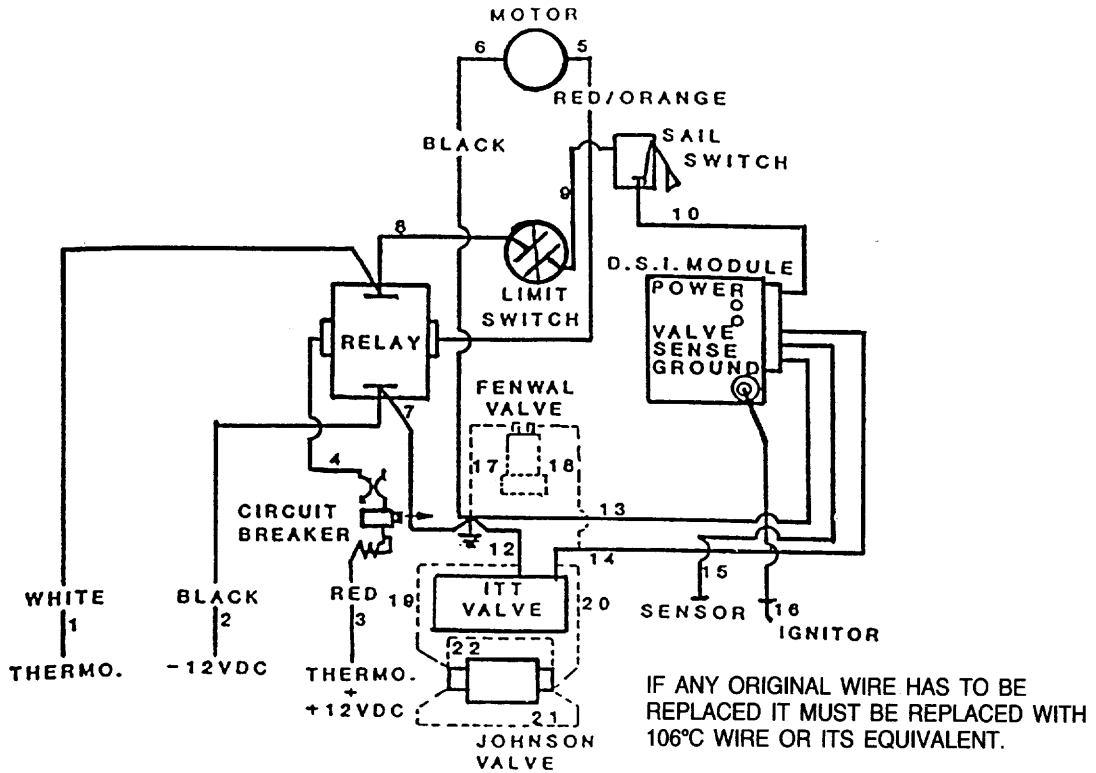
HF-77 BURNER ADJUSTMENT (PILOT)  
FIGURE #10



HF-77 AIR BOX EXTENSION ADJUSTMENT  
FIGURE #11



## HF-77 SERIES WIRING DIAGRAM FOR (DSI) MODELS



## HF-77 SERIES WIRING DIAGRAM FOR (PILOT) MODELS

