

Troubleshooting Guide

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INSTRUCTIONS

This guide uses your expertise and observations to lead you to the trouble spot as efficiently as possible. This is only intended as a guide and should not be used blindly. Your experience and expertise are of high value when troubleshooting this unit – do not disregard all of your instincts.

The microprocessor furnace control was designed with diagnostic capabilities built in. LED's are used to flash a code which will lead to 1 of the sections as listed in the index.

You should ALWAYS begin in the START HERE section (see the index for the page number) which will guide you to the appropriate section where a minimal number of steps will be used to correct the problem.

Once in a section, read the statement or question. A statement will have a number in the "GO TO" column. Do whatever the statement says, then go to the step indicated in the "GO TO" column.

If the step is a question (a question will have a number in the "YES" or "NO" column), answer it "YES" or "NO." If the answer is "YES," go the step in the "YES" column. If "NO," go to the step in the "NO" column.

Let us try our guide and see how it works. Suppose that the problem is a defective high-pressure switch (i.e. will not make). This is an internal problem and cannot simply be seen. We go to the START HERE section to Step 1.

EXAMPLE Start Here Section

STEP		YES	NO	GO TO
1.	Step 1 tells us to record the status of LED's 1 through 4 and go to Step 2.			2
2.	Step 2 asks the question, "Are any LED's flashing?" If the high-pressure switch is defective, a high-pressure switch fault would be flashing, so the answer is YES. Go to Step 5.	5	3	
5.	Step 5 tells us to go to the high-pressure switch fault section.			INDEX

High-Pressure Switch Fault Section

STEP		YES	NO	GO TO
1.	Step 1 tells us to turn the power OFF, remove the blower door, disconnect the R thermostat lead, and go to Step 2.			2
2.	Step 2 tells us to depress the door switch and use a piece of tape to hold it closed before going to Step 3.			3
3.	Step 3 asks the question, "Is the inducer motor running?" If the high-pressure switch is defective, it would not. The answer is NO. Go to Step 5.	4	5	
5.	Step 5 tells us to jumper R and W and go to Step 6.			6
6.	Step 6 tells us to observe the operation of the furnace through a heating cycle, then go to Step 7.			7
7.	Step 7 asks the question, "Does the fault recur?" If the high-pressure switch is defective, it would. The answer would be YES. Go to Step 11.	11	8	
11.	Step 11 asks the question, "Does the fault occur within 5 sec after a call for heat?" If the high-pressure switch is defective and will not make, it would not. The answer is NO. Go to step 17.	12	17	
17.	Step 17 asks the question, "Does the high-pressure switch make then break several times before faulting out?" It would not. The answer is NO. Go to Step 18.	32	18	
18.	Step 18 asks the question, "Does the fault occur before the main burners ignite?" If the high-pressure switch was defective and will not make, it would. The answer is YES. Go to Step 19.	19	38	
19.	Step 19 asks the question, "Do you have 24v between C (Common) on the high-pressure switch and C on the furnace control board?" It would. The answer is YES. Go to Step 21.	21	20	
21.	Step 21 asks the question, "Do you have at least 0.75-in. wc pressure drop (1.38-in. wc on downflow furnaces) across heat exchangers when the fault occurs?" To check this you would recycle the furnace with a slope manometer connected per the applicable pressure-check photo diagram in Appendix C. If the high-pressure switch is defective and will not make, the pressure will exceed 0.75 in. of wc. The answer is YES. Go to Step 33.	33	22	
33.	Step 33 tells us to disconnect the R thermostat lead, reset the power, wait 30 sec, and reconnect the R thermostat lead. Then, go to Step 34.			34
34.	Step 34 asks the question, "Do you have 24v between connector terminal PL7-7 and C on the furnace control board when the fault occurs?" If no voltage is present, the answer is NO. Go to Step 35.	13	35	
35.	Step 35 says to turn OFF the power and go to Step 36.			36
36.	Step 36 asks the question, "Do you have continuity across terminal PL7-7 and normally open (N.O.) contact on the high-pressure switch?" If the high-pressure switch were defective, we would have continuity on the wire, so we answer YES. Go to Step 16.	16	37	
16.	Step 16 tells us to replace the pressure switch assembly and go to Step 10.			10
10.	Step 10 tells us to go to the CLEANUP AND START-UP INSTRUCTIONS. This section tells us to check and verify that this was the correct and sole problem, reassemble the furnace, and clean up.			INDEX

SEQUENCE OF OPERATION

NOTE: Once electrical power is supplied to the furnace, the microprocessor CPU goes through a self-test sequence. This self-test sequence takes approximately 20 sec to complete. Seven sec after electrical power is supplied to the furnace, the green LED fault light comes on for 12 sec, followed by a 1-sec interval where both the green and yellow LED's are lit. If the wall thermostat has a "call for heat" during the self-test sequence, the CPU starts blower motor MTR2 on low speed (approximately 400 to 500 rpm) for 20 sec. At this time, the CPU takes a calibration reading and adjusts the blower motor MTR2 speed to deliver low-fire airflow. This is done as a precaution to cool the heat exchangers in the event electrical power was lost during a heating cycle. After the blower motor MTR2 has been on for 1 minute, the motor will be turned off and the following heating cycle will begin.

The control circuit of the furnace, shown in the schematic wiring diagrams in Appendix A, results in the following sequence of operation for heating cycle, emergency heat cycle, cooling cycle, and continuous blower.

Match the schematic in the unit with the schematic in Appendix A. If you have schematic 313652-401, use schematic 317278-401 as it is very similar. If you have schematic 311179-401, use the "Sequence of Operation" provided in the Installation Instructions with the unit.

HEATING CYCLE

- When the blower door is in place, 120v are supplied through blower door interlock switch ILK to the inducer controller PCB1 and blower motor MTR2. Transformer TRAN is energized, supplying 24v to the microprocessor control center PCB3 and R thermostat terminal.
- The room thermostat "calls for heat," closing the R-W circuit. This closed circuit supplies power to the 24v flow-sensing switches LPS and HPS.

3. The CPU, upon receiving a thermostat signal, starts inducer motor MTR1 and gradually increases the inducer motor MTR1 speed.
4. As inducer motor MTR1 comes up to speed, flow-sensing switches LPS and HPS close, supplying 24v to ignition relay contacts IGNR, the high-fire solenoid in gas valve GV, and the necessary input signals to the CPU—no gas flow will occur at this time.
5. Ten sec after flow-sensing switch HPS closes, the CPU activates ignition relay IGNR which then energizes the PILOT solenoid coil of gas valve GV and time-delay circuit of spark generator SG through fusible link FL.
6. When the PILOT solenoid coil of gas valve GV is energized, gas flows to the pilot. The internal pressure switch of gas valve GV senses the pilot gas pressure and closes, completing the HOLD circuit. The normally open, time-delay circuit closes after an additional 10-sec purge delay, energizing spark generator SG. The pilot is ignited by a spark produced by spark generator SG.
7. After a short delay, approximately 20 to 70 sec, while the pilot heats up, the normally closed flame-sensing switch contacts PIL open. The PILOT solenoid coil of gas valve GV remains energized through the HOLD circuit. Spark generator SG shuts off when the flame is sensed at the pilot spark electrode. The normally open, flame-sensing switch contacts PIL close 5 to 20 sec later, energizing the main operator MGV of gas valve GV. The MGV opens immediately, increasing the gas pressure approximately 5 sec later, allowing gas flow to the main burners. The pilot flame immediately ignites the gas.
8. Simultaneously, representative control signals are sent to the CPU which start the blower-on delay timer and make the appropriate inducer motor MTR1 speed adjustments necessary to maximize combustion efficiency. Approximately 35 sec after gas valve GV opens, the CPU starts blower motor MTR2 on low speed (approximately 400 to 500 rpm) for 20 sec. At this time, the CPU takes a calibration reading and adjusts the blower motor MTR2 speed to deliver the proper airflow for low- or high-fire operation.
9. Approximately 60 sec after gas valve GV opens, the CPU adjusts the inducer motor MTR1 speed to run the furnace in the low-fire mode for a predetermined time based on the furnace heating load— unless the thermostat is satisfied. If the thermostat has not been satisfied while in low fire in the allotted time period, the CPU adjusts the inducer motor MTR1 and blower motor MTR2 speeds. The adjustments allow the furnace to operate in high-fire mode for the rest of the thermostat cycle.
10. When the thermostat is satisfied, the R-W circuit is broken, de-energizing gas valve GV, which sends the control signal to the CPU, which stops inducer motor MTR1 after 15 sec. Gas flow to the pilot and main burners stops immediately. The CPU adjusts the blower motor MTR2 speed to deliver low-fire airflow for approximately 60 to 240 sec (depending upon the blower-off time adjustment), after which the CPU stops the blower motor MTR2.

NOTE: After a brief interruption of either the electric or gas supply, the furnace will not resume operation until the contacts of pilot flame-sensing switch PIL move from the normally open position to the normally closed position.

EMERGENCY HEAT CYCLE (SET-UP SWITCH SW4 ON)

In the event of CPU failure, the furnace can still deliver heat in the emergency heat mode until service may be obtained. Set-up switch SW4 must be ON. The furnace should be serviced as soon as possible.

NOTE: The furnace should not be run in emergency heat for extended periods of time. Operate the furnace in emergency heat only as long as it takes to replace a non-functioning component. In this mode, all logic is bypassed and the motors run at full speed which can overstress the electronics and reduce the life of the primary heat exchangers.

1. When the blower door is in place, 120v are supplied through blower door interlock switch ILK to the inducer controller PCB1 and blower motor MTR2. Transformer TRAN is energized, supplying 24v to the microprocessor control center PCB3.
2. The room thermostat "calls for heat," closing the R-W circuit. This closed circuit supplies power to the 24v flow-sensing switches LPS and HPS.
3. Simultaneously, the emergency heat electronic relay EHER is energized. EHER relay contacts close, starting inducer motor MTR1, blower motor MTR2, and activating ignition relay IGNR, which then energizes the PILOT solenoid of gas valve GV and time-delay circuit of spark generator SG through fusible link FL. Another set of contacts in the EHER relay close in the 24-v circuit, locking in the EHER relay. The EHER relay is locked in until the R-W circuit, limit switch LS, flame rollout switch FRS, or auxiliary limit switch ALS (when used) open.
4. When the PILOT solenoid coil of gas valve GV is energized, gas flows to the pilot. The internal pressure switch of gas valve GV senses the pilot gas pressure and closes, completing the HOLD circuit. The normally open, time-delay circuit closes after a 10-sec purge delay, energizing spark generator SG. The pilot is ignited by a spark produced by spark generator SG.
5. As the inducer motor MTR1 comes up to speed, flow-sensing switch HPS closes, energizing the high-fire solenoid of gas valve GV—no gas flow will occur at this time. After a short delay, approximately 20 to 70 sec, while the pilot heats up, the normally closed flame-sensing switch contacts PIL open. The PILOT solenoid coil of gas valve GV remains energized through the HOLD circuit. Spark generator SG shuts off when the flame is sensed at the pilot spark electrode. The normally open, flame-sensing switch contacts PIL close 5 to 20 sec later, energizing the main operator MGV of gas valve GV. The MGV opens immediately, increasing the gas pressure approximately 5 sec later, allowing gas flow to the main burners. The pilot flame immediately ignites the gas.
6. When the thermostat is satisfied, the R-W circuit is broken, de-energizing gas valve GV, inducer motor MTR1, and blower motor MTR2. The gas flow to the pilot and main burners stops immediately.

COOLING CYCLE

1. The room thermostat "calls for cooling"; R-G and R-Y circuits must be energized. Simultaneously, the R-Y circuit starts the outdoor condensing unit, and the R-G-Y circuit sends the appropriate signal to the CPU which starts blower motor MTR2 on low speed (approximately 400 to 500 rpm) for 20 sec. At this time, the CPU takes a calibration reading and adjusts the blower motor MTR2 speed to deliver 400 cfm/ton airflow. The airflow will vary depending on the setting of airflow selection switch RSW2.
NOTE: If the Y thermostat lead is not connected to the indoor microprocessor control board and a "call for cooling" occurs, the blower motor MTR2 will run at continuous blower speed. Indoor coil freeze-up can occur if the Y lead is not properly connected.
2. When the thermostat is satisfied, the R-G and R-Y circuits are broken, de-energizing the outdoor condensing unit and sending a control signal to the CPU which stops blower motor MTR2 after an additional 90 sec.

CONTINUOUS BLOWER CYCLE

1. When the room thermostat is set for continuous blower, the R-G circuit is energized. The R-G circuit sends the appropriate signal to the CPU which starts blower motor MTR2 on low speed (approximately 400 to 500 rpm) for 20 sec. At this time, the CPU takes a calibration reading and adjusts the blower motor MTR2 speed to run at continuous blower speed.
2. During a "call for heat," the blower motor MTR2 will stop when the main operator MG of gas valve GV is energized. This allows the furnace heat exchangers to heat up more quickly. Approximately 35 sec after the gas valve GV opens, the CPU starts blower motor MTR2 on low speed (approximately 400 to 500 rpm) for 20 sec. At this time, the CPU takes a calibration reading and adjusts the blower motor MTR2 speed to deliver the proper airflow for low- or high-fire operation.

Fault Code Instructions

CODE	DESCRIPTION
12	Blower Calibration Lockout
13	High-Limit Lockout
14	Pilot-Proving Lockout
21	Invalid Model Selection
22	Setup 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

NOTES:

1. Code 11 will be used to indicate no fault in the history display.
2. Red LED1 on solid means furnace is operating in emergency heat.
3. Red LED2 on solid means the microprocessor has malfunctioned. To reset: Put set-up switch SW-1 in the ON/UP position and jumper thermostat terminals R, W, and Y simultaneously with the door switch pushed in and power to the unit ON. Disconnect jumper and place set-up switch in the OFF/DOWN position. If LED2 reappears, replace main control board.
4. Yellow LED3 on solid means furnace is operating in high heat.
5. Green LED4 on solid means furnace is operation in low heat.
6. Alternate flashing of green and yellow LED's indicates fault. (See Fig. 1.)

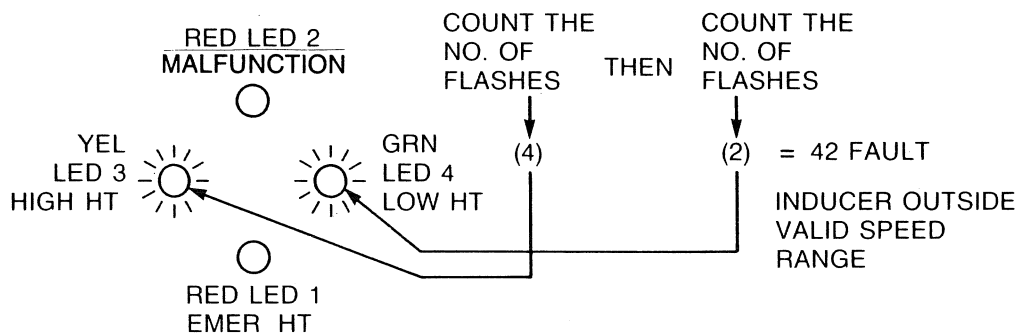


Fig. 1—Fault Code LED's

A87348

START HERE—If a problem exists, the serviceperson should always begin troubleshooting here.

STEP		YES	NO	GO TO
1.	DO NOT REMOVE BLOWER DOOR! Record status of LED'S 1 through 4. See fault code instructions on page 4.			2
2.	Are any LED's flashing?	5	3	
3.	Are any LED's on solid? Solid means ON continuously.	4	6	
4.	Go to the page number indicated in the index for the LED's 1, 2, 3, or 4 ON SOLID.			INDEX
5.	Go to the page number indicated in the index for the section covering the fault code being flashed.			INDEX
6.	Is the power on? (DO NOT cycle the power to the unit.)	8	7	
7.	Turn the power ON.			19
8.	Remove the blower door and depress the door switch. Use a piece of tape to hold it closed. Wait 30 sec for self-test before proceeding to the next step.			9
9.	Does the unit complete the self-test sequence properly? See note in "Sequence of Operation" section.	10	26	
10.	Does the problem appear to be low-cooling airflow?	11	12	
11.	Go to the page number indicated in the index for the section covering NOT ENOUGH COOLING AIRFLOW.			INDEX
12.	Make sure the thermostat is calling for heat.			13
13.	Make sure the thermostat fan control is in the AUTO position if equipped.			14
14.	Observe the operation of the furnace for 8 minutes.			15
15.	Is the temperature rise below the range specified on the rating plate when the unit is running in high fire?	16	17	
16.	Go to the page number indicated in the index for the section HIGH-FIRE TEMPERATURE RISE TOO LOW (COLD BLOW).			INDEX
17.	Is the problem interference with radio or television reception?	36	18	
18.	Does the furnace operate properly?	30	35	
19.	Remove the blower door and depress the door switch. Use a piece of tape to hold it closed. Wait 30 sec for self-test before proceeding to the next step.			20
20.	Disconnect the R thermostat lead, then wait until the blower motor shuts off.			21
21.	Put set-up switch SW-1 in the ON position.			22
22.	Record faults listed in fault history.			23
23.	Are any LED's flashing?	24	25	
24.	Are LED's 3 and 4 flashing a Code 11?	27	29	
25.	Are any LED's on solid? Solid means ON continuously.	4	26	
26.	Go to the page number indicated in the index for the section NO OPERATION WITH NO FLASHING FAULT CODE.			INDEX
27.	Put set-up switch SW-1 in the OFF position and reconnect the R thermostat lead.			28
28.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
29.	Go to the page number indicated in the index for the subsection covering the first fault code flashed.			INDEX
30.	Disconnect the R thermostat lead, then wait until the blower motor shuts off.			31
31.	Put set-up switch SW-1 in the ON position.			32
32.	Record faults listed in fault history.			33
33.	Are LED's 3 and 4 flashing a Code 11?	34	29	
34.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS. If this problem persists on an intermittent basis, replace the furnace control board. If the problem still persists on an intermittent basis after replacing the furnace control board, go to the page number indicated in the index for the section covering ELECTRICAL NOISE AND INTERFERENCE.			INDEX
35.	Does the furnace flash any fault code?	5	26	
36.	Go to the page number indicated in the index for the section covering ELECTRICAL NOISE AND INTERFERENCE.			INDEX

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. (Field strength meter may be required, see NOTE:)
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. Ferrite cores are available at electronic supply houses.
6. Isolate thermostat with a separate 24-v supply per Fig. 5 in Appendix B.

NOTE: If necessary, the user should consult the distributor 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.

Electrical noise and interference has many forms and cures and there may not be 1 simple answer for correcting the problem. Therefore, we suggest trying any or all combinations of the solutions listed.

STEP		YES	NO	GO TO
1.	Is the problem interference with radio or television reception?	2	21	
2.	Turn OFF the power and remove the blower and control doors.			3
3.	Disconnect all the thermostat leads from the furnace control board and pull them completely out of the casing.			4
4.	Put the blower and control doors in place and turn the power back on.			5
5.	Does the unit still interfere with radio or television reception?	7	6	
6.	The interference is being radiated from the thermostat wires. Proper installation of the antenna is usually able to correct this problem. Good reception before the furnace was installed DOES NOT mean signal levels from the antenna were good. Most "fringe reception areas" are probably operating with very low signal levels until some interfering equipment is installed. A television or antenna specialist should have the equipment needed to confirm signal levels when the furnace is OFF. If the problem still persists, try the following: •Make sure the antenna is grounded. •If you are using ribbon cable from a remote antenna, install coaxial cable. •If the cable from a remote antenna is installed near the thermostat wiring, reroute the thermostat cable or reroute the coaxial cable. •If using a humidifier, make sure it is isolated with a separate 24-v supply. •If using an electronic thermostat, disconnect it from the thermostat wires to see if the noise interference disappears. •Route all thermostat wires through a ferrite core that is placed as close to the furnace control board as possible. Ferrite cores are available at electronic supply houses. •Isolate the thermostat wires with a separate 24-v supply per Fig. 5 in Appendix B. •Use shielded cable instead of standard thermostat cable. Make sure cable shield is grounded to the C terminal on the furnace control board and to the thermostat. When completed, go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			
7.	Turn the power OFF and remove the blower and control doors.			8
8.	Disconnect connector PL2.			9
9.	Put the blower and control doors in place and turn the power back ON.			10
10.	Does the unit still cause interference?	14	11	
11.	Check the ground to the inducer motor.			12
12.	Install a 10-amp RFI filter as close to the inducer controller as possible on the 120-v lines. RFI filters are general purpose power line interference filters which can be found at most electronic supply houses. If the problem still persists, replace the inducer controller and the inducer motor.			13
13.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
14.	Turn OFF the power and remove the blower and control doors.			15
15.	Disconnect connector PL13. If you have a 2-piece 1/3-hp ECM design, disconnect connector PL4.			16

STEP		YES	NO	GO TO
16.	Put the blower and control doors in place and turn the power back ON.			17
17.	Does the unit still cause interference?	20	18	
18.	Check the ground to the blower motor.			19
19.	Install a 16-amp RFI filter as close to the blower motor as possible on the 120-v lines. RFI filters are general purpose power line interference filters which can be found at most electronic supply houses. If you have a 2-piece 1/3-hp ECM design, install the RFI filter as close to the blower controller as possible. If the problem still persists, replace the blower motor. If you have a 2-piece 1/3-hp ECM design, replace the blower motor and controller with a 1-piece 1/2-hp ICM design.			13
20.	Install a 3-amp RFI filter to the primary leads of the transformer P1 and P2. RFI filters are general purpose power line interference filters which can be found at most electronic supply houses.			13
21.	Does the furnace interfere with another device such as a garage door opener or an alarm system?	22	27	
22.	Turn the power off and remove the blower and control doors.			23
23.	Disconnect all the thermostat leads from the furnace control board and pull them completely out of the casing.			24
24.	Put the blower and control doors in place and turn the power back on.			25
25.	Does the unit still cause interference?	7	26	
26.	The interference is being radiated from the thermostat wires. If the device affected by the interference has a transmitter and receiver, try a different frequency; otherwise, try the following: •If the device affected by the interference has a battery, check it. •If the device affected has a transmitter and receiver, make sure their signals are not obstructed by appliances, metal doors, or screens. •Reroute the thermostat cable. •If using a humidifier, make sure it is isolated with a separate 24-v supply. •If using an electronic thermostat, disconnect it from the thermostat wires to see if the noise interference disappears. •Route all thermostat wires through a ferrite core placed as close to the furnace control board as possible. Ferrite cores are available at electronic supply houses. •Isolate the thermostat wires with a separate 24-v supply per Fig. 5 in Appendix B. •Use shielded cable instead of standard thermostat cable. Make sure cable shield is grounded to the C terminal on the furnace control board and to the thermostat. When completed, go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			
27.	Does the furnace fail intermittently during cooling operation?	28	38	
28.	Check the thermostat wire gage between the furnace and the thermostat, and the furnace and the outdoor unit. It is recommended that AWG No. 18 "color coded" copper thermostat wire be used for lengths up to 100 ft. For wire lengths over 100 ft, use AWG No. 16 wire.			29
29.	Check the outdoor unit contactor; failure to pull in can cause excessive current draw on the low-voltage circuit. This can be intermittent and may require extended operation to repeat problem. Isolating outdoor unit per Fig. 7 in Appendix B may solve problem.			30
30.	If using an electronic thermostat, check the battery. If you suspect the thermostat, isolate the W and Y circuits per Fig. 6 in Appendix B.			31
31.	If installation has an electronic air cleaner (EAC) and it is sparking continuously, clean it. If it was cleaned recently, make sure it is dry.			32
32.	Ensure that all wiring to the ACCR relay is not routed across the furnace control board.			33
33.	Ensure the furnace and accessories are properly grounded. If the unit functions properly when the accessories are disconnected, install an isolation relay between the ACCR relay and EAC if the installation has an EAC. If a humidifier is hooked up to the ACCR relay, rewire the ACCR relay to switch 120v to a separate 24-v transformer supplying the humidifier.			34
34.	If installation has an EAC, relocate the aluminum mesh prefilter in the EAC cabinet between the EAC and the furnace. If this solves problem, put aluminum mesh filters on each side of the EAC.			35

STEP		YES	NO	GO TO
35.	If installation has an EAC, install a 10-amp RFI filter as close to the EAC as possible on the 120-v lines. RFI filters are general purpose power line interference filters which can be found at most electronic supply houses.			36
36.	Ensure the EAC and the furnace on different branch circuits from the main fuse box.			37
37.	As a last resort, move the EAC further away from the furnace or replace it with a corporate product.			40
38.	Ensure the high-voltage lead from spark generator SG is making proper connection to the pilot PIL and spark generator SG and the electrode on pilot is properly positioned.			39
39.	Ensure spark generator SG is properly grounded, ballast resistor is approximately 480 ohms, and ballast resistor RES is properly connected across spark generator terminals T1 and T2.			30
40.	If the problem continues to occur on an intermittent basis, put a piece of tape across the door switch to ensure power is present when the blower door is removed when the next service call is required.			41
41.	If the unit acts up again, try resetting the power to the blower motor only. To reset power to the blower motor, disconnect PL15 then reconnect it. If you have a 2-piece 1/3-hp ECM design, disconnect connector PL4 then reconnect it.			42
42.	Does the unit function properly after only resetting the power to the blower motor?	43	44	
43.	Replace the blower motor. If you have a 2-piece 1/3-hp ECM design, replace the blower motor and controller with a 1-piece 1/2-hp ICM design.			13
44.	Does the unit function properly after only resetting the power to the inducer controller? To reset power to the inducer controller, disconnect PL2 then reconnect it.	45	46	
45.	Replace the inducer controller and inducer motor.			13
46.	Press down on the Eprom chip and make sure it is properly seated to the furnace control board. If it is properly seated, replace the furnace control board.			13

NO OPERATION WITH NO FLASHING FAULT CODE—Generally, this indicates there is no power to the microprocessor board.

STEP		YES	NO	GO TO
1.	Make sure the power is ON.			2
2.	Remove the blower door and depress the door switch. Use a piece of tape to hold it closed. Wait 30 sec for self-test before proceeding to the next step.			3
3.	Make sure the thermostat is calling for heat.			4
4.	Make sure the thermostat fan control is in the AUTO position if equipped.			5
5.	Check the fuses, circuit breakers, or manual disconnects to be sure they are set correctly.			6
6.	Does the 120-v wiring match the wiring diagram?	9	7	
7.	Fix the problem.			8
8.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
9.	Do you have 120v at the primary leads P1 and P2 on the panel mount terminal block TB located on the right side of the control board?	14	10	
10.	Do you have 120v to the panel mount terminal block TB located on the right side of the control box?	11	12	
11.	Check all connections at the panel mount terminal block TB and replace if necessary.			8
12.	Turn OFF the power.			13
13.	Check the continuity of the power supply leads and the door switch.			7
14.	Do you have 24v between SEC-1 and SEC-2 on the furnace control board?	16	15	
15.	Replace the transformer.			8
16.	Do you have 24v between R and C on the furnace control board?	18	21	
17.	Replace the furnace control board.			8
18.	Do you have 24v between W and C on the furnace control board?	59	19	

STEP		YES	NO	GO TO
19.	Double-check to see that the thermostat is calling for heat.			20
20.	You have a defective thermostat or a break in the wiring between the thermostat and the furnace.			7
21.	Turn OFF the power.			22
22.	Remove the 24-v circuit breaker and make sure it is reset.			23
23.	Do you have continuity across the 24-v circuit breaker?	25	24	
24.	Replace the 24-v circuit breaker.			8
25.	Reinstall the 24-v circuit breaker and reset the power.			26
26.	Does the 24-v circuit breaker trip?	27	45	
27.	Disconnect furnace control board connectors PL6, PL7, and R thermostat terminal lead and reset the 24-v circuit breaker.			28
28.	Does the 24-v circuit breaker trip?	29	32	
29.	Replace the 24-v circuit breaker.			30
30.	Does the new 24-v circuit breaker trip?	17	31	
31.	Reconnect connectors PL6, PL7, and R thermostat terminal leads.			8
32.	Reconnect connector PL6.			33
33.	Does the 24-v circuit breaker trip?	34	38	
34.	Disconnect connector PL4 and reset the 24-v circuit breaker.			35
35.	Does the 24-v circuit breaker trip?	36	37	
36.	You have a short circuit in the blower harness or the blower adaptor harness. Repair or replace it.			8
37.	Replace the blower motor, MTR2.			8
38.	Reconnect connector PL7.			39
39.	Does the 24-v circuit breaker trip?	41	40	
40.	You have a defective thermostat or a short in the wiring between the thermostat and the furnace.			7
41.	Disconnect inducer controller connector PL2 and reset the 24-v circuit breaker and reconnect the R thermostat terminal leads.			42
42.	Does the 24-v circuit breaker trip?	43	44	
43.	You have a short circuit between connector PL2 and PL7 or a short in the limit switch circuit.			7
44.	Replace the inducer controller.			8
45.	Observe the operation of the furnace in heating and cooling mode. The heating cycle needs to run for at least 8 minutes.			46
46.	Does the furnace operate properly in the heating cycle?	47	48	
47.	Does the furnace operate properly in the cooling cycle?	64	65	
48.	Does the 24-v circuit breaker trip?	49	54	
49.	Disconnect gas valve connector PL10 and reset the 24-v circuit breaker.			50
50.	Recycle the furnace, and observe its operation for 8 minutes.			51
51.	Does the 24-v circuit breaker trip?	53	52	
52.	Replace the gas valve GV.			8
53.	You have a short in the main wiring harness. Repair or replace it.			8
54.	Does the furnace alternately cycle the inducer and blower motor?	55	56	
55.	The sparker leads are reversed or there is a direct short in either the ballast resistor, the IID circuit, or the pressure switch circuits. Note which event occurs last to determine where the short is.			7
56.	Does the furnace keep going through a self-test sequence after running properly until the blower is energized?	57	58	
57.	There is a direct short in the accessory circuit.			7
58.	The pilot harness wires in the burner box may be pinched. This can cause an intermittent short circuit. Also, check the high-voltage lead from spark generator SG to the pilot PIL for proper connection.			7
59.	Does the furnace even respond to the call for heat?	62	60	
60.	Turn the power OFF.			61
61.	Press down on the Eprom chip and make sure it is properly seated to the furnace control board. If it is replace, the furnace control board.			7
62.	Does the furnace alternately cycle the inducer and blower motor?	55	63	
63.	Does the furnace keep going through a self-test sequence after running properly until the blower is energized?	57	67	
64.	Check the outdoor unit contactor. Failure to pull in can cause excessive current draw on the low-voltage circuit. This can be an intermittent problem.			7
65.	Does the 24-v circuit breaker trip?	66	64	

STEP		YES	NO	GO TO
66.	You have a defective thermostat or a short in the wiring between the thermostat and the outdoor unit.			7
67.	Does the furnace ever abruptly go through a self-test sequence during low- or high-fire operation?	58	68	
68.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS. If this problem persists on an intermittent basis, replace the furnace control board. If the problem still persists on an intermittent basis after replacing the furnace control board, go to the page number indicated in the index for the section covering ELECTRICAL NOISE AND INTERFERENCE.			INDEX

NOT ENOUGH COOLING AIRFLOW—Generally, this indicates the Y thermostat lead is not properly connected.

STEP		YES	NO	GO TO
1.	Remove the blower door and depress the door switch. Use a piece of tape to hold it closed. Wait 30 sec for self-test before proceeding to the next step.			2
2.	Make sure thermostat is calling for cooling. If thermostat lead G is not connected, jumper across thermostat terminals R and G.			3
3.	Make sure thermostat fan control is in the AUTO position if equipped.			4
4.	Do you have 24v across Y and C on the furnace control board?	8	5	
5.	You have a defective thermostat, or a break in the wiring between the thermostat and the furnace, or the Y thermostat terminal is not wired to the thermostat.			6
6.	Fix the problem.			7
7.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
8.	Is the cooling tonnage select switch RSW-2 set to the proper tonnage as required by the condensing unit?	10	9	
9.	Set the cooling tonnage select switch RSW-2 to the proper tonnage as required by the condensing unit.			7
10.	Disconnect the G thermostat lead or jumper if used.			11
11.	Does the blower motor turn OFF when the G thermostat lead is disconnected?	12	13	
12.	Replace the furnace control board.			7
13.	Observe the operation of the furnace in the cooling mode for 8 minutes.			14
14.	Does the furnace operate properly in the cooling mode?	15	25	
15.	Disconnect the R thermostat lead. Wait at least 90 sec before proceeding to the next step.			16
16.	Put set-up switch SW-1 in the ON position.			17
17.	Record faults listed in fault history.			18
18.	Has a fault 44 or 41 occurred?	22	19	
19.	Are LED's 3 and 4 flashing a Code 11?	20	21	
20.	Make sure outdoor unit is properly charged. If it is, go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS. If this problem persists on an intermittent basis, replace the furnace control board. If the problem still persists on an intermittent basis after replacing the furnace control board, go to the page number indicated in the index for the section covering ELECTRICAL NOISE AND INTERFERENCE.			INDEX
21.	Go to the page number indicated in the index for the section the first FAULT CODE FLASHED.			INDEX
22.	Does the unit have an electronic air cleaner (EAC)?	23	24	
23.	Go to the page number indicated in the index for the section covering ELECTRICAL NOISE AND INTERFERENCE.			INDEX
24.	Go to the page number indicated in the index for the section covering FAULT CODE 41.			INDEX
25.	Disconnect the R thermostat lead. Wait at least 90 sec before proceeding to the next step.			26
26.	Put set-up switch SW-1 in the ON position.			27
27.	Are any LED's flashing?	28	30	

28.	Record faults listed in fault history.			29
29.	Has a fault 44 or 41 occurred?	24	22	
30.	Press down on the Eprom chip and make sure it is properly seated to the furnace control board. If it is properly seated, replace the furnace control board.			6

HIGH-FIRE TEMPERATURE RISE TOO LOW (COLD BLOW)—Generally, this indicates the HIGH/LOW solenoid in gas valve GV has failed or the furnace is extremely underfired.

STEP		YES	NO	GO TO
1.	Turn OFF the power and remove the blower door. Make sure the thermostat is NOT calling for heat.			2
2.	Depress the door switch. Use a piece of tape to hold it closed. Wait 30 sec for self-test before proceeding to the next step.			3
3.	Set the thermostat to call for heat or jumper the R and W thermostat terminals.			4
4.	When the green LED4 is ON solid, clock the low-fire gas rate. You have 6 minutes on this first "call for heat." On propane installations, check the manifold pressure.			5
5.	When the yellow LED3 is ON solid, clock the high-fire gas rate. On propane installations check the manifold pressure.			6
6.	Is the high-fire rate approximately the same as the low-fire rate?	7	13	
7.	Do you have 24vac across gas valve terminal PL10-1 and C on the furnace control board during high fire?	10	8	
8.	You have an open wire or bad terminal on the brown wire from the high-pressure switch to the gas valve GV. Repair it or replace the harness.			9
9.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
10.	Do you have 24vac across gas valve terminal PL10-1 and PL10-4?	12	11	
11.	You have an open wire or bad terminal on the green wire between the 3-way splice and the gas valve GV. Repair it or replace the harness.			9
12.	Replace the gas valve.			9
13.	Is the high-fire rate within 2 percent of that specified on the rating plate?	15	14	
14.	Ensure the gas inlet pressure and burner orifice are correct. Then adjust the gas valve to the proper rate. If it cannot be adjusted to the proper rate, replace the gas valve.			9
15.	Check outdoor condensing unit for operation during heating cycle. This can happen if the outdoor Y thermostat lead is wired through the accessory relay ACCR.			16
16.	Check temperature rise with blower door in place. Temperature rise should be mid-range or slightly higher than midpoint of range stated on furnace rating plate. If return temperature is below 60° F, condensation may form on heat exchangers. If left uncorrected, failure will result.			17
17.	Check return air ducts in unheated spaces for leaks.			9

LED's 1, 2, 3, or 4 ON SOLID (Solid means on continuously)

•Red LED1 on solid indicates the furnace is operating in emergency heat.

•Red LED2 on solid indicates the microprocessor malfunctioned.

•Yellow LED3 on solid indicates the furnace is operating in high fire.

•Green LED4 on solid indicates the furnace is operating in low fire.

•Red LED1 and 2 both on solid indicates the microprocessor malfunctioned and the furnace is operating in emergency heat.

STEP		YES	NO	GO TO
1.	Remove the blower door and depress the door switch. Use a piece of tape to hold it closed. Wait 30 sec for self-test before proceeding to the next step.			2
2.	Make sure the thermostat is calling for heat or jumper the R and W thermostat terminals.			3
3.	Is red LED1 ON?	4	8	
4.	Is set-up switch SW-4 labeled EMER HEAT in the ON position?	5	19	
5.	Put set-up switch SW-4 labeled EMER HEAT in the OFF position.			7
6.	Replace the furnace control board.			7
7.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
8.	Is red LED2 ON?	9	35	
9.	Is set-up switch SW-6 in the OFF position for PROPANE GAS?	10	11	
10.	Put set-up switch SW-6 in the ON position for NATURAL GAS because when in the OFF position, emergency heat is disabled.			3
11.	Do you have less than 21v between R and C on the furnace control board?	12	33	
12.	Do you have less than 102v at the primary leads P1 and P2 on the panel mount terminal block TB located on the right side of the control box?	13	15	
13.	Make sure the wire gage between the main fuse box and the furnace complies with the wire size specification in the Installation, Start-up and Operation Instructions.			14
14.	Fix the problem.			7
15.	Disconnect the R thermostat lead.			16
16.	Is red LED2 ON?	17	18	
17.	Replace the transformer.			7
18.	Check the thermostat wire gage between the furnace and the thermostat, and the furnace and the outdoor unit. It is recommended that AWG No. 18 "color coded" copper thermostat wire be used for lengths up to 100 ft. For wire lengths over 100 ft, use AWG No. 16 wire.			14
19.	Is red LED2 ON?	20	6	
20.	Disconnect all thermostat leads from the furnace control board.			21
21.	Put set-up switch SW-1 in the ON position and jumper the R, W, and Y thermostat terminals simultaneously.			22
22.	Does red LED2 turn OFF?	23	6	
23.	Put set-up switch SW-1 back in the OFF position.			24
24.	Turn OFF the power and reconnect the thermostat leads to the furnace control board.			25
25.	Turn ON the power.			26
26.	Does red LED2 turn back ON?	27	39	
27.	Disconnect all thermostat leads from the furnace control board.			28
28.	Put set-up switch SW-1 in the ON position and jumper the R, W, and Y thermostat terminals simultaneously until red LED2 turns OFF.			29
29.	Put set-up switch SW-1 back in the OFF position.			30
30.	Jumper the R and W thermostat terminals.			31
31.	Does red LED2 turn back ON?	6	32	
32.	Install isolation relays in the W and Y circuits per Fig. 6 in Appendix B or replace the thermostat.			7
33.	Do you have 24v between W and C on the furnace control board?	6	34	
34.	You have a defective thermostat or a break in the wiring between the thermostat and the furnace. Repair it and go back to Step 3.			3
35.	Was the red LED2 ON before you started Step 1?	37	36	
36.	Solid yellow LED3 indicates the furnace is in high fire and solid green LED4 indicates the furnace is in low fire.			7

STEP		YES	NO	GO TO
37.	Check the outdoor unit contactor. Failure to pull in can cause excessive current draw on the low-voltage circuit. This can be intermittent and may require extended operation to repeat problem. Isolating outdoor unit per Fig. 7 in Appendix B may solve problem.			38
38.	Check the thermostat wire gage between the furnace and the outdoor unit. It is recommended that AWG No. 18 "color coded" copper thermostat wire be used for lengths up to 100 ft. For wire lengths over 100 ft, use AWG No. 16 wire.			14
39.	Observe the operation of the furnace through a 10-minute heat cycle. Try to pinpoint where in the cycle red LED2 turns ON.			40
40.	Go to the step indicated below if the red LED2 turns ON when 1 of the following events occur: •High-pressure switch HPS makes. •Blower motor MTR2 turns ON. •The high-pressure switch HPS opens during the transition from high- to low-fire. •During low fire. •The high-pressure switch HPS makes during the transition from low- to high-fire. •During high fire. •Call for heat is satisfied. •Blower motor MTR2 turns OFF. •Red LED2 never comes ON.			41 49 41 49 41 49 64 49 75
41.	Ensure the high-voltage lead from spark generator SG is making proper connection to the pilot PIL and spark generator SG and the electrode on pilot is properly positioned.			42
42.	Ensure spark generator SG is properly grounded, ballast resistor is approximately 480 ohms, and ballast resistor RES is properly connected across spark generator terminals T1 and T2.			43
43.	Disconnect all thermostat leads from the furnace control board.			44
44.	Put set-up switch SW-1 in the ON position and jumper the R, W, and Y thermostat terminals simultaneously until red LED2 turns OFF.			45
45.	Put set-up switch SW-1 back in the OFF position.			46
46.	Jumper the R and W thermostat terminals.			47
47.	Does red LED2 turn back ON?	48	7	
48.	Replace the gas valve.			7
49.	Ensure the high-voltage lead from spark generator SG is making proper connection to the pilot PIL and spark generator SG and the electrode on pilot is properly positioned.			50
50.	Ensure spark generator SG is properly grounded, ballast resistor is approximately 480 ohms, and ballast resistor RES is properly connected across spark generator terminals T1 and T2.			51
51.	Disconnect all thermostat leads from the furnace control board.			52
52.	Put set-up switch SW-1 in the ON position and jumper the R, W, and Y thermostat terminals simultaneously until red LED2 turns OFF.			53
53.	Put set-up switch SW-1 back in the OFF position..			54
54.	Remove all accessory connections from the ACCR relay.			55
55.	Jumper the R and W thermostat terminals.			56
56.	Does red LED2 turn back ON?	6	57	
57.	If installation has an electronic air cleaner (EAC) and it is sparking continuously, clean it. If it was cleaned recently, make sure it is dry.			58
58.	Ensure that all wiring to the ACCR relay is not routed across the furnace control board.			59
59.	Ensure the furnace and accessories are properly grounded. If installation has an EAC, install an isolation relay between the ACCR relay and EAC. If a humidifier is hooked up to the ACCR relay, rewire the ACCR relay to switch 120v to a separate 24-v transformer supplying the humidifier.			60
60.	If installation has an EAC, relocate the aluminum mesh prefilter in the EAC cabinet between the EAC and the furnace. If this solves problem, put aluminum mesh filters on each side of the EAC.			61
61.	If installation has an EAC, install a 10-amp RFI filter as close to the EAC as possible on the 120-v lines. RFI filters are general purpose power line interference filters which can be found at most electronic supply houses.			62

STEP		YES	NO	GO TO
62.	Ensure the EAC and the furnace are on different branch circuits from the main fuse box.			63
63.	As a last resort, move the EAC further away from the furnace or replace it with a corporate product.			14
64.	Disconnect all thermostat leads from the furnace control board.			65
65.	Put set-up switch SW-1 in the ON position and jumper the R, W, and Y thermostat terminals simultaneously until red LED2 turns OFF.			66
66.	Put set-up switch SW-1 back in the OFF position.			67
67.	Jumper the R and W thermostat terminals.			68
68.	Does red LED2 turn back ON?	69	32	
69.	Disconnect the jumper from the R and W thermostat terminals.			70
70.	Put set-up switch SW-1 in the ON position and jumper the R, W, and Y thermostat terminals simultaneously until red LED2 turns OFF.			71
71.	Put set-up switch SW-1 back in the OFF position.			72
72.	Remove all accessory connections from the ACCR relay.			73
73.	Jumper the R and W thermostat terminals.			74
74.	Does red LED2 turn back ON?	6	57	
75.	Observe the operation of the furnace through a 4 minute cooling cycle. Does red LED2 turn ON?	76	83	
76.	Disconnect all thermostat leads from the furnace control board.			77
77.	Put set-up switch SW-1 in the ON position and jumper the R, W, and Y thermostat terminals simultaneously until red LED2 turns OFF.			78
78.	Put set-up switch SW-1 back in the OFF position.			79
79.	Reconnect only the outdoor unit to the Y and C terminals on the furnace control board.			80
80.	Jumper the R and Y thermostat terminals.			81
81.	Does red LED2 turn back ON?	82	32	
82.	Isolate the outdoor unit contactor with a separate 24-v supply or replace the outdoor unit contactor.			7
83.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS. If this problem persists on an intermittent basis, go to the page number indicated in the index for the section covering ELECTRICAL NOISE AND INTERFERENCE.			INDEX

11

NO FAULT HISTORY IN DISPLAY—This indicates no faults have occurred in the last 5 previous cycles or the fault history has been cleared by jumpering R, W, and Y thermostat leads simultaneously while set-up switch SW1 was in the ON position.

STEP		YES	NO	GO TO
1.	Remove the blower door and depress the door switch. Use a piece of tape to hold it closed.			2
2.	Is set-up switch SW1 in the ON position?	3	5	
3.	Put set-up switch SW1 in the OFF position.			4
4.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
5.	Jiggle set-up switch SW1 back and forth. If the fault code 11 continues to flash, replace the furnace control board.			4

BLOWER CALIBRATION LOCKOUT—This fault indicates that the blower motor speed calculated for low heat is either less than 300 rpm or greater than 1300 rpm on 2 successive attempts at calibration.

STEP		YES	NO	GO TO
1.	Turn OFF the power, wait 30 sec, then restore power. Reset the thermostat. Observe the operation of the furnace through a heating cycle. NOTE: Blower door must be in place.			2
2.	Does only a fault 44 occur?	39	6	
3.	The problem is excessive restriction in the air delivery system. Check filters and ductwork.			4
4.	Fix the problem.			5
5.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
6.	Does a fault 44 flash twice then flash 41?	9	7	
7.	Does a different fault code occur?	8	38	
8.	Go to the page number indicated in the index for the fault code flashed.			INDEX
9.	Turn OFF the power and remove the blower door.			10
10.	Are all pins and wire leads intact on the connectors between the furnace control board and the blower motor?	11	4	
11.	Depress the door switch. Use a piece of tape to hold it closed. Wait 30 sec for self-test before proceeding to the next step.			12
12.	Disconnect all thermostat leads from the furnace control board and jumper R and W thermostat terminals.			13
13.	Does the blower motor turn ON and come up to speed (400 to 500 rpm) before fault code flashes?	14	20	
14.	Disconnect the jumper wire across the R and W thermostat terminals. When the inducer shuts off, put set-up switch SW-4 labeled EMER HEAT in the ON position. NOTE: On propane installations, set-up switch SW-6 must be in the ON or NAT position for emergency heat to function. DO THIS ONLY WHEN TROUBLE-SHOOTING.			15
15.	Does the voltage increase from zero VDC to approximately 8 — 12 VDC across terminals PL6-2 (+) and PL6-3 (-) within 20 sec after the R and W thermostat terminals are jumpered?	16	17	
16.	Replace the furnace control board.			5
17.	Do you see approximately the same DC voltage across the orange (+) and violet (-) wire in connector PL4 as compared with terminals PL6-2 and PL6-3?	18	19	
18.	Replace the blower motor. If you have a 2-piece 1/3-hp ECM design, replace the blower motor and controller with a 1-piece 1/2-hp ICM design.			5
19.	You have an open wire or bad terminal on either the orange or violet wire between connectors PL4 and PL6. Repair it or replace the blower harness.			5
20.	Remove tape from door switch and shut power OFF at main disconnect.			21
21.	Does the blower wheel rub against the blower housing?	4	22	
22.	Does the blower wheel turn freely?	23	24	
23.	Is the blower wheel firmly mounted on the motor shaft?	25	4	
24.	Replace the blower motor. If you have a 2-piece 1/3-hp ECM design, replace the blower motor and controller with a 1-piece 1/2-hp ICM design. If you have an ICM motor design, inspect electronics portion of failed motor for water damage. If present, find source of water and fix. Check A-coil and/or humidifier.			5
25.	Disconnect the jumper wire across the R and W thermostat terminals.			26
26.	Turn power back ON. Depress the door switch. Use a piece of tape to hold it. Wait 30 sec before proceeding to the next step.			27
27.	Do you have 120v between B1 and B2 on the panel mount terminal block TB?	28	4	
28.	Do you have 120v between the black and white power lead at the blower motor MTR2?	30	29	

STEP		YES	NO	GO TO
29.	You have an open wire or bad terminal on either the black or white wire between the panel mount terminal block TB and the blower motor MTR2.			5
30.	Put set-up switch SW-4 labeled EMER HEAT in the OFF position.			31
31.	Do you see a voltage change of at least 6v dc across terminals PL6-1 (+) and PL6-5 (-) when the R and G thermostat terminals are jumpered?	32	16	
32.	Do you see approximately the same DC voltage across the red (+) and blue (-) wire in connector PL4 as compared to terminals PL6-1 and PL6-5?	34	33	
33.	You have an open wire or bad terminal on either the red or blue wire between connectors PL4 and PL. Repair it or replace the blower harness.			5
34.	Disconnect the jumper across the R and G thermostat terminals.			35
35.	Do you see a voltage change of at least 0.8v dc across terminals PL6-1 (+) and PL6-4 (-) when the R and G thermostat terminals are jumpered?	36	16	
36.	Do you see approximately the same dc voltage across the red (+) and yellow (-) wire in connector PL4 as compared to across terminals PL6-1 and PL6-4?	18	37	
37.	You have an open wire or bad terminal on either the red or yellow wire between connectors PL4 and PL6. Repair it or replace the blower harness.			5
38.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS. If this problem persists on an intermittent basis, replace the blower motor. If you have a 2-piece 1/3-hp ECM design, replace the blower motor and controller with a 1-piece 1/2-hp ICM design. If the problem still persists on an intermittent basis after replacing the blower motor, go to the page number indicated in the index for the section ELECTRICAL NOISE AND INTERFERENCE.			INDEX
39.	Turn OFF the power and remove the blower door. Depress the door switch. Use a piece of tape to hold it closed. Wait 30 sec for self-test before proceeding to the next step.			40
40.	Disconnect all thermostat leads from the furnace control board. If the blower motor is running, wait until it shuts off.			41
41.	Jumper the R and G thermostat terminals. Observe the operation of the furnace for the next 30 sec.			42
42.	Approximately 20 sec after energizing the G thermostat terminal, does the blower motor pause briefly (less than 1/2 sec)?	3	18	

13

HIGH-LIMIT LOCKOUT—This fault indicates the limit switch has tripped 10 times in a row in high fire or 3 times in a row in low fire.

NOTE: After 2 low-fire limit trips, the control is locked into the high heat mode, however, a third low heat cycle can be forced due to various abnormal reasons such as set-up switch SW-2 being in the ON position or excessive restriction in the air delivery system.

STEP		YES	NO	GO TO
1.	Turn OFF the power and remove the blower door. Make sure thermostat is NOT calling for heating or cooling.			2
2.	Depress the door switch. Use a piece of tape to hold it closed.			3
3.	Is set-up switch SW-2 in the ON position?	7	4	
4.	Put set-up switch SW-1 in the ON position.			5
5.	Is a fault 44 present in the fault history?	49	6	
	NOTE: Read codes until they repeat.			
6.	Put set-up switch SW-1 in the OFF position.			43
7.	Does the furnace have the proper limit switch, limit shield, and blower baffle (if used)? If so, are the limit switch, limit shield, and heat exchangers properly aligned?	11	51	
8.	Replace the limit switch.			10
9.	Replace the furnace control board.			10

STEP		YES	NO	GO TO
10.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
11.	Put set-up switch SW-2 in the ON position.			12
12.	Make sure the thermostat is calling for heat or jumper the R and W thermostat terminals.			13
13.	Is the furnace considerably overfired (10 percent or more)? Clock the rate; do not base it on the manifold pressure method.	14	15	
14.	Ensure the gas inlet pressure and burner orifice are correct. Then adjust the gas valve to the proper rate per the installation procedures. If it cannot be adjusted to the proper rate, replace the gas valve.			10
15.	Is the personality connector PL11 properly wired per the furnace model sizing chart on the wiring diagram?	56	16	
16.	Replace or rewire the personality connector.			10
17.	Does the installation have a bypass humidifier?	18	31	
18.	Is set-up switch SW-7 in the ON position?	20	19	
19.	Put set-up switch SW-7 in the ON position.			10
20.	Recycle the furnace with the blower door in place and record the temperature rise across the furnace 6 minutes after main burner ignition.			21
21.	Cycle thermostat OFF and wait until the blower shuts off.			22
22.	Remove the blower door and put set-up switch SW-7 in the OFF position.			23
23.	Recycle the furnace with the blower door in place and record the temperature rise across the furnace 6 minutes after main burner ignition.			24
24.	Is the temperature rise in Step 23 more than 10° F higher than the temperature rise in Step 20?	25	9	
25.	Cycle the thermostat OFF and wait until the blower shuts off.			26
26.	Remove the blower door and put set-up switch SW-7 in the ON position.			27
27.	Recycle the furnace with the blower door in place and record the temperature rise across the return air duct before and after the bypass.			28
28.	Is the temperature rise across the bypass greater than 15° F?	29	30	
29.	The bypass is oversized. Adjust damper or replace with properly sized bypass.			10
30.	Cycle the thermostat OFF and wait until the blower shuts off.			31
31.	Does the installation have modulating zone dampers?	32	8	
32.	Is set-up switch SW-5 in the ON position?	34	33	
33.	Put set-up switch SW-5 in the ON position.			10
34.	Make sure the thermostat is calling for heat or jumper the R and W thermostat terminals.			35
35.	Does the blower recalibrate every minute? Check by monitoring the dc voltage across terminals PL6-1 and PL6-5. If the dc voltage momentarily goes up to 12 vdc approximately every 60 sec after the furnace went to low fire, then the blower is recalibrating properly.	36	9	
36.	Disable the modulating zone damper system with all dampers in the open position, except the bypass damper. If the installation is equipped with a bypass damper, it should be in the closed position.			37
37.	Put set-up switch SW-2 in the OFF position. Reset the power and the thermostat. Monitor the manifold gas pressure while observing the furnace operation for 10 minutes. NOTE: The blower door must be in place.			38
38.	Does a fault 33 occur?	40	39	
39.	The problem is caused by the modulating zone damper system. Install a 2-stage thermostat interface kit and let the zone system modulate the gas flow. This kit is not required with 40YV/TV systems. If you still have a problem, check the zone system manufacturer's installation and troubleshooting guide for corrective action.			10
40.	While monitoring the manifold pressure in step 37, did it drop to low-fire manifold pressure during low-fire operation?	55	41	
41.	Replace the gas valve.			10
42.	Replace the blower motor and belly band. If you have a 2-piece 1/3-hp ECM design, replace the blower motor and controller with 1-piece 1/2-hp design. NOTE: Torque belly band screw to 80 in. lb (6.7 ft lb). DO NOT OVER-TIGHTEN!			10

STEP		YES	NO	GO TO
43.	Put set-up switch SW-3 in the ON position.			44
44.	Make sure the thermostat is calling for heat or jumper the R and W thermostat terminals.			45
45.	Does the blower motor turn on about 35 sec after the main burners ignite?	46	52	
46.	Is the furnace considerably overfired (10 percent or more)? Clock the rate; do not base it on the manifold pressure method.	47	48	
47.	Ensure the gas inlet pressure and burner orifice are correct. Then adjust the gas valve to the proper rate per the installation procedures. If it cannot be adjusted to the proper rate, replace the gas valve.			10
48.	Cycle the thermostat OFF and wait until the blower shuts off. Then put set-up switch SW-3 in the OFF position.			7
49.	Excessive restriction of airflow during locked in high-fire mode, caused a third low-fire cycle to occur (which indirectly caused the lockout).			50
50.	Relieve restriction. Check all dampers, filters, and return-air grilles for blockage. Put set-up switch SW-1 in the OFF position.			43
51.	Fix the problem.			10
52.	After the pilot proves, do you have 24v between connector terminal PL1-2 and thermostat terminal C on the furnace control board?	53	54	
53.	Do you have 24v between connector terminal PL7-6 and thermostat terminal C on the furnace control board?	9	54	
54.	The white wire on the circuit to terminal PL7-6 is not making a good connection. Repair or replace it.			10
55.	Is the temperature rise within $\pm 10^{\circ}$ F of the midpoint of the rise range?	8	42	
56.	Is the temperature rise within $\pm 10^{\circ}$ F of the midpoint of the rise range?	8	17	

14

PILOT-PROVING LOCKOUT —This fault indicates the pilot failed to prove in 5 minutes on 2 successive cycles.

STEP		YES	NO	GO TO
1.	Turn OFF the power and set the thermostat to the OFF position. Turn the power back ON and wait 30 sec for self-test then set the thermostat to call for heat. Observe the operation of the furnace through 2 heating cycles. NOTE: Observe each cycle for 8 minutes or until fault is flashed.			2
2.	Does the fault recur after the second cycle?	3	46	
3.	Does the pilot remain lit while the fault is flashing?	14	4	
4.	Remove the blower door and depress the door switch. Use a piece of tape to hold it closed.			5
5.	Put set-up switch SW-4 labeled EMER HEAT in the ON position. NOTE: On propane installations set-up switch SW-6 must be in the ON or NAT position for emergency heat to function. DO THIS ONLY WHEN TROUBLESHOOTING.			6
6.	Make sure the thermostat is calling for heat or jumper the R and W thermostat terminals. (See note in "Sequence of Operation" section).			7
7.	Does the pilot light or cycle?	36	8	
8.	Is the electrode properly positioned?	9	49	
9.	Do you have a strong spark at the pilot?	10	15	
10.	Are all the manual gas cocks in the ON position?	11	49	
11.	Is the pilot orifice free of restriction?	12	49	
12.	Do you have 24v between the gas valve connector terminal PL10-6 and C on the furnace control board?	13	34	
13.	Do you have 24v between the following gas valve connector terminals (PL10-6 and PL10-3) and (PL10-6 and PL10-4)?	14	35	
14.	Replace the gas valve.			48
15.	Do you have 24v between connector terminal PL1-5 and C on the furnace control board?	17	16	

STEP		YES	NO	GO TO
16.	Do you have 24v between connector terminal PL7-10 and C on the furnace control board?	51	50	
17.	Do you have 24v between spark generator terminal T3 and C on the furnace control board?	18	20	
18.	Check for cracks in the porcelain of the spark electrode and for breaks or shorts to ground in the high-voltage cable. Do you have 24v between spark generator terminal T2 and R on the furnace control board?	19	21	
19.	Replace the spark generator.			48
20.	Do you have 24v between connector terminal PL9-1 and C on the furnace control board?	23	22	
21.	The green wire to the spark generator is not making a good connection. Repair or replace it.			48
22.	The yellow wire to the pilot connector PL9 is not making a good connection. Repair or replace it.			48
23.	Do you have 24v between connector terminal PL8-1 and C on the furnace control board?	29	24	
24.	Do you have good connections on the yellow and green wires from the pilot?	25	49	
25.	Is the fusible link in the pilot harness assembly open?	26	28	
26.	Are there air leaks around the burner enclosure gasket?	49	27	
27.	Turn OFF the power.			52
28.	Replace the pilot.			48
29.	Do you have good connections from the yellow and green wires from the pilot?	30	49	
30.	Do you have 24v between connector terminal PL8-3 and C on the furnace control board?	31	28	
31.	Do you have 24v between connector terminal PL9-3 and C on the furnace control board?	32	33	
32.	The blue wire to the spark generator is not making a good connection. Repair or replace it.			48
33.	The green is not making a good connection. Repair or replace it.			48
34.	The blue wire to the gas valve is not making a good connection. Repair or replace it.			48
35.	One or both of the green wires to the gas valve is not making a good connection. Repair or replace it.			48
36.	Do you have 24v between gas valve connector terminal PL10-5 and C on the furnace control board?	38	37	
37.	The yellow wire to the gas valve is not making a good connection. Repair or replace it.			48
38.	Does the pilot cycle on and off?	39	40	
39.	Do you have proper incoming gas pressure?	14	49	
40.	Do you have flame contact on the pilot switch?	41	49	
41.	Do you have proper incoming gas pressure?	42	49	
42.	Adjust the pilot flame.			43
43.	Clean the pilot orifice.			44
44.	Reset the power and the thermostat.			45
45.	Do the main burners come on?	48	28	
46.	Does a different fault occur?	47	48	
47.	Go to the page number indicated in the index for the fault code flashed.			INDEX
48.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
49.	Fix problem.			48
50.	Replace the furnace control board.			48
51.	The yellow wire from terminal PL1-5 to terminal PL7-10 is not making a good connection. Repair or replace it.			48
52.	Replace the fusible link (make sure it is properly positioned), turn on the power, and observe the furnace operation for two 15-minute cycles.			53
53.	Does the fusible link open again?	55	54	
54.	Does a different fault occur?	47	48	
55.	You have a restriction in the heat exchangers. This may be caused by: • Reversed vent and combustion-air pipes. • Poor burner, manifold, or orifice alignment. • A leak somewhere between the primary and secondary heat exchangers.			49

INVALID MODEL SELECTION—Personality connector PL11 is either not connected or jumpered wrong.

STEP		YES	NO	GO TO
1.	Turn OFF the power and remove the blower door.			2
2.	Is the personality connector PL11 properly wired per the furnace model size chart on the wiring diagram?	5	3	
3.	Replace or rewire the personality connector.			4
4.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
5.	Depress the door switch. Use a piece of tape to hold it closed.			6
6.	Make sure thermostat is calling for heat or jumper the R and W thermostat terminals. See note in "Sequence of Operation" section.			7
7.	Will the furnace operate while flashing fault?	9	8	
8.	Replace the furnace control board.			4
9.	Are the personality plug wires making a good connection?	10	11	
10.	The furnace will operate acceptably. However, a model selection circuit failure has occurred and the furnace control board is defaulting to the last valid model selection. Board replacement is not necessary but this fault code will flash continuously.			4
11.	Fix poor terminal connection or replace personality connector.			4

SET-UP ERROR—This fault indicates that 1 or more set-up switches SW-1, SW-2, or SW-3 are ON when they should be OFF. The following combinations will cause the fault:

- Thermostat call with SW-1 ON
- SW-2 and SW-3 ON
- SW-1 and SW-2 ON
- SW-1 and SW-3 ON
- SW-1, SW-2, and SW-3 ON

STEP		YES	NO	GO TO
1.	Turn OFF the power and remove the blower door.			2
2.	Make sure the thermostat is NOT calling for heating or cooling. Disconnect all thermostat terminal leads to make sure.			3
3.	Is set-up switch SW-1 in the ON position?	4	6	
4.	Put set-up switch SW-1 in the OFF position.			5
5.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
6.	Is set-up switch SW-6 in the OFF position?	7	8	
7.	The propane option is not available with this furnace control board. This unit is only approved for natural gas and set-up switch SW-6 must be in the ON position.			5
8.	Are set-up switches SW-2 and SW-3 both in the ON position?	9	10	
9.	Put both set-up switches SW-2 and SW-3 in the OFF position.			5
10.	Replace the furnace control board.			5

23

COOLING CAPACITY ERROR—This fault indicates the cooling tonnage selected for the furnace model size is not within the allowable limits. If fault is flashing, unit will still operate but it will default to the closest allowable airflow. The 60 size and 3-ton 80 size furnace can deliver 1-1/2 to 3 tons of cooling airflow. The 3-1/2 ton 80 size furnace can deliver 1-1/2 to 3-1/2 tons of cooling airflow. The 100 size furnace can deliver 2-1/2 to 5 tons of cooling airflow. 100 size furnaces with a CESO130004 board can deliver 2 to 5 tons of cooling airflow.

STEP		YES	NO	GO TO
1.	Turn OFF the power and remove the blower door.			2
2.	Is the cooling tonnage select switch RSW-2 within the allowable limits?	5	3	
3.	Adjust the cooling tonnage select switch RSW-2 for the proper tonnage as required by the condensing unit.			4
4.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
5.	Is the furnace a 100 size?	8	6	
6.	The problem is in the cooling airflow selection circuit. The maximum cooling airflow for this unit will be delivered.			7
7.	Try adjusting rotary switch RSW-2 to a different setting and then back. If the fault continues to flash, replace the furnace control board.			4
8.	The problem is in the cooling airflow selection circuit. The minimum cooling airflow for this unit will be delivered.			9
9.	Try adjusting rotary switch RSW-2 to a different setting and then back. If the fault continues to flash, try 1 setting higher than needed. If the fault still continues to flash, replace the furnace control board.			4

24

ILLEGAL THERMOSTAT INPUT—This fault indicates that the Y and W thermostat terminals are both energized.

STEP		YES	NO	GO TO
1.	Turn OFF the power and remove the blower door.			2
2.	Depress the door switch. Use a piece of tape to hold it closed.			3
3.	Do you have 24v between thermostat terminals W - C and Y - C at the same time?	21	4	
4.	Disconnect the W thermostat lead from the furnace control board.			5
5.	Is fault 24 still flashing?	7	6	
6.	Install an isolation relay in the W thermostat circuit per Fig. 8 in Appendix B or replace the thermostat.			11
7.	Turn OFF the power.			8
8.	Remove connector PL7 and jumper PL7-1 to PL7-11 on the furnace control board.			9
9.	Reset the power.			10
10.	Does fault 24 recur?	22	12	
11.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
12.	Turn OFF the power and disconnect jumper from PL7-1 to PL7-11, then reconnect connector PL7.			13
13.	Disconnect connector PL1 and jumper PL1-8 to PL1-9 on the harness side going to the furnace control board. Reset the power.			14
14.	Does fault 24 recur?	15	16	
15.	Repair or replace the furnace control board harness; it has a short in it.			11
16.	Turn OFF power and disconnect jumper from PL1-8 to PL1-9 then reconnect connector PL1.			17

STEP		YES	NO	GO TO
17.	Disconnect connector PL2 and reset the power.			18
18.	Does fault 24 recur?	19	20	
19.	Repair or replace the main harness. It has a short in the wires to the inducer controller.			11
20.	Replace the inducer controller.			11
21.	Either the thermostat is miswired or there is a short in the thermostat wire. Fix the problem.			11
22.	Disconnect the Y thermostat lead from the furnace control board.			23
23.	Is fault 24 still flashing?	25	24	
24.	Install isolation relays in the W and Y thermostat circuits or replace the thermostat.			11
25.	Replace the furnace control board.			11

31

HIGH-PRESSURE SWITCH FAULT—This fault indicates the high-pressure switch is closed at "call for heat," during low-fire operation, or fails to close after "call for heat," or opens during high-fire operation.

STEP		YES	NO	GO TO
1.	Turn OFF the power, remove the blower door, and disconnect the R thermostat lead.			2
2.	Depress the door switch. Use a piece of tape to hold it closed.			3
3.	Is the inducer motor running?	4	5	
4.	Are the inducer and blower motor running?	13	24	
5.	Set the thermostat to call for heat or jumper the R and W thermostat terminals.			6
6.	Observe the operation of the furnace through a heating cycle.			7
7.	Does the fault recur?	11	8	
8.	Does a different fault occur?	9	10	
9.	Go to the page number indicated in the index for the fault code flashed.			INDEX
10.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
11.	Does the fault occur within 5 sec after a call for heat?	12	17	
12.	Do you have 24v between the N.O. (Normally Open contact) on the high-pressure switch and C on the furnace control board?	14	46	
13.	Replace the furnace control board.			10
14.	Is the high-pressure switch wired correctly?	16	15	
15.	Rewire the high-pressure switch per the wiring diagram.			10
16.	Replace the pressure switch assembly.			10
17.	Does the high-pressure switch make, then break several times before faulting out?	32	18	
18.	Does the fault occur before the main burners ignite?	19	38	
19.	Do you have 24v between C (Common) on the high-pressure switch and C on the furnace control board?	21	20	
20.	The orange wire to the high-pressure switch is not making a good connection. Repair or replace it.			10
21.	Do you have at least 0.75-in. wc pressure drop (1.38 in. wc on downflow furnaces) across the heat exchangers when the fault occurs? Determine this by connecting 1 side of slope manometer with a T to the collector box pressure tap. Connect the other side with a T to the gas valve air pressure fitting. Refer to the applicable pressure-check diagram in Appendix C.	33	22	
22.	Is the inducer motor rotating in the direction indicated on the inducer housing?	26	23	
23.	Does the wiring on connector PL3 match the wiring diagram?	24	25	
24.	Replace the inducer controller.			10
25.	Fix the problem.			10
26.	Turn OFF the power.			27
27.	Is the inducer blower wheel OKay?	29	28	
28.	If possible, replace the inducer blower wheel. Otherwise, replace the inducer motor assembly.			10
29.	Is there any frost build up on the combustion air inlet?	30	31	

STEP		YES	NO	GO TO
30.	The problem is caused by reversed vent and combustion-air pipes or some other moist air entering combustion-air pipe.			25
31.	You have excessive restriction in the combustion air or vent pipe.			10
32.	The problem is either a droop in the vent pipe or a clogged drain trap or line.			25
33.	Disconnect the R thermostat lead. Reset the power and wait 30 sec. Reconnect the R thermostat lead.			34
34.	Do you have 24v between connector terminal PL7-7 and C on the furnace control board when the fault occurs?	13	35	
35.	Turn OFF the power.			36
36.	Do you have continuity across terminal PL7-7 and N.O. (Normally Open contact) on the high-pressure switch?	16	37	
37.	The brown wire from the high-pressure switch to the furnace control board is not making a good connection. Repair the wire or replace the harness.			10
38.	Does the fault occur during the transition from high fire to low fire? This is the first 45 sec after green LED4 turns ON.	48	39	
39.	Do you have combustion oscillations?	40	61	
40.	Make sure perforated disk is in the combustion air vent inlet.			41
41.	Check pressure tubing going to the gas valve air pressure fitting for kinks.			42
42.	Check the leak limiting orifice located under the gas valve air pressure fitting for blockage.			43
43.	Ensure that the vent and combustion-air pipes are not reversed.			44
44.	Check the burner orifice size and alignment. Make sure diffuser plate is properly positioned and centered in respect to the perforated disk in the combustion air vent inlet.			45
45.	Add restriction to the combustion air pipe or lengthen it a few feet if possible.			10
46.	Do you have 24v between connector terminal PL7-7 and C on the furnace control board?	47	13	
47.	The main harness or control box harness is miswired.			25
48.	Reset the power and the thermostat. When the burners ignite, jumper PL9-1 to PL9-2.			49
49.	Does the fault recur?	58	50	
50.	Check the inlet gas pressure.			51
51.	Clean the pilot orifice.			52
52.	Is the pilot flame barely visible?	53	54	
53.	Increase the pilot flow. Turn pilot adjustment screw on gas valve CCW until pilot flame extends about 1 in. above the burner carry-over.			55
54.	Decrease the pilot flow. Turn pilot adjustment screw on gas valve CW until pilot flame reduces by 20 percent.			55
55.	Reset the power and the thermostat. Disconnect the jumper between PL9-1 and PL9-2.			56
56.	Does the fault recur?	57	10	
57.	Replace the pilot.			10
58.	Put set-up switch SW-4 labeled EMER HEAT in the ON position. Turn OFF the power and hook up a magnahelic to the gas valve outlet so you can monitor the manifold pressure in the next step. Then turn the power back ON. NOTE: On propane installations, set-up switch SW-6 must be in the ON or NAT position for emergency heat to function. DO THIS ONLY WHEN TROUBLESHOOTING.			59
59.	After the burners ignite, disconnect the N.O. (Normally Open contact) on the high-pressure switch. Does the manifold pressure make a smooth transition to low fire?	16	60	
60.	Replace the gas valve.			10
61.	Reset the power and the thermostat. When the burners ignite, jumper PL9-1 to PL9-2.			62
62.	Does the fault recur?	63	50	
63.	Turn OFF the power and disconnect the jumper between PL9-1 and PL9-2. Connect 1 side of a slope manometer with a T to the collector box pressure tap. Connect the other side with a T to the gas valve air pressure fitting. Refer to the applicable pressure check diagram. Turn the power back ON.			64
64.	Monitor the slope manometer. Does the pressure reading appear to be stable when the fault occurs?	65	66	

STEP		YES	NO	GO TO
65.	Replace the pressure switch assembly. If the problem persists, check wiring for an intermittent connection in the high-pressure switch circuit.			10
66.	Check for a droop in the vent pipe. If the problem persists, replace the inducer controller.			10

32

LOW-PRESSURE SWITCH FAULT—This fault indicates the low-pressure switch is closed at "call for heat," or fails to close after "call for heat," or opens during operation.

STEP		YES	NO	GO TO
1.	Turn OFF the power, remove the blower door, and disconnect the R thermostat lead.			2
2.	Depress the door switch. Use a piece of tape to hold it closed.			3
3.	Is the inducer motor running?	4	5	
4.	Are the inducer and blower motor running?	13	27	
5.	Set the thermostat to call for heat or jumper the R and W thermostat terminals.			6
6.	Observe the operation of the furnace through a heating cycle.			7
7.	Does the fault recur?	11	8	
8.	Does a different fault occur?	9	10	
9.	Go to the page number indicated in the index for the fault code flashed.			INDEX
10.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
11.	Does the fault occur within 5 sec after a call for heat?	12	17	
12.	Do you have 24v between the N.O. (Normally Open contact) on the low pressure switch and C on the furnace control board?	14	48	
13.	Replace the furnace control board.			10
14.	Is the low-pressure switch wired correctly?	16	15	
15.	Rewire the low-pressure switch per the wiring diagram.			10
16.	Replace the pressure-switch assembly.			10
17.	At the start of the cycle as the inducer is ramping up, does the low-pressure switch make, then break?	35	18	
18.	Does the fault occur 45 sec after the call for heat?	19	41	
19.	Do you have 24v between C (Common) on the low pressure switch and C on the furnace control board?	24	20	
20.	Do you have 24v between connector terminal PL7-5 and C on the furnace control board?	21	13	
21.	Turn OFF the power.			20
22.	Double-check continuity between C (Common) on the low-pressure switch and connector terminal PL7-5.			21
23.	The orange wire to the low-pressure switch is not making a good connection. Repair or replace it.			10
24.	Do you have at least 0.48-in. wc pressure drop (0.75-in. wc on downflow furnaces) across the heat exchangers when the fault occurs? Determine this by connecting 1 side of slope manometer with a T to the collector box pressure tap. Connect the other side with a T to the gas valve air pressure fitting. Refer to the applicable pressure-check diagram in Appendix C.	36	25	
25.	Is the inducer motor rotating in the direction indicated on the inducer housing?	29	26	
26.	Does the wiring on connector PL3 match the wiring diagram?	27	28	
27.	Replace the inducer controller.			10
28.	Fix the problem.			10
29.	Turn OFF the power.			30
30.	Is the inducer blower wheel OKay?	32	31	
31.	If possible, replace the inducer blower wheel. Otherwise, replace the inducer motor assembly.			10
32.	Is there any frost build up on the combustion air inlet?	33	34	
33.	The problem is caused by reversed vent and combustion-air pipes or some other moist air entering combustion air pipe.			28

STEP		YES	NO	GO TO
34.	You have excessive restriction in the combustion-air or vent pipe.			10
35.	The problem is either a droop in the vent pipe or a clogged drain trap or line.			28
36.	Disconnect the R thermostat lead. Reset the power and wait 30 sec. Reconnect the R thermostat lead.			37
37.	Do you have 24v between connector terminal PL7-9 and C on the furnace control board when the fault occurs?	13	38	
38.	Turn OFF the power.			39
39.	Do you have continuity across terminal PL7-9 and N.O. (Normally Open contact) on the low-pressure switch?	16	40	
40.	The violet wire from the low-pressure switch to the furnace control board is not making a good connection. Repair the wire or replace the harness.			10
41.	Do you have combustion oscillations?	42	50	
42.	Make sure perforated disk is in the combustion-air vent inlet.			43
43.	Check pressure tubing going to the gas valve air pressure fitting for kinks.			44
44.	Check the leak-limiting orifice located under the gas valve air pressure fitting for blockage.			45
45.	Ensure that the vent and combustion-air pipes are not reversed.			46
46.	Check the burner orifice size and alignment.			47
47.	Add restriction to the combustion-air pipe or lengthen it a few ft if possible.			10
48.	Do you have 24v between connector terminal PL7-9 and C on the furnace control board?	49	13	
49.	The main harness or control box harness is miswired.			25
50.	Turn OFF the power. Connect 1 side of a slope manometer with a T to the collector box pressure tap. Connect the other side with a T to the gas valve air pressure fitting. Refer to the applicable pressure-check diagram. Then turn the power back on.			51
51.	Monitor the slope manometer. Does the pressure reading appear to be stable when the fault occurs?	52	53	
52.	Replace the pressure-switch assembly. If the problem persists, check wiring for an intermittent connection in the high-pressure switch circuit.			10
53.	Check for a droop in the vent pipe. If the problem persists, replace the inducer controller.			10

33

HIGH-LIMIT FAULT—This fault indicates the limit switch is open or the unit is operating in high heat only mode due to 2 successive low-fire limit trips.

STEP		YES	NO	GO TO
1.	Turn OFF the power, remove the blower door, and disconnect the R thermostat lead.			2
2.	Depress the door switch. Use a piece of tape to hold it closed.			3
3.	Is the fault flashing?	11	4	
4.	Set the thermostat to call for heat or jumper the R and W thermostat terminals.			5
5.	Observe the operation of the furnace for the next 10 minutes.			6
6.	Does the fault recur?	41	7	
7.	Does a different fault occur?	8	9	
8.	Go to the page number indicated in the index for the fault code flashed.			INDEX
9.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
10.	Consider this fault like a fault 13 and go to the page number indicated in the index for fault code 13.			INDEX
11.	Do you have 24v between terminals PL7-11 and C?	13	12	
12.	Replace the furnace control board.			9
13.	Do you have 24v between terminals PL1-8 and C?	15	14	
14.	You have an open red wire or bad terminal in the limit circuit. Repair or replace it.			9

STEP		YES	NO	GO TO
15.	Do you have 24v between terminals PL1-9 and C?	16	17	
16.	Do you have 24v between terminals PL7-1 and C?	12	14	
17.	Turn OFF the power.			18
18.	Do you have continuity across the limit switch?	23	19	
19.	Wait for the unit to cool, then recheck for continuity across the limit switch.			20
20.	Do you have continuity across the limit switch LS?	22	21	
21.	Replace the limit switch.			9
22.	Turn the power ON and wait 30 sec before proceeding to the next step.			4
23.	Check the wiring schematic to this unit. Does it have a flame roll-out switch FRS in the limit circuit between PL1-8 and PL1-9?	24	14	
24.	Do you have continuity across the flame rollout switch FRS?	32	25	
25.	Can the flame rollout switch FRS be reset?	27	26	
26.	Replace the flame rollout switch.			9
27.	Reset the flame rollout switch FRS, turn on the power and observe the furnace operation for two 15-minute cycles.			28
28.	Does the flame rollout switch trip again?	30	29	
29.	Does a different fault occur?	8	9	
30.	You have a restriction in the heat exchangers. This may be caused by: •Reversed vent and combustion-air pipes. •Poor burner, manifold, or orifice alignment. •Leak somewhere between the primary and secondary heat exchangers. •Leak in secondary heat exchangers.			31
31.	Fix the problem.			9
32.	Is this a downflow unit?	33	14	
33.	Do you have continuity across the auxiliary limit switch ALS?	14	34	
34.	Can the auxiliary limit switch ALS be reset?	36	35	
35.	Replace the auxiliary limit switch.			9
36.	Reset the auxiliary limit switch ALS, put the blower door in place, turn ON the power, and observe the furnace operation for 15 minutes.			37
37.	Does the fault recur?	39	38	
38.	Does a different fault occur?	8	9	
39.	Does the furnace have the proper limit switch, limit shield, blower baffle (if used), and auxiliary limit switch?	40	31	
40.	Change the limit switch first. If problem still exists, replace the auxiliary limit switch. One of these switches is out of calibration.			9
41.	Does the blower ever come on?	44	42	
42.	Wait for the unit to recycle. When the burners ignite, do you have 24v between terminals PL7-6 and C on the furnace control board?	12	43	
43.	The white wire from the pilot and gas valve to the furnace control board is not making a good connection. Repair the wire or replace the harness.			9
44.	Does the fault occur during low fire?	45	10	
45.	On the third burner cycle, the unit will run in the high-fire mode and flash the fault continuously. The unit is locked into the high-fire only mode.			10

34

PILOT-PROVING FAULT—This fault indicates the pilot failed to prove within 5 minutes or the pilot opened during the cycle.

STEP		YES	NO	GO TO
1.	Turn OFF the power and set the thermostat to the OFF position. Turn the power back ON and wait 30 sec then set the thermostat to call for heat. Observe the operation of the furnace through 2 heating cycles. NOTE: Observe each cycle for 8 minutes or until fault is flashed.			2
2.	Does the fault recur on each cycle?	8	3	

STEP		YES	NO	GO TO
3.	Does a lockout fault 14 occur on the second cycle?	4	5	
4.	Go to the page number indicated in the index for fault 14.			INDEX
5.	Do any faults occur on either cycle?	6	7	
6.	Go to the page number indicated in the index for the fault code flashed.			INDEX
7.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
8.	Do you have proper incoming gas pressure?	9	22	
9.	Turn OFF the power and jumper PL10-5 to PL10-6. Then turn the power back ON.			10
10.	Observe the unit for another cycle. Does the fault recur?	12	11	
11.	Replace the gas valve.			7
12.	Clean the pilot orifice.			13
13.	Is the pilot flame barely visible?	14	15	
14.	Increase the pilot flow. Turn pilot adjustment screw on gas valve CCW until pilot flame extends about 1 in. above the burner carryover.			16
15.	Decrease the pilot flow. Turn pilot adjustment screw on gas valve CW until pilot flame reduces by 20 percent.			16
16.	Reset the power and the thermostat. Disconnect the jumper between PL10-5 and PL10-6.			17
17.	Does the fault recur?	18	7	
18.	Is the white wire from the pilot making a good connection? NOTE: Check connection at wire terminals PL8-2 and PL9-2.	19	22	
19.	Are the vent and combustion-air pipes reversed?	22	20	
20.	Is the diffuser plate properly positioned?	21	22	
21.	Replace the pilot.			7
22.	Fix the problem.			7

41

BLOWER OUTSIDE VALID SPEED RANGE—This fault indicates that the blower motor speed cannot be maintained within 10 percent of the calculated speed over a 30-sec period or the blower motor speed is less than 300 rpm or greater than 1300 rpm for more than 10 sec.

STEP		YES	NO	GO TO
1.	Turn OFF the power, remove the blower door, and disconnect the R thermostat lead.			2
2.	Depress the door switch. Use a piece of tape to hold it closed.			3
3.	Set the thermostat to call for heat or jumper the R and W thermostat terminals.			4
4.	Observe the operation of the furnace for the next 8 minutes or until fault occurs.			5
5.	Does fault 44 flash twice then flash 41?	6	7	
6.	After about 10 minutes of operation, the furnace will lockout and flash FAULT CODE 12. Go to the page number indicated in the index for FAULT CODE 12.			INDEX
7.	Does only a fault 41 flash?	11	8	
8.	Does a different fault occur?	9	31	
9.	Go to the page number indicated in the index for the fault code flashed.			INDEX
10.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
11.	Does the fault occur during the transition from low fire to high fire? This is the first 45 sec after green LED4 turns OFF and yellow LED3 turns ON.	12	17	
12.	On motors with torque taps, check for proper settings. Normal settings are white on pin-1, and black on pin-10 unless used on 2 speed or variable-speed cooling systems. If the white tap is too high or the black tap is too low, this fault will occur. Some units may have a red tap. Ignore it because it will not cause this fault. If you have a variable-speed cooling system, refer to the variable-speed interface instructions for the proper settings.			13

STEP		YES	NO	GO TO
13.	If the torque tap settings are in the proper position, try setting white on pin-2 and black on pin-9.			14
14.	Reset the power and the thermostat.			15
15.	Does the fault recur?	16	10	
16.	Replace the blower motor. If have a 2-piece 1/3-hp ECM design, replace the blower motor and controller.			10
17.	Does the fault occur during the transition from high fire to low fire? This is the first 45 sec after yellow LED3 turns OFF and green LED4 turns ON.	12	18	
18.	Do you have 24v across thermostat terminals G and C?	19	22	
19.	Turn OFF the power. Disconnect the G thermostat lead. Then turn the power back ON.			20
20.	Does the fault recur?	22	21	
21.	Replace the furnace control board.			10
22.	Does the blower motor shut off abruptly and completely before the fault is signaled?	23	30	
23.	Turn OFF the power.			24
24.	Put set-up switch SW-4 labeled EMER HEAT in the ON position. NOTE: On propane installations set-up switch SW-6 must be in the ON or NAT position for emergency heat to function. DO THIS ONLY WHEN TROUBLESHOOTING.			25
25.	Reset the power and the thermostat.			26
26.	Check connectors PL4, PL5, PL6, B1, and B2. On applicable units also check PL13 and PL15.			27
27.	Does the motor operate intermittently as these connectors and wires are moved?	29	28	
28.	Does the blower motor shut off abruptly and completely?	30	21	
29.	Fix the problem.			10
30.	Replace the blower motor. If you have a 2-piece 1/3-hp ECM design, replace the blower motor and controller with a 1-piece 1/2-hp ICM design. If the problem still persists after replacing the blower motor, go to the page number indicated in the index for the section covering ELECTRICAL NOISE AND INTERFERENCE.			INDEX
31.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS. If this problem persists on an intermittent basis, replace the blower motor. If you have a 2-piece 1/3-hp ECM design, replace the blower motor and controller with a 1-piece 1/2-hp ICM design. If the problem still persists on an intermittent basis after replacing the blower motor, go to the page number indicated in the index for the section covering ELECTRICAL NOISE AND INTERFERENCE.			INDEX

42

INDUCER OUTSIDE VALID SPEED RANGE—This fault indicates that the inducer motor is not operating at the calculated rpm, or has not started within 10 sec after a “call for heat,” or is out of range when the pressure switches make.

STEP		YES	NO	GO TO
1.	Turn OFF the power, remove the blower door, and disconnect all the thermostat leads.			2
2.	Depress the door switch. Use a piece of tape to hold it closed.			3
3.	Jumper the R and W thermostat terminals.			4
4.	Observe the operation of the furnace for the next 8 minutes or until fault occurs.			5
5.	Does the fault recur?	9	6	
6.	Does a different fault occur?	7	66	
7.	Go to the page number indicated in the index for the fault code flashed.			INDEX
8.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
9.	Does the fault occur within 11 sec after a call for heat?	70	40	
10.	Do you have 120v between terminals L1 and L2 on terminal block TB?	12	11	

STEP		YES	NO	GO TO
11.	Replace the feed-through terminal block TB.			8
12.	Do you have 120v between terminals PL2-6 and PL2-3?	14	13	
13.	You have an open wire or bad terminal on either the black or white wire between the panel mount terminal block TB and the inducer controller.			5
14.	Are all pins and wire leads intact on the connectors between the furnace control board and the inducer motor?	16	15	
15.	Fix the problem.			8
16.	Turn OFF the power.			17
17.	Disconnect the jumper wire across the R and W thermostat terminals. Put set-up switch SW-4 labeled EMER HEAT in the ON position. NOTE: On propane installations, set-up switch SW-6 must be in the ON or NAT position for emergency heat to function. DO THIS ONLY WHEN TROUBLESHOOTING.			18
18.	Jumper the R and W thermostat terminals.			19
19.	Does the inducer motor turn on?	35	20	
20.	Does the inducer wheel rub against the inducer housing?	15	21	
21.	Turn OFF the power.			22
22.	Does the inducer wheel turn freely?	27	23	
23.	Disconnect the inducer motor connector PL3.			24
24.	Does the inducer wheel turn freely?	34	25	
25.	Replace the inducer motor assembly.			8
26.	Replace the furnace control board.			8
27.	Disconnect the jumper wire across the R and W thermostat terminals.			28
28.	Turn power back ON. Depress the door switch. Use a piece of tape to hold it closed. Wait 30 sec for self-test before proceeding to the next step.			29
29.	Do you see a voltage increase of approximately 1v dc across terminals PL7-2 (+) and PL7-4 (-) when the R and W thermostat terminals are jumpered?	30	26	
30.	Do you see approximately the same dc voltage across the brown (+) and yellow (-) wire in connector PL2 as compared to terminals PL7-2 and PL7-4?	32	31	
31.	You have an open wire or bad terminal on either the yellow or brown wire between connectors PL2 and PL7. Repair it or replace the harness.			8
32.	Turn OFF the power and disconnect connector PL3.			33
33.	Do you have continuity between pins 5 and 6, pins 4 and 3, and pins 2 and 3 on the inducer motor side of connector PL3?	34	25	
34.	Replace the inducer motor controller.			8
35.	Does the voltage increase from zero vdc to approximately 7 to 9 vdc across terminals PL2-2 (+) and PL2-1 (-) when the R and W thermostat terminals are jumpered?	36	34	
36.	Do you see approximately the same dc voltage across the brown (+) and orange (-) wires, terminals PL7-2 and PL7-3 compared to across terminals PL2-2 and PL2-1?	38	37	
37.	You have an open wire or bad terminal on the orange wire between connectors PL2 and PL7. Repair it or replace the harness.			8
38.	Disconnect the jumper wire across the R and W thermostat terminals. Then put set-up switch SW-4 labeled EMER HEAT in the OFF position.			39
39.	Does the inducer motor start turning within 8 sec after the R and W thermostat terminals are jumpered?	26	34	
40.	Does the fault occur a few sec after the low-pressure switch makes? NOTE: Check for 24v between the N.O. (Normally Open contact) on the low-pressure switch and C on the furnace control board to know when the low-pressure switch makes.	41	55	
41.	Is the inducer motor rotating in the direction shown on the inducer housing?	44	42	
42.	Is connection PL3 wired properly?	34	43	
43.	Repair the wiring or replace the inducer motor assembly.			8
44.	Turn OFF the power.			45

STEP		YES	NO	GO TO
45.	Disconnect the jumper wire across the R and W thermostat terminals. Put set-up switch SW-4 labeled EMER HEAT in the ON position. NOTE: On propane installations, set-up switch SW-6 must be in the ON or NAT position for emergency heat to function. DO THIS ONLY WHEN TROUBLESHOOTING.			46
46.	Jumper the R and W thermostat terminals.			47
47.	Do you have at least 0.85-in. wc pressure drop (1.45-in. wc on downflow furnaces) across the heat exchangers? Determine this by connecting 1 side of slope manometer with a T to the collector box pressure tap. Connect the other side with a T to the gas valve air pressure fitting. Refer to the applicable pressure-check diagram in Appendix C.	54	48	
48.	Turn OFF the power.			49
49.	Is the inducer blower wheel OKay?	51	50	
50.	If possible, replace the inducer blower wheel. Otherwise, replace the inducer motor assembly.			8
51.	Is there any frost build-up on the combustion air inlet?	52	53	
52.	The problem is caused by reversed vent and combustion-air pipes or some other moist air entering combustion-air pipe.			15
53.	You have excessive restriction in the combustion-air or vent pipe.			15
54.	Replace the pressure switch assembly.			8
55.	Does the fault occur a few sec after the high-pressure switch makes? NOTE: Check for 24v between the N.O. (Normally Open contact) on the high-pressure switch and C on the furnace control board to know when the high-pressure switch makes.	41	56	
56.	Does the fault always occur when the blower motor is energized?	26	57	
57.	Ensure the high-voltage lead from spark generator SG is making proper connection to the pilot PIL and spark generator SG and the electrode on pilot is properly positioned.			58
58.	Ensure spark generator SG is properly grounded, ballast resistor is approximately 480 ohms, and ballast resistor RES is properly connected across spark generator terminals T1 and T2.			59
59.	Turn OFF the power.			60
60.	Disconnect the jumper wire across the R and W thermostat terminals. Put set-up switch SW-4 labeled EMER HEAT in the ON position. NOTE: On propane installations, set-up switch SW-6 must be in the ON or NAT position for emergency heat to function. DO THIS ONLY WHEN TROUBLESHOOTING.			61
61.	Jumper the R and W thermostat terminals.			62
62.	Observe the operation of the furnace for 8 minutes.			63
63.	Does the inducer motor run properly in the emergency heat mode? Refer to the "Sequence of Operation".	69	64	
64.	After the inducer motor quits running, turn OFF the power and disconnect PL3.			65
65.	Do you have continuity across pins 5 and 6 on the motor side of connector PL3?	34	25	
66.	Ensure the high-voltage lead from spark generator SG is making proper connection to the pilot PIL and spark generator SG and the electrode on pilot is properly positioned.			67
67.	Ensure spark generator SG is properly grounded, ballast resistor is approximately 480 ohms, and ballast resistor RES is properly connected across spark generator terminals T1 and T2.			68
68.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS. If this problem persists on an intermittent basis, go to the page number indicated in the index for the section covering ELECTRICAL NOISE AND INTERFERENCE.			INDEX
69.	Replace the furnace control board. If the problem still persists after replacing the furnace control board, go to the page number indicated in the index for the subsection covering ELECTRICAL NOISE AND INTERFERENCE.			INDEX
70.	Turn OFF the power and disconnect the jumper wire across the R and W thermostat terminals.			71
71.	Turn the power back ON. Depress the door switch and use a piece of tape to hold it down. Wait 30 sec for self-test before proceeding to the next step.			72
72.	Disconnect the collector box tube to the pressure switch assembly.			73

STEP		YES	NO	GO TO
73.	Does fault code 42 occur within 11 sec after the R and W thermostat terminals are jumpered?	74	75	
74.	Reconnect collector box tube to the pressure switch assembly.			10
75.	Reconnect collector box tube to the pressure switch assembly.		41	

43

RPM RATIO OUT OF RANGE—This fault indicates the inducer rpm ratio between the low- and high-pressure switch makes points during purge is less than 0.65 or greater than 0.90.

STEP		YES	NO	GO TO
1.	Turn OFF the power, remove the blower door, and disconnect the all thermostat leads.			2
2.	Depress the door switch. Use a piece of tape to hold it closed.			3
3.	Jumper the R and W thermostat terminals.			4
4.	Observe the operation of the furnace for the next 8 minutes or until fault occurs.			5
5.	Does the fault recur?	9	6	
6.	Does a different fault occur?	7	8	
7.	Go to the page number indicated in the index for the fault code flashed.			INDEX
8.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
9.	Is the drain trap or line clogged?	10	11	
10.	Fix the problem.			8
11.	Are the pressure switches wired correctly?	13	10	
12.	Replace the pressure switch assembly.			8
13.	Do you have 24v between C (common) on the low-pressure switch and C on the furnace control board?	15	14	
14.	The orange wire to the low-pressure switch is not making a good connection. Repair wire or replace harness.			8
15.	Disconnect the jumper wire across the R and W thermostat terminals. Reset the power and wait 30 sec. Reconnect the jumper across the R and W terminals.			16
16.	Do you have 24v between connector terminal PL7-9 and C on the furnace control board when the fault occurs?	21	18	
17.	Replace the furnace control board.			8
18.	Turn OFF the power.			19
19.	Do you have continuity across terminal PL7-9 and N.O. (Normally Open contact) on the low-pressure switch?	12	20	
20.	The violet wire from the low-pressure switch to the furnace control board is not making a good connection. Repair the wire or replace the harness.			8
21.	Disconnect the jumper wire across the R and W thermostat terminals. Reset the power and wait 30 sec. Disconnect the BROWN wire from the N.O. (Normally Open contact) on the high-pressure switch. Reconnect the jumper across the R and W terminals.			22
22.	Does a fault 32 occur?	17	23	
23.	Reconnect the brown wire to the N.O. (Normally Open contact) on the high-pressure switch.			24
24.	Add some restriction to the combustion air pipe. If the fault still occurs, replace the pressure switch assembly.			8

BLOWER CALIBRATION FAULT—This fault indicates that the blower motor speed calculated is below 300 or above 1300 rpm. The unit will default to either mode if possible.

STEP		YES	NO	GO TO
1.	Turn OFF the power, wait 30 sec then restore power. Reset the thermostat. Observe the operation of the furnace through a heating cycle. NOTE: Blower door must be in place.			2
2.	Does a fault 44 flash twice then flash 41?	3	4	
3.	Eventually the furnace will lockout on FAULT CODE 12 given enough time. Go to the page number indicated in the index for FAULT CODE 12.			INDEX
4.	Does only a fault 44 occur?	8	5	
5.	Does a different fault occur?	6	7	
6.	Go to the page number indicated in the index for the fault code flashed.			INDEX
7.	Go to the page number indicated in the index for the CLEANUP AND START-UP INSTRUCTIONS.			INDEX
8.	Does the unit operate while flashing fault 44?	9	3	
9.	You have excessive restriction in the air delivery system. Furnace will operate in low heat only. Check filter and ductwork.			10
10.	Fix the problem.			7

CLEANUP AND START-UP INSTRUCTIONS

1. Start the furnace using the procedure outlined on the Lighting Instructions attached to the furnace. Observe the operation of the furnace through at least 2 complete heating cycles controlled from the room thermostat. Observe each cycle for 8 minutes or until a fault is flashed. If a fault occurs, refer to the index.
2. While these cycles are running, check the thermostat heat anticipator setting, the gas input rates, and the temperature rises. These procedures are outlined in the Installation Instructions.
3. Check the operation of the safety devices; the pressure switches, limit switches, and flame rollout switch.
4. Put set-up switch No. 1, SW1, in the ON position and jumper R, W, and Y terminals on the control board simultaneously to clear the fault history.
5. Put set-up switch No. 1, SW1, in the OFF position.
6. Put all set-up switches in their proper positions.
NOTE: On propane installations set-up switch SW-6 must be in the OFF or propane position.
7. Remove the tape from the door switch.
8. Replace the thermostat lead (if necessary).
9. Set the thermostat in the AUTO position, calling for heat.
10. Make sure the temperature setting on the thermostat is **normal**.
11. Replace the control access doors and clean up.

APPENDIX A

WIRING SCHEMATICS

Match the schematic in the unit with the schematic in Appendix A. If you have schematic 313652-401, use schematic 317278-401. It is very similar. If you have schematic 311179-401, use the "Sequence of Operation" provided in the Installation Instructions with the unit.

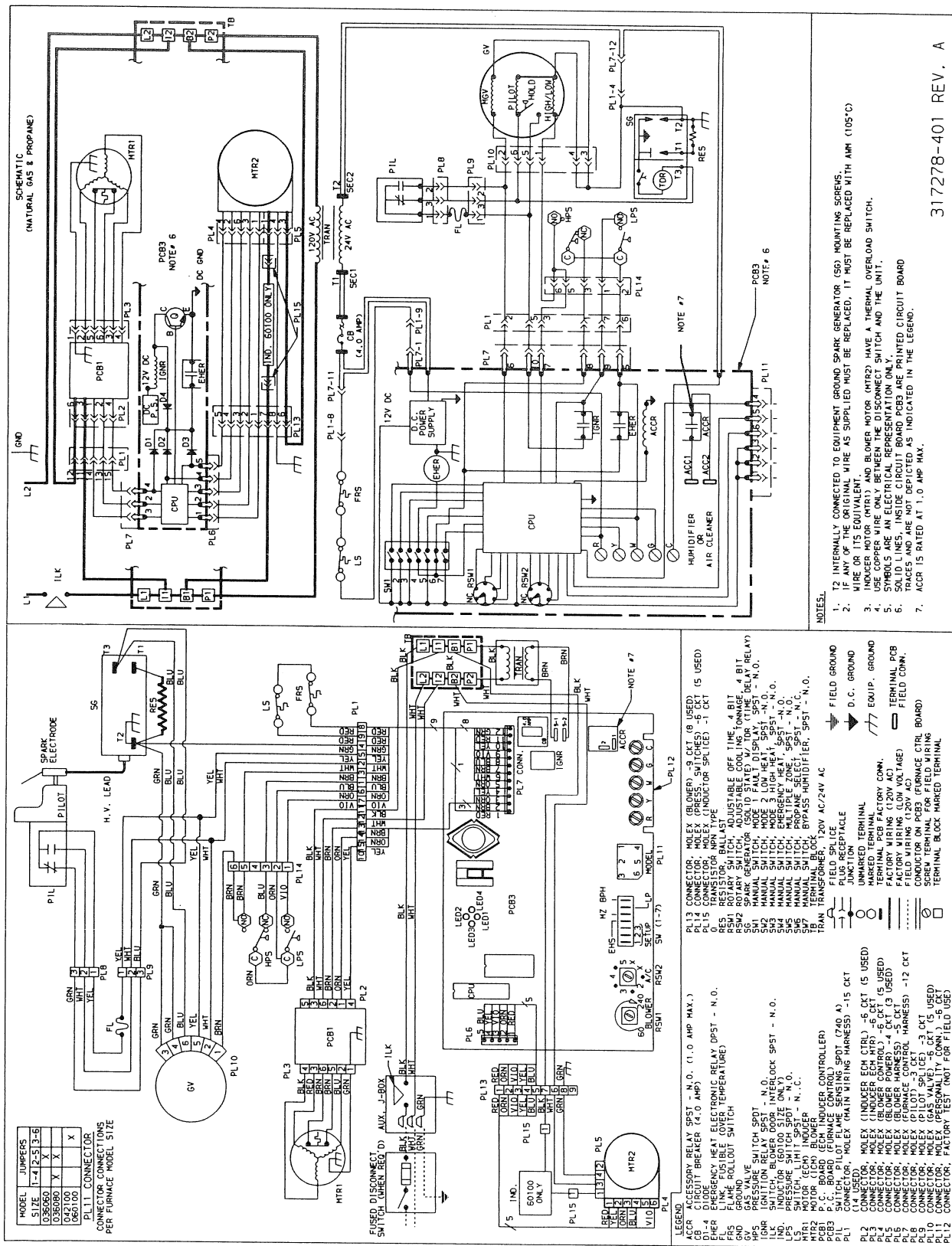


Fig. 3—Wiring Schematic

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317278-401 REV. A

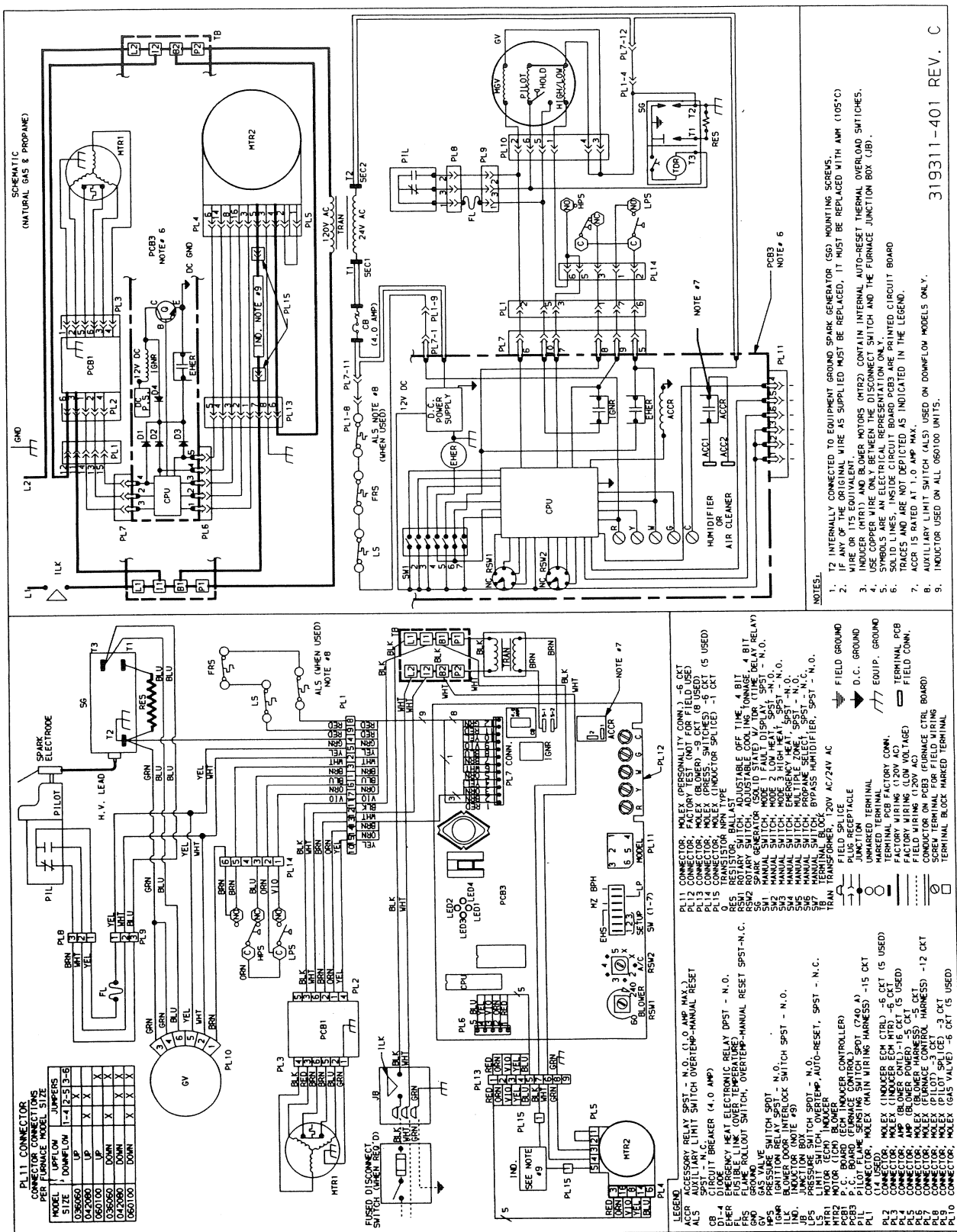
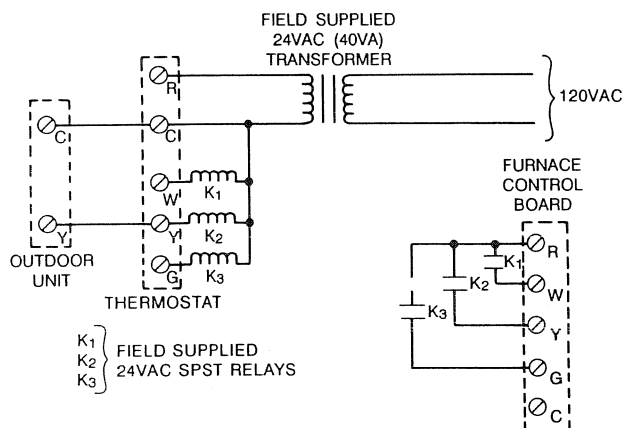


Fig. 4—Wiring Schematic

A92410

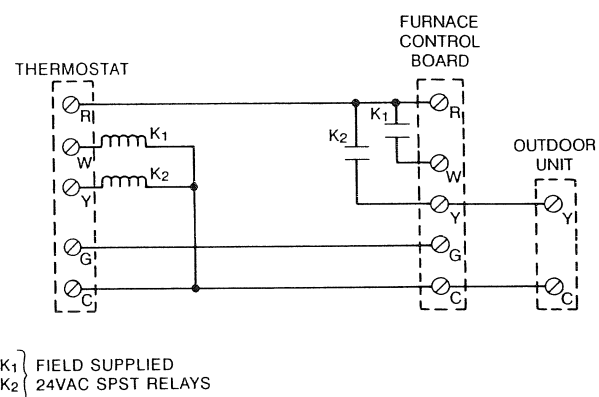
APPENDIX B

ISOLATION CIRCUITS



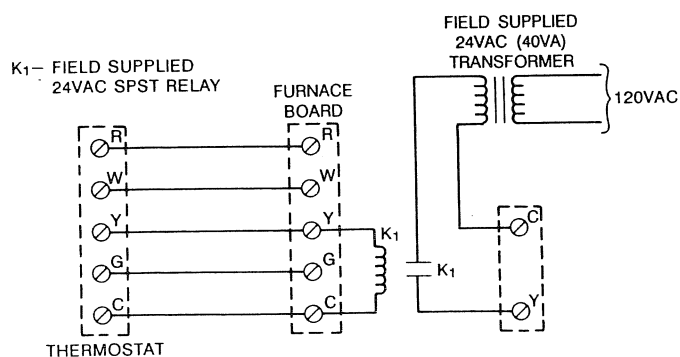
A92412

Fig. 5—Isolation of Thermostat With a Separate 24-v Supply



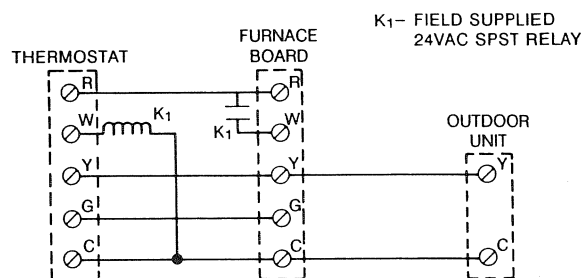
A92413

Fig. 6—Isolation of W and Y Thermostat Circuits



A92414

Fig. 7—Isolation of Outdoor Unit With a Separate 24-v Supply



A92415

Fig. 8—Isolation of W Thermostat Circuit

APPENDIX C

PRESSURE-CHECK DIAGRAMS

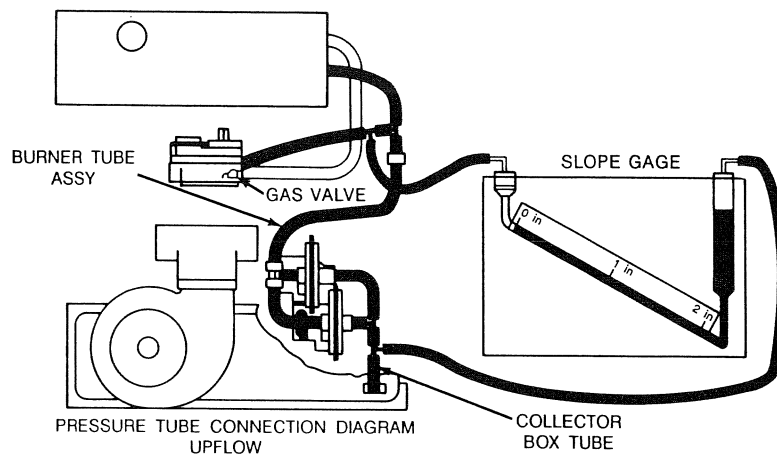


Fig. 9—Pressure Check Diagram for Upflow Units With Oldstyle Pressure Switch Assembly

A92416

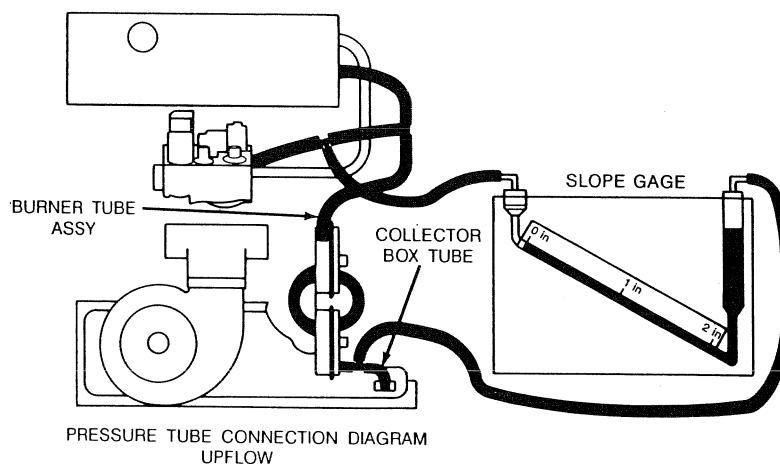


Fig. 10—Pressure Check Diagram for Upflow Units With Newstyle Pressure Switch Assembly

A92417

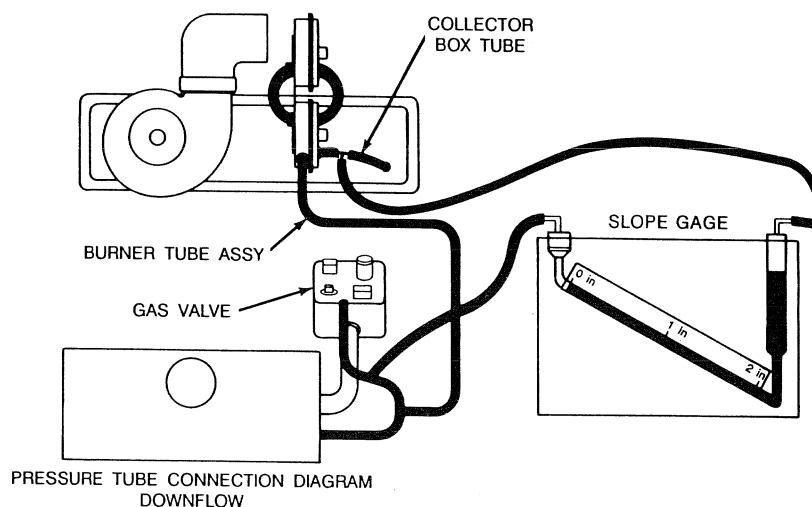


Fig. 11—Pressure Check Diagram for Downflow Units

A92418

APPENDIX D

OPERATIONAL TIMING CHART

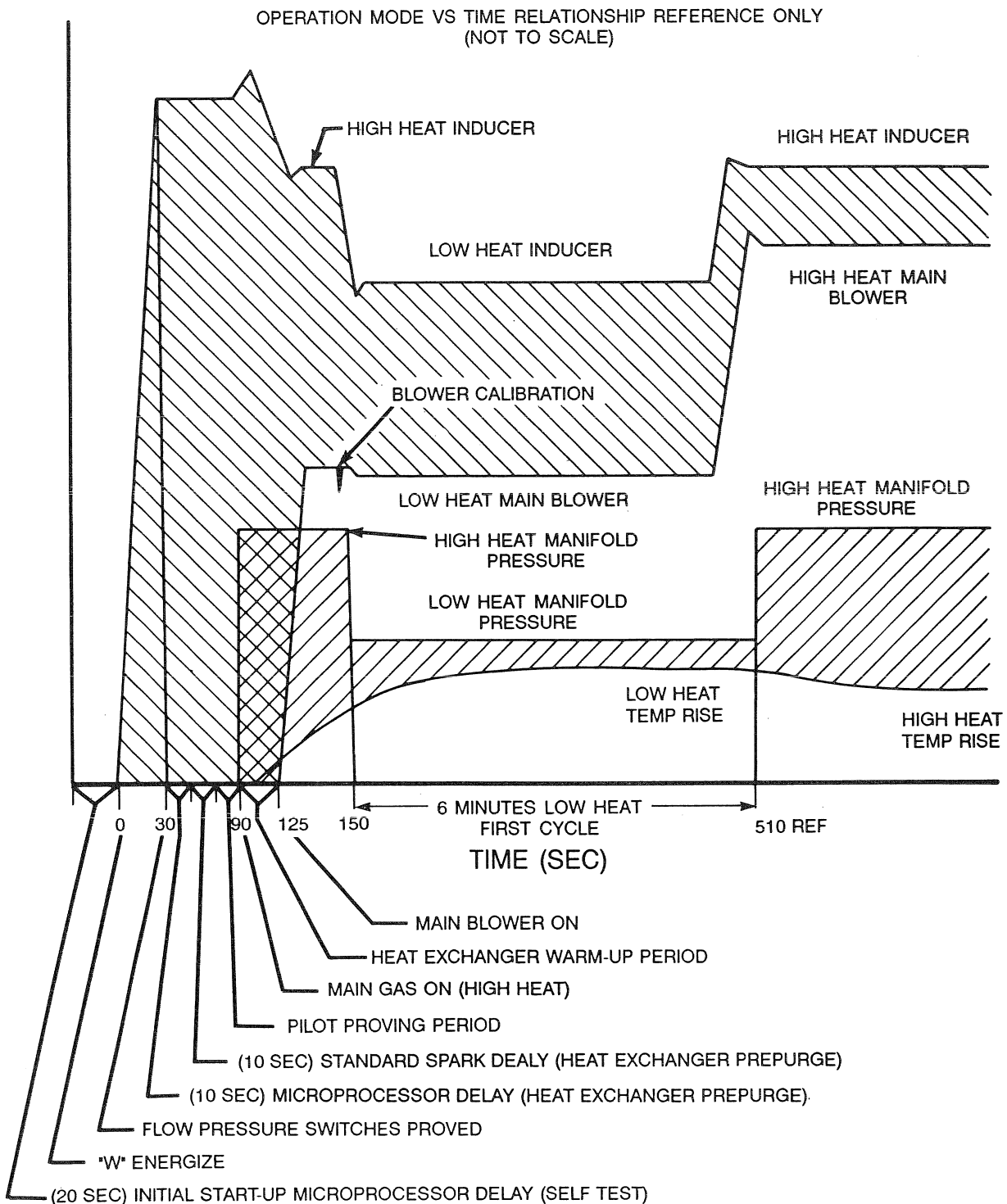


Fig. 12—Operational Timing Chart

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.