



58SXB Deluxe Gas-Fired Condensing Furnaces

Installation, Start-Up and Service Instructions

For Sizes 060, 080, and 100 (130 Series)

NOTE: Read these instructions carefully and completely before installing the furnace.

INTRODUCTION

Before installing the furnace, refer to "Procedure for Deluxe Gas-Fired Condensing Furnaces" (packaged with the equipment) for information concerning combustion, venting, piping, and other standard installation practices.

Reference should also be made to the regulations of the servicing gas supplier and the local building, heating, plumbing, or other codes in effect in the area in which the installation is made.

In the United States, refer to the current edition of the National Fuel Gas Code NFPA No. 54-1988/ANSI Z223.1-1988. Installations made in Canada must comply with the current edition of the National Standard of Canada CAN/CGA-B149.1- and .2-M86 Natural Gas and Propane Gas Installation Codes, and must be in accordance with the provincial authorities having jurisdiction.

SAFETY CONSIDERATIONS

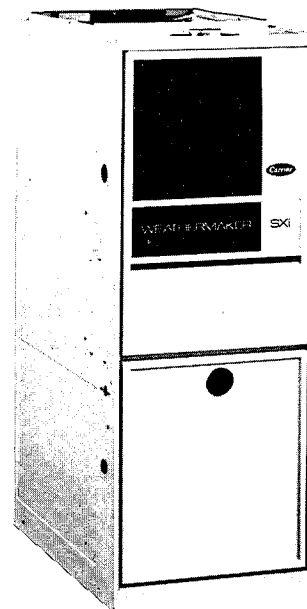
Installation and servicing of heating equipment can be hazardous due to gas and electrical components. Only trained and qualified personnel should install, repair, or service heating equipment.

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

Follow all safety codes. In the United States, follow all safety codes including the National Fuel Gas Code NFPA No. 54-1988/ANSI Z223.1-1988. In Canada, refer to the current edition of the National Standard of Canada CAN/CGA-B149.1- and .2-M86 Natural Gas and Propane Gas Installation Codes. Wear safety glasses and work gloves. Have fire extinguisher available during startup and adjustment procedures and service call.

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

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



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Fig. 1—Model 58SXB

Each Model 58SXB is shipped from the factory completely assembled with a variable speed direct drive blower, variable speed inducer motor wired and ready for an indoor heating installation. The furnace features a microprocessor control center programmed to ensure optimum performance and maximum heating and electrical efficiency.

The output capacity and any representations of efficiency for this furnace are based on standard Department of Energy test procedures.

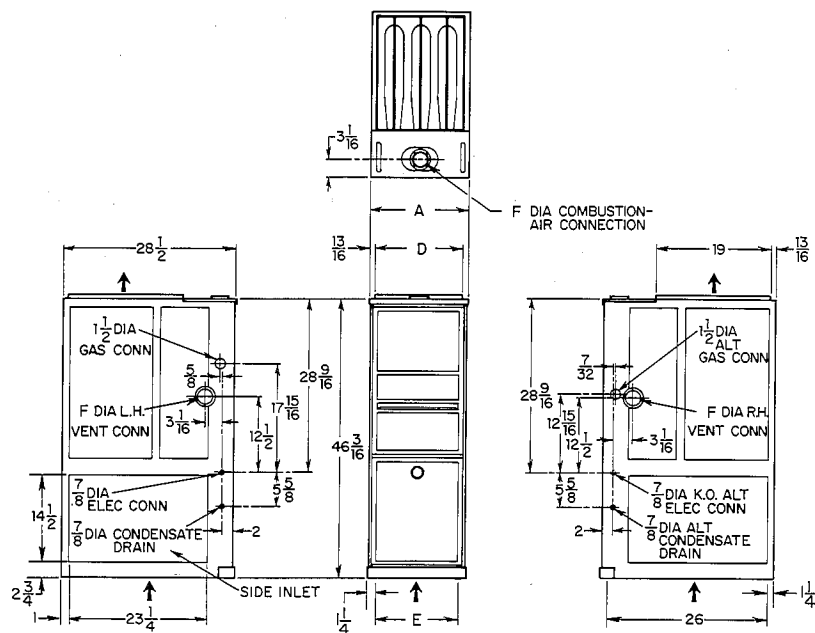
The installed operation may vary, depending on installation, weather, and other factors.

The Model 58SXB Deluxe Gas-Fired Condensing Furnace is designed for installation in alcoves, attics, basements, closets, and utility rooms. This furnace shall not be installed directly on carpeting, or any combustible material other than wood flooring. This furnace is NOT designed for installation in mobile homes, recreation vehicles, or outdoors.

Δ WARNING

Improper installation, adjustment, alteration, service, maintenance, or use can cause carbon monoxide poisoning, explosion, fire, electrical shock, or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency, local gas supplier or your Distributor or Branch for information or assistance. The qualified installer or agency must use only factory authorized and listed kits or accessories when modifying this product. A failure to follow this warning could cause electrical shock, fire, personal injury, or death.

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



→ Fig. 2—Dimensional Drawing

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Table 1—Dimensions (In Ins.)

Size	A	D	E	F
060	17-1/2	15-7/8	15	2
080	17-1/2	15-7/8	15	2
100	21	19-3/8	18-1/2	2-1/2

Table 2—Ratings and Performance

Size	Input Btuh*	Indoor Capacity Btuh†	ICS** Capacity Btuh†	Temperature Rise Range	Heating		Cooling		Motor HP & Type††	Approx. Shipping Weight
					Ext Static Pressure	CFM‡	Ext Static Pressure	CFM‡		
060	43,500	41,000	41,000	70—80	—	500	0.50	1200	1/2 ICM	185
	63,000	60,000	59,000	55—65	0.12	925				
080	58,000	55,000	55,000	70—80	—	665	0.50	1200	1/2 ICM	195
	84,000	80,000	79,000	55—65	0.15	1235				
100	72,500	69,000	68,000	70—80	—	835	0.50	2000	1 ICM	237
	105,000	100,000	99,000	65—75	0.20	1320				

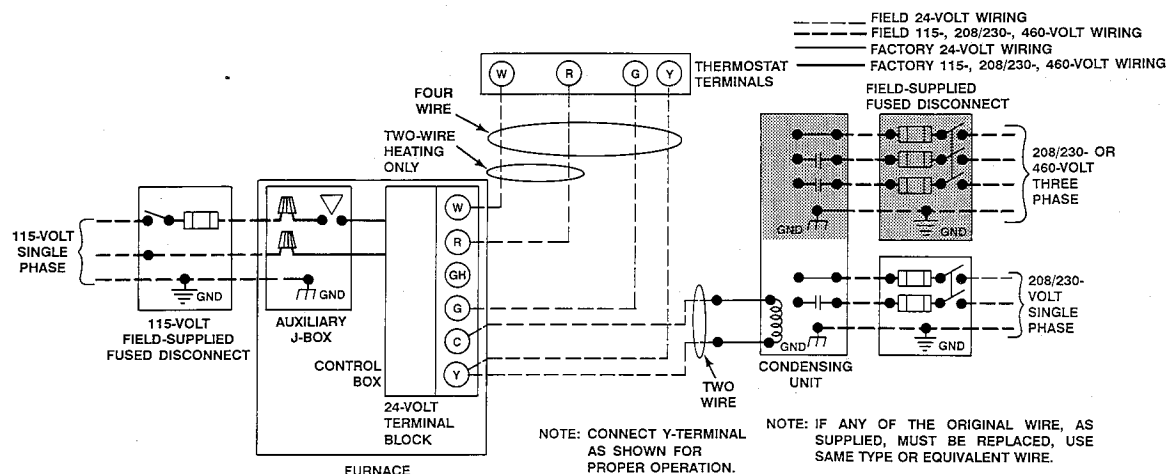
*Gas input ratings are certified for elevations to 2000 ft. For elevations above 2000 ft, reduce ratings 4% for each 1000 ft above sea level. In Canada, from 2000 to 4500 ft above sea level, derate the unit 10%.

†Determined by U.S. Government tests.

‡Air delivery above 1800 cfm requires that both sides, or a combination of one side and bottom or bottom only, of the furnace be used for return air.

**Isolated combustion system; GAMA non-weatherized.

→ ††ICM—Integrated Control and Motor.



→ Fig. 3—Heating and Cooling Application Wiring Diagram

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⚠ CAUTION

Do not use the rear of the furnace for a return-air duct connection. Use the side(s) and/or bottom only. Air delivery above 1800 cfm requires that both sides of the furnace be used, or a combination of one side and the bottom, or the bottom only.

Installation requires the following:

- *I. Inspection
- *II. Canadian Installations
- *III. Furnace Location
- *IV. Gas Piping
- *V. Combustion-Air and Vent Piping

- *VI. Condensate Piping
- VII. Electrical
- VIII. Sequence of Operation
- IX. Filter
- X. Startup and Adjustment
- XI. Care and Maintenance

*For these sections (or installation steps), refer to the appropriate sections of "Procedures for Deluxe Gas-Fired Condensing Furnaces" booklet packaged with this unit.

For accessory installation details, refer to the applicable installation literature.

NOTE: Remove all shipping brackets and materials before operating the furnace.

VII. ELECTRICAL CONNECTIONS

A. 115-Volt Wiring

IMPORTANT: Before proceeding with the electrical connections, make certain that voltage, frequency, and phase correspond to that specified on the unit rating plate. Also, check to be sure that the service provided by the utility is sufficient to handle the load imposed by this equipment. Refer to Table 3 for the equipment electrical specifications.

Table 3—Electrical Data

Size	Volts-Hertz-Phase	Operating Voltage Range		Max. Unit Amps	Min. Wire Size	Max. Wire Length Ft†	Max. Fuse† or HACR-Type Ckt Bkr Amps
		Max.*	Min.*				
060	115-60-1	127	104	9.0	14	44	15
080	115-60-1	127	104	9.0	14	44	15
100	115-60-1	127	104	13.0	12	44	20

*Permissible limits of the voltage range at which the unit will operate satisfactorily.

†Time-delay fuse is recommended.

‡Length shown is as measured one way along wire path between unit and service panel for maximum 2% voltage drop.

⚠ CAUTION

Do not connect aluminum wire between the disconnect switch and the furnace.

See Fig. 3 for a wiring diagram showing the proper field 115- and 24-volt wiring. Be sure field wiring complies with the National Electrical Code in the United States, or CSA C22.1 Electrical Code in Canada, and any local codes or ordinances that might apply. Voltage to the system must be within the limits shown in Table 3. Contact local power company for correction of improper voltage.

NOTE: Operation of unit on improper line voltage constitutes abuse and could affect unit reliability. Do not install unit in system where voltage may fluctuate above or below permissible limits.

Use a separate, fused branch electrical circuit containing a properly sized fuse or HACR-type circuit breaker for this furnace. See Table 3 for wire size and fuse specifications. A disconnecting means must be located within sight of, and readily accessible to, the furnace. The blower door switch may be acceptable in some areas as a disconnecting means.

The auxiliary J-box can be moved to the right-hand side of the furnace when a right-side power supply is desired.

1. Remove two screws holding auxiliary J-box.
2. Drill two holes in same position on opposite side and mount auxiliary J-box. (Rotate the J-box 180° so that the switch will be in the notch in the casing flange.)
3. Plug or cap unused electrical entry holes in left side of casing.

⚠ WARNING

The cabinet must have an uninterrupted or unbroken ground according to National Electrical Code, ANSI/NFPA 70-1987, CSA C22.1 Electrical Code in Canada, or local codes to minimize personal injury if an electrical fault should occur. This may consist of electrical wire or conduit approved for electrical ground when installed in accordance with existing electrical codes. Do not use gas piping as an electrical ground. A failure to follow this warning could result in an electrical shock, fire, or death.

If 115-volt wiring to the unit is encased in a nonmetallic sheath, connect the incoming ground wire to the grounding wire inside the furnace J-box. If properly grounded metallic conduit is used, it will serve as the furnace ground.

B. 24-Volt Wiring

Make field 24-volt connections at the 24-volt terminal strip. See Fig. 3.

NOTE: Use AWG No. 18 "color-coded" copper thermostat wire for lengths up to 100-ft. For wire lengths over 100-ft, use AWG No. 16 wire.

NOTE: When using an electronic thermostat, set the cycle rate for three cycles per hour.

IMPORTANT: The thermostat heat anticipation must be set to match the amp draw of the gas valve and other electrical components in the R-W circuit while operating in low heat. An accurate amp draw reading can be obtained at thermostat subbase terminals R and W as illustrated in Fig. 4.

The room thermostat should be located where it will be in the natural circulation path of room air. Avoid locations where the thermostat would be:

1. Exposed to cold-air infiltration.
2. Exposed to drafts from windows, doors, or other openings leading to the outside.
3. Exposed to air currents from warm- or cold-air registers.
4. Located behind doors, above or below shelves, mantels, or any other location where the natural circulation of air is cut off.
5. Exposed to heat from fireplaces, radios, televisions, lamps, or the rays of the sun.
6. Located on a wall containing pipes or warm-air ducts, or flue or vent pipes.
7. Located on a wall that is inadequately sealed from the attic, crawlspace, or basement.

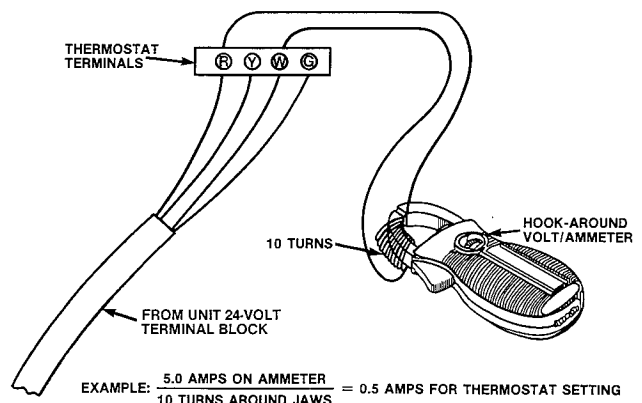


Fig. 4—Amp Draw Check With Ammeter

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Any hole in the plaster or panel through which the wires pass from the thermostat should be adequately sealed with suitable material to prevent drafts from affecting the thermostat.

C. Microprocessor Control Center

This furnace features a microprocessor control center. This control center will aid the installer and service technician when installing or servicing the unit. The 24-volt connections are provided for easy connection of field wiring. See Fig. 5.

The microprocessor control center features state-of-the-art control of combustion, temperature, and airflow to maximize comfort while operating at peak efficiency.

Combustion control is obtained by taking the appropriate inducer motor RPM readings when the low- and high-fire pressure switches make. Using this information, the microprocessor maintains consistent air to fuel ratio independent of vent sizing.

A single stage thermostat is used to provide two-stage heating. The first cycle after power reset will provide six minutes of low heat before switching to high heat unless the room thermostat has been satisfied. Subsequent thermostat cycles will provide anywhere from 0 to 15 minutes of low heat depending on the length of the previous thermostat cycle.

Airflow control is accomplished by using a technique involving the microprocessor and blower motor whereby the static load on the air delivery system is measured each heating cycle. The microprocessor then uses this information to deliver correct airflow independent of variations in system restrictions. (For example, dirty filter and zone damper.)

Additional features are as follows: (See Fig. 5 for location.)

1. Adjustable blower off-time from 60 to 240 seconds in 20 second intervals. Adjust by turning blower switch RSW1 in the direction indicated on the printed circuit board. After a change in blower off-time or cooling airflow the thermostat must be cycled to set the new values.
2. Variable cooling airflow switch RSW2 for selecting cooling airflow which matches the cooling capacity of the air conditioning system. (See Section X, B for additional details.)
3. LED fault code display to aid the installer and service technician while installing or servicing the unit.
4. Accessory connection for easy field wiring.
5. System modification and setup switches are provided for startup and proper operation of the furnace. See Fig. 5 and Table 4 for location, description, and function of the switches.

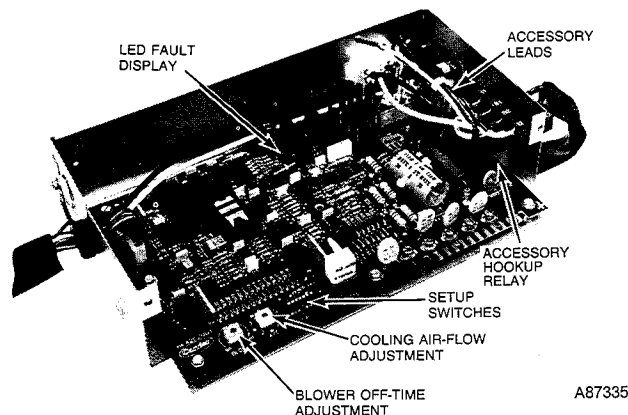


Fig. 5—Microprocessor Control Center

VIII. SEQUENCE OF OPERATION

Heating Cycle

The control circuit of the furnace shown in the schematic wiring diagram, Fig. 6, results in the following sequence of operation for the heating cycle:

NOTE: After power is reset, the microprocessor (CPU) goes through a self test sequence. This self test sequence takes approximately 20 seconds to complete. Seven seconds after power is reset, the green LED fault light comes on for 12 seconds, followed by one second where both the green and yellow LED are on. If the wall thermostat has a "call for heat" immediately after the conclusion of the self test sequence, the CPU starts integrated control and motor (ICM) MTR2 on low speed (approximately 400-500 RPM) for 20 seconds. At this time the CPU takes a calibration reading and subsequently makes the necessary blower motor MTR2 speed adjustments to deliver low-fire airflow. After the blower motor MTR2 has been on for an elapsed time of one minute, the blower motor MTR2 will be turned off and the following heating or cooling cycle will commence.

1. When the blower door is in place, 115 volts is supplied through blower door interlock switch ILK to the inducer controller, PCB1 and blower motor MTR2. Transformer TRAN is energized, supplying 24 volts to the microprocessor control center PCB3.
2. The wall thermostat "calls for heat," closing the R and W circuit. This closed circuit supplies power to the 24-volt flow sensing switches LPS and HPS.
3. The microprocessor control center CPU upon receiving a thermostat signal starts electronically commutated motor (ECM) MTR1 and gradually increases the inducer motor speed.
4. As inducer motor MTR1 comes up to speed, flow sensing switches LPS and HPS close, supplying 24 volts to ignition relay contacts IGNR, the high-fire solenoid in gas valve GV, and the necessary input signals to the onboard CPU (no gas flow will occur at this time).
5. Ten seconds 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

→ Table 4—Setup Switch Information

Switch No.	Normal Position	Description of use
1 (FLT)	Down	Turn switch up for fault history display.
2 (LO)	Down	Turn switch up to lock furnace in the low heat mode operation only.
3 (HI)	Down	Turn switch up to lock furnace in the high heat mode operation only.
4 (EMER HEAT)†	Down	Turn switch up to bypass microprocessor control. Furnace will operate at high heat only with main blower and inducer motor operating at maximum conditions. NO safeties are bypassed.
5 (MZ)	Down	Turn switch up when modulating dampers are used. In this mode the main blower speed is re-calculated once every minute while the furnace is in the low heat or continuous blower mode.
6	NAT	Up for natural gas operation.
	Prop*	Down for propane gas operation.
7 (BPH)	Down	Turn switch up when a bypass humidifier is used. This will compensate for the higher return air temperature.

*Series 100, 110, and 120 furnaces are not propane convertible.

†Function is disabled when propane operation is selected.



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and closes, completing the HOLD circuit. The normally open time-delay circuit closes after an additional 10 second purge delay, energizing spark generator SG. The pilot is ignited by a spark produced by spark generator SG.

7. After a short delay, during which the pilot flame heats up the flame sensing contacts PIL, the normally-closed contacts open. The PILOT solenoid coil remains energized through the HOLD circuit. Spark generator SG shuts off when flame is sensed at the spark electrode. The normally open flame-sensing switch contacts PIL close 5 to 20 seconds later, energizing the MGV (main operator) of gas valve GV. The MGV of gas valve GV opens immediately increasing the gas pressure approximately 5 seconds 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 seconds after gas valve GV opens, the CPU starts blower motor MTR2 on low speed (approximately 400-500 RPM) for 20 seconds. At this time, the CPU takes a calibration reading and subsequently makes the necessary blower motor MTR2 speed adjustments to deliver the proper airflow for low- or high-fire operation.
9. Approximately 60 seconds after gas valve GV opens the CPU makes the necessary inducer motor MTR1 speed adjustments 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 within the predetermined time period the CPU makes the necessary inducer motor MTR1 and blower motor MTR2 speed adjustments to operate the furnace in the high-fire mode for the remainder of the thermostat cycle.
10. When the thermostat is satisfied, the R and W circuit is broken, deenergizing gas valve GV, which in turn sends the representative control signal to the CPU which stops inducer motor MTR1 after 15 seconds. Gas flow to the pilot and main burners stops immediately. The CPU then makes the necessary blower motor MTR2 speed adjustments to deliver low-fire airflow for

approximately 60 to 240 seconds (depending on 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.

Cooling Cycle

1. The wall thermostat "calls for cooling."
2. The R, G, and Y circuits are energized. Simultaneously, the R and Y circuit starts the outdoor condensing unit, and the R, Y, and G circuit sends the appropriate signal to the CPU which starts the integrated control and motor (ICM) MTR2 on low speed (approximately 400-500 RPM) for 20 seconds. At this time the CPU takes a calibration reading and subsequently makes the necessary blower motor MTR2 speed adjustments to deliver 400 cu ft/ton of cooling (varies depending on cooling airflow selection).

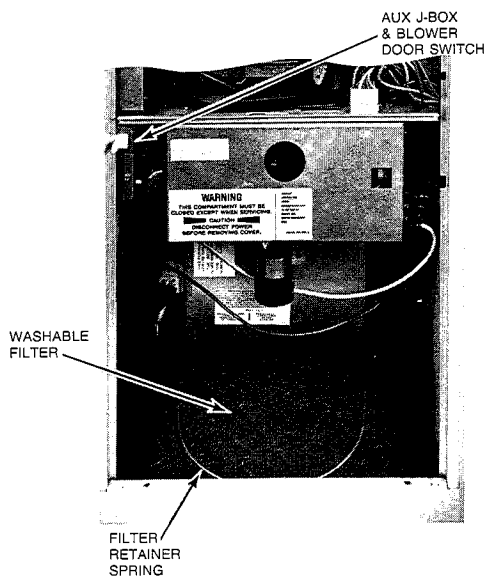
NOTE: If the Y thermostat lead is not connected to the indoor microprocessor control board and a call for cooling occurs, the blower motor MTR2 will run at continuous blower speed (same as low heat speed). Indoor coil freeze-up can occur if not properly connected.

3. When the thermostat is satisfied the R, G, and Y circuits are broken, deenergizing the outdoor condensing unit and sending the representative control signal to the CPU which stops blower motor MTR2 after an additional 90 seconds.

Emergency Heat Cycle (setup switch SW4 ON, see Fig. 5 and Table 4).

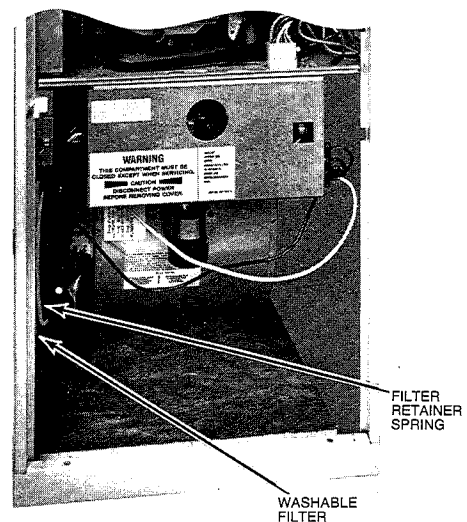
In the event of CPU failure, the furnace will deliver heat in the emergency-heat mode until service may be obtained. Setup switch SW4 must be on. The furnace should be serviced as soon as possible.

1. When the blower door is in place, 115 volts is supplied through blower door interlock switch ILK to the inducer controller PCB1 and blower motor MTR2. Transformer TRAN is energized, supplying 24 volts to the microprocessor control center PCB3.
2. The wall thermostat "calls for heat," closing the R and W circuit. This closed circuit supplies power to the flow



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Fig. 7—Filter Installed for Bottom Inlet



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Fig. 8—Filter Installed for Left-Hand Side Inlet Only

sensing switches LPS and HPS.

3. Simultaneously, the emergency heat electronic relay EHER is energized. Emergency heat electronic relay contacts EHER close. Starting electronically commutated motor (ECM) MTR1, integrated control and motor (ICM) MTR2 and activating ignition relay IGNR which then energizes the PILOT solenoid coil of gas valve GV and time-delay circuit of spark generator SG are energized through fusible link FL. Also, another set of contacts in the emergency heat electronic relay EHER close in the 24-volt circuit, and lock in the emergency heat electronic relay EHER. The emergency heat electronic relay EHER is locked in until the R and W circuit or limit switch LS 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 10 second 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 contacts energizing the high-fire solenoid of gas valve GV (no gas flow will occur at this time). After a short delay, during which the pilot flame heats up the flame sensing contacts PIL, the normally-closed contacts open. The PILOT solenoid coil remains energized through the HOLD circuit. Spark generator SG shuts off when flame is sensed at the spark electrode. The normally open flame sensing switch contacts PIL close 5 to 20 seconds later, energizing the MG (main operator) of gas valve GV. Gas valve GV opens immediately then steps up the gas

pressure approximately 5 seconds later, allowing gas flow to the main burners. The pilot flame immediately ignites the gas.

6. When the thermostat is satisfied, the R and W circuit is broken, deenergizing gas valve GV, inducer motor MTR1, and ICM blower motor MTR2. The gas flow to the pilot and main burners stop immediately.

IX. FILTER

A. Filter Arrangement

The filter is supplied in the blower compartment of the furnace. For bottom inlet application, the filter should be cut to fit where necessary and installed as shown in Fig. 7.

NOTE: Remove and discard the bottom closure panel when the bottom inlet is used.

For left-hand side inlet application, see Fig. 2 for the opening size. Remove the filter and retainer spring from the bottom opening. Install the retainer spring in the holes provided—one in the blower shelf and the other in the retainer spring bracket. Install the filter as shown in Fig. 8. Move the unused retainer bracket to the left side, near the front of the furnace, to support the filter.

⚠ CAUTION

Be sure the filter retainer spring is behind the flange of the casing side.

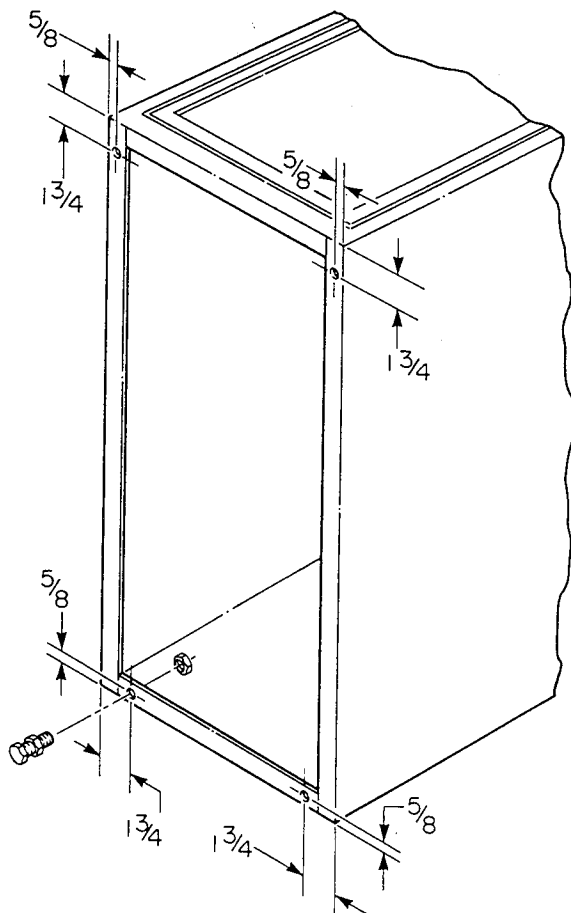
For right-hand side inlet applications, install an accessory filter rack. See instructions packaged with filter rack for installation.

B. Leveling Legs (If Required)

When the furnace is used with side inlet(s), and leveling legs are required, refer to Fig. 9, and install field-supplied corrosion-resistant 5/16-in. machine bolts and nuts.

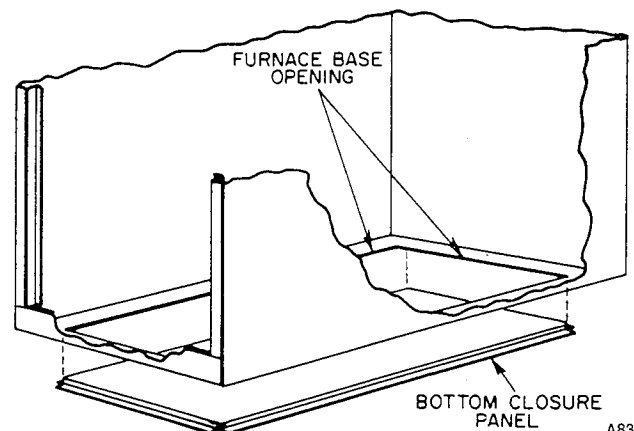
NOTE: The maximum length of the bolt should not exceed 1-1/2 ins.

1. Lay furnace on its back, locate and drill 5/16-in. diameter hole in each bottom corner of furnace as shown in Fig. 9.
2. Install nut on bolt and install bolt and nut in hole. (Install flat washer if desired.)
3. Install another nut on other side of furnace base. (Install flat washer if desired.)
4. Adjust outside nut to provide desired height, and tighten inside nut to secure arrangement.



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Fig. 9—Leveling Leg Installation



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Fig. 10—Installing Bottom Closure Panel

C. Bottom Closure Panel

When the side inlet is used, the bottom opening must be properly sealed by installing a bottom closure panel shipped under the filter in each furnace. To install the bottom closure panel, perform the following steps:

1. After filter has been installed for side return, remove bottom closure.
2. With furnace either tilted or raised, install panel in opening from bottom of furnace with insulation up. See Fig. 10.
3. Apply appropriate material around bottom closure to obtain airtight seal.

⚠ WARNING

Never operate the unit without a filter or with the filter access door removed. A failure to follow this warning could cause fire, physical injury, or death.

X. STARTUP AND ADJUSTMENT

In addition to the following information, refer to "Procedures for Deluxe Gas-Fired Condensing Furnaces."

NOTE: The furnace blower access panel must be in place to complete the 115-volt circuit to the furnace.

⚠ CAUTION

This furnace is equipped with a fusible link in the burner enclosure. This link will melt if an overheating condition caused by an inadequate combustion-air supply or improper venting practices develops. **DO NOT** jumper this fuse. Correct the condition and replace the fuse with an identical part.

The gas service pressure must not exceed 0.5 psig (14 in. wc) for natural gas.

NOTE: The gas valve regulator has been nominally set at 1.6 in. wc for low-fire and 3.5 in. wc for high-fire operation with natural gas. Refer to "Procedures for Deluxe Gas-Fired Condensing Furnaces" for readjusting and checking inputs.

⚠ CAUTION

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

A. When winterizing the furnace, it is necessary to proceed as follows:

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

B. Adjustment of Cooling Airflow

The microprocessor control center is programmed to deliver 400 cfm/ton of airflow. To select the proper cooling airflow, the cooling airflow selection switch should be adjusted to match the tons of cooling being delivered by the outdoor condensing unit. See Fig. 5.

NOTE: If the 24-volt terminal block Y connection has not been made, blower motor airflow will be lower than required for cooling operation. This can cause the evaporator coil to freeze up.

C. Automatic Gas Control Valve

These units are equipped with an automatic gas control valve. Check the proper operation of this valve by moving the room thermostat pointer above and below the room temperature and observe that the main burners light when the pointer is above and go off when the pointer is below the room temperature setting.

XI. CARE AND MAINTENANCE

⚠ CAUTION

Because of possible damage to the equipment or personal injury, maintenance should be performed by qualified persons only.

⚠ WARNING

Never store any flammables, chloride, or halogen-containing compounds near, or in contact with, the furnace. A failure to follow this warning could cause a fire, personal injury, or death.

For continuing high performance, and to minimize equipment failure, it is essential that periodic maintenance be performed on this equipment. Consult your local Dealer as to the proper frequency of maintenance and the availability of a maintenance contract.

⚠ WARNING

The ability to properly perform maintenance on this equipment requires certain expertise, mechanical skills, tools, and equipment. If you do not possess these, do not attempt to perform any maintenance on this equipment other than those procedures recommended in the Users Manual. A failure to follow this warning could result in serious personal injury and possible damage to this equipment.

⚠ WARNING

Turn off gas and electrical supply to the unit before performing any maintenance or service on the unit. Follow the operating instructions attached to the furnace. A failure to follow this warning could cause personal injury.

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

1. Check and clean or replace air filter each month or as required.
2. Check blower motor and wheel for cleanliness and lubrication each heating and cooling season. Clean and lubricate as necessary. (See Section XI, B.)

3. Check electrical connections for tightness and controls for proper operation each heating season. Service as necessary.
4. Check for proper condensate drainage.
5. Check for blockages of combustion-air and vent pipes.

⚠ WARNING

As with any mechanical equipment, personal injury can result from sharp metal edges, etc.; therefore, be careful when removing parts.

A. Air Filter

Remember to disconnect electrical power before removing access panels. To clean or replace the air filter, proceed as follows:

1. Remove blower access panel.
2. Release filter retainer spring from behind flange of furnace casing. See Fig. 7 or 8.
3. Slide out filter.
4. Clean filter with cold tap water. Spray in direction opposite to airflow.
5. Rinse and let dry. DO NOT oil or coat filter.
6. Place filter in furnace with cross-hatch binding facing blower.

B. Blower Motor and Wheel

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

The following steps should be performed by a qualified serviceperson or agency.

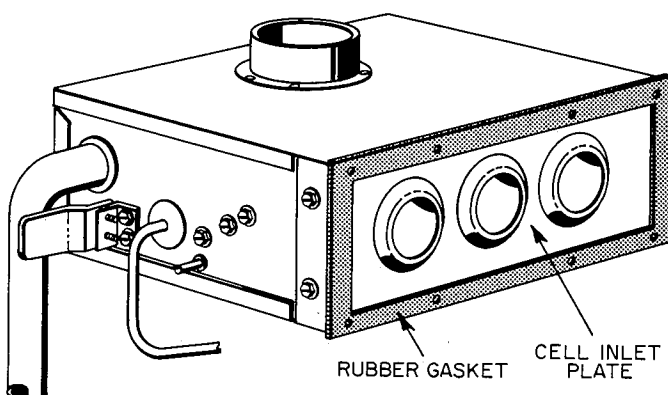
Some motors have prelubricated sealed bearings and require no lubrication. These motors can be identified by the lack of oil ports on each end of the motor. For those motors with oil ports lubricate as follows:

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

Remember to disconnect electrical supply before removing access panels.

Clean and lubricate as follows:

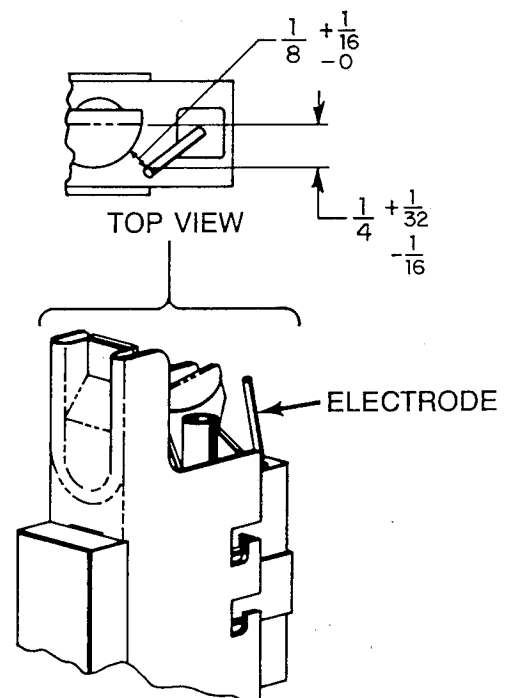
1. Remove access panels.
2. Remove control box from bottom side of blower shelf and position out of way.



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Fig. 11—Burner Enclosure

3. Disconnect 9-circuit connector PL-4 from blower housing.
4. Using backup wrench, disconnect drain pipe at coupling in blower compartment.
5. Loosen hose clamps and remove 7/8-in. diameter drain hose.
6. Loosen hose clamp and disconnect 5/8-in. diameter drain hose at bottom of inducer housing located under blower shelf.
7. Remove screws securing drain trap assembly.
8. Remove screws securing blower assembly to blower shelf and slide blower assembly out of furnace.
9. Squeeze side tabs of connector PL4 and pull from blower housing bracket.
10. Mark blower wheel location on shaft before disassembly, to insure proper reassembly.
11. Loosen setscrew holding blower wheel on motor shaft.
12. Remove bolts holding motor mount to blower housing and slide motor and mount out of housing.
13. Lubricate motor (when oilers are provided).
 - a. Remove dust caps or plugs from oil ports located at each end of motor. If motor does not have these caps or plugs, bearings are sealed and need no further lubrication.
 - b. Use a good grade of SAE 20 nondetergent motor oil and add one teaspoon (5 cc, 3/16 oz, or 16 to 25 drops) in each oil port. The use of other types or grades of oil will damage the motor. Excessive oiling can cause premature bearing failures.
 - c. Allow time for total quantity of oil to be absorbed by each bearing.
 - d. After oiling motor, wipe excess oil from motor housing.
 - e. Replace dust caps or plugs on oil ports.
14. Remove blower wheel from housing.
 - a. Mark blower wheel orientation and cutoff plate location to insure proper reassembly.



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Fig. 12—Position of Electrode to Pilot

- b. Remove screws securing cutoff plate and remove cutoff plate from housing.
- c. Remove blower wheel from housing.
- 15. Clean blower wheel and motor by using a vacuum with soft brush attachment. Be careful not to disturb balance weights (clips) on blower wheel vanes. Do not drop or bend wheel because balance will be affected.
- 16. Reassemble blower by reversing steps 14a through c. Be sure wheel is positioned for proper rotation.
- 17. Reassemble motor and blower by reversing steps 9 through 12. If motor has ground wire, be sure it is reconnected. Be sure motor oiling plugs are pointed up when motor is installed and that wheel is centered in blower housing. Spin blower wheel to check clearance.
- 18. Reinstall blower assembly in furnace.
- 19. Inspect drain trap and hoses to insure they are not blocked or restricted. Replace drain trap and hoses. Be sure to tighten hose clamps.
- 20. Using backup wrench, attach drain pipe and tighten compression coupling.
- 21. Reconnect 9-circuit connector. Note that connector is polarized for correct assembly. DO NOT force.
- 22. Reinstall control box on bottom side of blower shelf.
- 23. Turn on electrical power and check for proper rotation and speed changes between low and high heat and cooling; operate unit 10 minutes and carefully check for condensate leaks.

C. Cleaning Heat Exchangers

If it becomes necessary to clean the heat exchangers, proceed as follows:

- 1. Turn off gas and electrical supplies to furnace.
- 2. Remove control and blower access panels.
- 3. Loosen hose clamps on combustion-air pipe and move air pipe aside.
- 4. Using backup wrench, disconnect gas supply at ground joint union. Remove gas pipe from valve.
- 5. Disconnect pilot leads at 3-circuit connector outside of burner enclosure.
- 6. Disconnect high-voltage lead at spark generator.
- 7. Disconnect valve leads at 6-circuit connector on top of gas valve.
- 8. Disconnect pressure tubing from right-hand side of burner enclosure and outlet end of gas valve.
- 9. Remove burner enclosure front.
- 10. Remove diffuser from inside top of burner enclosure. Remove screws that secure burner enclosure to cell panel. These screws are located inside the burner enclosure.
- 11. Using care not to damage cell inlet panel gasket, remove gas control assembly from furnace.
- 12. Loosen hose clamps at vent pipe connection; disconnect vent pipe and position out of way.
- 13. Disconnect both 6-circuit connectors from inducer controller mounted on left side of furnace.
- 14. Remove screws securing inducer controller to mounting plate attached to left side of furnace.
- 15. Disconnect 15-circuit connector from main control box at blower shelf.
- 16. Disconnect 6-circuit connector from both pressure switches.
- 17. Remove screws securing main control box to blower shelf and position control box out of way.
- 18. Loosen hose clamp and remove drain tube from inducer housing located on bottom side of blower shelf.

- 19. Remove mounting screws securing inducer assembly to collector box; remove inducer assembly and remove all old sealant from parts.
- 20. Loosen hose clamp and remove drain tube from inducer outlet box.
- 21. Remove screws securing coupling box and remove from furnace. Remove all old sealant from parts.
- 22. Remove choke plate (when used).
- 23. Loosen hose clamp and remove 7/8-in. drain tube from trap.
- 24. Place bucket under 7/8-in. drain tube in blower compartment.
- 25. Using garden hose, flush each cell of the condensing heat exchanger with water. Use care not to spray water onto interior surfaces of control compartment. Dry all surfaces. Be careful not to remove sealant around cell openings in cell panel.
- 26. Using field-provided small wire brush, steel "snake" cable, reversible electric drill, and vacuum cleaner; clean primary heat exchanger cells. **Do not use wire brush or other sharp object to clean condensing heat exchanger.** Failure of the condensing heat exchanger will occur—flush with water only.
- 27. Using vacuum cleaner with soft brush attachment, clean burner assembly.
- 28. Remove any accumulation of soot and carbon from pilot.

D. Reassemble Furnace

- 1. Install choke plate (when used). Be sure choke plate bottom conforms to condensing heat exchanger top flange.
- 2. Apply sealant releasing agent (Pam) to flange of coupling box.
- 3. Apply a generous bead (3/16-in. dia.) of G.E. RTV 122, 162, or Dow-Corning RTV 738 sealant (NO substitute is permissible) to flange of coupling box over releasing agent. Your Distributor should have G.E. RTV 122, 162, or Dow-Corning RTV 738 sealants in stock.
- 4. Being careful not to smear sealant, position coupling box so that slot is on left-hand side and install coupling box.
- 5. Be sure small round gasket(s) is in place between blower shelf and inducer housing.
- 6. Apply sealant releasing agent (Pam) to collector box.
- 7. Apply 1/8-in.-diameter bead of G.E. RTV 122, 162, or Dow-Corning RTV 738 sealant to back of inducer housing. Apply sealant around inlet air opening. (The sealant should be about 1/4-in. from the edge of the inlet air opening.)
- 8. Using stainless steel screws, install inducer assembly on collector box and support bracket to coupling box.
- 9. Connect drain tube from collector box to inducer outlet box.
- 10. Connect 7/8-in.-drain tube to trap and collector box. Tighten hose clamps.
- 11. Connect small drain tube from top of trap to fitting on bottom of inducer housing.
- 12. Reinstall main control box on blower shelf.
- 13. Reconnect 15-circuit connector from wire harness to main control box at blower shelf.
- 14. Reconnect vent pipe. Be sure clamps are tight.
- 15. Check condition of gasket on cell inlet panel of burner enclosure. Replace gasket if necessary. See Fig. 11.
- 16. Install gas control assembly in furnace.

17. Install diffuser burner enclosure front.
18. Reconnect pilot leads at 3-circuit connector.
19. Reconnect high-voltage lead to spark generator.
20. Reconnect gas valve leads at 6-circuit connector.
21. Reconnect inducer controller leads at both 6-circuit connectors.
22. Reconnect 6-circuit connector to both pressure switches.
23. Reconnect pressure tubes to gas valve and burner enclosure. Be sure tubes are not kinked.
24. Using backup wrench, install gas pipe in gas valve.
25. Reconnect gas pipe at ground joint union.
26. Reconnect combustion-air pipe. Tighten hose clamps.
27. Turn on gas and electrical supplies.

▲ WARNING

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

28. Check for gas leaks.

29. Check furnace operation through two complete operating cycles.
30. Check pilot tube and gas valve manifold connection for gas leaks while furnace is in operation.
31. After condensate starts to drain, check for condensate leaks.
32. Replace control and blower access panels.

E. Pilot

Check the pilot and clean if necessary at the beginning of each heating season. The pilot flame should be high enough for proper impingement of the safety element and to light the burners. Remove any accumulation of soot and carbon from the safety element. Check spark electrode gap. See Fig. 12 for proper spark gap.

F. Electrical Controls and Wiring

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

With power disconnected to unit, check all electrical connections for tightness. Tighten all screws on electrical connections. If any smoky or burned connections are noticed, disassemble the connection, clean all parts, strip wire, and reassemble properly and securely. Electrical controls are difficult to check without proper instrumentation; therefore, reconnect electrical power to unit and observe unit through two complete operating cycles.

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

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Tab 6a 8a

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