

Installation, Start-Up and Service Instructions

For Sizes 030-095

(FOR USE IN CALIFORNIA ONLY)

NOTE: Read the entire instruction before starting the installation.

NOTE: The Energy Guide tag can be removed from the furnace when the installation is completed.

INTRODUCTION

Before installing the furnace, refer to "Procedures for Gas Furnace Installation" (packaged with the equipment) for information concerning combustion, venting, piping, and other standard installation practices. Further reference is made to the current edition of the National Fuel Gas Code NFPA No. 54-1984/ANSI Z223.1-1984.

Each furnace is shipped from the factory completely assembled with multispeed direct-drive blower and wired ready for indoor heating installation. All sizes feature a printed-circuit board control center with easy-to-read, low-voltage terminal strip to ensure proper connections.

NOTE: The furnaces covered by these instructions are design-certified for use with the vent damper specified on the furnace rating plate. See the instructions packaged with the vent damper for its installation.

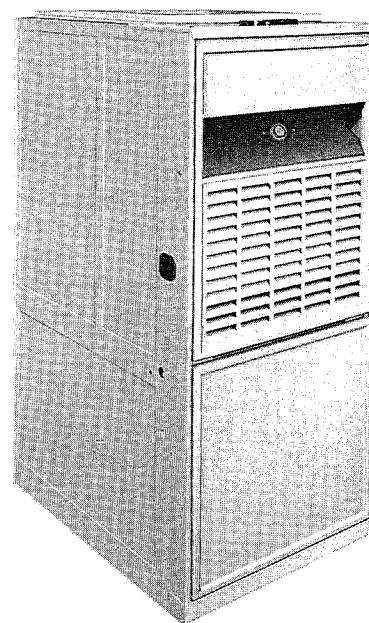


Fig. 1—Model 58GSC

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⚠ CAUTION

Do not install the furnace in a damp, corrosive, or contaminated atmosphere. Make sure all combustion and circulating air requirements listed in "Procedure for Gas Furnace Installation" are adhered to, in addition to all local codes and ordinances.

Do not use this furnace during construction when adhesives, sealers, and/or new carpet are being installed. If the furnace is required during construction, use clean outside air for combustion and ventilation. Compounds of chlorine and fluorine when burned with combustion air form acids which will cause corrosion of the heat exchangers and metal vent system. Some of these compounds are paneling and dry wall adhesives, paints, thinners, masonry cleaning materials, and many other solvents commonly used in the construction process.

Table I—Clearances (In Inches)

SIZES	030 thru 045	065 thru 095
Sides—Single-Wall Vent	1	1
Type-B1 Double-Wall Vent	0	1
Back	0	0
Top of Plenum	1	1
Vent Connector—Single-Wall	6	6
Type-B1 Double-Wall	1	1
Front*	6	6
Service	30	30

*The 6-inch front clearance is needed for combustion-air entry and draft diverter relief.

Installation comprises the following:

- *I. Inspection
- *II. Location, Ventilation, and Air for Combustion
- *III. Gas Piping
- *IV. Venting
- V. Electrical
- VI. Sequence of Operation
- VII. Filter
- VIII. Startup and Adjustment
- IX. Care and Maintenance

*To perform these sections (or installation steps), refer to the appropriate sections of "Procedures for Natural-Draft Furnaces" booklet packaged with this unit.

The design of the upflow gas-fired furnace is A.G.A. certified for installation on combustible flooring, in alcoves, basements, closets, or utility rooms. This appliance must *not* be installed directly on carpeting, tile, or combustible material other than wood flooring. The design of this furnace line is *not* A.G.A. certified for installation in a mobile home, recreation vehicle, or outdoors.

⚠ CAUTION

Do not use the rear of the furnace for return-air duct connection. Use the side(s) or bottom only.

For accessory installation details, refer to the applicable installation literature. Terminals EAC-1 and EAC-2 in the control box are for direct connection of an electronic air cleaner.

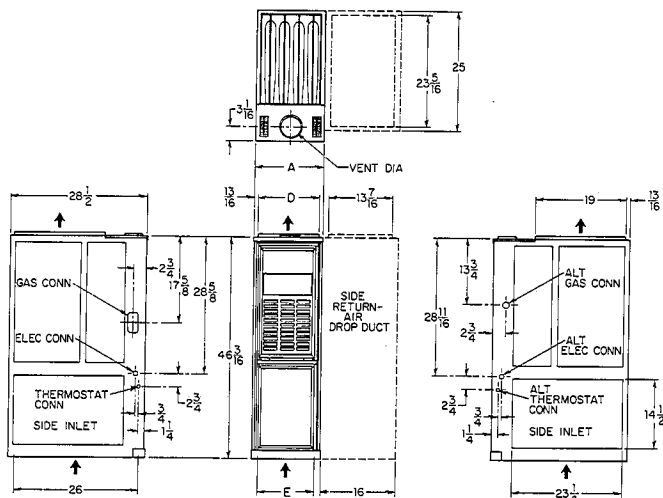


Fig. 2—Dimensional Drawing

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Table II—Dimensions (In Inches)

SIZE	A	D	E	Vent Conn.
030-BB	14 ³ / ₁₆	12 ⁹ / ₁₆	11 ¹ / ₁₆	4
045-CB	14 ³ / ₁₆	12 ⁹ / ₁₆	11 ¹ / ₁₆	4
065-CB	17 ¹ / ₂	15 ⁷ / ₈	15	4
065-DB	21	19 ³ / ₈	18 ¹ / ₂	4
080-CB	21	19 ³ / ₈	18 ¹ / ₂	5
080-DB	21	19 ³ / ₈	18 ¹ / ₂	5
095-DB	24 ¹ / ₂	22 ⁷ / ₈	22	6

Table III—Ratings and Performance

SIZE	Input BTUH*	Capacity†	Temperature Rise Range	Heating		Cooling		PSC Motor HP	Approx Shipping Wt
				External Static Pressure	CFM†	External Static Pressure	CFM†		
030-BB	40,000	32,000	30—60	0.10	570	0.50	845	¹ / ₅	122
045-CB	60,000	48,000	30—60	0.12	920	0.50	1205	¹ / ₃	132
065-CB	80,000	65,000	30—60	0.15	1310	0.50	1220	¹ / ₃	154
065-DB	80,000	65,000	35—65	0.15	1234	0.50	1610	¹ / ₂	167
080-CB	100,000	81,000	50—80	0.20	1234	0.50	1550	¹ / ₂	182
080-DB	100,000	81,000	40—70	0.20	1560	0.50	1950	¹ / ₂	191
095-DB	120,000	97,000	40—70	0.20	1851	0.50	2110	¹ / ₂	220

*Gas input ratings are certified for elevations to 2000 feet. For elevations above 2000 feet, reduce ratings 4% for each 1000 feet above sea level.

†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.

‡Determined by U.S. Government tests. Refer to Product Data Sheet for complete efficiency and output information.

V. ELECTRICAL CONNECTIONS

A. Line-Voltage Wiring

NOTE: Refer to "Procedures for Gas Furnaces Installations" (packaged with the equipment) for additional information.

See Fig. 3 for wiring diagram showing the proper field high- and low-voltage wiring.

Use a separate fused branch electrical circuit containing a properly sized fuse or circuit breaker for this furnace. 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 furnace when a right-hand 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.
3. Plug or cap unused electrical entry holes in left side of casing.

B. Low-Voltage Wiring

Make field low-voltage connections at the low-voltage terminal strip. See Fig. 3.

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

IMPORTANT: The thermostat heat anticipation must be set to match the amp draw of the gas valve and electrical components in the R-W circuit. Accurate amp draw read-

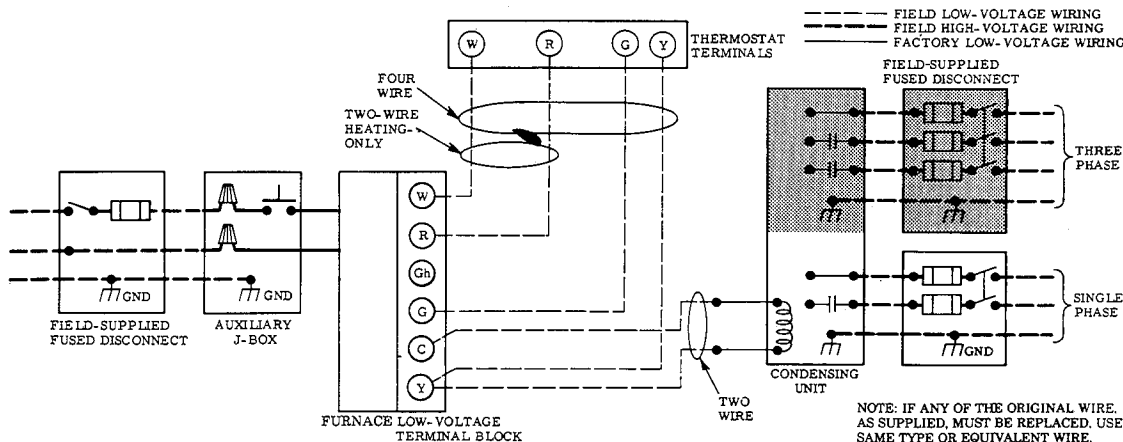


Fig. 3—Heating and Cooling Application Wiring Diagram

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ings can be obtained at thermostat subbase terminals R and W. Fig. 4 illustrates an easy method of obtaining the actual amp draw.

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 exposed to cold-air infiltration, drafts from windows, doors, or other openings leading to the outside, or exposure to air currents from warm- or cold-air registers; or to exposure where the natural circulation of the air is cut off—such as behind doors, above or below mantels, shelves, etc.

The thermostat should not be exposed to heat from nearby fireplaces, radios, televisions, lamps, or rays from the sun.

Nor should the thermostat be mounted on a wall containing pipes or warm-air ducts, or a flue or vent that could affect its operation and prevent it from properly controlling the room temperature. 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.

VI. SEQUENCE OF OPERATION

NOTE: See Fig. 5 for heating/cooling wiring diagram.

A. Heating

Gas and electrical supplies must be turned on at the furnace.

NOTE: When power is applied to heat relay coil HFR in the control circuit, the normally closed contacts in the supply circuit will open.

1. White Rodgers 36E Gas Valves (IID Models, 030 thru 095 sizes). See Fig. 5.

When the thermostat “calls for heat,” the control circuit is closed between terminals R and W. Power from transformer TRAN through fusible link FL, limit switch LS, and vent safety shut-off switch VSSS, energizes the pilot valve part of automatic gas valve GV and pilot igniter PI. The pilot valve opens, permitting gas flow to the pilot burner where it is ignited.

The pilot valve portion of automatic gas valve GV has a “pick” solenoid coil and latching “hold” device. The “pick” coil must be energized to open the pilot valve, but only the “hold” device must be energized to keep it open.

The “hold” device varies with the gas valve design used on the furnace. It could be an internal pressure switch in series with the “pick” solenoid coil, an internal electrical resistor in series with the solenoid “pick” coil, or a separate electrical solenoid coil.

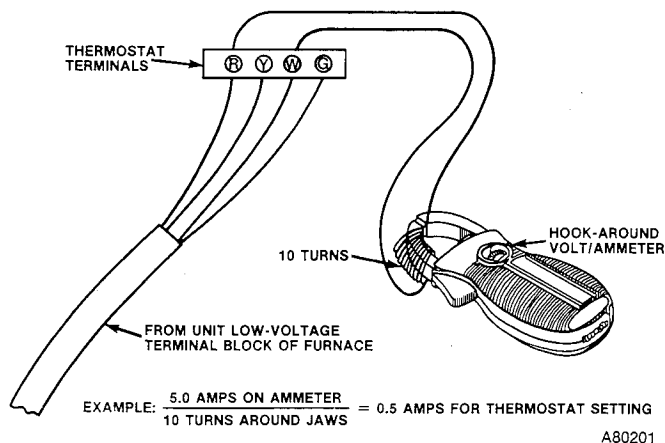


Fig. 4—Amp Draw Check With Ammeter

When the pilot flame is established, safety pilot SP switches its contacts in approximately 40 to 60 seconds, energizing the main valve portion of gas valve GV and deenergizing safety pilot igniter SP and the “pick” coil of the pilot solenoid portion in gas valve GV. The pilot valve is held open by the “hold” device within gas valve GV.

The main valve portion of gas valve GV has a delayed opening operator that opens within 6 to 15 seconds after it is energized, permitting gas flow to the main burners where the gas is ignited by pilot SP.

2. Blower Circuit

With power through the solid-state time-delay circuit on printed-circuit board PCB and heat relay HFR, blower motor MTR is energized on heating speed approximately 75 seconds after the pilot flame has been proven.

3. Limit Control

If the furnace overheats for any reason, limit control switch LS opens, breaking the circuit to automatic gas valve GV. The gas valve closes immediately, stopping gas flow to the main burners and the pilot. In addition, blower motor MTR continues to operate because heat relay HFR is deenergized to cool the furnace.

Fusible link FL is provided in the transformer TRAN secondary circuit as protection from overheating conditions in the vestibule area of the furnace. Should overheating occur, the fuse opens and deenergizes gas valve GV and heat relay HFR, stopping the gas flow to the burners and starting blower motor MTR.

When the thermostat is satisfied, the circuit between R and W is broken, deenergizing automatic gas valve GV, pilot SP, and the solid-state time-delay circuit on printed-circuit board. The gas flow stops immediately to the pilot and main burners. After approximately 105 seconds, heat relay HFR is energized and blower motor MTR stops.

4. Vent Safety Shut-off System Switch

The purpose of this control is to safely shutdown the furnace if a blocked vent condition occurs.

During a blocked vent condition, temperature in the drafthood opening will rise causing vent safety shut-off system switch to open, breaking the circuit to gas valve GV. The gas valve closes immediately, stopping gas flow to the main burners and pilot, and the blower will run continuously.

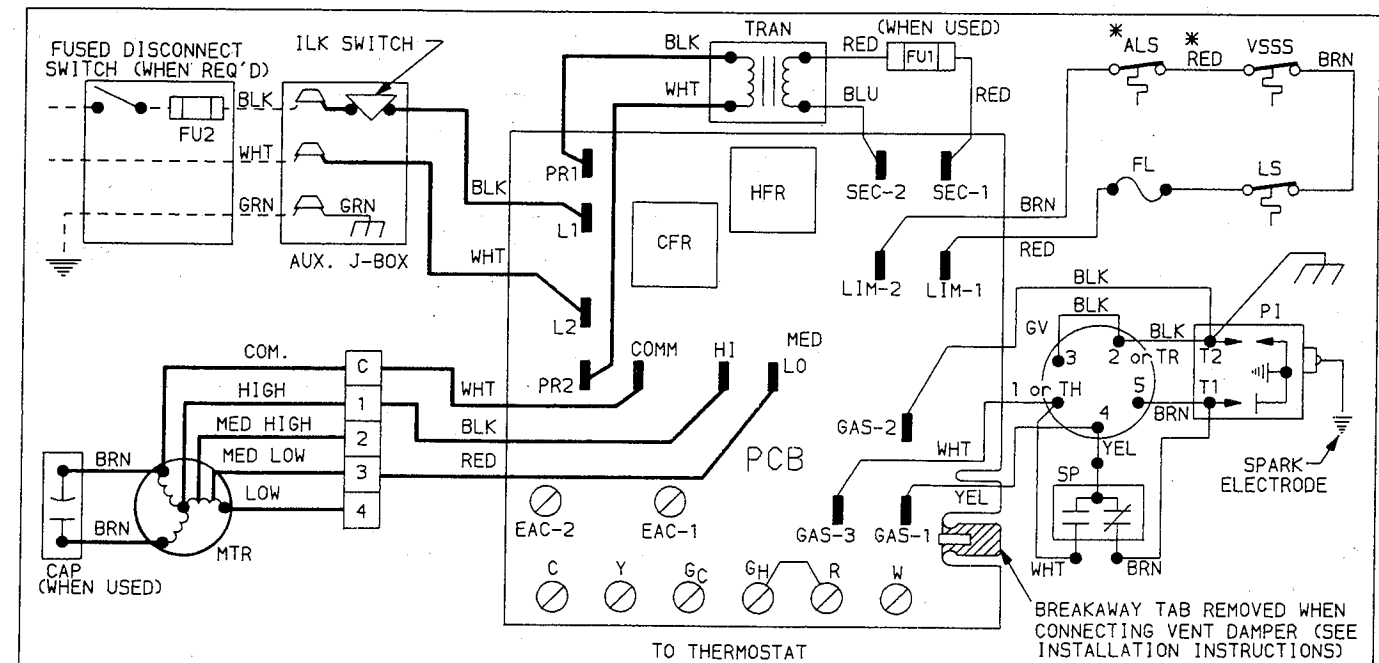
The furnace will remain in this mode until the vent safety shut-off system switch is manually reset.

B. Vent Damper (when used)

With gas and electrical power supplied to the furnace, the vent damper motor is deenergized, and the vent damper is closed until the thermostat “calls for heat.”

On a “call for heat” by the thermostat, the vent damper motor is energized and the damper opens. When the vent damper reaches the full-open position, the damper motor is deenergized and a circuit is completed to the main gas valve via the pilot. At this time, the main gas valve is energized and the main burners are ignited; the vent damper will remain open until the thermostat is satisfied.

When the thermostat is satisfied, it will deenergize the main gas valve and stop the gas flow. The vent damper motor will energize and close the damper. When the vent damper reaches the full-closed position, the damper motor is deenergized and will remain so until the next “call for heat” by the thermostat.



NOTES:

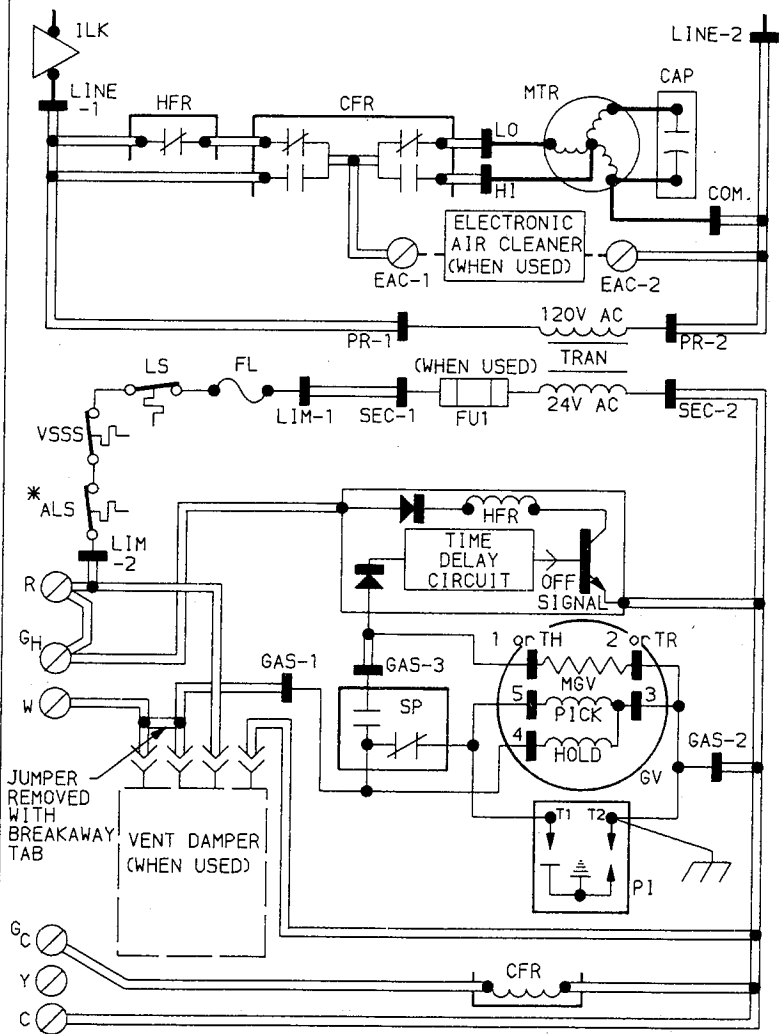
* DOWNFLOW FURNACES ONLY

1. HEATING FAN RELAY CONTACT IS NORMALLY CLOSED UNTIL 115V AC IS APPLIED TO FURNACE.
2. TO CHANGE MOTOR SPEED, MOVE BLK OR RED WIRE TO DESIRED SPEED SETTING.
3. IF ANY OF ORIGINAL WIRE AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, IT MUST BE REPLACED WITH AWM (105°C) WIRE OR ITS EQUIVALENT.
4. MOTOR IS THERMALLY OVERLOAD PROTECTED.
5. FACTORY SPEED SELECTION IS FOR AVERAGE CONDITIONS, SEE INSTALLATION INSTRUCTIONS FOR OPTIMUM SPEED SELECTION. MOTOR MAY BE 3 OR 4 SPEED.
6. SYMBOLS ARE AN ELECTRICAL REPRESENTATION ONLY.

LEGEND

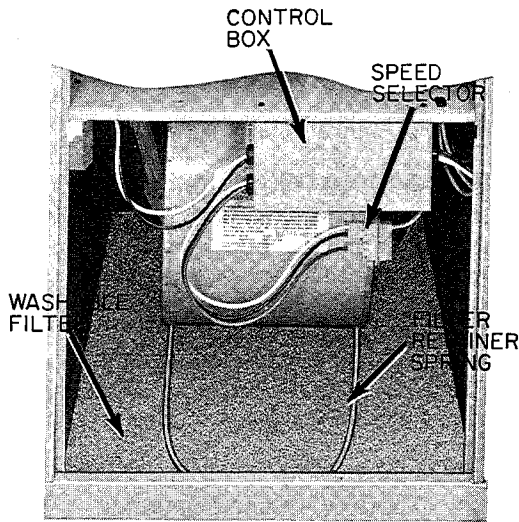
ALS	AUXILIARY LIMIT SWITCH, MANUAL-RESET (SPST-NC)
CAP	RUN CAPACITOR
CFR	COOLING FAN RELAY (DPDT)
FL	FUSIBLE LINK
FU1	FUSE IN LINE 2 AMP
FU2	FIELD FUSE
GV	GAS VALVE
HFR	HEATING FAN RELAY (SPST-NC)
ILK	SWITCH, BLOW. DOOR INTERLOCK (SPST-NO)
LS	LIMIT SWITCH, AUTO.-RESET (SPST-NC)
MTR	MOTOR, BLOWER
PCB	PRINTED CIRCUIT BOARD
P1	PILOT IGNITER
SP	SAFETY PILOT (FLAME SENSING)
TRAN	TRANSFORMER
VSSS	VENT SAFETY SHUTOFF SWITCH, MANUAL-RESET (SPST-NC)

	FIELD SPLICE
	PLUG RECEPTACLE
	JUNCTION
	UNMARKED TERMINAL
	TERMINAL PCB FACTORY CONN.
	FACTORY WIRING (120V AC)
	FACTORY WIRING (LOW VOLTAGE)
	FIELD WIRING (120V AC)
	CONDUCTOR ON PRINTED CIRCUIT BOARD
	SCREW TERMINAL FOR FIELD WIRING
	FIELD GROUND
	EQUIP. GROUND



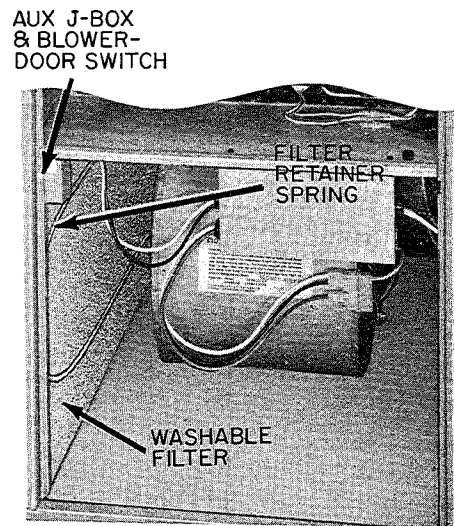
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Fig. 5—Wiring Diagram for Sizes 030 thru 095 (IID Pilot) Natural Gas



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Fig. 6—Filter Installed for Bottom Inlet



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Fig. 7—Filter Installed for Side Inlet

C. Cooling (Cooling Models Only)

When the thermostat “calls for cooling,” power from transformer TRAN energizes the condensing unit contactor, starting the condensing unit. Simultaneously, cooling relay coil CFR is energized, closing its contacts and energizing blower motor MTR on its cooling speed. It continues to operate until the thermostat is satisfied.

When the thermostat is satisfied, the circuit to terminal Gc is broken, deenergizing cooling relay coil CFR which, in turn, opens its contacts, stopping blower motor MTR.

VII. FILTER

A. Filter Arrangement

⚠ CAUTION

Air delivery above 1800 cfm, or systems with a total static pressure drop above 0.5 in. wc, require that both sides, or a combination of one side and the bottom, or the bottom only, of the furnace be used for return air. When both sides of the furnace are used for return air, an extra filter and retainer spring may be required.

The filter is factory-installed in the bottom of the furnace. This is for the bottom inlet application. See Fig. 6.

NOTE: The filter shipped with the 14³/₁₆-inch furnace casing is sized for side return inlet and must be trimmed to properly fit the bottom opening.

For the 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 deck and the other in the retainer spring bracket. Install the filter (The filter must be trimmed to clear the J-box on some sizes.) as shown in Fig. 7.

⚠ CAUTION

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

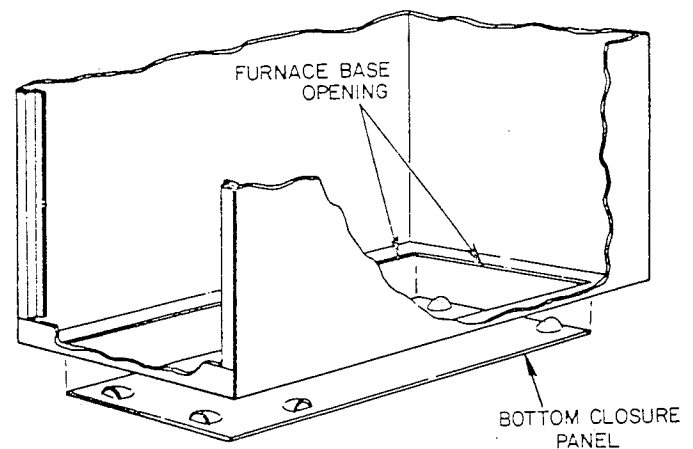
B. Bottom Closure Panel

When the side inlet(s) is used, the bottom opening must be properly sealed by installing a bottom closure panel. After the filter has been installed for side return, perform the following steps:

1. Position bottom closure panel so that it appears as shown in Fig. 8.
2. With furnace either tilted or raised, install panel in bottom opening of furnace. See Fig. 8. (Install from bottom side of furnace.)

⚠ WARNING

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

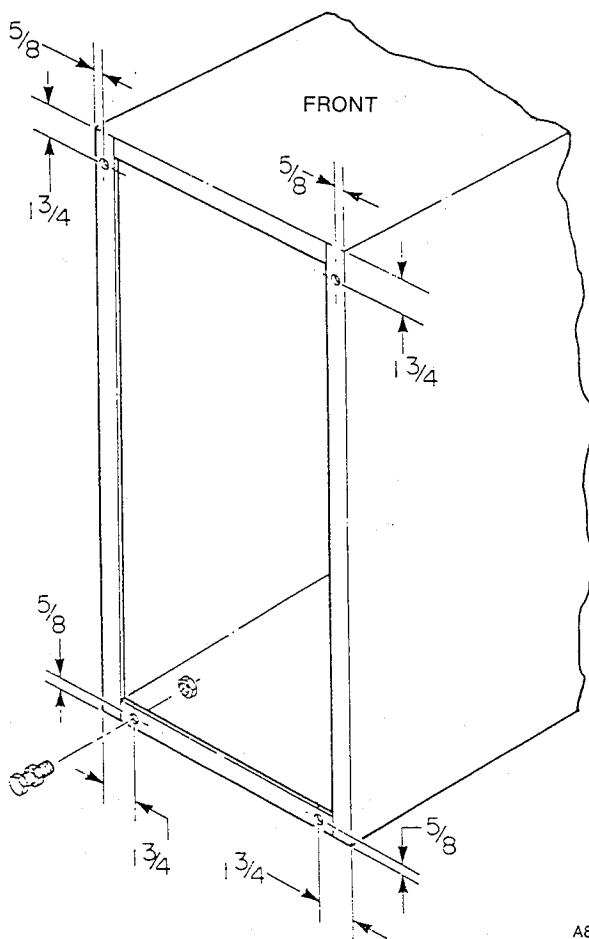


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Fig. 8—Installing Bottom Closure Panel

C. 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-inch machine bolts and nuts.



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Fig. 9—Leveling Leg Installation

NOTE: The maximum length of the bolt should not exceed $1\frac{1}{2}$ inches.

1. Lay furnace on its back, locate and drill $\frac{5}{16}$ -inch 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.

VIII. STARTUP AND ADJUSTMENT

In addition to the following information, refer to "Procedures for Gas Furnace Installation" packaged with the unit.

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

⚠ CAUTION

This furnace is equipped with a fusible link in the vestibule area that 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 link with an identical part.

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

NOTE: The gas valve regulator has been factory-set at 3.5 in. wc for natural gas. Refer to "Procedure for Gas Furnace Installation" for readjusting when checking input.

A. Adjustment of Blower Speed

⚠ WARNING

Disconnect the electrical power before changing the speed tap. A failure to adhere to this warning can cause personal injury.

To change motor speed taps, remove the motor tap lead (See Fig. 6 and Table IV.) and relocate it on the desired terminal on the plug-in terminal block/speed selector located on the blower.

Table IV—Speed Selector

Speed	Tap No.*†
Common	C
HI	1
Med-Hi	2
Med-Low	3
Low	4

*Furnaces without a cooling fan relay are equipped with a 3-speed motor.

†White wire from control box to common; black wire from control box to cooling speed selection (when used); red wire from control box to heating speed selection.

⚠ CAUTION

When adjusting the blower speed, make certain that the temperature rise across the heat exchanger does not exceed that specified on the rating plate.

B. Automatic Gas Control Valve

These units are equipped with an automatic gas control valve. If not already checked when lighting the main burner, check the proper operation of this valve by moving the room thermostat pointer above and below the room temperature and observing that the main burners light on "call for heat" and go off when the pointer is moved below the room temperature setting.

NOTE: For ease of adjusting the pilot flame, disconnect terminal No. 1 at the main gas valve. This will prevent main burner ignition and allow time to adjust the pilot. Reconnect the power lead after adjustment.

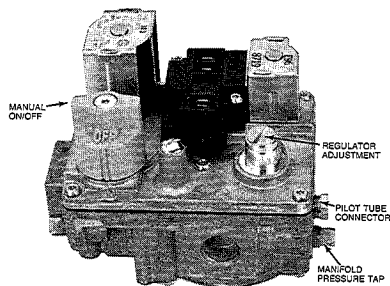
⚠ CAUTION

Be sure to follow the startup and pilot safety check procedures as outlined in "Procedures for Gas-Fired Furnaces" instructions packaged with the equipment.

IX. CARE AND MAINTENANCE

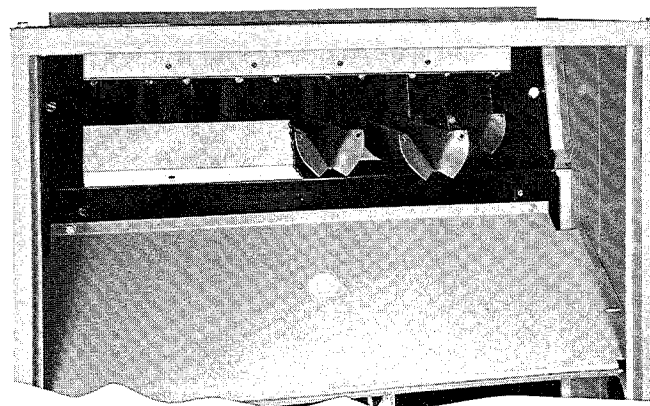
⚠ CAUTION

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



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Fig. 10—White Rodgers Model 36 Gas Valve



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Fig. 11—Removing Baffles

⚠ WARNING

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

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

A failure to adhere to this warning can cause corrosion of the heat exchanger and vent system, fire, personal injury, or death.

For continuing high performance, and to minimize possible 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.

The ability to properly perform maintenance on this equipment requires certain mechanical skills and tools. If you do not possess these, contact your Dealer for maintenance.

⚠ WARNING

Turn off gas and electrical supplies to the unit before performing any maintenance or service on the unit. Follow the relighting instructions on the label attached to the furnace. A failure to adhere to this warning could lead to 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.
3. Check electrical connections for tightness and controls for proper operation each heating season. Service as necessary.

⚠ 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 air filter, proceed as follows:

1. Remove control and blower access doors.
2. Push filter retainer spring toward back of furnace until it clears flange of furnace casing.
3. Slide out filter.
4. Clean filter with tap water.
5. Rinse and let dry. Oiling or coating of filter is not required.
6. Place dry filter in furnace with cross-sectional binding up or facing blower.

B. Blower Motor and Wheel

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

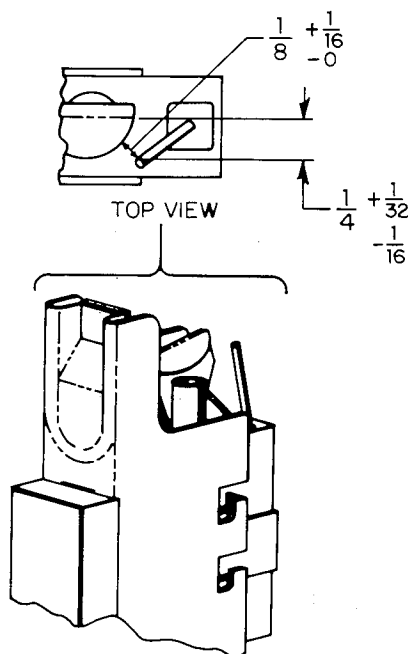
The following steps should be performed by a qualified serviceperson.

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

Remember to disconnect the electrical supply before removing the access panels.

Clean and lubricate as follows:

1. Remove access panels.
2. Remove control box from bottom side of blower deck and lay it on top side. (Two clips are provided on back side of control box for hanging box on blower deck flange when desired.)



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Fig. 12—Position of Electrode to Pilot

3. Remove electrical leads from numbered side of speed selector. See Fig. 6 and Table IV. Note location of wires for reassembly.
4. Remove screws holding blower assembly against blower deck and slide blower assembly out of furnace.
5. Squeeze side tabs of speed selector and pull it from blower housing.
6. Loosen a screw in strap holding motor capacitor to blower housing and slide capacitor from under strap.
7. Mark blower wheel(s), motor, and motor support in relation to blower housing(s) before disassembly, to insure proper reassembly.
8. Loosen setscrew holding blower wheel(s) onto motor shaft.
9. Remove bolts holding motor mount to blower housing and slide motor and mount out of housing. Some motors have a ground wire attached to blower housing; disconnect it also.
10. Lubricate motor.
 - a. Remove dust caps or plugs from oil ports located at each end of motor.
 - b. Use a good grade of SAE 20 nondetergent motor oil and add one teaspoon, 5 cc, $\frac{3}{16}$ oz, or 16 to 25 drops in each oil port.
 - c. Allow time for total quantity of oil to be absorbed by each bearing.
 - d. After oiling motor, be sure to wipe excess oil from motor housing.
 - e. Replace dust cap or plugs on oil ports.
11. Remove blower wheel(s) from housing.
 - a. Mark blower wheel(s) orientation and cutoff location to insure proper reassembly.
 - b. Remove screws holding cutoff plate and remove cutoff plate from housing.
 - c. Lift blower wheel(s) from housing through opening.
12. Clean blower wheel(s) and motor by using vacuum with soft brush attachment. Care must be exercised not to

disturb balance weights (clips) on blower wheel vanes. Also do not drop or bend wheel, as balance will be affected.

13. Reassemble blower by reversing procedures 11a thru c. Be sure wheel is positioned for proper rotation.
14. Reassemble motor and blower by reversing procedures 5 thru 9. If motor has ground wire, be sure it is connected as before. Be sure the blower wheel setscrew is on flat of the motor shaft when tightening.
15. Reinstall blower assembly in furnace.
16. Connect electrical leads to speed selector. Please note that connections are polarized for assembly—**do not force**.
17. Reinstall control box on bottom side of blower deck.
18. Turn on electrical power and check for proper rotation and speed changes between heating and cooling.

C. Cleaning Heat Exchanger

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

1. Turn off gas and electrical supply.
2. Remove access panels.
3. Remove vent connector and draft diverter. Screws are located inside draft diverter opening.
4. Remove flue choke across flue outlets and baffles from flue outlets of heat exchanger. See Fig. 11.
5. Remove secondary-air baffle and burners. To remove pilot burner, disconnect pilot supply tube at gas valve.
6. Clean flue ways with brush and or vacuum. Check heat exchanger for leaks and cracks. Replace if necessary.
7. Using vacuum cleaner with soft brush attachment, clean burners. After cleaning, reinstall burners.
8. Replace flue baffles and flue choke. Be sure all screws are in place and tight.
9. Replace draft diverter and vent connector. Be sure screws are replaced and tight.
10. Replace secondary-air baffle and burners.
11. Turn on gas and electricity. Check for gas leaks.

▲ WARNING

Never use a match or other open flame to check for gas leaks. Use a soap-and-water solution. A failure to adhere to this warning can cause an explosion, fire, personal injury, or death.

D. 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 the accumulation of soot and carbon from the sensing probe.

E. 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 any loose screws or 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 one complete operating cycle.

Table V—Trouble Analysis Chart

⚠ WARNING

Turn off gas and power supply to unit before servicing (unless specific test requires gas and electric supplies). A failure to adhere to this warning, can cause a fire, explosion, personal injury, or death.

SYMPTOM	CAUSE	REMEDY
Furnace will not operate	No 115-volt power to furnace	Connect to power supply. Check fuse, wiring, or circuit breaker.
	Blower door not in place	Install furnace blower door.
	Defective blower door switch	Replace switch.
Pilot will not light	Vent safety shut-off switch open	Check for vent blockage and proper installation of vent pipe.
	No spark at electrode	Readjust, if necessary, so that gap between electrode tip and pilot burner is as shown in Fig12.
		Clean dirt or moisture accumulation from electrode ceramic with cloth.
		Cracked ceramic—replace pilot electrode assy.
		Check for loose or broken wiring at and between spark generator and electrode. Replace wire or tighten connection as necessary.
		Check fuse or circuit breaker for 115-volt supply to furnace.
		Check 24-volt input to spark generator. If you read 24 volts and above steps have been completed, replace spark generator assy.
Burners will not ignite	Spark shorting out to main burner	Readjust electrode as specified.
	No gas at pilot burner	Clean pilot orifice.
		Check voltage to terminals 3 and 5 of gas valve.
		Check for proper opening of pilot valve, broken wires, or loose connections. If no deficiency is found, replace valve assy.
	No 115-volt power to furnace	Connect to power supply. Check fuse, wiring, or circuit breaker.
	No 24-volt power to control circuit	Replace transformer.
	Miswired or loose connections	Check all wiring and all wirenut connections.
Blower operates continuously	No gas at main burners	Check voltage to terminals 1 and 2 of gas valve.
	Dirty pilot—yellow flame	Check for proper opening of main gas valve, broken wires, or loose connections. If no deficiency is found, replace gas valve assy.
		Clean pilot orifice.
	Thermostat fan switch in ON position	Move thermostat fan switch to AUTO position.
	Fusible link blown	Correct combustion air and venting practice—replace fuse link with identical part.
	Dirty filter causing limit operation	Clean dirty air filter—reinstall.
	Defective heat relay	Replace printed-circuit board.
Inadequate heating	Vent safety shut-off switch open	Check for vent blockage and proper installation of vent pipe.
	Furnace undersized for application	Replace with proper size furnace.
	Gas input to furnace too low	Check gas pressure at manifold. Clock gas meter for input. If too low, increase manifold pressure or install correct orifices.
	Limit switch cycles main burners	Clean dirty air filter—reinstall.
		Increase blower speed.
		Open registers—ductwork restricted.
	Thermostat anticipator set too low	Check thermostat circuit amps and set anticipator accordingly. See Fig. 4.
Aldehyde odors, (CO), sooting flame—floating flame	Incomplete combustion—poor flame characteristics	Adjust air shutter on burners to provide soft, blue flame. Check all screws around flue outlets and burner compartment. Tighten.
		See "Section II, Location & Air for Combustion & Ventilation" (Procedures for Gas-Fired Furnaces).
		Replace cracked heat exchanger.
		Reduce input and check orifices—furnace overfired.
		Check vent for restriction.

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