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Installation, Start-Up, and Operating Instructions

Sizes 045-155, Series 140 (LIMITED)

NOTE: Read the entire instruction manual before starting the installation.

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REGISTERED QUALITY SYSTEM

SAFETY CONSIDERATIONS

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


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

Follow all safety codes. In the United States, follow all safety codes including the National Fuel Gas Code (NFGC) NFPA 54-1999/ANSI Z223.1-1999 and the Installation Standards, Warm Air Heating and Air Conditioning Systems (NFPA 90B) ANSI/NFPA 90B.

In Canada, refer to CAN/CGA-B149.1- and .2-M95 National Standard of Canada, Natural Gas and Propane Installation Codes (NSCNGPIC).

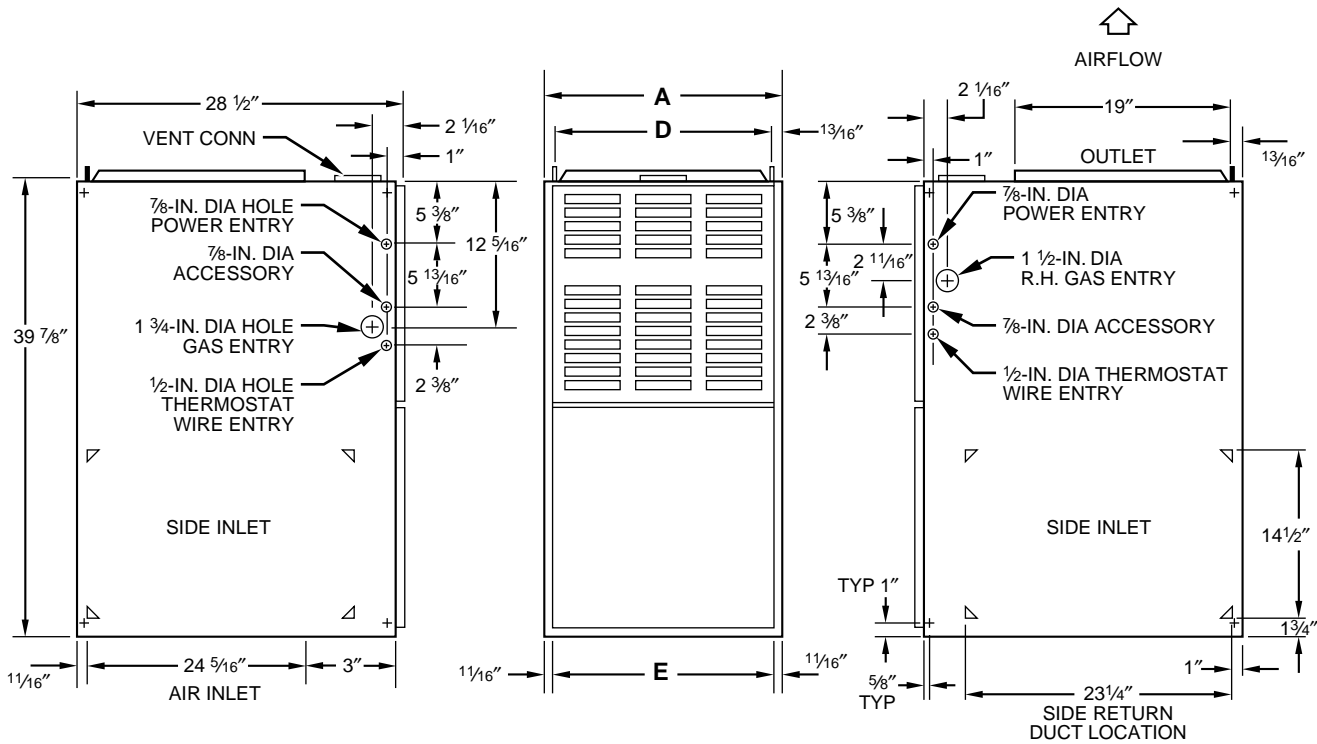
These instructions cover minimum requirements and conform to existing national standards and safety codes. In some instances, these instructions exceed certain local codes and ordinances, especially those that may not have kept up with changing residential construction practices. We require these instructions as a minimum for a safe installation.

Wear safety glasses and work gloves. Have fire extinguisher available during start-up and adjustment procedures and service calls.

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

Understand the signal words DANGER, WARNING, CAUTION, and NOTE. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies a hazard which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **would** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

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



- NOTES:**
- Two additional 7/8-in. dia holes are located in the top plate.
 - Minimum return-air openings at furnace, based on metal duct. If flex duct is used, see flex duct manufacturer's recommendations for equivalent diameters.
 - Minimum return-air opening at furnace:
 - For 800 CFM—16-in. round or 14 1/2 x 12-in. rectangle.
 - For 1200 CFM—20-in. round or 14 1/2 x 19 1/2-in. rectangle.
 - For 1600 CFM—22-in. round or 14 1/2 x 23 1/4-in. rectangle.
 - For airflow requirements above 1800 CFM, see Air Delivery table in Product Data literature for specific use of single side inlets. The use of both side inlets, a combination of 1 side and the bottom, or the bottom only will ensure adequate return air openings for airflow requirements above 1800 CFM.

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Fig. 1—Dimensional Drawing
Table 1—Dimensions (In.)

UNIT SIZE	A	D	E	VENT CONN	SHIP. WT (LB)
045-08	14-3/16	12-9/16	12-11/16	4	119
045-12	14-3/16	12-9/16	12-11/16	4	121
070-08	14-3/16	12-9/16	12-11/16	4	126
070-12	14-3/16	12-9/16	12-11/16	4	129
091-14	17-1/2	15-7/8	16	4	147
091-16	21	19-3/8	19-1/2	4	159
111-12	17-1/2	15-7/8	16	4	155
111-16	21	19-3/8	19-1/2	4	164
111-20	24-1/2	22-7/8	23	4	182
136-16	21	19-3/8	19-1/2	5	173
136-20	24-1/2	22-7/8	23	5	186
155-20	24-1/2	22-7/8	23	5	196

ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS PROCEDURE

⚠ CAUTION

Electrostatic discharge can affect electronic components. Take precautions during furnace installation and servicing to protect the furnace electronic control. Precautions will prevent electrostatic discharges from personnel and hand tools which are held during the procedure. These precautions will help to avoid exposing the control to electrostatic discharge by putting the furnace, the control, and the person at the same electrostatic potential.

1. Disconnect all power to the furnace. **DO NOT TOUCH THE CONTROL OR ANY WIRE CONNECTED TO THE CONTROL PRIOR TO DISCHARGING YOUR BODY'S ELECTROSTATIC CHARGE TO GROUND.**
2. Firmly touch a clean, unpainted, metal surface of the furnace chassis which is close to the control. Tools held in a person's hand during grounding will be satisfactorily discharged.

3. After touching the chassis you may proceed to service the control or connecting wires as long as you do nothing that recharges your body with static electricity (for example; **DO NOT** move or shuffle your feet, **DO NOT** touch ungrounded objects, etc.).
4. If you touch ungrounded objects (recharge your body with static electricity), firmly touch furnace again before touching control or wires.
5. Use this procedure for installed and uninstalled (ungrounded) furnaces.
6. Before removing a new control from its container, discharge your body's electrostatic charge to ground to protect the control from damage. If the control is to be installed in a furnace, follow items 1 through 5 before bringing the control or yourself into contact with the furnace. Put all used **AND** new controls into containers before touching ungrounded objects.
7. An ESD service kit (available from commercial sources) may also be used to prevent ESD damage.

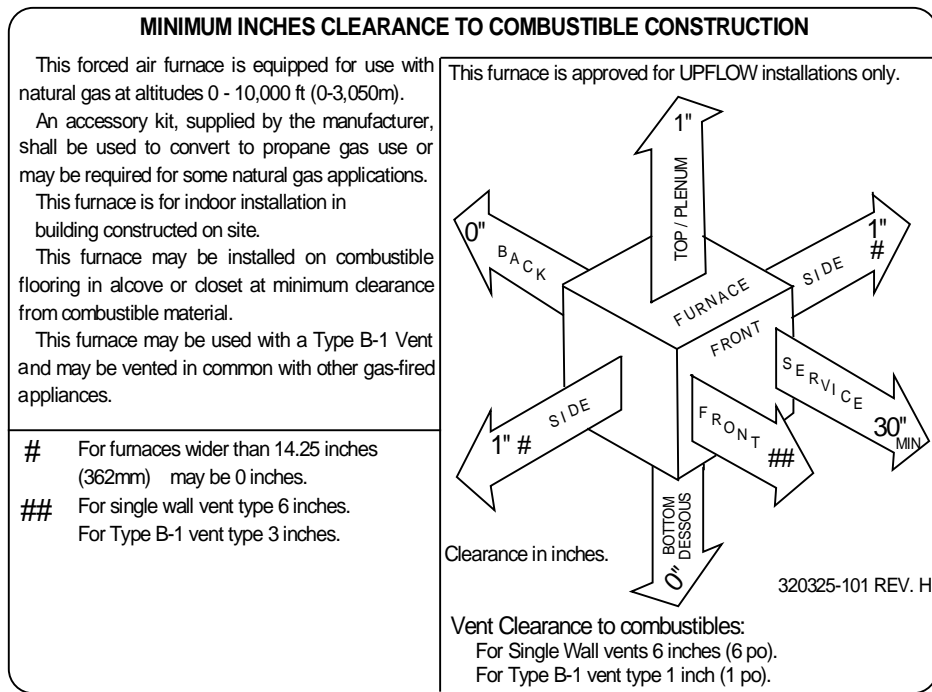


Fig. 2—Clearances to Combustibles

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INTRODUCTION

The Model 58WAV, Series 140 Limited Furnace is available in sizes 44,000 through 154,000 Btuh input capacities.

The design of the upflow gas-fired furnace is A.G.A./C.G.A. certified for natural and propane gas and for installation on combustible flooring, in alcoves, attics, basements, closets, or utility rooms. The furnace is factory-shipped for use with natural gas. A factory accessory gas conversion kit, as listed on the furnace rating plate is required to convert furnace for use with propane gas. The design of this furnace line is **not** A.G.A./C.G.A. certified for installation in mobile homes, recreation vehicles, or outdoors.

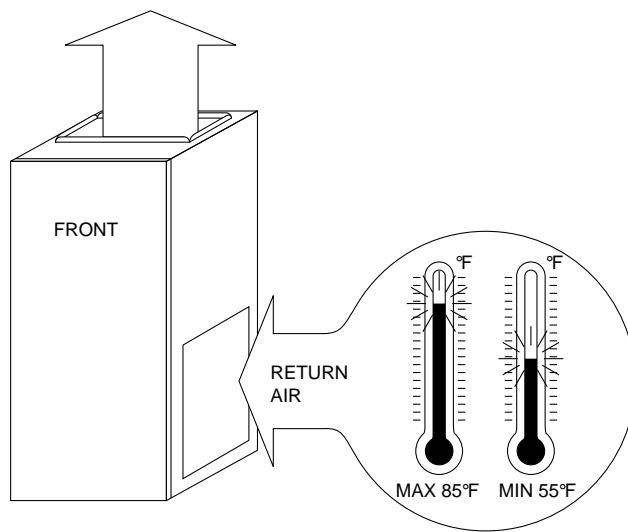
Before installing the furnace in the United States, refer to the current edition of the NFGC and the NFPA 90B. For copies of the NFGC and NFPA 90B, contact the National Fire Protection Association Inc., Batterymarch Park, Quincy, MA 02269; or for only the NFGC contact the American Gas Association, 400 N. Capitol St., N.W., Washington DC 20001.

Before installing the furnace in Canada, refer to the NSCNPGIC. For a copy of the NSCNPGIC, contact Standard Sales, CSA International, 178 Rexdale Boulevard, Etobicoke (Toronto), Ontario, M9W 1R3, Canada.

Installation must comply with regulations of serving gas supplier and local building, heating, plumbing or other codes in effect in the area in which installation is made. In absence of local building codes, installation must comply with NFGC in the United States and the NSCNPGIC and all authorities having jurisdiction in Canada.

⚠ CAUTION

Application of this furnace should be indoors with special attention given to vent sizing and material, gas input rate, air temperature rise, and unit sizing. Improper installation or misapplication of the furnace can require excessive servicing or cause premature component failure.



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This furnace is designed for a minimum continuous return-air temperature of 60°F db or an intermittent operation down to 55°F db such as when used with a night setback thermostat. Return-air temperature must not exceed a maximum of 85°F db.

⚠ 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.

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

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

Step 1—Location

GENERAL

⚠ CAUTION
Do not install furnace in a corrosive or contaminated atmosphere. Make sure all combustion and circulating air requirements are met, in addition to all local codes and ordinances.

⚠ CAUTION
Do not use this furnace during construction when adhesives, sealers, and/or new carpets 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 cause corrosion of the heat exchangers and metal vent system. Some of these compounds are found in paneling and dry wall adhesives, paints, thinners, masonry cleaning materials, and many other solvents commonly used in the construction process.
Excessive exposure to contaminated combustion air will result in safety and performance related problems.

⚠ WARNING
DO NOT install the furnace on its back or sides. Safety control operation will be adversely affected. A failure to follow this warning can cause fire, personal injury, or death.

This furnace must be installed so the electrical components are protected from water. This furnace shall not be installed directly on carpeting, tile, or any combustible material other than wood flooring.

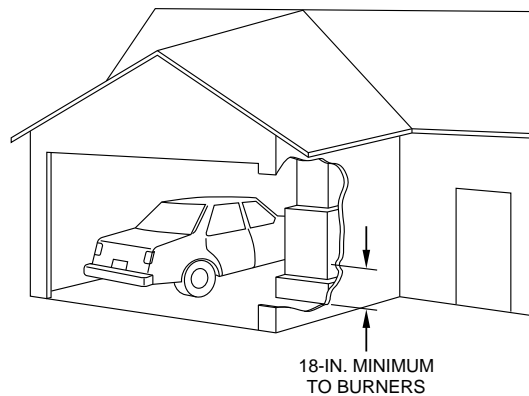
Locate furnace as close to the chimney/vent and as near the center of the air distribution system as possible. The furnace should be installed as level as possible.

Provide ample space for servicing and cleaning. Always comply with the minimum fire protection clearances shown on the unit rating plate.

LOCATION RELATIVE TO COOLING EQUIPMENT — The cooling coil must be installed parallel with or on the downstream side of the unit to avoid condensation in the heat exchangers. When installed parallel with a furnace, dampers or other means used to control the flow of air must prevent chilled air from entering the unit. If the dampers are manually operated, they must be equipped with means to prevent operation of either unit unless the damper is in the full-heat or full-cool position.

HAZARDOUS LOCATIONS

⚠ WARNING
When furnace is installed in a residential garage, it must be installed so that burners and ignition sources are located a minimum of 18 in. above floor. The furnace must be located or protected to avoid physical damage by vehicles. When furnace is installed in a public garage, airplane hangar, or other building having a hazardous atmosphere, unit must be installed in accordance with requirements of National Fire Protection Association, Inc.



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Step 2—Air For Combustion and Ventilation

Provisions for adequate combustion and ventilation air must be provided in accordance with Section 5.3 of the NFGC, Air for Combustion and Ventilation, or applicable provisions of the local building codes.

Canadian installations must be installed in accordance with NSC-NGPIC and all authorities having jurisdiction.

⚠ CAUTION
Air for combustion must not be contaminated by halogen compounds, which include fluoride, chloride, bromide, and iodide. These elements are found in aerosol sprays, detergents, bleaches, cleaning solvents, salts, air fresheners, and other household products.

All fuel-burning equipment must be supplied with air for combustion of the fuel. Sufficient air **MUST** be provided to ensure there will not be a negative pressure in the equipment room or space. In addition, a positive seal **MUST** be made between the furnace cabinet and the return-air duct to prevent pulling air from the burner area and blocked vent safeguard opening.

⚠ CAUTION
The operation of exhaust fans, kitchen ventilation fans, clothes dryers, or fireplaces could create a **NEGATIVE PRESSURE CONDITION** at the furnace. Make-up air **MUST BE PROVIDED** for the ventilation devices, in addition to that required by the furnace.

The requirements for combustion and ventilation air depend upon whether the furnace is located in an unconfined or confined space.

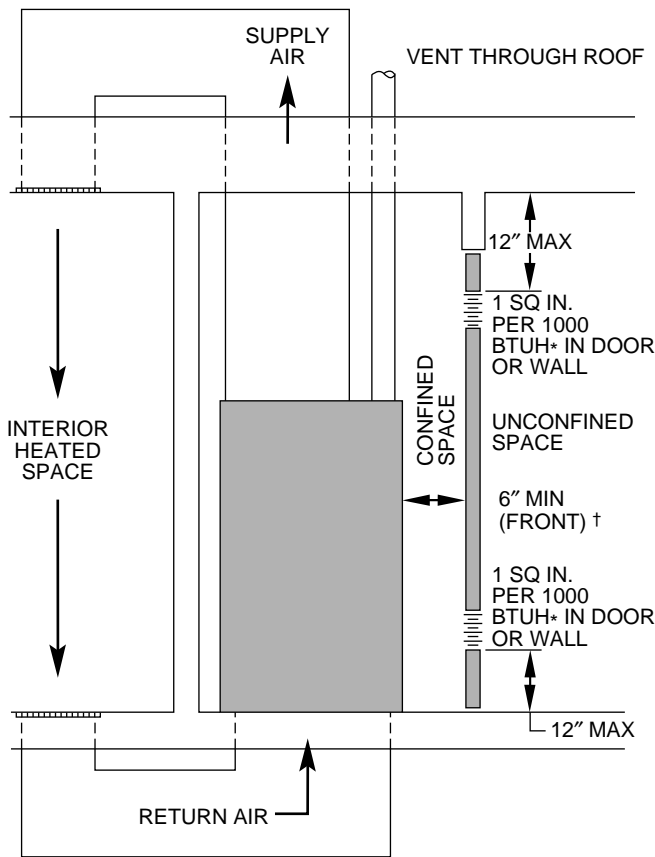
UNCONFINED SPACE

An unconfined space has volume of at least 50 cu ft for each 1000 Btuh of total input for all appliances (such as furnaces, clothes dryers, water heaters, etc.) in the space.

For Example:

58WAV FURNACE INPUT BTUH	MINIMUM SQ FT WITH 7-1/2 FT CEILING
44,000	293
66,000	440
88,000	587
110,000	733
132,000	880
154,000	1026

If the unconfined space is of unusually tight construction, air for combustion and ventilation **MUST** come from either the outdoors or spaces freely communicating with the outdoors. Combustion and ventilation openings must be sized the same as for a confined



* Minimum opening size is 100 sq in. with minimum dimensions of 3 in.

† Minimum of 3 in. when type-B1 vent is used.

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Fig. 3—Confined Space: Air for Combustion and Ventilation from an Unconfined Indoor Space

space as defined below. Return air must not be taken from the room unless an equal or greater amount of air is supplied to the room.

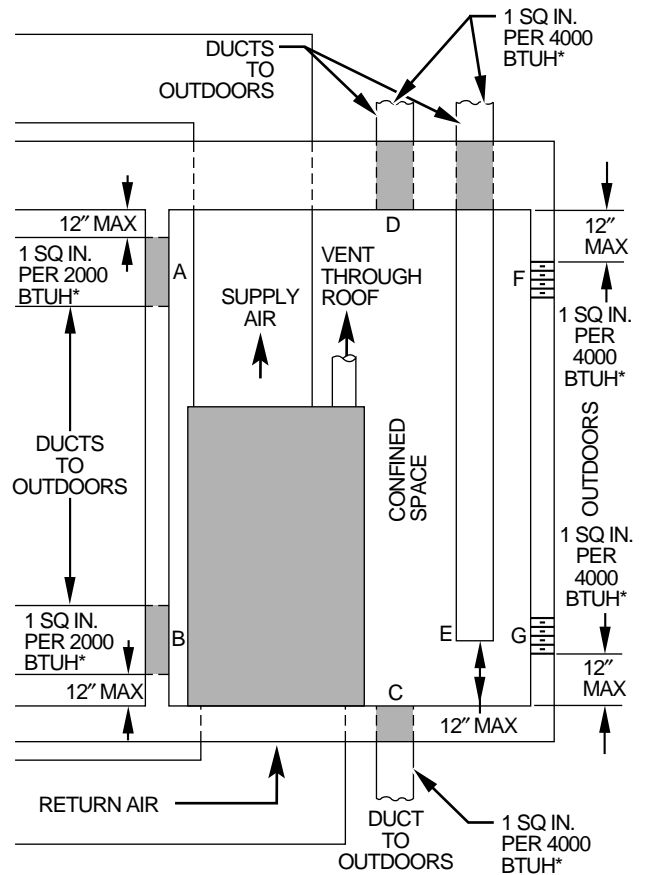
CONFINED SPACE

A confined space is defined as a space whose volume is less than 50 cu ft per 1000 Btuh of total input ratings of all appliances installed in that space. A confined space **MUST** have provisions for supplying air for combustion, ventilation, and dilution of flue gases using 1 of the following methods. (See Fig. 3, 4, and Table 2.)

NOTE: In determining free area of an opening, the blocking effect of louvers, grilles, and screens must be considered. If free area of louver or grille design is unknown, assume that wood louvers have a 20 percent free area and metal louvers or grilles have a 60 percent free area. Screens, when used, must not be smaller than 1/4-in. mesh. Louvers and grilles must be constructed so they cannot be closed.

The size of the openings depends upon whether air comes from outside of the structure or an unconfined space inside the structure.

1. All air from inside the structure requires 2 openings (for structures not usually tight):
 - a. Each opening **MUST** have at least 1 sq in. of free area per 1000 Btuh of total input for all equipment within the confined space, but not less than 100 sq in. per opening. (See Fig. 3 and Table 2.) The minimum dimension of air openings shall not be less than 3 in.



*Minimum dimensions of 3 in.

NOTE: Use any of the following combinations of openings:
A & B C & D D & E F & G

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Fig. 4—Confined Space: Air for Combustion and Ventilation from Outdoors

- b. If building is constructed unusually tight, a permanent opening directly communicating with the outdoors shall be provided. See item 2 below.
 - c. If furnace is installed on a raised platform to provide a return-air plenum, and return air is taken directly from hallway or space adjacent to furnace, all air for combustion must come from outdoors.
2. Air from outside the structure requires 1 of the following methods:
 - a. If combustion air is taken from outdoors through 2 vertical ducts, the openings and ducts **MUST** have at least 1 sq in. of free area per 4000 Btuh of total input for all equipment within the confined space. (See Fig. 4 and Table 2.)
 - b. If combustion air is taken from outdoors through 2 horizontal ducts, the openings and ducts **MUST** have at least 1 sq in. of free area per 2000 Btuh of total input for all equipment within the confined space. (See Fig. 4 and Table 2.)
 - c. If combustion air is taken from outdoors through a single opening or duct (horizontal or vertical) commencing within 12 in. of the top of the confined space, opening and duct **MUST** have at least 1 sq in. of free area per 3000 Btuh of the total input for all equipment within the confined space and not less than the sum of the areas of all vent connectors in the confined space. (See Fig. 4 and Table 2.) Equipment clearances to the structure shall be at least 1 in. from the sides and back and 6 in. from the front of the appliances.

Table 2—Minimum Free Area Of Combustion Air Opening*

58WAV FURNACE INPUT (BTUH)	AIR FROM INDOOR UNCONFINED SPACE	OUTDOOR AIR THROUGH VERTICAL DUCTS		OUTDOOR AIR THROUGH HORIZONTAL DUCTS		OUTDOOR AIR THROUGH SINGLE DUCT	
	Free Area of Opening (Sq In.)	Free Area of Opening and Duct (Sq In.)	Round Pipe (In. Dia)	Free Area of Opening and Duct (Sq In.)	Round Pipe (In. Dia)	Free Area of Opening and Duct (Sq In.)	Round Pipe (In. Dia)
44,000	100	11.0	4	22.0	6	14.67	5
66,000	100	16.5	5	33.0	7	22.00	6
88,000	100	22.0	6	44.0	8	29.33	7
110,000	110	27.5	6	55.0	9	36.67	7
132,000	132	33.0	7	66.0	10	44.00	8
154,000	154	38.5	8	77.0	10	51.33	9

* Free area shall be equal to or greater than the sum of the areas of all vent connectors in the confined space. Opening area must be increased if other gas appliances in the space require combustion air.

When ducts are used, they must be of the same cross-sectional area as the free area of the openings to which they connect. The minimum dimension of ducts must not be less than 3 in. (See Fig. 4.)

AIR DUCTS

Step 1—General Requirements

The duct system should be designed and sized according to accepted national standards such as those published by: Air Conditioning Contractors Association (ACCA), Sheet Metal and Air Conditioning Contractors National Association (SMACNA) or American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE). Or consult factory *The Air Systems Design Guidelines* reference tables available from your local distributor. The duct system should be sized to handle the required system design airflow CFM at the design external static pressure.

When a furnace is installed so that the supply ducts carry air to areas outside the space containing the furnace, the return air must also be handled by a duct(s) sealed to the furnace casing and terminating outside the space containing the furnace.

Secure ductwork with proper fasteners for type of ductwork used. Seal supply- and return-duct connections to furnace with code approved tape or duct sealer.

Flexible connections should be used between ductwork and furnace to prevent transmission of vibration. Ductwork passing through unconditioned space should be insulated to enhance system performance. When air conditioning is used, a vapor barrier is recommended.

Maintain a 1-in. clearance from combustible materials to supply air ductwork for a distance of 36 in. horizontally from the furnace. See NFPA 90B or local code for further requirements.

Step 2—Ductwork Acoustical Treatment

Metal duct systems that do not have a 90 degree elbow and 10 ft of main duct to the first branch take-off may require internal acoustical lining. As an alternative, fibrous ductwork may be used if constructed and installed in accordance with the latest edition of SMACNA construction standard on fibrous glass ducts. Both acoustical lining and fibrous ductwork shall comply with NFPA 90B as tested by UL Standard 181 for Class 1 Rigid air ducts.

Step 3—Supply Air Connections

Connect supply-air duct to 3/4-in. flange on furnace supply-air outlet. The supply-air duct attachment must ONLY be connected to furnace supply-/outlet-air duct flanges or air conditioning coil casing (when used). DO NOT cut main furnace casing to attach supply side air duct, humidifier, or other accessories. All accessories MUST be connected external to furnace main casing.

Step 4—Return Air Connections

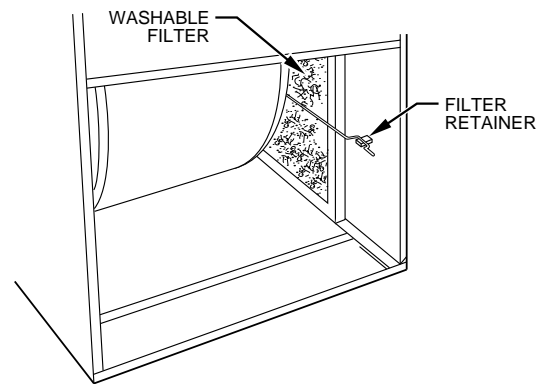
⚠ WARNING

Never connect return-air ducts to the back of the furnace. A failure to follow this warning can cause a fire, personal injury, or death.

The return-air duct must be connected to bottom, sides (left or right), or a combination of bottom and side(s) of main furnace casing as shown in Fig. 1. Bypass humidifier may be attached into unused side return air portion of the furnace casing. DO NOT connect any portion of return-air duct to back of furnace casing.

Step 5—Filter Arrangement

The factory-supplied filter(s) is shipped in the blower compartment. Determine location for the filter and relocate filter retaining wire if necessary. See Fig. 5 for side return application and Fig. 6 for bottom return application. See Table 3 to determine correct filter size for desired filter location. Table 3 indicates filter size, location, and quantity shipped with the furnace.



**Fig. 5—Side Filter Arrangement
(Control Removed for Clarity)**

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For bottom air-return applications, filter may need to be cut to fit some furnace casing widths. A bottom closure panel is factory installed in the bottom of the furnace. When bottom return inlet is desired, remove and discard the bottom closure panel. Two sets of hardware are needed for furnaces in 24-1/2-in. wide casings using 2 filters for bottom return. All hardware is provided for filter installation.

NOTE: Furnaces with a 17-1/2-in. wide casing require an additional procedure when locating the filter for bottom return-air application. Field fabricate a sheet metal filler strip 1 X 3 X 24-1/2 in. and install it along side of the filter as shown in Fig. 6. Drive 2 screws through the casing side and into the filler strip to secure

17½-IN. WIDE CASINGS ONLY:
INSTALL FIELD-SUPPLIED FILTER FILLER STRIP UNDER FILTER.

24½-IN. WIDE CASINGS ONLY:
CUT AND FOLD FACTORY-PROVIDED FILTERS AS SHOWN TO DESIRED SIZE.

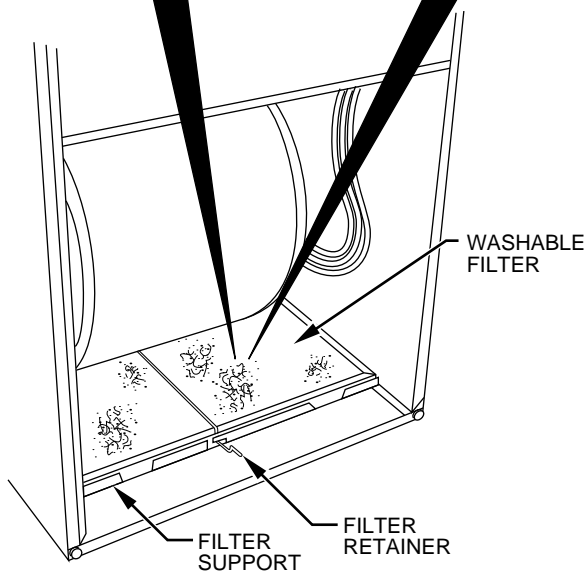
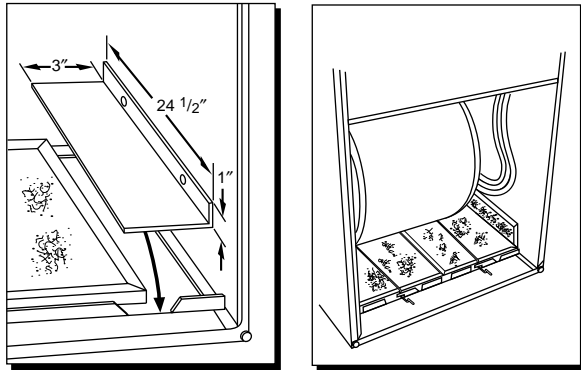


Fig. 6—Bottom Filter Arrangement (Control Removed for Clarity)

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Table 3—Filter Information (In.)

FURNACE CASING WIDTH	FILTER SIZE*		FILTER TYPE
	Side Return	Bottom Return	
14-3/16	(1) 16 X 25 X 1†	(1) 14 X 25 X 1	Cleanable
17-1/2	(1) 16 X 25 X 1†	(1) 16 X 25 X 1	Cleanable
21	(1) 16 X 25 X 1	(1) 20 X 25 X 1†	Cleanable
24-1/2	(2) 16 X 25 X 1†	(1) 24 X 25 X 1	Cleanable

* Filters can be field modified by cutting the frame as marked and folding to the desired size. Alternate sizes can be ordered from your distributor or dealer.
† Factory provided with the furnace.

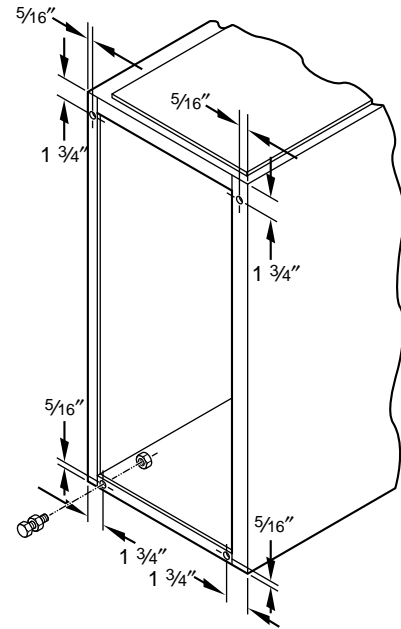
it in place. Filter should rest on the top of the filler strip when installed.

⚠ WARNING

Never operate unit without a filter or with filter access door removed. Failure to follow this warning can cause fire, personal injury, or death.

Step 6—Leveling Legs (If Required)

When the furnace is used with side inlet(s) and leveling legs are required, refer to Fig. 7, and install field-supplied, corrosion-resistant 5/16-in. machine bolts and nuts.



A89014

Fig. 7—Leveling Leg Installation

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

1. Lay furnace on its back. Locate and drill 5/16-in. diameter hole in each bottom corner of furnace as shown in Fig. 7.
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.

Step 7—Gas Piping

Gas piping must be installed in accordance with national and local codes. Refer to the current edition of the NFGC. Canadian installations must be installed in accordance with NSCNGPIC and all authorities having jurisdiction.

Refer to Table 4 for the recommended gas pipe size. Risers must be used to connect to the furnace and the meter.

⚠ CAUTION

If a flexible connector is required or allowed by the authority having jurisdiction, black iron pipe shall be installed at the gas valve and extend a minimum of 2 in. outside the furnace casing.

⚠ WARNING

Use the proper length of pipes to avoid stress on the gas control manifold. Failure to follow this warning can result in a gas leak, causing fire, explosion, personal injury, or death.

⚠ CAUTION

Connect the gas pipe to the furnace using a backup wrench to avoid damaging gas controls.

⚠ WARNING

Never purge a line into a combustion chamber. Never use matches, candles, flame, or other sources of ignition for the purpose of checking leakage. Use a soap-and-water solution to check for leakage. Failure to follow this warning can cause a fire, explosion, personal injury, or death.

Table 4—Maximum Capacity of Pipe*

NOMINAL IRON PIPE SIZE (IN.)	INTERNAL DIAMETER (IN.)	LENGTH OF PIPE (FT)				
		10	20	30	40	50
1/2	0.622	175	120	97	82	73
3/4	0.824	360	250	200	170	151
1	1.049	680	465	375	320	285
1-1/4	1.380	1400	950	770	660	580
1-1/2	1.610	2100	1460	1180	990	900

* Cubic ft of gas per hr for gas pressures of 0.5 psig (14-in. wc) or less, and a pressure drop of 0.5-in. wc (based on a 0.60 specific gravity gas). Ref: Table 10-2 NFPA 54-1999.

Install a sediment trap in the riser leading to the furnace. The trap can be installed by connecting a tee to the riser leading from the furnace. Connect a capped nipple into the lower end of the tee. The capped nipple should extend below the level of the gas controls. (See Fig. 8.)

Apply joint compound (pipe dope) sparingly and only to the male threads of each joint. The compound must be resistant to the action of propane gas.

An accessible manual shutoff valve **MUST** be installed upstream of the furnace gas controls and within 72 in. of the furnace. A 1/8-in. NPT plugged tapping, accessible for test gage connection, **MUST** be installed immediately upstream of the gas supply connection to the furnace and downstream of the manual shutoff valve. Place ground joint union between the gas control manifold and the manual shutoff valve.

Piping should be pressure tested in accordance with local and national plumbing and gas codes before the furnace has been attached. If the pressure exceeds 0.5 psig (14-in. wc), the gas supply pipe must be disconnected from the furnace and capped before the pressure test. If the test pressure is equal to or less than 0.5 psig (14-in. wc), turn off electric shutoff switch located on the gas valve before the test. It is recommended that the ground joint union be loosened before pressure testing. After all connections have been made, purge the lines and check for leakage with regulated gas supply pressure.

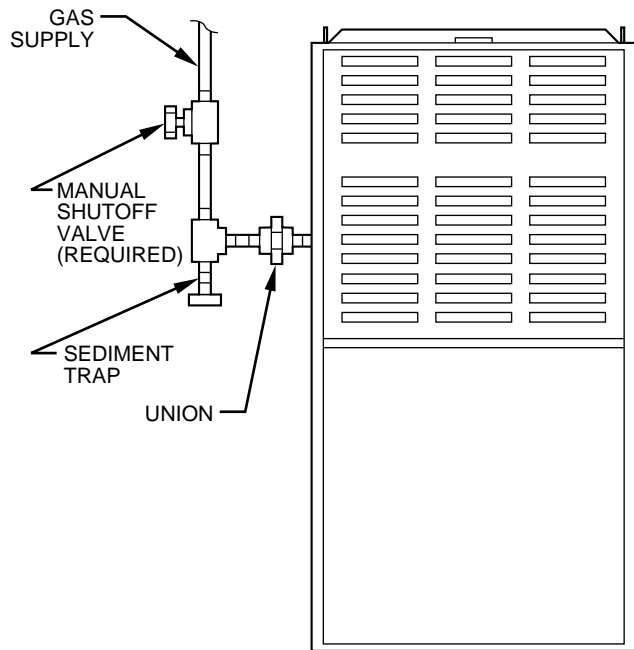
Step 8—Electrical Connections

115-V WIRING — Refer to the unit rating plate or Table 5 for equipment electrical requirements. The control system requires an earth ground for proper operation.

⚠ CAUTION

Do not connect aluminum wire between disconnect switch and furnace. Use only copper wire.

Make all electrical connections in accordance with the National Electrical Code (NEC) ANSI/NFPA 70-1999 and local codes or ordinances that might apply. For Canadian installations, all electrical connections must be made in accordance with CSA C22.1 Canadian Electrical Code, or authorities having jurisdiction.



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Fig. 8—Typical Gas Pipe Arrangement

⚠ WARNING

The cabinet **MUST** have an uninterrupted or unbroken ground according to NEC, ANSI/NFPA 70-1999 and Canadian Electrical Code, CSA C22.1 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. Failure to follow this warning could result in electrical shock, fire, or death.

The junction box (J-box) can be moved to the left-hand side of the furnace when a left-side power supply is desired. Remove the 2 screws holding the auxiliary J-box. Mount the J-box on the left-hand side of the furnace (holes have been pre-drilled in casing). When moved, tuck the wiring harness behind the clip provided to keep extra wire lengths out of the way.

NOTE: Proper polarity must be maintained for 115-v wiring. If polarity is incorrect, control status indicator light will flash rapidly and the furnace will not operate.

24-V WIRING

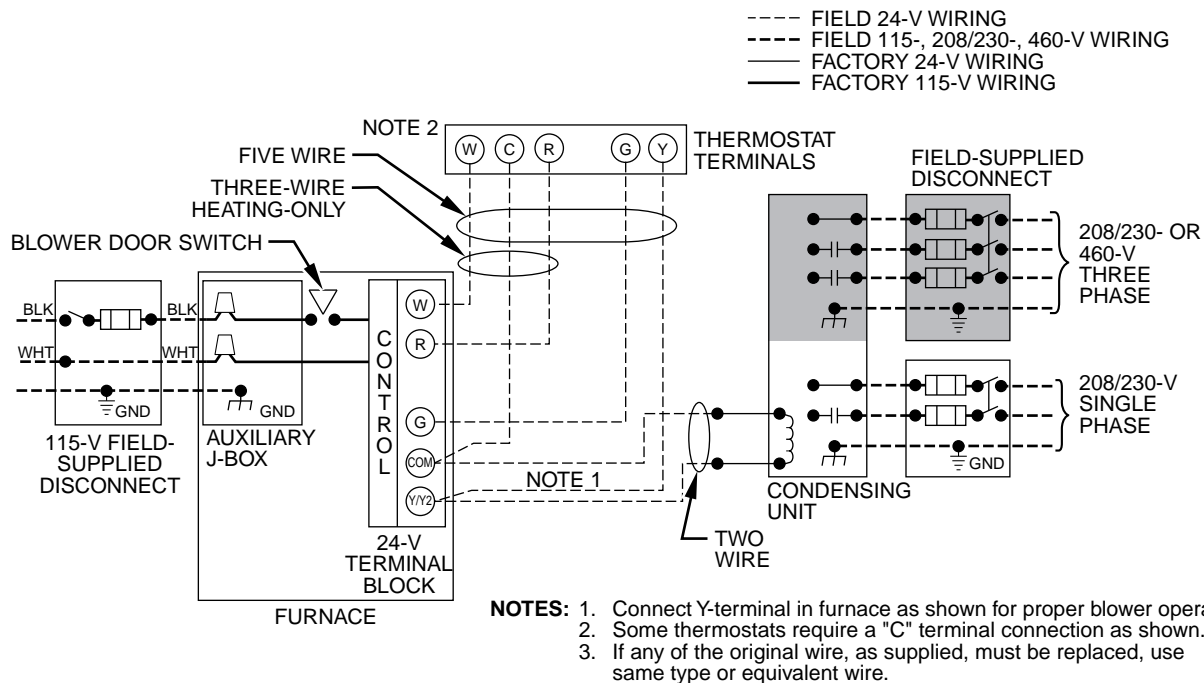
Make field 24-v connections at the 24-v terminal strip. (See Fig. 15.) Connect terminal Y/Y2 as shown in Fig. 9 for proper cooling operation. Use only AWG No. 18, color-coded, copper thermostat wire.

The 24-v circuit contains an automotive-type, 3-amp fuse located on the main control board. Any 24-v shorts during installation, service, or maintenance could cause this fuse to blow. If fuse replacement is required, use **ONLY** a 3-amp fuse of identical size.

ACCESSORIES

1. Electronic Air Cleaner (EAC)

Two quick-connect terminals, marked EAC-1 and EAC-2, are provided for EAC connection. (See Fig. 15.) These terminals are energized with 115-v, (1.0-amp maximum) during blower motor operation.



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Fig. 9—Standard Heating and Cooling Application Wiring Diagram

Table 5—Electrical Data

UNIT SIZE	VOLTS—HERTZ—PHASE	OPERATING VOLTAGE RANGE		MAXIMUM UNIT AMPS	MINIMUM WIRE GAGE	MAXIMUM WIRE LENGTH (FT)‡	MAXIMUM FUSE OR CKT BKR AMPS†
		Maximum*	Minimum*				
045-08	115—60—1	127	104	6.0	14	47	15
045-12	115—60—1	127	104	8.3	14	34	15
070-08	115—60—1	127	104	5.9	14	47	15
070-12	115—60—1	127	104	8.7	14	32	15
091-14	115—60—1	127	104	9.0	14	31	15
091-16	115—60—1	127	104	10.4	14	27	15
111-12	115—60—1	127	104	8.0	14	35	15
111-16	115—60—1	127	104	10.1	14	28	15
111-20	115—60—1	127	104	14.4	12	31	20
136-16	115—60—1	127	104	10.1	14	28	15
136-20	115—60—1	127	104	13.3	12	33	20
155-20	115—60—1	127	104	14.0	12	31	20

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

† Time-delay type is recommended.

‡ Length shown is as measured 1 way along wire path between unit and service panel for maximum 2 percent voltage drop.

2. Humidifier (HUM)

Quick-connect terminal (HUM) and screw terminal (COM-24V) are provided for 24-v humidifier connection. The terminals are energized with 24-v 0.5-amp maximum after inducer motor prepurge period.

⚠ WARNING

DO NOT connect furnace control HUM terminal to HUM (humidifier) terminal on Thermostat™, Zone Controller or similar device. See Thermostat, Zone Controller, thermostat, or controller manufacturer's instructions for proper connection. A failure to follow this warning could result in fire.

NOTE: A field-supplied, 115-v controlled relay connected to EAC terminals may be added if humidifier operation is desired during blower operation.

Step 9—Venting

Refer to the national or local installation code such as NFGC in the United States or the NSCNPIC in Canada for proper vent sizing and installation requirements. Use the enclosed Installation Instruction (Single-Stage Vent Tables for Category I Fan-Assisted Furnaces) for a quick, easy reference.

After fully assembling the vent connector to the furnace flue collar, securely fasten the vent connector to the collar with two field-supplied, corrosion-resistant, sheet metal screws located 180° apart and midway up the collar.

The horizontal portion of the venting system shall maintain a minimum of 1/4-in. upward slope per linear ft and it shall be rigidly supported every 5 ft or less with hangers or straps to ensure that there will be no movement after installation.

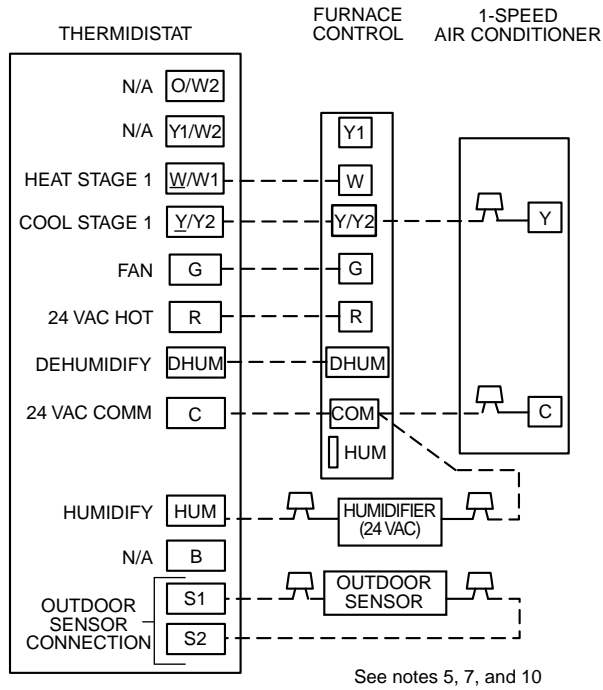


Fig. 10—Single-Stage Furnace with 1-Speed Air Conditioner

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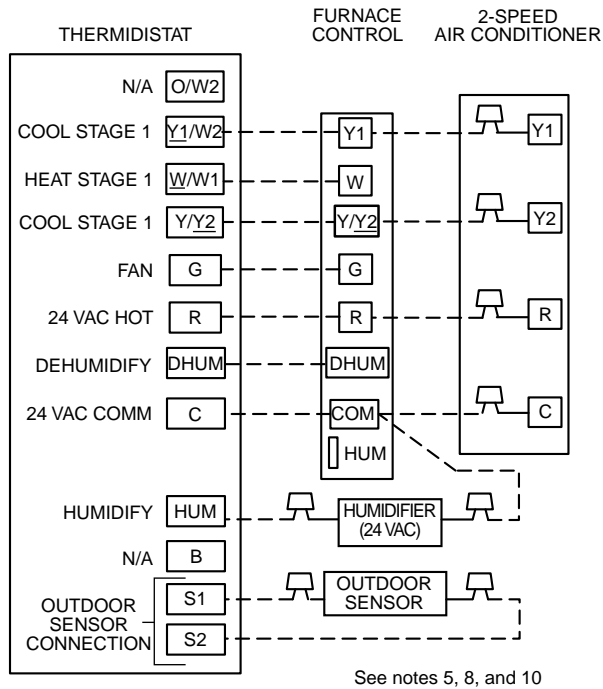


Fig. 11—Single-Stage Furnace with 2-Speed Air Conditioner

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