
INSTALLATION INSTRUCTIONS

Wall Mounted Gas/Electric

Models:

W24G4	W30G4	W36G4	W42G4	W48G4	W60G4
W24G4D	W30G4D	W36G4D	W42G4D	W48G4D	W60G4D

WARNING

READ ALL INSTRUCTIONS CAREFULLY BEFORE BEGINNING THE INSTALLATION.

THE INSTALLATION MUST COMPLY WITH THESE INSTRUCTIONS AND THE REQUIREMENTS OF ALL GOVERNING CODES AND ORDINANCES FOR THE INSTALLATION LOCATION.

IT IS THE RESPONSIBILITY OF INSTALLER TO KNOW AND UNDERSTAND ALL OF THESE REQUIREMENTS.

FAILURE TO DO SO COULD CREATE A HAZARD RESULTING IN PROPERTY DAMAGE, BODILY INJURY, OR DEATH.



Climate Control Solutions

Bard Manufacturing Company, Inc.
Bryan, Ohio 43506
www.bardhvac.com

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Getting Other Information and Publications

These publications can help when installing the furnace. They can usually be found at the local library or purchased directly from the publisher. Be sure to consult the current edition of each standard.

National Fuel Gas CodeANSI Z223.1/NFPA 54

National Electrical CodeANSI/NFPA 70

Standard for the Installation of Air Conditioning and Ventilating SystemANSI/NFPA 90A

Standard for Warm Air Heating and Air Conditioning Systems..... ANSI/NFPA 90B

Standard for Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances NFPA 211

Load Calculation for Residential Winter and Summer Air Conditioning ACCA Manual J

Duct Design for Residential Winter and Winter Air Conditioning and Equipment Selection ACCA Manual D

Canadian Electrical Code..... CSA C22.1

Canadian Installation Code CAN/CGA B149

For more information, contact these publishers:

ACCA **Air Conditioning Contractors of America**
1712 New Hampshire Avenue, NW
Washington, DC 20009
Telephone: (202) 483-9370

ANSI **American National Standards Institute**
11 West Street, 13th Floor
New York, NY 10036
Telephone: (212) 642-4900
Fax: (212) 302-1286

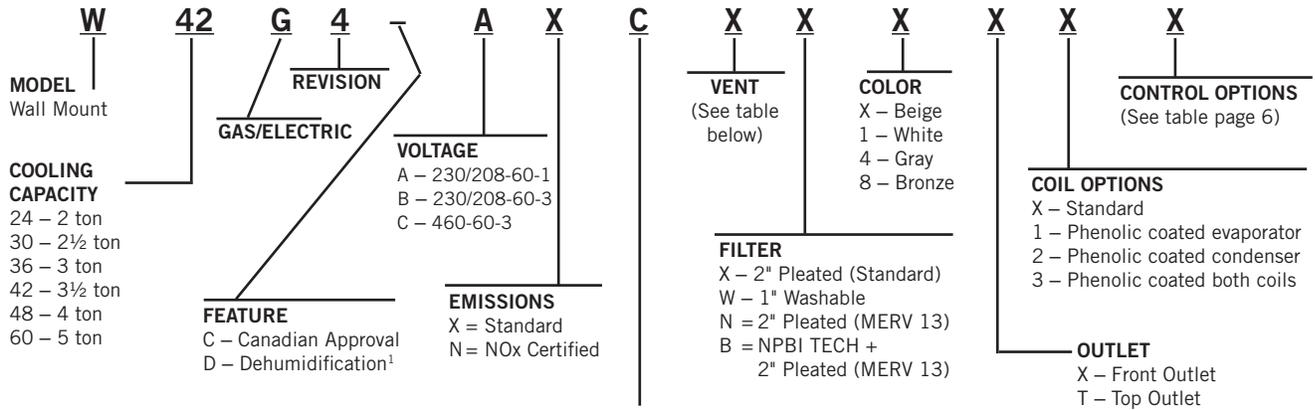
ASHRAE **American Society of Heating Refrigerating, and Air Conditioning Engineers, Inc.**
1791 Tullie Circle, NE.
Atlanta, GA 30329-2305
Telephone: (404) 636-8400
Fax: (404) 321-5478

NFPA **National Fire Protection Association**
Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9901
Telephone: (800) 344-3555
Fax: (617) 984-7057

CSA **Canadian Standards Association**
178 Rexdale Boulevard
Rexdale, Ontario
Canada. M9W 1R3
Telephone: (416) 447-4044

WALL MOUNT GAS/ELECTRIC GENERAL INFORMATION

Model Number Nomenclature



HEATING INPUT

2 - 3 Ton		3.5 - 5 Ton	
A	45,000	B	75,000
B	67,500	C	100,000
C	90,000	D	125,000*

*125,000 BTU input model is not NOx certified.

¹ Reference Supplemental Instructions 7960-867 for dehumidification unit information.

Ventilation Options

		Models	
		W24G, W30G, W36G	W42G, W48G, W60G
Description	Factory Installed Code No.	Field Installed Part No.	Field Installed Part No.
Barometric Fresh Air Damper	X	WGBFAD-3	WGBFAD-5
Blank-Off Plate	B	WGBOP-3	WGBOP-5
Motorized Fresh Air Damper	M	WGMFAD-3A	WGMFAD-5A
Commercial Ventilator – Spring Return	V	WGCRVS-3A	WGCRVS-5A
Commercial Ventilator – Power Return	P	WGCRVP-3A	WGCRVP-5A
Economizer - Fully Modulating ①	E	WGJIFM-3	WGJIFM-5
Energy Recovery Ventilator – 230 Volt	R	WGERV-A3B	WGERV-A5B
Energy Recovery Ventilator – 460 Volt	R	WGERV-C3C	WGERV-C5C

① Low ambient control is required with economizer for low temperature compressor operation.

Air Conditioning Module Options

CCM ①	HPC ②	LPC ③	LAC ④	SK ⑤	Factory Installed Code	Field Installed Part
STD	STD	STD	•		H	CMA-45 (WG4D Units) CMA-46 (WG4 Units)
				•	Field Only	SK111 or CMC-15

STD – Standard equipment.

- ① CCM Compressor control module has adjustable 30 second to 5 minute delay-on-break timer. On initial power up, or any time the power is interrupted, the delay-on-make will be 2 minutes plus 10% of the delay-on-break setting. There is no delay-on-make during routine operation of the unit. The module also provides the lockout feature (with 1 retry) for high and/or low pressure controls, and a 2-minute timed bypass for low pressure control.
- ② HPC High pressure control is auto reset. Always used with compressor control module (CCM) which is included. See Note ①.
- ③ LPC Low pressure control is auto reset. Always used with compressor control module (CCM) which is included. See Note ①.
- ④ LAC Low ambient control permits cooling operation down to 0°F. (Includes fan cycling control + Freeze Stat)
- ⑤ SK CMC-15 is PTCR Start Kit can be used with all -A single phase models. Increases starting torque 2-3X. Not used for -B or -C 3-phase models. Do not use if SK111 is used.
- ⑤ SK SK111 Start Capacitor and Potential Relay Start Kit can be used with all -A single phase models. Increases starting torque 9x. Not used for -B or -C 3-phase models. Do not use if CMC-15 is used.

TABLE 1A
Specifications
W24G4, W30G4 and W36G4 Models

Models	W24G4-A	W24G4-B	W24G4-C	W30G4-A	W30G4-B	W30G4-C	W36G4-A	W36G4-B	W36G4-C
<i>Electrical Rating – 60 Hz</i>	230/208-1	230/208-3	460-3	230/208-1	230/208-3	460-3	230/208-1	230/208-3	460-3
<i>Operating Voltage Range</i>	197-253	187-253	414-506	197-253	187-253	414-506	197-253	187-253	414-506
<i>Minimum Circuit Ampacity</i>	20.6	12.6	8	22.6	16.1	8.6	26.4	19	10.6
<i>* Field Wire Size</i>	10	14	14	10	12	14	8	10	14
<i>Ground Wire Size</i>	10	14	14	10	12	14	10	10	14
<i>** Delay Fuse or Circuit Breaker Max.</i>	30	15	10	30	20	10	35	25	15
<i>Compressor</i>									
<i>Voltage</i>	230/208	230/208	460	230/208	230/208	460	230/208	230/208	460
<i>Rated Load Amps</i>	7.6/8.7	4.6/5.3	2.5	9.4/10.7	6/6.9	3.2	12/13.5	7.8/8.7	4.8
<i>Branch Circuit Selection Current</i>	12.9	6.5	3.6	14.2	9	4.2	16.7	10.5	5.8
<i>Lock Rotor Amps</i>	58.3	55.4	28	73	58	28	79	73	38
<i>Compressor Type</i>	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
<i>Fan Motor and Condenser</i>									
<i>Fan Motor – HP/RPM/SPD</i>	1/5-1100-1	1/5-1100-1	1/5-1100-1	1/5-1100-1	1/5-1100-1	1/5-1100-1	1/5-1100-1	1/5-1100-1	1/5-1100-1
<i>Fan Motor – Amps</i>	1.4	1.4	0.8	1.4	1.4	0.8	1.4	1.4	0.8
<i>Fan – DIA/CFM</i>	20" - 2100	20" - 2100	20" - 2100	20" - 2100	20" - 2100	20" - 2100	20" - 2000	20" - 2000	20" - 2000
<i>Blower Motor and Evaporator</i>									
<i>Blower Motor – HP/RPM/SPD</i>	1/2-670-5	1/2-670-5	1/2-670-5	1/2-750-5	1/2-750-5	1/2-750-5	1/2-870-5	1/2-870-5	1/2-870-5
<i>Blower Motor – Amps</i>	0.9	0.9	1.2	1.2	1.2	1.2	1.9	1.9	1.2
<i>CFM Cooling and E.S.P.</i>	800 - 0.15	800 - 0.15	800 - 0.15	900 - 0.15	900 - 0.15	900 - 0.15	1100 - 0.15	1100 - 0.15	1100 - 0.15
<i>Filter Size</i>	20 x 25 x 2	20 x 25 x 2	20 x 25 x 2	20 x 25 x 2	20 x 25 x 2	20 x 25 x 2	20 x 25 x 2	20 x 25 x 2	20 x 25 x 2
<i>Shipping Weight – LBS.</i>	500	500	500	530	530	530	540	540	540
<i>Unit Charge (R-410A lb.)</i>	5.750	5.750	5.750	5.750	5.750	5.750	6.625	6.625	6.625

* 75° C Copper wire size

** Maximum time delay fuse or circuit breaker

TABLE 1B
Specifications
W42G, W48G and W60G Models

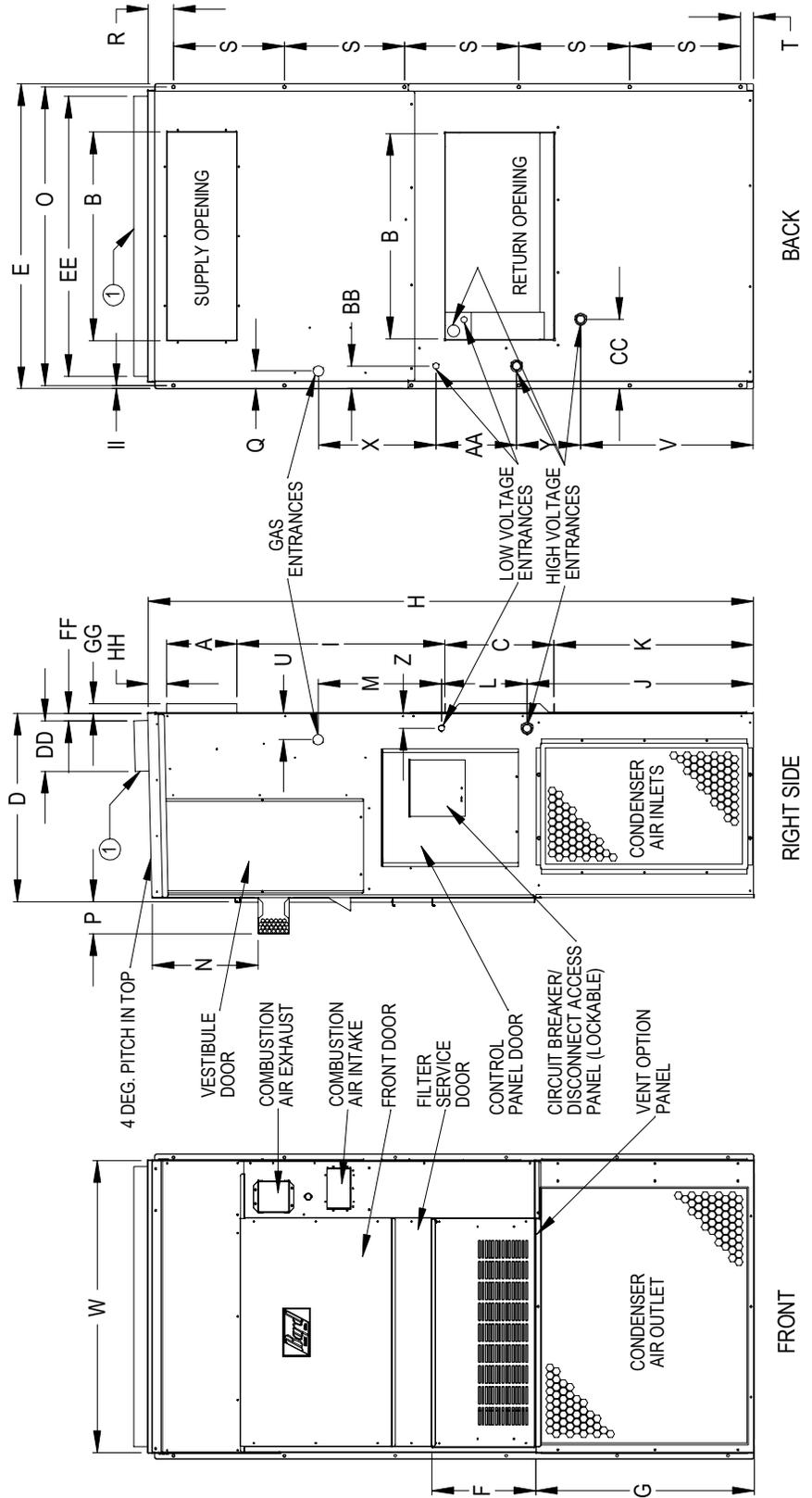
Models	W42G4-A	W42G4-B	W42G4-C	W48G4-A	W48G4-B	W48G4-C	W60G4-A	W60G4-B	W60G4-C
<i>Electrical Rating – 60 Hz</i>	230/208-1	230/208-3	460-3	230/208-1	230/208-3	460-3	230/208-1	230/208-3	460-3
<i>Operating Voltage Range</i>	197-253	187-253	414-506	197-253	187-253	414-506	197-253	187-253	414-506
<i>Minimum Circuit Ampacity</i>	29	23.4	11.5	34.4	24.4	12	40.2	29.7	13.6
<i>* Field Wire Size</i>	8	10	14	8	10	14	8	8	12
<i>Ground Wire Size</i>	10	10	14	10	10	14	10	10	12
<i>** Delay Fuse or Circuit Breaker Max.</i>	40	30	15	50	30	15	50	40	20
<i>Compressor</i>									
<i>Voltage</i>	230/208	230/208	460	230/208	230/208	460	230/208	230/208	460
<i>Rated Load Amps</i>	15.5/17.4	11.7/13.2	5.9	16.7/19.5	10.6/12.3	6.5	19.5/21.9	12.9/14.4	7
<i>Branch Circuit Selection Current</i>	18	13.6	6	21.8	13.8	6.5	24.4	16	7.8
<i>Lock Rotor Amps</i>	112	88	44	117	83.1	41	144.2	110	52
<i>Compressor Type</i>	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
<i>Fan Motor and Condenser</i>									
<i>Fan Motor – HP/RPM/SPD</i>	1/3-850-1	1/3-850-1	1/3-850-1	1/3-830-1	1/3-830-1	1/3-830-1	1/2-1000-1	1/2-1000-1	1/2-1000-1
<i>Fan Motor – Amps</i>	1.8	1.8	1	1.8	1.8	1	3.8	3.8	2.5
<i>Fan – DIACFM</i>	24" - 2900	24" - 2900	24" - 2900	24" - 2700	24" - 2700	24" - 2700	24" - 3400	24" - 3400	24" - 3400
<i>Blower Motor and Evaporator</i>									
<i>Blower Motor – HP/RPM/SPD</i>	3/4-850-5	3/4-850-5	3/4-850-5	3/4-940-5	3/4-940-5	3/4-940-5	3/4-1040-5	3/4-1040-5	3/4-1040-5
<i>Blower Motor – Amps</i>	2.4	2.4	1.7	3.1	3.1	1.7	3.7	3.7	1.7
<i>CFM Cooling and E.S.P.</i>	1300 - 0.15	1300 - 0.15	1300 - 0.15	1450 - 0.20	1450 - 0.20	1450 - 0.20	1650 - 0.20	1650 - 0.20	1650 - 0.20
<i>Filter Size</i>	20 x 30 x 2	20 x 30 x 2	20 x 30 x 2	20 x 30 x 2	20 x 30 x 2	20 x 30 x 2	20 x 30 x 2	20 x 30 x 2	20 x 30 x 2
<i>Shipping Weight – LBS.</i>	500	500	500	530	530	530	550	550	550
<i>Unit Charge (R-410A lb.)</i>	6.500	6.500	6.500	7.125	7.125	7.125	9.625	9.625	9.625

* 75° C Copper wire size

** Maximum time delay fuse or circuit breaker

FIGURE 1
Unit Dimensions

UNIT	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
W24G-W30G-W36G	7.88	27.88	13.88	24.25	40	14.88	25.63	81.63	30	27.38	27.5	14.12	15.44	15.31	39.25	4.5	2.5	5.88
W42G-W48G-W60G	9.88	29.88	15.88	27.25	43.81		31.63	87.5		33.38	28.75				42.88			3.75
UNIT	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	II	
W24G-W30G-W36G	12-7 HOLES	3.75	2.88	22.9	38	17.84	4.44	2.25	11.44	3.25	9	7.25	36.25	1.13	1.25	2	0.38	
W42G-W48G-W60G	16-6 HOLES		3.88	24.9	42	17.34	8.44		12.19		10		40.25			2.75	0.44	



MIS-3239 A



CAUTION

During the initial firing of the burners there will probably be some amount of smoke issued to the circulating air stream as the result of residual oil burning off of the heat exchanger tubes. This oil is required during the forming process of the stainless steel heat exchanger tubes to facilitate the bending. OSHA or the National Toxicology Program does not list the oil as a carcinogen. In vapor form this may be irritating to the eyes or could cause headaches. This is a one-time occurrence, and ventilation of the space may be required depending upon the space being conditioned.

1. Transportation Damage

All units are packed securely in shipping containers. All units should be carefully inspected upon arrival for damage. In the event of damage, the consignee should:

1. Note on delivery receipt of any damage to container.
2. Notify carrier promptly, and request an inspection.
3. In case of concealed damage, the carrier must be notified as soon as possible within 15 days after delivery.
4. Claims for any damage, apparent or concealed, should be filed with the carrier, using the following supporting documents:
 - A. Original Bill of Lading, certified copy or indemnity bond.
 - B. Original paid freight bill of indemnity in lieu thereof.
 - C. Original invoice or certified copy thereof showing trade and other discounts or deductions.
 - D. Copy of the inspection report issued by carrier's representative at the time damage is reported to carrier.

2. Important

The equipment covered in this manual is to be installed by trained, experienced service and installation technicians. All duct work or portions thereof not in the conditioned space should be properly insulated in order to both conserve energy and prevent condensation or moisture damage.

3. General Information

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

These instructions explain the recommended method to install the air cooled self-contained electric air conditioning and gas heating unit and the electrical

wiring connections and gas piping to the unit. The refrigerant system is completely assembled and charged. All internal wiring is complete.

These instructions and any instructions packaged with any separate equipment required to make up the entire heating/cooling system should be carefully read before beginning the installation.

While these instructions are intended as a general recommended guide, they do not supersede any national and/or local codes in any way. Authorities having jurisdiction should be consulted before the installation is made. See page 4 for information on codes and standards.

Size of unit for proposed installation should be based on heat loss/heat gain calculations made according to methods of Air Conditioning Contractors of America (ACCA). The air duct should be installed in accordance with the Standards of the National Fire Protection Association for the Installation of Air Conditioning and Ventilating Systems of Other Than Residence Type, NFPA No. 90A, and Residence Type Warm Air Heating and Air Conditioning Systems, NFPA No. 90B. Where local regulations are at a variance with instructions, installer should adhere to local codes.

4. Application

This is a fan-assisted forced air gas furnace with electric air conditioning for outdoor installation. A fan-assisted furnace is equipped with an integral mechanical means to draw products of combustion through the combustion chamber and heat exchanger. The furnace installation must conform with local building codes and ordinances or, in their absence, with the National Fuel Gas Code ANSI Z223.1 or CAN/CGA-B149.1, latest edition, and the National Electrical Code ANSI/NFPA-7 or CSA C22.1, latest edition. It is the personal responsibility and obligation of the purchaser to contact a qualified installer to assure that installation is adequate and is in conformance with governing codes and ordinances.

5. Duct Work

The unit is designed for use with or without duct work (see **WARNING**). Flanges are provided for attaching the supply and return ducts. All duct work, supply and return, must be properly sized for the design

airflow requirement of the equipment. Air Conditioning Contractors of America (ACCA) is an excellent guide to proper sizing.

 WARNING
<p>In all cases, there must be a metal duct connection made to the supply air flange, and a 1" clearance to combustibles must be maintained to this duct connection.</p> <p>For free blow applications, a metal sleeve must be used in the wall opening itself, again maintaining a 1" clearance to combustibles.</p> <p>Failure to use the sheet metal can cause fire resulting in property damage, injury, or death.</p>

Refer to Tables 12, 13, 14, 15, 16 and 17 for maximum static pressure available for duct design.

See Figures 3A and 3B and clearance information in Section 9 and Table 2 for additional information.

Design the duct work according to methods given by the Air Conditioning Contractors of America (ACCA). When duct runs through unheated spaces, it should be insulated with a minimum of 1" of insulation. Use insulation with a vapor barrier on the outside of the insulation. Flexible joints should be used to connect the duct work to the equipment in order to keep the noise transmission to a minimum.

A 1" clearance to combustible material for the first 3' of duct attached to the outlet air frame is required. See wall mounting instructions and Figures 2A, 2B, 3A and 3B for further details.

Ducts through the walls must be insulated and all joints taped or sealed to prevent air or moisture entering the wall cavity.

Some installations may not require any return air duct. A metallic return air grille is required with installations not requiring a return air duct. The spacing between louvers on the grille shall not be larger than 5/8".

Any grille that meets with the 5/8" louver criteria may be used. It is recommended that Bard Return Air Grille or Return Filter Grille be installed when no return duct is used. Contact distributor or factory for ordering information. If using a return air filter grille, filters must be of sufficient size to allow a maximum velocity of 400 fpm.

NOTE: *If no return air duct is used, applicable installation codes may limit this cabinet to installation only in a single story structure.*

6. High Altitude Applications

Ratings of gas utilization equipment are based on sea level operation and need not be changed for operation at elevations up to 6000'. For operation at elevations above 6000' and in the absence of specific recommendations from the local authority having jurisdiction, equipment ratings shall be reduced as specified in Section 21.

7. Wall Mounting Information

1. Two holes for the supply and return air openings must be cut through the wall as detailed in Figure 4.
2. On wood-frame walls, the wall construction must be strong and rigid enough to carry the weight of the unit without transmitting any unit vibration.
3. Concrete block walls must be thoroughly inspected to ensure that they are capable of carrying the weight of the installed unit.

8. Mounting the Unit

1. These units are secured by wall mounting brackets which secure the unit to the outside wall surface at both sides. A bottom mounting bracket is provided for ease of installation but is not required.

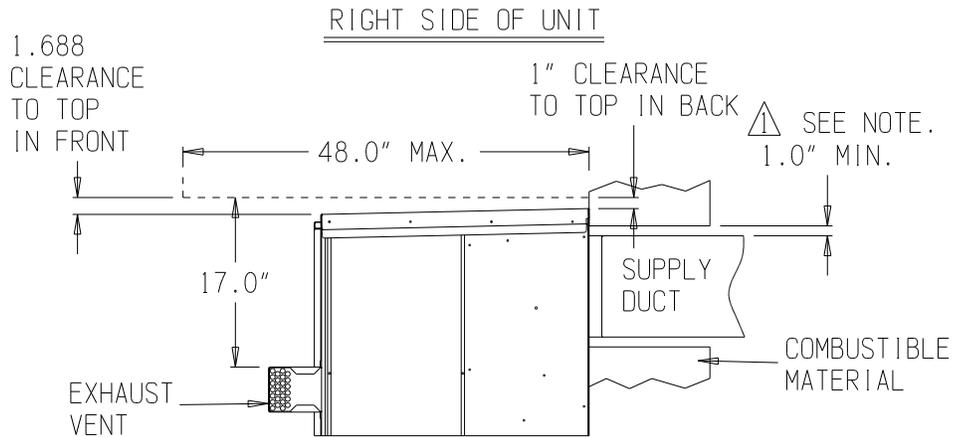
 CAUTION
<p>If the bottom bracket is used, be certain the bracket is secured to the outside wall surface in a way sufficient to support the entire weight of the unit during installation until side mounting brackets are secured.</p>

2. The W42G, W48G and W60G models are suitable for 0 clearance on the installation mounting wall and to the top. For all models, the supply air duct flange and the first 3' of supply air duct require a minimum of 1" clearance to combustible material. The W24G, W30G and W36G models are suitable for 0 clearance on the installation mounting wall, but require 1" clearance to the top if combustible material overhang projects above the unit (see Figures 3A and 3B). If a combustible wall, use a minimum of Figure 1 "A" dimension plus 2" and "B" dimension plus 2". See Figures 4 and 5 for details.

 WARNING
<p>Failure to provide the 1" clearance between the supply duct and a combustible surface for the first 3' of duct can result in fire causing damage, injury or death.</p>

3. Locate and mark lag bolt locations and bottom mounting bracket location.
4. Mount bottom mounting bracket.
5. Hook top rain flashing under back bend of top. Top rain flashing is shipped secured to the right side of the back.
6. Position unit in opening and secure with 5/16" lag bolts; use 7/8" diameter flat washers on the lag bolts. Use lag bolts long enough to support the unit's weight when mounted to the structure. This length may be dependent on the type of construction.
7. Secure rain flashing to wall and caulk across entire length of top (see Figures 2A and 2B).
8. On side-by-side installations, maintain a minimum of 20" clearance on right side to allow access to control panel and burner compartment, and to allow proper airflow to the outdoor coil. Additional clearance may be required to meet local or national codes.

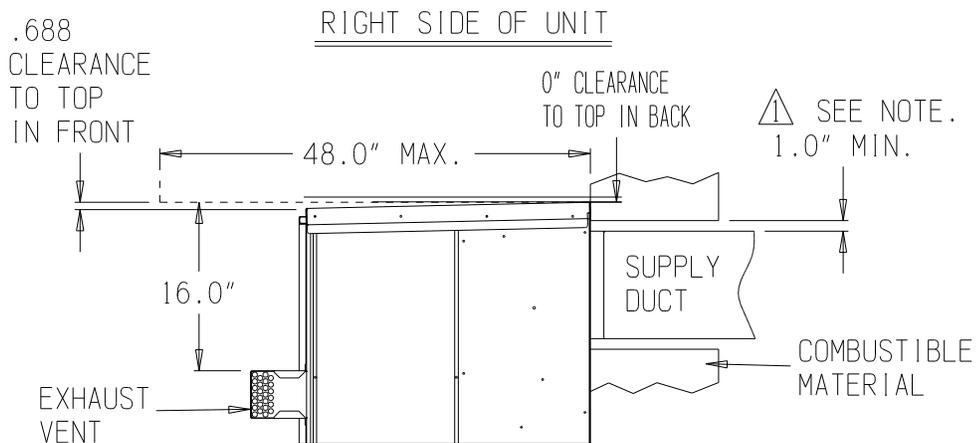
FIGURE 3A
Combustible Clearance
for W24G, W30G and W36G Models



⚠ SIDE SECTION VIEW OF SUPPLY AIR DUCT
 FOR WALL MOUNTED UNIT SHOWING 1.0"
 CLEARANCE TO ALL COMBUSTIBLE SURFACES.

MIS-1682

FIGURE 3B
Combustible Clearance
for W42G, W48G and W60G Models



⚠ SIDE SECTION VIEW OF SUPPLY AIR DUCT
 FOR WALL MOUNTED UNIT SHOWING 1.0"
 CLEARANCE TO ALL COMBUSTIBLE SURFACES.

MIS-1714



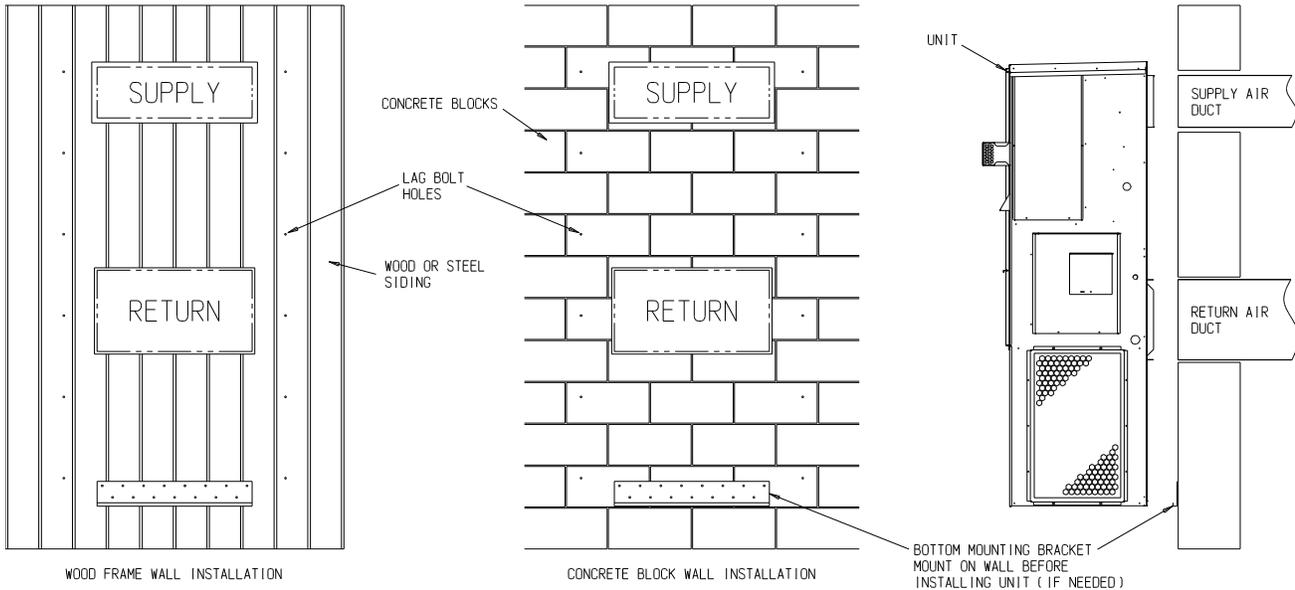
WARNING

A **minimum** of 1" clearance must be maintained between the supply air duct and combustible materials. This is required for the first 3' of ducting.

It is important to insure that the one 1" minimum spacing is maintained at all points.

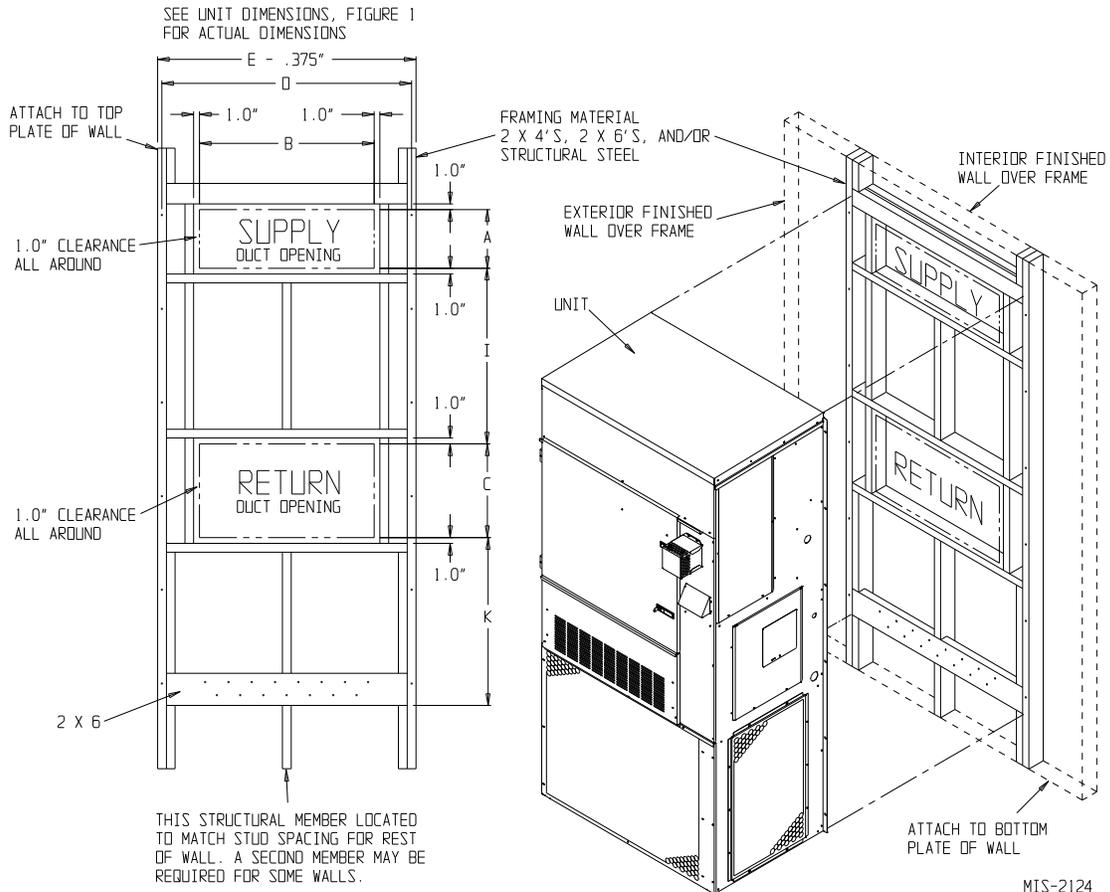
Failure to do this could result in overheating the combustible material and may result in a fire causing damage, injury or death.

FIGURE 4
Wall Mounting Instructions



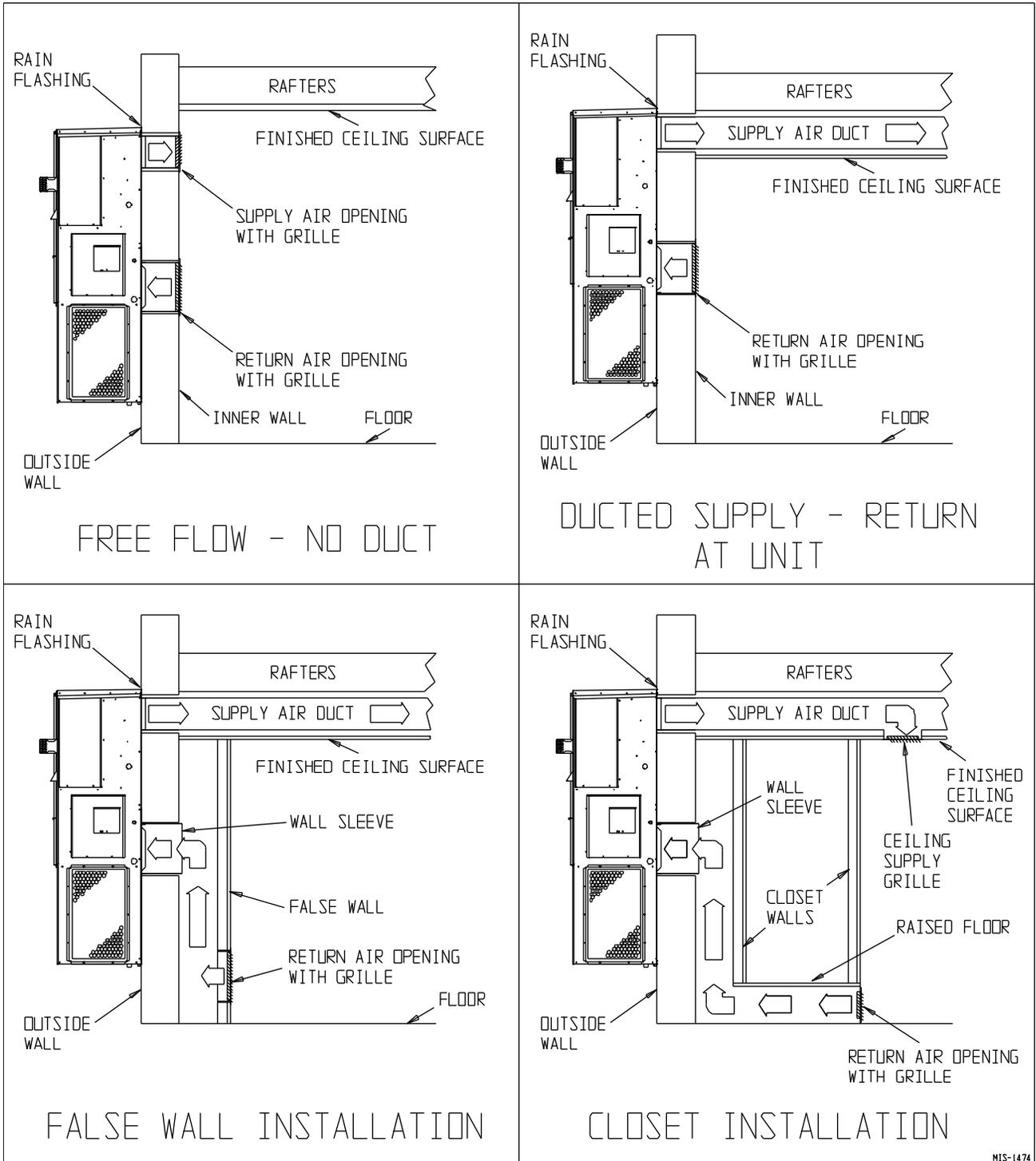
MIS-1475

FIGURE 5
Wall Mounting Instructions



MIS-2124

FIGURE 6
Common Wall Mounting Installations



MIS-1474

9. Clearances

Minimum clearances, as specified in Table 2, must be maintained from adjacent structures to provide adequate fire protection, adequate combustion air and room for service personnel.

While minimum clearances are acceptable for safety reasons, they may not allow adequate air circulation around the unit for proper operation in the cooling mode. Whenever possible, it is desirable to allow additional clearance, especially around the condenser inlet and discharge openings. **Do not install the unit in a location that will permit discharged air from the condenser to recirculate to the condenser inlet.**

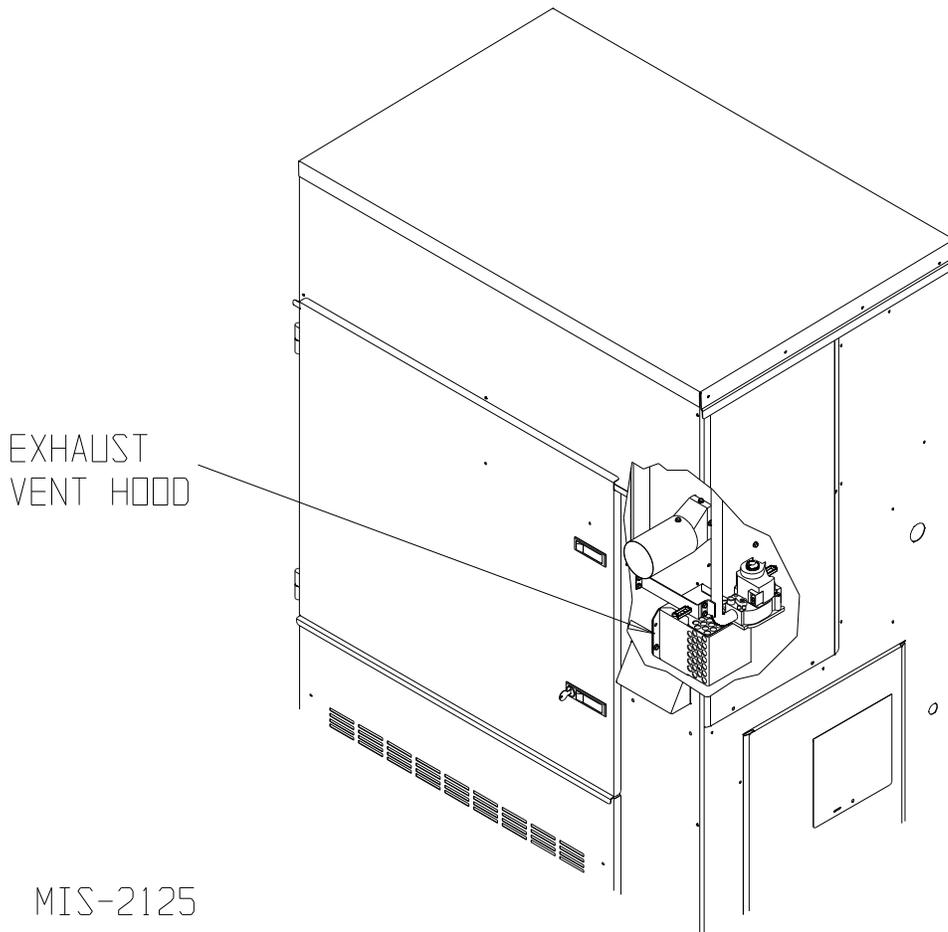
WARNING

Clearances from combustible materials must be maintained as specified. Failure to maintain clearances could cause fire resulting in property damage, injury or death.

TABLE 2
Minimum Installation Clearances

Outlet Duct (from combustible materials)	1" first 3'
Vent Terminal (from combustible materials)	17"*
Condenser Inlet	20"
Top	See Figures 3A and 3B
Burner Service	20"
Combustible Base (Wood or Class A, B or C roof covering material)	0
* See Figures 3A and 3B	

FIGURE 7
Location of Vent Terminal in Shipping



10. Vent Terminal and Combustion Air Inlet Hood

The vent terminal is shipped in the burner compartment (see Figure 7). Remove the two shipping screws and separate the two-piece assembly. Install the vent terminal by using the four screws provided. **Do not cut or trim gasket. Make sure gasket is in place.** See Figure 8. The combustion air intake vent hood is factory installed.

11. Optional Vertical Venting

With the optional vertical venting kit (VVK-5), this unit may be vented vertically through a roof or overhang. The kit includes a stainless steel transition drain tee, silicone sealant and drain tubing.

If unit is installed with vertical vent kit, annually inspect the vent system and drain. Replace any portion of the vent system that shows signs of deterioration. Make sure drain is open and free of obstruction.

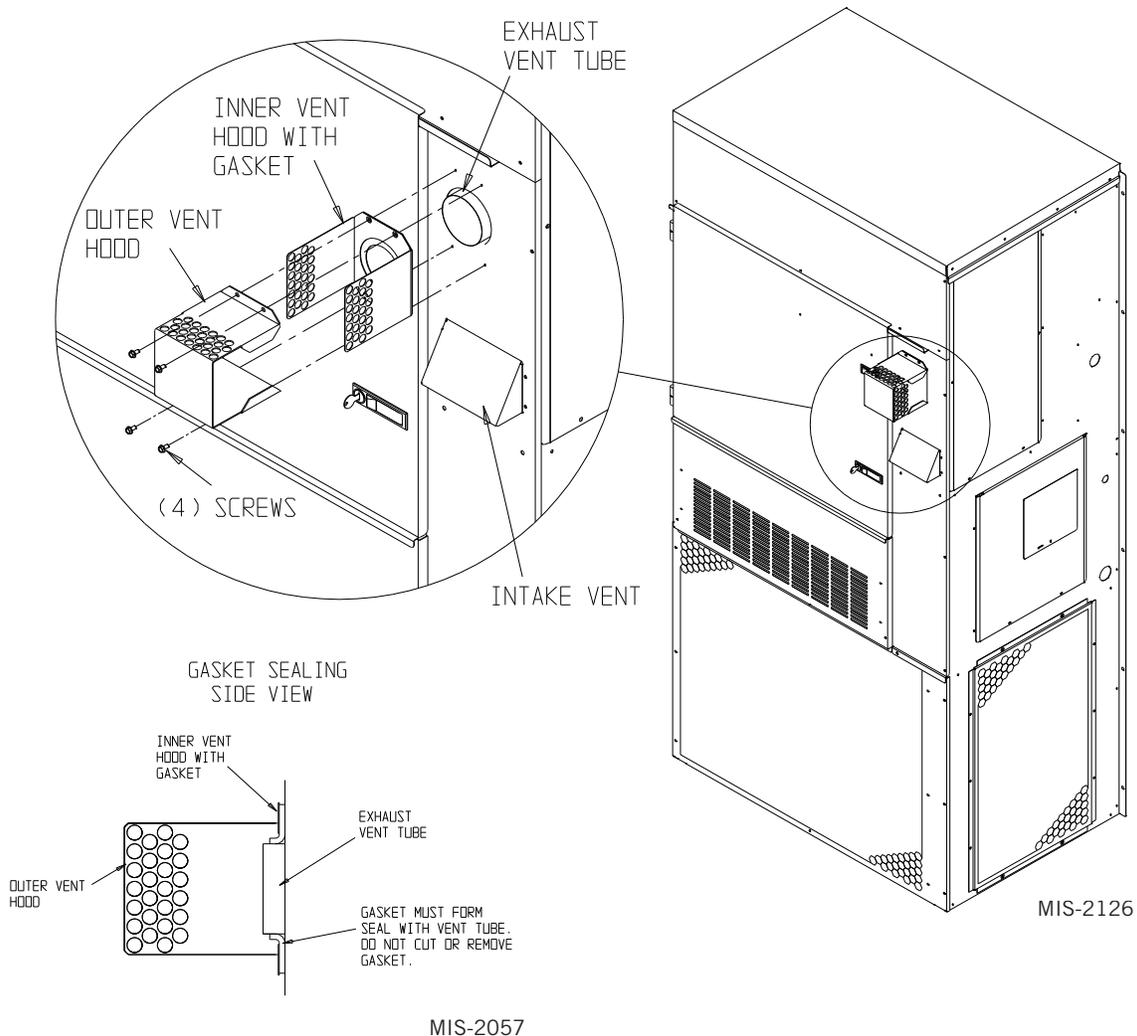


CAUTION

Vent terminal must be installed as shown in Figure 8 for proper operation of the heating system.

NOTE: The inner vent hood gasket is designed to stretch over and seal around the combustion air blower outlet. This is a very critical seal to prevent water and flue products from entering the unit. Care must be taken to insure this gasket is in place and sealing properly.

FIGURE 8
Vent Terminal and Combustion Air Intake



12. Vent Resizing Instructions

When an existing furnace is removed from a venting system servicing other appliances, the venting system is likely to be too large to properly vent the remaining attached appliances.

The following steps shall be followed with each of the appliances remaining connected to the common venting system, placed in operation one at a time while the other appliances remaining connected to the common venting system are not in operation.

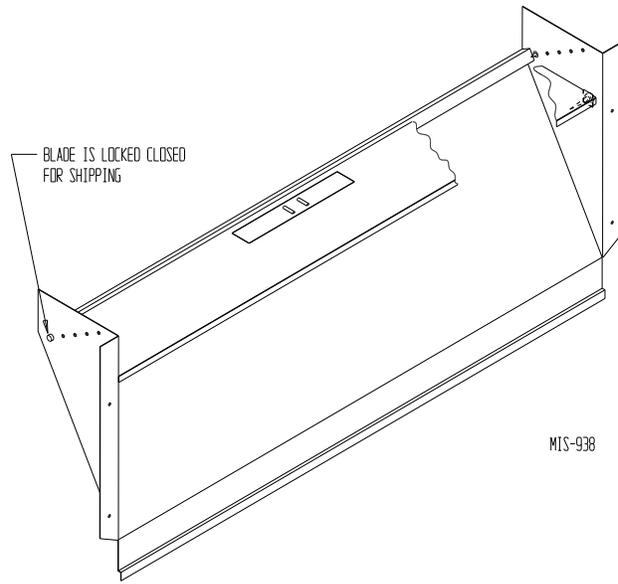
1. Seal any unused openings in the venting system.
2. Inspect the venting system for proper size and horizontal pitch, as required in the National Fuel Gas code, ANSI Z223.1 or the CAN/CGA B149 Installation Codes and these instructions. Determine that there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.
3. In so far as is practical, close all building doors and windows and all doors between the space in which the appliance(s) connected to the venting system are located and other spaces of the building. Turn on clothes dryers and any appliances not connected to the venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.
4. Follow the lighting instructions. Place the appliance being inspected in operation. Adjust thermostat so appliance shall operate continuously.
5. Test for draft hood equipped appliance spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle.
6. After it has been determined that each appliance connected to the venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-burning appliances to their previous conditions of use.
7. If improper venting is observed during any of the above tests, the venting system must be corrected.

13. Fresh Air Intake

All units are built with fresh air inlet slots punched in the service panel.

If the unit is equipped with a fresh air damper assembly, the assembly is shipped already attached to the unit. The damper blade is locked in the closed position. To allow the damper to operate, the maximum and minimum blade position stops must be installed (see Figure 9).

FIGURE 9
Fresh Air Damper



All capacity, efficiency and cost of operation information as required for Department of Energy “Energyguide” Fact Sheets is based upon the fresh air blank-off plate in place and is recommended for maximum energy efficiency.

The blank-off plate is available upon request from the factory and is installed in place of the fresh air damper shipped with each unit.

One of several other ventilation options may be installed. Refer to model number and/or supplemental installation instructions.

14. Condensate Drain

A plastic drain hose extends from the drain pan at the top of the unit down to the unit base. There are openings in the unit base for the drain hose to pass through. In the event the drain hose is connected to a drain system of some type, it must be an open or vented type system to assure proper drainage.

15. Wiring – Main Power

WARNING

For personal safety, turn off electric power at service entrance panel before making any electrical connections. Failure to do so could result in electric shock or fire.

Refer to unit rating plate for wire sizing information and maximum fuse or circuit breaker size. Each outdoor unit is marked with a “Minimum Circuit Ampacity”.

This means that the field wiring used must be sized to carry that amount of current. All models are suitable only for connection with copper wire. Each unit and/or wiring diagram will be marked “Use Copper Conductors Only”. These instructions **must be** adhered to. Refer to the National Electrical Code (NEC) for complete current carrying capacity data on the various insulation grades of wiring material. All wiring must conform to NEC and all local codes.

The electrical data lists fuse and wire sizes (75° C copper) for all models.

The unit rating plate lists a “Maximum Time Delay Relay Fuse” or circuit breaker that is to be used with the equipment. The correct size must be used for proper circuit protection and also to assure that there will be no nuisance tripping due to the momentary high starting current of the compressor motor.

The disconnect access door on this unit may be locked to prevent unauthorized access to the disconnect. To convert for the locking capability, bend the tab located in the bottom left-hand corner of the disconnect opening under the disconnect access panel straight out. This tab will now line up with the slot in the door. When shut, a padlock may be placed through the hole in the tab preventing entry.

WARNING

Failure to provide an electrical power supply shut off means could result in electric shock or fire.

Electrical Grounding

When installed, the furnace must be electrically grounded in accordance with local codes, or in the absence of local codes, with the National Electrical Code, ANSI/NFPA 70 or Canadian Electrical Code, CSA22.1, latest edition. Use a copper wire from green ground wire on the furnace to a grounded connection in the service panel or a properly driven and electrically grounded ground rod. See Tables 1A and 1B for proper ground wire size.

WARNING

Failure to provide a proper electrical ground could result in electric shock or fire.

Field-Installed Equipment

Wiring to be done in the field between the furnace and devices not attached to the furnace, or between

separate devices which are field installed and located, shall conform with the temperature limitation for Type T wire {63° F rise (36° C)} when installed in accordance with the manufacturer’s instructions.

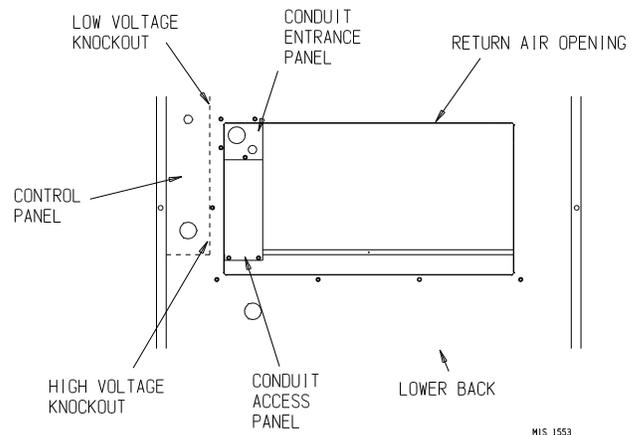
Installation of Flexible Conduit Through Return Air Opening

NOTE: To allow proper clearance between the control panel and any vent options, 90° conduit fittings must be used on the back of the control panel.

Installing Conduit (see Figure 10)

1. Remove conduit access panel if required to gain access to area behind control panel.
2. Remove low voltage and high voltage knockouts located in rear of control panel.
3. Run low voltage conduit through 7/8 bushing located in conduit entrance plate and secure to low voltage opening in rear of control panel.
4. Run high voltage conduit through 1-3/4 bushing located in conduit entrance plate and secure to high voltage opening in rear of control panel.
5. Replace conduit access panel if required to complete installation.
6. Seal around conduit in conduit entrance plate.

FIGURE 10
Installation of Flexible Conduit



16. Wiring – Low Voltage Wiring

230/208 Volt Units

All 230/208V 1 phase and 3 phase equipment have dual primary voltage transformers. All equipment leaves the factory wired on 240V tap. For 208V operation, reconnect from 240V to 208V tap. The acceptable operating voltage range for the 240 and 208V taps are:

- | | |
|----------|------------------|
| Tap: 240 | Range: 253 – 216 |
| Tap: 208 | Range: 215 – 187 |

NOTE: The voltage should be measured at the field power connection point in the unit and while the unit is operating at full load (maximum amperage operating condition).

For low voltage wiring, an 18 gauge copper, color-coded cable is recommended. See Table 5 for more information.

460 Volt Units

All models are equipped with single primary voltage transformers and no rewiring is required.

Direct Digital Controls (DDC)

For total and proper control using DDC, a total of six controlled outputs are required (five if no ventilation is installed).

TABLE 3
Low Voltage Connections for DDC Control

	Standard Units	Units w/ Economizers
Fan Only	Energize G	Energize G
1st Stage Cooling Mode/ Balanced Climate	Energize Y1, G	Energize Y1, G
2nd Stage Cooling Mode	Energize Y2 to override Balanced Climate mode when Y1-Y2 jumper is removed	Energize Y1, Y2, G
Gas Heating	Energize B/W1	Energize B/W1
Ventilation	Energize A	Energize A
Dehumidification (if employed)	Energize D	Energize D

Low Voltage (24VAC) Connections

These units use a 24-volt AC low voltage circuit.

C terminal is the *24VAC common and is grounded*.

G terminal is the *indoor blower input*.

Y1 terminal is the *1st Stage cooling input*. Economizer stage when used. Balanced Climate stage when used.

Y2 terminal is the *2nd Stage cooling input*. Compressor cooling stage when economizer or Balanced Climate is used.

B/W1 terminal is the *gas heat*.

A terminal is the *ventilation option input*. This terminal energizes any factory-installed ventilation option and indoor blower.

D terminal is the *dehumidification input*. If installed, this terminal energizes any factory-installed dehumidification option.

L terminal is *24 volt alarm active output*.

Unit Shutdown Feature (Standard on All Models)

The RT terminal is the 24VAC transformer output, and the R terminal is the 24VAC hot terminal for the operation of the equipment. RT and R are connected with a brass jumper bar which can be removed and RT and R connected to an external NC (normally closed) contact such as a fire/smoke detector that will cause shutdown of the equipment upon activation.

Balanced Climate™ Feature (Standard on All Models)

All units are equipped with the capability of running in Balanced Climate mode. This mode is designed to enhance the comfort level by reducing the indoor airflow amount and extending the run time to help extract more humidity during cooling operation. The Y1 terminal is the 24VAC input for Balanced Climate compressor cooling operation. The Y2 terminal is the 24VAC input for compressor cooling standard operation. Y1 and Y2 are connected with a brass jumper bar which can be removed to enable Balanced Climate mode. Units with an economizer will not have the brass jumper installed. Refer to vent manuals for instructions on how Balanced Climate works with each vent.

To operate in Balanced Climate mode, a 2-stage cooling thermostat is required. The lower indoor airflow operation is overridden by utilizing a 2-stage thermostat. If the call for cooling is not satisfied within a given time frame or temperature differential (specified by the thermostat), the thermostat will send a signal to Y2 which then increases the blower speed back to the selected speed. See pages 44 – 45 for blower speed selection options.

In units with an economizer vent installed, Balanced Climate mode should not be used. The Y1 and Y2 jumper must remain installed.

Dehumidification Feature (Optional)

The D terminal is the 24VAC input for dehumidification operation on dehumidification hot gas reheat equipped units. When 24VAC is applied to the D terminal, a 3-way valve solenoid is energized. The reheat coil located behind the evaporator coil is then active to reheat the supply air during cooling mode. This allows humidity to be removed from the air entering the unit without a large amount of sensible cooling capacity. During dehumidification, the indoor blower speed is reduced to help with the humidity removal. A humidity sensing thermostat or humidistat is required to control dehumidification operation. See Supplemental Instructions 7960-867 for additional information on dehumidification unit operation.

Ventilation Features (Optional)

See ventilation instructions provided with unit for low voltage wiring.

Low Ambient Control (LAC)

The low ambient control is a pressure switch that is attached to the liquid line of the system and monitors

high side pressure. Operation of the LAC occurs as outdoor temperatures drop below 60°F. On/Off and modulating controls are used which operate based on pressure changes caused by outdoor temperature changes. On/Off LAC operation cycles the condenser fan on/off to maintain desired liquid pressure while modulating LAC operation is factory adjusted and slows the condenser fan speed (rpm).

Outdoor Temperature Switch and Freeze Protection Thermostat

An outdoor temperature switch and an evaporator freeze protection thermostat is supplied with all units that have a low ambient control. The outdoor switch disables Balanced Climate mode (if enabled) when the temperature drops below 50°F. This prevents potential evaporator coil freeze up issues. The freeze thermostat cuts out compressor operation if the evaporator begins to freeze up.

Balanced Climate Mode

If the application is likely to require air conditioning operation below 60°F outdoor conditions, a low ambient control (LAC) kit must be installed.

If the unit is being installed with any ventilation package, a Bard LAC kit must be installed. Failure to utilize an LAC with any air conditioner can cause coil freeze up. Balanced Climate can readily be applied to duct-free (supply and return air grille) applications. It may also be applied to ducted applications with **limited rated static (total including both supply and return statics)**. Consult Bard Application Engineering for details prior to implementation.

CAUTION: *Balanced Climate is not a replacement for a dehumidification (hot gas reheat) unit for extreme applications, but rather an enhancement feature for limited climates and applications.*

17. Thermostats

**TABLE 4
CO₂ Controllers**

Part Number	Predominate Features
8403-056	CO ₂ ventilation control with digital display. Normally Open SPST (Default: Close at 800ppm)
8403-096	Normally Open SPST relay closes-on-rise 24V dual wave length sensor. Default setting 950ppm, adjustable to 0-2000ppm Default off setting 1000ppm, adjustable to 0-200 ppm can be calibrated

**TABLE 5
Thermostat Wire Size**

Transformer VA	FLA	Wire Gauge	Maximum Distance in Feet
55	2.3	18 gauge 16 gauge 14 gauge 12 gauge	60 100 160 250

**TABLE 6
Wall Thermostats**

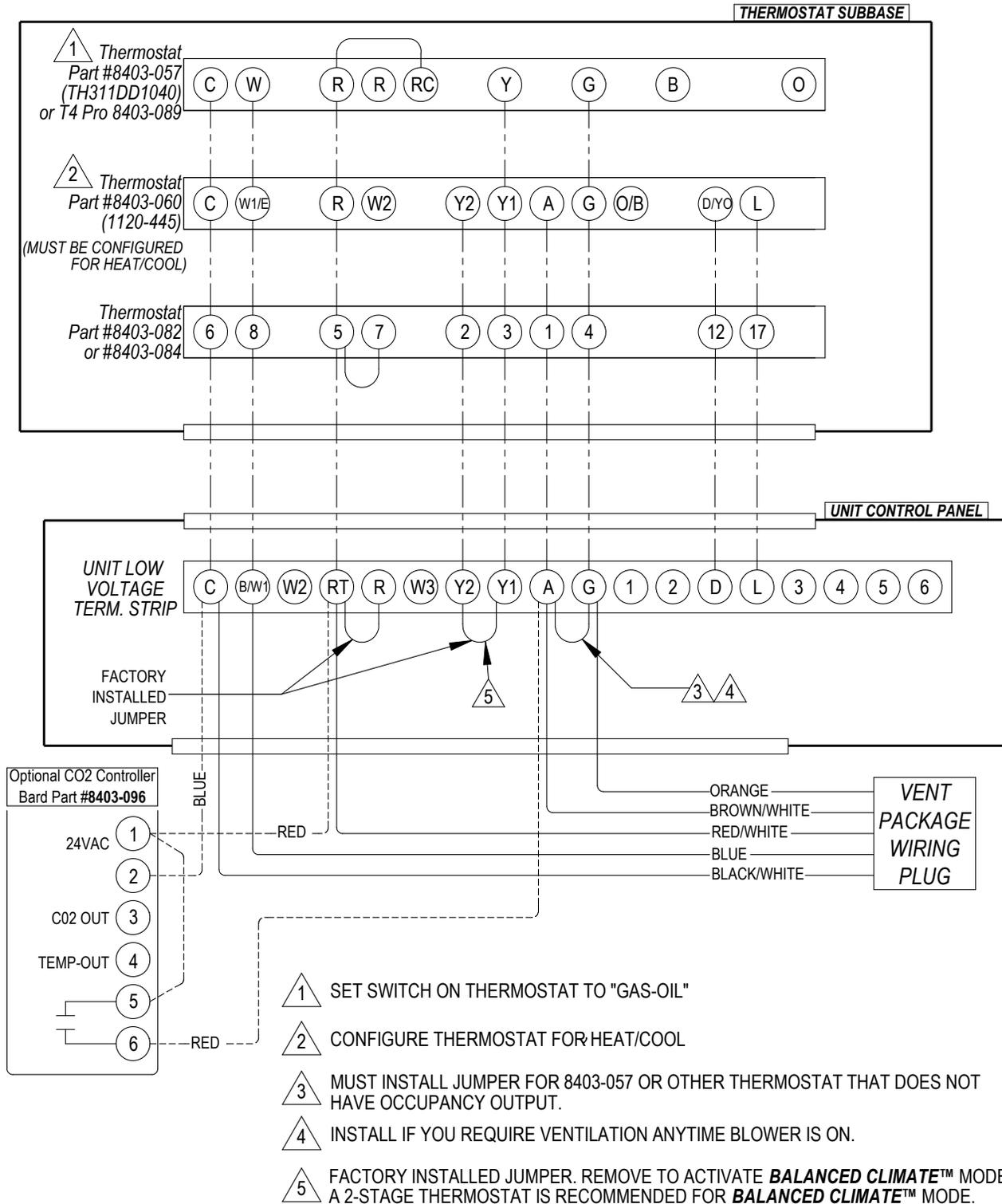
Thermostat	Predominant Features
8403-060 1120-445	3 Stage Cool; 3 Stage Heat Programmable/Non-Programmable Electronic HP or Conventional Auto or Manual changeover
8403-082 (VT8600U5500B)	2 stage Cool; 2 stage Heat Programmable/Non-Programmable Electronic HP or Conventional, Auto or Manual changeover with Occupancy Sensor, BACnet
8403-084 (VT8600U5000B)	2 stage Cool; 2 stage Heat Programmable/Non-Programmable Electronic HP or Conventional, Auto or Manual changeover with BACnet
8403-089 (T4 Pro)	1 stage Cool; 1 stage Heat – Heat Pump 1 stage Cool; 1 stage Heat – Conventional Programmable/Non-Programmable Electronic Auto or Manual changeover
8403-090 (T6 Pro)	2 stage Cool; 3 stage Heat – Heat Pump 2 stage Cool; 2 stage Heat – Conventional Programmable/Non-Programmable Electronic Auto or Manual changeover
8403-091 (T701-FEMA)	1 stage Cool, 1 stage Heat Non-Programmable FEMA use
8403-092 (T6 Pro Wi-Fi)	2 stage Cool, 3 stage Heat – Heat Pump 2 stage Cool, 2 stage Heat – Conventional Programmable/Non-Programmable Electronic Auto or Manual changeover Wi-Fi

**TABLE 7
Humidity Controls**

Part Number	Predominate Features
8403-100* (H6062A1000)	Electronic humidistat DPST; Humidity range 10-90% with adjustable stops
8403-047 (H200-10-21-10)	Electronic dehumidistat SPST closes-on-rise; Humidity range 10-90% with adjustable stops

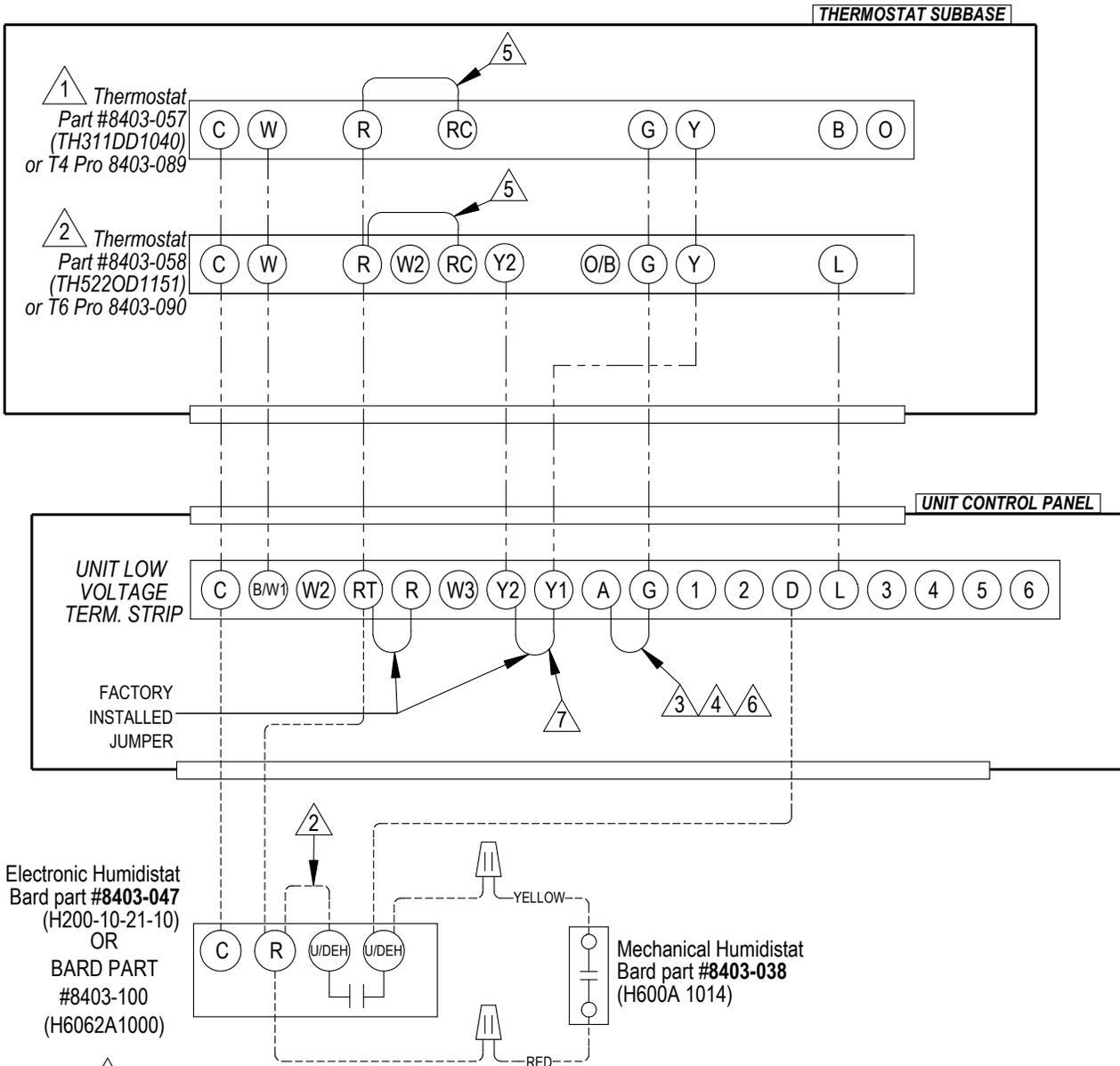
* If using Honeywell HumidiPRO (H6062A1000) 8403-100 humidistat, it must be configured for dehumidification in the menu.

FIGURE 11
Low Voltage Wiring
All Units Except Units with Economizers



MIS-2775 I

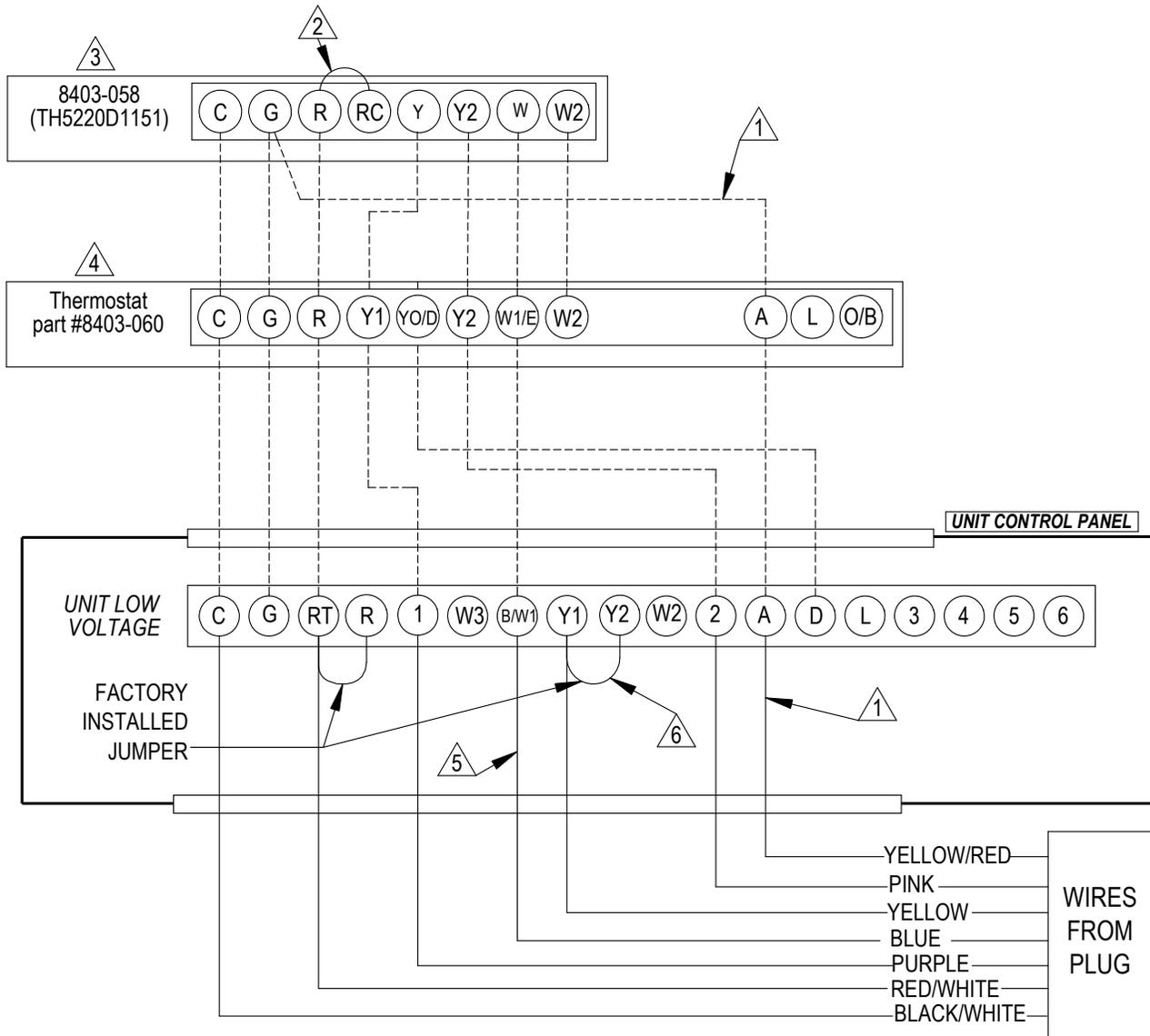
FIGURE 12
Low Voltage Wiring
Thermostat Using Separate Temperature and Humidity Controllers



- 1 SET SWITCH ON THERMOSTAT TO "GAS-OIL"
- 2 CHANGE "SYSTEM TYPE". SET UP FUNCTION 1, FROM 5 (2 HEAT/ 1 COOL HEAT PUMP) TO 6 (2 HEAT/ 2 COOL CONVENTIONAL).
- 3 MUST INSTALL JUMPER FOR 8407-057, 8403-058 OR OTHER THERMOSTAT THAT DOES NOT HAVE OCCUPANCY OUTPUT.
- 4 INSTALL IF YOU REQUIRE VENTILATION ANYTIME BLOWER IS ON.
- 5 FACTORY INSTALLED JUMPER.
- 6 IF THIS "A" TO "G" JUMPER IS INSTALLED, YOU MUST INSURE TO REMOVE VENTILATION PACKAGE ORANGE WIRE FROM TERMINAL "G".
- 7 FACTORY INSTALLED JUMPER. REMOVE TO ACTIVATE **BALANCED CLIMATE™** MODE. A 2-STAGE THERMOSTAT IS RECOMMENDED FOR **BALANCED CLIMATE™** MODE.
- 8 HUMIDISTAT 8403-100 WILL NEED TO BE CONFIGURED FOR DEHUMIDIFICATION IN THE MENU. SEE USER'S MANUAL

MIS-2788 E

FIGURE 13
Low Voltage Wiring
JIFM Economizer

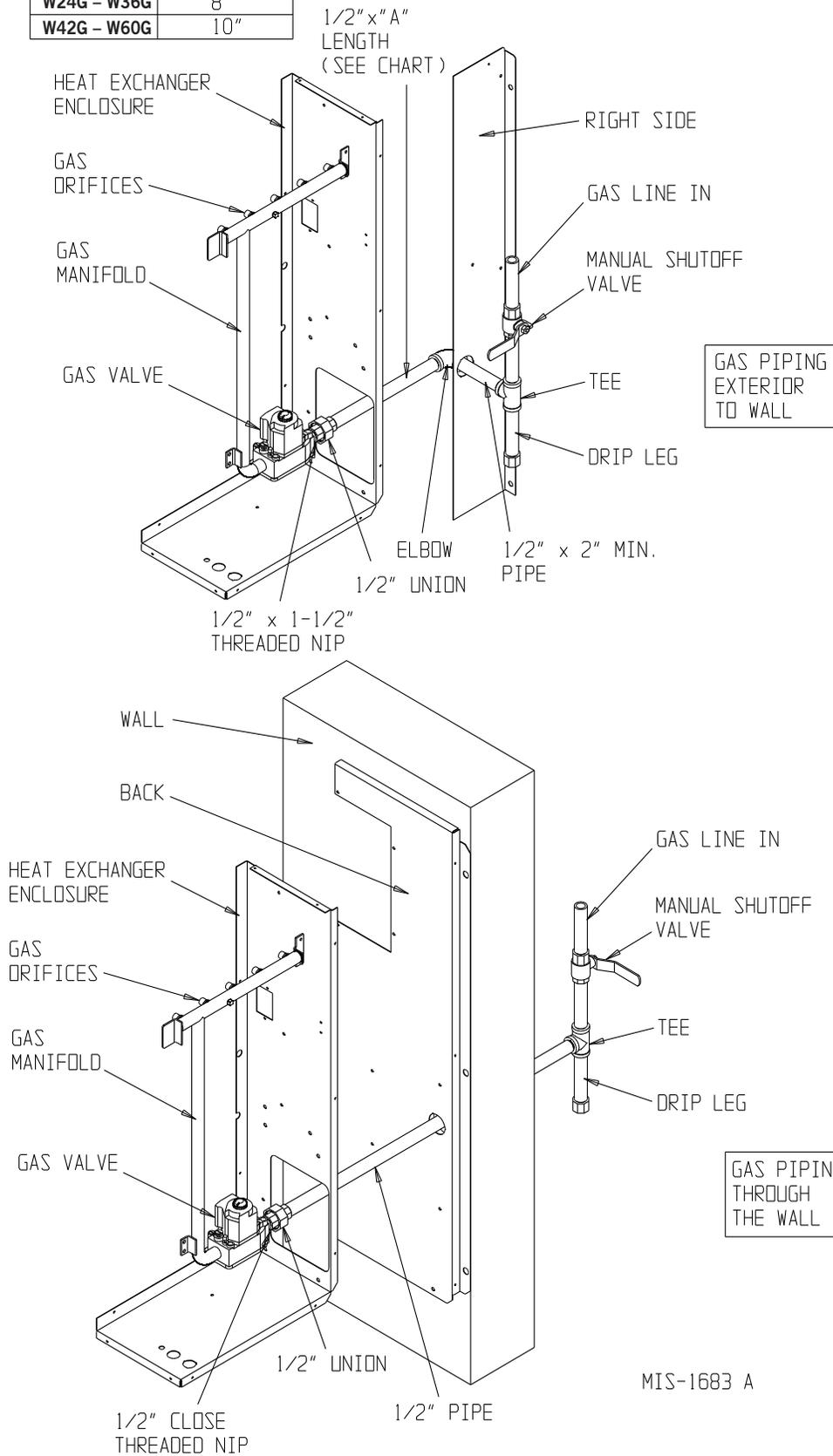


- ① Must be energized to enable minimum position. NOTE: Economizer Control Default Setting is 10V (100%). Depending upon application may require setting to lower value.
- ② Factory installed jumper.
- ③ Change "system type", set up function 1, from 5 (2 heat/ 1 cool heat pump) to 6 (2 heat/ 2 cool conventional).
- ④ Change model configuration from heat pump to heat/cool, and must be configured for economizer for YO/D output to be active as first stage cooling.
- ⑤ For demand ventilation and/or to disable ventilation on call for heat, move blue wire to "A" terminal.
- ⑥ Balance Climate is unavailable with economizer. Leave the jumper installed.

MIS-3349 C

FIGURE 14
Gas Pipe Connection

UNIT	"A" LENGTH
W24G - W36G	8"
W42G - W60G	10"



18. Gas Supply and Piping

General Recommendations

1. Be sure the gas line complies with the local codes and ordinances, or in their absence with the National Fuel Gas Code, ANSI Z223.1, or Natural Gas Installation Code, CAN/CGA B149.1, or Propane Installation Code B149.2, latest edition.
2. A sediment trap or drip leg must be installed in the supply line to the furnace.
3. A ground joint union shall be installed in the gas line adjacent to and upstream from the gas valve and downstream from the manual shut-off valve.
4. An 1/8" NPT plugged tapping accessible for test gauge connection shall be installed immediately upstream of the gas supply connection to the furnace for the purpose of determining the supply gas pressure. This can be omitted if local codes permit use of plugged tapping in gas valve inlet.
5. Install listed manual shut-off valve in the supply gas line external to and immediately upstream of the furnace (see Figure 14).
6. Use steel or wrought iron pipe and fittings.
7. **Do not thread pipe too far.** Valve distortion or malfunction may result from excess pipe within the control. Use pipe joint compound resistant to the action of liquefied petroleum gases on male threads only. **Do not use Teflon tape.** See Table 8 and Figure 15.

TABLE 8
Length of Standard Pipe Threads (Inches)

Pipe Size	Effective Length of Thread	Overall Length of Thread
3/8	1/2	9/16
3/4	1/2 - 9/16	13/16
1	9/16	1

FIGURE 15
Proper Piping Practice

PROPER PIPING PRACTICE



USE MODERATE AMOUNT OF THREAD SEALANT, LEAVE 2 END THREADS BARE

MIS-897

8. Refer to Table 9 for gas pipe sizes for natural gas. If more than one appliance is supplied from a single line size, capacity must equal or exceed the combined input to all appliances, and the branch lines feeding the individual appliances properly sized for each input.

This product must be gas piped by a licensed plumber or gas fitter in the commonwealth of Massachusetts.

TABLE 9
Gas Pipe Sizes – Natural Gas

Length of Pipe - Feet	Pipe Capacity - BTU per Hour Input Pipe Size			
	1/2"	3/4"	1"	1-1/4"
10	132,000	278,000	520,000	1,050,000
20	92,000	190,000	350,000	730,000
30	73,000	152,000	285,000	590,000
40	63,000	130,000	245,000	500,000
50	56,000	115,000	215,000	440,000
60	50,000	105,000	195,000	400,000
70	46,000	96,000	180,000	370,000
80	43,000	90,000	170,000	350,000
100	38,000	79,000	150,000	305,000

Checking the Gas Piping

Before turning gas under pressure into piping, all openings from which gas can escape should be closed. Immediately after turning on gas, the system should be checked for leaks. This can be done by watching the 1/2 cubic foot test dial, allowing 4 minutes to show any movement, soaping each pipe connection and watching for bubbles. If a leak is found, make the necessary repairs immediately and repeat the above test. The furnace must be isolated from the gas supply piping system by closing the manual shut-off valve on the combination gas control valve during pressure testing of the gas supply piping system at pressures up to 1/2 PSIG. The furnace and its individual shut-off valve must be disconnected from supply piping and supply piping capped during any pressure testing of supply piping system at test pressures in excess of 1/2 PSIG.

Defective pipes or fittings should be replaced and not repaired. Never use a flame or fire in any form to locate gas leaks; use a soap solution.

After the piping and meter have been checked completely, purge the system of air. **Do not bleed air inside the furnace. Be sure to check and relight all the gas pilots on other appliances that may have been extinguished because of interrupted gas supply.**

PROPANE (LP) GAS CONVERSION

This unit may be converted in the field for use with propane (LP) gas. Propane gas conversion kit number WGCK-1 is designed for conversions of units installed from 0 – 6000' elevations. Propane gas conversion kit number WGCK-2 is designed for conversions of units installed from 6001' – 10,000' elevations. These kits may be purchased from the local distributor.

WARNING

When converting from propane (LP) gas to natural gas, the gas orifice spuds and gas valve spring must be replaced and the gas valve regulator pressure must be adjusted correctly. Failure to do so can result in fire, injury or death. Refer to Tables 11A and 11B for proper orifice sizing.

Natural gas spring kit, part number 5603-007, can be purchased through the local distributor.

19. Manifold Pressure Adjustment

A 0 to 15" water manometer with 0.1" resolution and a 1/8" NPT manual shut-off valve is needed to measure actual manifold pressure.

WARNING

Correct manifold pressure is necessary for proper ignition and burner operation. Failure to accurately adjust pressure could cause heat exchanger failure.

1. Turn off gas at equipment shut-off valve in gas supply line just ahead of furnace.
2. Remove plug from outlet pressure tap in gas control or gas manifold.
3. Install 1/8" NPT manual shut-off valve in hole vacated by plug. Make sure shut-off valve is in OFF position.
4. Attach manometer to 1/8" NPT manual shut-off valve just installed.

5. Slowly open equipment shut-off valve in gas supply line just ahead of furnace. Start furnace following "Operating Instructions" on front door.
6. Slowly open 1/8" NPT manual shut-off valve leading to manometer.
7. Read manifold pressure on manometer.
8. Adjust manifold pressure by turning gas control regulator adjusting screw clockwise to increase pressure or turning counterclockwise to decrease pressure. Manifold pressure must be within allowable range as follows:
 - Natural gas manifold pressure must be between 3.2" and 3.8" W.C. Rated pressure is 3.5" W.C.
 - Propane gas (LP) manifold pressure must be between 9.7" and 10.3" W.C. Rated pressure is 10" W.C.

NOTE: For natural gas, if gas flow rate can't be properly set within these pressure ranges, the main burner orifices must be changed to obtain proper gas flow rate.

9. Shut off furnace. Turn off gas at equipment shut-off valve in gas supply line just ahead of furnace. Install outlet pressure tap plug in gas control. Turn on gas.
10. Check regulator adjustment cover screw and gas control plug for gas leaks. Use a commercial soap solution made for leak detection.

20. Checking Gas Input Rate

It is the installer's responsibility to see that the BTU input rate of the furnace is properly adjusted. Under-firing could cause inadequate heat, excessive condensation or ignition problems. Overfiring could cause sooting, flame impingement or overheating of heat exchanger.

WARNING

Failure to adjust furnace to the proper firing rate could cause heat exchanger failure.

Depending on local gas heating value and elevation, the manifold pressure may need to be adjusted or the orifices changed to get proper gas input rate. Check with the local gas supplier to determine heating value (BTU/cu. ft.) of natural gas in the area.

NOTE: If furnace is being installed at an altitude of more than 6000' above sea level, the furnace must be derated. See Section 21 "Standard Orifice Sizing and High Altitude Derate".

Natural Gas Input Rate

Natural gas heating value (BTU/cu. ft.) can vary significantly. Before starting natural gas input check, obtain gas heating value at the location from local supplier. A stopwatch will be needed to measure actual gas input.

1. Gas supply pressure must be between 5" and 7" W.C. for natural gas.
2. Turn off all other gas appliances. The pilots may be left on.
3. Start furnace following "Operating Instructions" on front door.
4. Let furnace warm up for 6 minutes.
5. Locate gas meter. Determine which dial has the least cubic feet of gas and how many cubic feet per revolution it represents. This is usually one-half, one or two cubic feet per revolution.
6. With stopwatch, measure time it takes to consume two cubic feet of gas.
 - If dial is one-half cubic foot per revolution, measure time for four revolutions.
 - If dial is one cubic foot per revolution, measure time for two revolutions.
 - If dial is two cubic feet per revolution, measure time for one revolution.
7. Divide this time by two. This gives average time for one cubic foot of gas to flow through meter. Example: If it took 58 seconds for two cubic feet to flow, it would take 29 seconds for one cubic foot to flow.

8. Calculate gas input using this formula:

$$\text{Gas input} = \frac{\text{Gas Heating Value (BTU/cu. ft.)} \times 3600 \text{ sec/hr}}{\text{Time (Seconds for one cubic foot of gas)}} = \text{BTU/hour}$$

Example:

Assume it took 29 seconds for one cubic foot of gas to flow and heating value of 1,000 BTU/cu. ft.

$$\text{Gas input} = \frac{1,000 \times 3,600}{29} = 124,138 \text{ BTU}$$

If no other pilots were left on, this is the furnace gas input.

9. If the water heater, dryer or range pilots were left on, allow for them in calculating correct furnace gas input. A quick way is to allow 1000 BTU per hour for a water heater, 500 BTU per hour for dryer and 500 BTU per hour for each range burner pilot.

Example:

If the gas water heater, dryer, two range burner pilots and one oven pilot were left on, allow:

Water heater pilot	1000 BTU per hour
Dryer pilot	500 BTU per hour
2 range burner pilots	1000 BTU per hour
1 range oven pilot	500 BTU per hour
	<hr/>
	3000 BTU per hour

Subtracting 3000 BTU per hour from 124,138 BTU per hour measured above equals 121,138 BTU per hour. This would be the correct furnace gas input after allowing for pilots left on.

10. Manifold pressure may be adjusted within the range of 3.2" W.C. to 3.8" W.C. to get rated input ± 2 percent. See Section 19, "Manifold Pressure Adjustment." If rated input with manifold pressure cannot be gotten within the allowable range, orifices must be changed.

Propane (LP) Gas Input Rate

WARNING

Propane (LP) gas installations do not have gas meters to double check input rate. Measure manifold pressure adjustment with an accurate manometer. Failure to accurately adjust pressure could cause heat exchanger failure, asphyxiation, fire or explosion, resulting in damage, injury or death.

1. Make the main burner orifices are correct.
2. Gas supply pressure must be between 11" and 13" W.C. for propane (LP) gas.
3. Start furnace following "Operating Instructions" on front door.
4. Let furnace warm up for 6 minutes.
5. Adjust manifold pressure to 10.0" W.C. ± 0.3 ". See Section 19, "Manifold Pressure Adjustment".

WARNING

Do not set propane (LP) manifold pressure at 11.0" W.C. It could cause heat exchanger failure.

21. Standard Orifice Sizing and High Altitude Derate

This furnace is shipped with fixed gas orifices for use with natural gas and sized for 1000 BTU/cubic foot gas. Make sure actual gas input does not exceed rating plate input. The orifices may need to be changed to get the correct gas input. Whether they need to be changed or not depends on input and the gas heat value at standard conditions and elevation. Consult the local gas supplier for gas heat value and any special derating requirements. See Section 20 for more information.

At higher altitudes, the density of the air is reduced. Therefore, for proper combustion, the quantity of gas burned in the furnace must also be reduced. This is called derating. This unit must be derated when installed at altitudes greater than 6000' above sea level. A high altitude pressure switch must also be installed for operation above 6000'. High Altitude Pressure Switch Kit number 8620-189 is designed for this application.

It is the installer's responsibility to see that the furnace input rate is adjusted properly. Derating must be achieved by reducing the size of the main burner orifices. Derating the furnace by adjusting the manifold pressure lower than the range specified in the Section 19, "Manifold Pressure Adjustment" is considered to be an improper procedure.

Above 6000' elevation orifice changes are required, and capacity reductions are a function of altitude impact and orifice change. Pressure switch change is required above 6000' elevation. For natural gas, see Altitude Table 10 below and Orifice Tables 11A and 11B on following pages.

TABLE 10
Natural Gas Derate Capacities
for All Models

W**G Rated Input	Sea Level	1000	2000	3000	4000	5000	6000	7000	8000	9000	10,000
41,000	40,500	39,204	37,908	36,612	35,640	34,992	34,182	33,696	33,048	32,643	32,076
45,000	45,000	43,560	42,120	40,680	39,600	38,880	37,980	37,440	36,720	36,270	35,640
61,000	60,750	58,806	56,862	54,918	53,460	52,488	51,273	50,544	49,572	48,965	48,114
68,000	67,500	65,340	63,180	61,020	59,400	58,320	56,970	56,160	55,080	54,405	53,460
75,000	75,000	72,600	70,200	67,800	66,000	64,800	63,300	62,400	61,200	60,450	59,400
81,000	81,000	78,408	75,816	73,224	71,280	69,984	68,364	67,392	66,096	65,286	64,152
90,000	90,000	87,120	84,240	81,360	79,200	77,760	75,960	74,880	73,440	72,540	71,280
100,000	100,000	96,800	93,600	90,400	88,000	86,400	84,400	83,200	81,600	80,600	79,200
113,000	112,500	108,900	105,300	101,700	99,000	97,200	94,950	93,600	91,800	90,675	89,100
125,000	125,000	121,000	117,000	113,000	110,000	108,000	105,500	104,000	102,000	100,750	99,000

TABLE 11A
Natural Gas Orifice Tables for Models W24G, W30G and W36G

Factory Standard Input	Gas Heat* Value BTU/Cu. Ft.	Up to 6,000' No Changes Except for BTU Content	6,001' to 8,000' Requires Pressure Switch Change and Orifice Change Based on BTU Content	8,001' to 10,000' Requires Pressure Switch Change and Orifice Change Based on BTU Content
25000 BTU Per Burner	700-749	2.75	2.70	2.60
	750-799	2.70	2.60	2.50
	800-849	2.60	2.50	2.45
	850-899	2.50	2.45	2.35
	900-949	2.45	2.35	(2.30)
	950-999	2.35	(2.30)	2.25
	1000-1049**	(2.30)	2.25	[2.20]
	1050-1100	2.25	[2.20]	2.15
	Pressure Switch	Standard (.55)	Order 8620-189 High Altitude Pressure Switch Kit (.42)	
(2.30) is the standard factory-installed orifice size			[2.20] orifices are shipped with the unit for field-installed optional 10% derate	

Optional 10% Field-Converted Derate	Gas Heat* Value BTU/Cu. Ft.	Up to 6,000' No Changes Except for BTU Content	6,001' to 8,000' Requires Pressure Switch Change and Orifice Change Based on BTU Content	8,001' to 10,000' Requires Pressure Switch Change and Orifice Change Based on BTU Content
22250 BTU Per Burner	700-749	2.60	2.50	2.45
	750-799	2.50	2.45	2.40
	800-849	2.45	2.40	(2.30)
	850-899	2.40	(2.30)	2.25
	900-949	(2.30)	2.25	[2.20]
	950-999	2.25	[2.20]	2.15
	1000-1049**	[2.20]	2.15	2.10
	1050-1100	2.15	2.15	2.10
	Pressure Switch	Standard (.55)	Order 8620-189 High Altitude Pressure Switch Kit (.42)	
[2.20] orifices are shipped with the unit for field-installed optional 10% input rate			(2.30) is the factory-installed orifice size for full rated input	

* At standard conditions: 30.00 inches Mercury, 60F, saturated, .60 specific gravity.

** All Natural Gas factory orifice sizing and standard input ratings based on nominal 1025 BTU/cu. ft. gas and sea level conditions

All other orifice sizes shown are available as individual field-supplied items. See orifice tables below for specifications and number required.

Orifice Size (mm)	Orifice Diameter
2.10	0.0826
2.15	0.0846
2.20	0.0866
2.25	0.0885
2.30	0.0905
2.35	0.0925
2.40	0.0945

Orifice Size (mm)	Orifice Diameter
2.45	0.0964
2.50	0.0984
2.60	0.1024
2.70	0.1063
2.75	0.1082
2.80	0.1102
2.90	0.1142

No. of Orifices Required Based on Unit Input Rating
41,000 (2)
45,000 (2)
61,000 (3)
68,000 (3)
75,000 (3)
81,000 (4)
90,000 (4)
100,000 (4)
113,000 (5)
125,000 (5)

TABLE 11B
Natural Gas Orifice Tables for Models W42G, W48G and W60G

Factory Standard Input	Gas Heat* Value BTU/Cu. Ft.	Up to 6,000' No Changes Except for BTU Content	6,001' to 8,000' Requires Pressure Switch Change and Orifice Change Based on BTU Content	8,001' to 10,000' Requires Pressure Switch Change and Orifice Change Based on BTU Content
25000 BTU Per Burner	700-749	2.90	2.80	2.70
	750-799	2.80	2.70	2.60
	800-849	2.70	2.60	2.50
	850-899	2.60	2.50	2.45
	900-949	2.50	2.45	(2.40)
	950-999	2.45	(2.40)	2.35
	1000-1049**	(2.40)	2.35	[2.30]
	1050-1100	[2.30]	2.25	2.20
	Pressure Switch	Standard (.55)	Order 8620-189 High Altitude Pressure Switch Kit (.42)	
(2.40) is the standard factory-installed orifice size			[2.30] orifices are shipped with the unit for field-installed optional 10% derate	
Optional 10% Field Converted Derate	Gas Heat* Value BTU/Cu. Ft.	Up to 6,000' No Changes Except for BTU Content	6,001' to 8,000' Requires Pressure Switch Change and Orifice Change Based on BTU Content	8,001' to 10,000' Requires Pressure Switch Change and Orifice Change Based on BTU Content
22250 BTU Per Burner	700-749	2.75	2.70	2.60
	750-799	2.70	2.60	2.50
	800-849	2.60	2.50	
	850-899	2.50	2.45	(2.40)
	900-949	(2.40)	2.35	[2.30]
	950-999	2.35	[2.30]	2.25
	1000-1049**	[2.30]	2.25	2.20
	1050-1100	2.25	2.25	2.20
	Pressure Switch	Standard (.55)	Order 8620-189 High Altitude Pressure Switch Kit (.42)	
[2.30] orifices are shipped with the unit for field-installed optional 10% input rate			(2.40) is the factory-installed orifice size for full rated input	

* At standard conditions: 30.00 inches Mercury, 60F, saturated, .60 specific gravity.

** All Natural Gas factory orifice sizing and standard input ratings based on nominal 1025 BTU/cu. ft. gas and sea level conditions

All other orifice sizes shown are available as individual items. See orifice tables on page 32 for part numbers and number required.

22. Conversion of Gas Input BTUH from High to Low Rating

All the derated WG series units are produced with maximum BTUH input orifices installed. To field convert input, a change to main burner orifices is required.

NOTE: No change to air orifices is necessary. A set of low input orifices is shipped with every unit. They will be found packaged in a bag behind the burner door. Refer to the unit rating plate to confirm the proper orifice size.

Proper installation of the orifices is detailed as follows:

1. Shut off electrical supply to the unit.
2. Shut off gas supply to the unit.
3. Remove burner access panel.
4. Disconnect gas valve from gas supply piping.
5. Disconnect the two wires from the gas valve.
6. Remove the manifold assembly so that orifices are now accessible and remove orifices.
7. Apply a modest amount of pipe compound to the new orifices and screw them into the manifold.
8. To assemble burner, reverse Steps 1 through 7.

WARNING

Failure to follow these instructions could create a hazard resulting in property damage, bodily injury or death.

23. Measuring Air Temperature Rise

Air temperature rise (supply air temperature minus return air temperature) must be within allowable air temperature rise range specified on furnace rating plate.

Two thermometers with 1° resolution capable of reading up to 200°F will be needed. Check thermometers to make sure they agree, or compensate accordingly.

Follow this procedure:

1. Open supply air registers and return air grilles. Make sure the registers and grilles are free of obstruction from rugs, carpets, drapes or furniture.
2. Set balancing dampers in supply duct system.
3. Check duct work for obstructions or leaks.
4. Make sure filters are clean and in place.
5. Place one thermometer in supply air plenum approximately 2' from furnace. Locate thermometer

tip in center of plenum to ensure proper temperature measurement.

6. Place second thermometer in return air duct approximately 2' from furnace. Locate thermometer tip in center of duct to ensure proper temperature measurement.
7. Set room thermostat on highest temperature setting. Operate furnace 10 minutes. Record supply air and return air temperatures.
8. Calculate air temperature rise by subtracting return air temperature from supply air temperature.
 - If air temperature rise is above the temperature rise range on rating plate, furnace is overfired or has insufficient airflow. Check gas input following the instructions in Section 20, "Checking Gas Input Rate". If air temperature rise is still above temperature rise range specified, more heating airflow is needed. Check duct work and grilles to make sure all are properly sized.
 - If air temperature rise is below the temperature rise range on rating plate, furnace is underfired or has too much airflow. Check gas input following the instructions in Section 20, "Checking Gas Input Rate". If air temperature rise is still below temperature rise range specified, less heating airflow is needed. Adjust dampers or grilles as needed.
 - After making adjustments, check air temperature rise to verify that resulting air temperature rise is within allowable range. If air temperature rise is still outside the temperature rise range specified on rating plate, check duct system design with a qualified heating engineer. It may be necessary to re-size the duct work. Recheck air temperature rise after revising duct systems.
9. Set room thermostat to desired setting.
10. Remove thermometers and seal duct work holes.

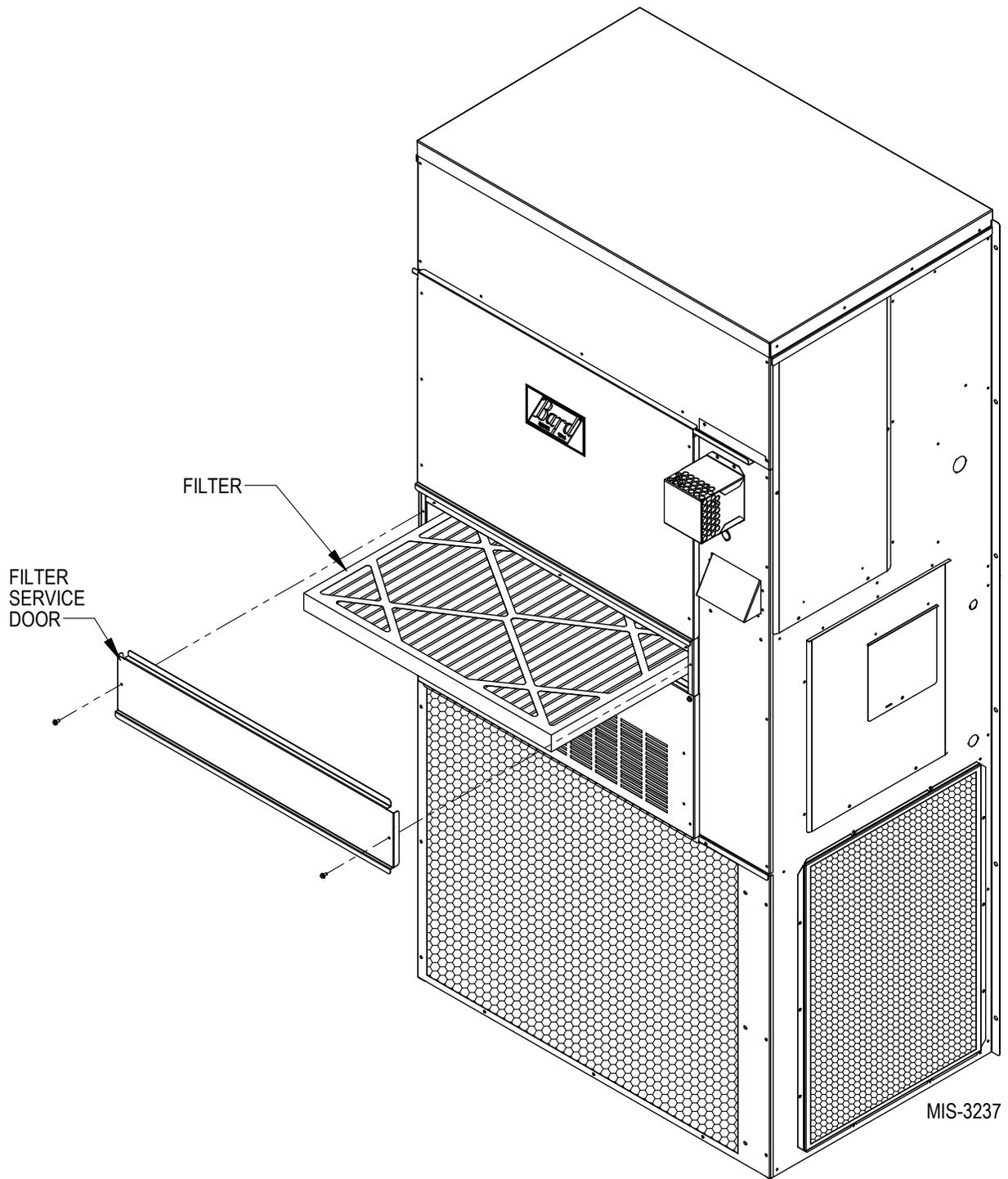
NOTE: Failure to seal holes could result in reduced system performance.

24. Filters

A 2" thick throwaway filter is supplied with each unit. This filter is installed by opening the filter service door (see Figure 16).

Replacement filters are available through the dealer.

FIGURE 16
Access Internal Filter Through Upper Service Door



25. Compressor Control Module

The compressor control module is standard on models covered by this manual.

Features

Delay-on-Make Timer
Short Cycle Protection/Delay-on-Break
High Pressure Detection
Low Pressure Detection
LPC and HPC Status LED
Test Mode
Brownout Protection with Adjustment

Delay-on-Make Timer

A delay-on-make timer is included to be able to delay startup of the compressor. This is desired when more than one unit is on a structure so that all of the units do not start at the same time which could happen after a power loss or building shutdown. The delay-on-make time period is 2 minutes plus 10% of the delay-on-break time period. To ensure that all of the units do not start at the same time, adjust the delay-on-break timer on each unit to a slightly different delay time.

Short Cycle Protection/Delay-on-Break

An anti-short cycle timer is included to prevent short cycling the compressor. This is adjustable from 30 seconds to 5 minutes via the adjustment knob. Once a compressor call is lost, the time period must expire before a new call will be initiated.

Low Pressure Detection

Low pressure switch monitoring allows for a lockout condition in a situation where the switch is open. If the low pressure switch remains open for more than 2 minutes, the CCM will de-energize the compressor for the delay-on-break time. If the switch closes again, it will then restart the compressor. If the switch trips again during the same Y call, the compressor will be de-energized and the alarm terminal will be energized indicating an alarm. The blue LED will light and stay on until power is cycled to the control or a loss of voltage is present at Y terminal for more than ½ second.

High Pressure Detection

High pressure switch monitoring allows for a lockout condition in a situation where the switch is open. If the high pressure switch opens, the CCM will de-energize the compressor. If the switch closes again, it will then restart the compressor after the delay-on-break setting has expired on the device. If the switch trips again during the same thermostat call, the compressor will be de-energized and the alarm terminal will be energized indicating an alarm. The red LED will light and stay on until power is cycled to the control or a loss of voltage is present at Y terminal for more than ½ second.

Test Mode

By rapidly rotating the potentiometer (POT) clockwise (see Figure 17), all timing functions will be removed for testing.

The conditions needed for the unit to enter test mode are as follows: POT must start at a time less than or equal to the 40 second mark. The POT must then be rapidly rotated to a position greater than or equal to the 280 second mark in less than ¼ second. Normal operation will resume after power is reset or after the unit has been in test mode for at least 5 minutes.

Brownout Protection with Adjustment

Brownout protection may be necessary if the utility power or generator power has inadequate power to prevent the voltage from dropping when the compressor starts. This is rare but can happen if the generator is undersized at the site or if the site is in a remote location far from the main power grid. Under normal circumstances, allowing the brownout to be ignored for a time period should not be needed. The 8201-171 is shipped in "0" do not ignore position, with all the DIP switches off (see Figure 17).

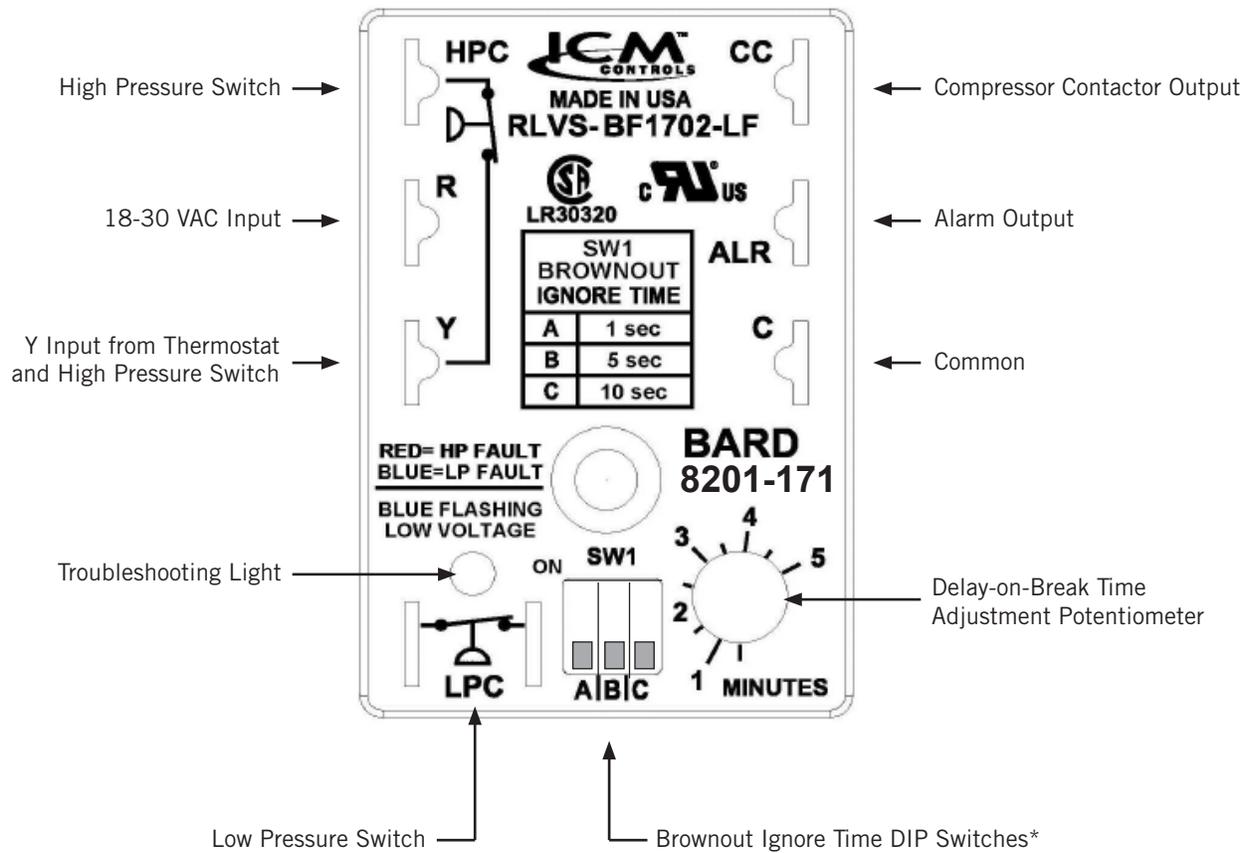
If ignoring the brownout is needed because of the above conditions, three preset timers can be set by DIP switches in order to delay signaling a power brownout for a specific length of time after compressor contactor is energized. This allows the compressor a time period to start even if the voltage has dropped and allows the voltage to recover. This delay only happens when the CC terminal energizes. The delay can be set to 1 second ("A" DIP switch), 5 seconds ("B" DIP switch) or 10 seconds ("C" DIP switch); time is not cumulative—only the longest setting will apply. If the voltage recovers during the brownout delay period, the compressor will continue running.

If a brownout condition is detected by the 8201-171 at any point while there is a cooling call or power is on at Y, the troubleshooting light will flash blue. The light will continue to flash until the cooling call is satisfied or power is removed from the Y terminal. This condition does not prevent operation, it only indicates that a brownout condition was present at some point during the call. If a brownout condition is detected while CC has an output, CC will be de-energized and will retry after the delay-on-break timer is satisfied, honoring any DIP switch timer chosen when the CC output is re-energized; this process will continue until call is satisfied.

If inadequate utility or generator power continues after the Delay-on-Make or Delay-on-Break timer is fulfilled, the CC output will not energize. This could lead to the compressor never starting. The control will see the brownout immediately and not start.

A common scenario and one that has been seen in the field is when a unit or units switches from utility power to generator power. With slower transfer switches, the

FIGURE 17
8201-171 COMPRESSOR CONTROL MODULE



* Turn on only one switch for that specific "Ignore Time" setting. 10 seconds is the maximum brownout "Ignore Time".

time delay between the utility power and generator power didn't cause a problem. The units lost power, shut off and came back on line normally. With the introduction of almost instantaneous transfer switches, the power glitch may be enough that the compressor will start to run backwards.

26. Phase Monitor

All units with three phase scroll compressors are equipped with a three phase line monitor to prevent compressor damage due to phase reversal.

The phase monitor in this unit is equipped with two LEDs. If the "Y" signal is present at the phase monitor and phases are correct, the green LED will light.

If phases are reversed, the red fault LED will be lit and compressor operation is inhibited.

If a fault condition occurs, reverse two of the supply leads to the unit. Do not reverse any of the unit factory wires as damage may occur.

27. Lighting and Shutdown Instructions

FIGURE 18
Lighting and Shutdown Instruction Label

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do NOT try to light the burner by hand.
- B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

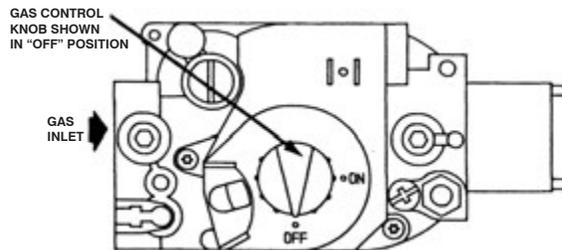
- * Do not try to light any appliance.
- * Do not touch any electric switch; do not use any phone in your building.
- * Immediately call your supplier from a neighbor's phone. Follow the gas supplier's instructions.

* If you cannot reach your gas supplier; call the fire department.

- C. Use only your hand to push in or move the gas control lever. Never use tools. If the lever will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to lowest setting
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the burner. Do NOT try to light the burner by hand.



5. Remove control access panel.
6. Push in gas control knob slightly and turn clockwise to "OFF".
NOTE: Knob cannot be turned to "OFF" unless knob is pushed in slightly. Do not force.
7. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
8. Turn gas control knob counterclockwise to "ON".
9. Replace control access panel.
10. Turn on all electric power to the appliance.
11. Set thermostat to desired setting.
12. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove control access panel.
4. Push in gas control lever slightly and move to "OFF". Do not force.
5. Replace control access panel.

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28. Service Agency Procedures

CAUTION

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

WARNING

Follow these procedures before inspecting furnace.

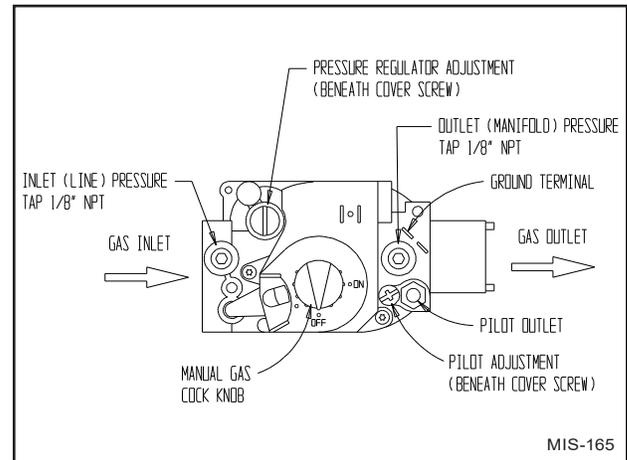
- Turn room thermostat to its lowest or off setting.
- Turn off manual gas shut-off valve.
- Wait at least 5 minutes for furnace to cool if it was recently operating.
- Turn off furnace electrical power; failure to do so could result in injury or death.

Main Burner

Observe the main burners in operation. The flame should be mostly “blue” with possibly a little orange (not yellow) at the tips of the flame. The flames should be in the center of the heat exchanger tubes and not impinging on the heat exchanger surfaces themselves.

Observe the fire until the blower starts (there is a normal delay period until the heat exchanger warms up). There should be no change in the size or shape of the flame. If there is any wavering or blowing of the flame on blower start-up, it is an indication of a possible leak in the heat exchanger.

FIGURE 19
Top View of Gas Control



Burners/Heat Exchanger/Flue Gas Passage Ways

The burners, heat exchanger and interior flue gas passages may be inspected using a light on small mirror or an extension handle. Remove the screws securing the inducer and collector box. Now inspect the upper tubes of the heat exchanger.

Check the exterior of the heat exchanger and the interior flue gas passages for any evidence of deterioration due to corrosion, cracking or other causes. If signs of sooting exist, remove the burners and clean the heat exchanger, as required.

29. Maintaining Unit in Good Working Order

The unit should be inspected annually by a qualified service agency.

WARNING

Use replacement parts listed in the Replacement Parts list only. The use of incorrect parts could cause improper unit operation, resulting in damage, injury or death.

WARNING

Disconnect electrical power before servicing unit. Failure to do so could result in electrical shock or death.

Annual Maintenance

Routine inspection and maintenance procedures are the responsibility of the user and are outlined below.

1. Before inspecting unit:
 - A. Turn room thermostat to lowest or off setting.
 - B. Turn off equipment gas shut-off valve.
 - C. Wait for unit to cool if it was recently operating.
 - D. Turn off electrical power to unit.
2. Inspect the following:
 - A. Vent terminal and combustion air intake terminal. Make sure both are free from obstructions.
 - B. Vertical vent applications: Inspect venting system. Make sure system has no holes, is physically sound and free from obstructions.
 - C. Make sure the supply and return air flange sleeves or duct work are securely fastened to unit and physically sound.
 - D. Supply and return grilles must be open and free from obstructions.
 - E. Inspect to make sure the unit is securely fastened to the wall. Seal any possible leaks between unit and wall with appropriate exterior sealing material.
 - F. Inspect burners, heat exchanger, induced draft blower and induced draft blower collector box. There must be no obvious signs of deterioration.
 - G. Inspect all electrical connections and wiring.
 - H. Check all gas piping for leaks with soap solution used to detect leaks.
 - I. Inspect, clean and repair as needed the entire blower assembly, air filters, draft inducer, cooling coils and vent options (if installed).

Routine Maintenance

1. **Air Filters:** Check the condition at least monthly when the unit is in use, and replace as necessary.
2. **Lubrication Requirements:** The indoor circulating air blower motor and outdoor circulating air fan motor are permanently lubricated and require no re-oiling. The combustion air blower motor requires no re-oiling.



Turn off electrical power supply to prevent injury from moving parts or electric shock.

Routine Inspection

1. Inspect the physical support of the unit annually to make sure it is securely fastened to the building. Also look for any obvious signs of deterioration.
2. Inspect the main burners at the beginning of each heating season and clean as necessary.
3. Inspect the vent terminal and combustion air intake hood for any obvious deterioration, to make sure it is free and clear of any obstructions.

30. Troubleshooting NIDEC SelecTech Series ECM Motors

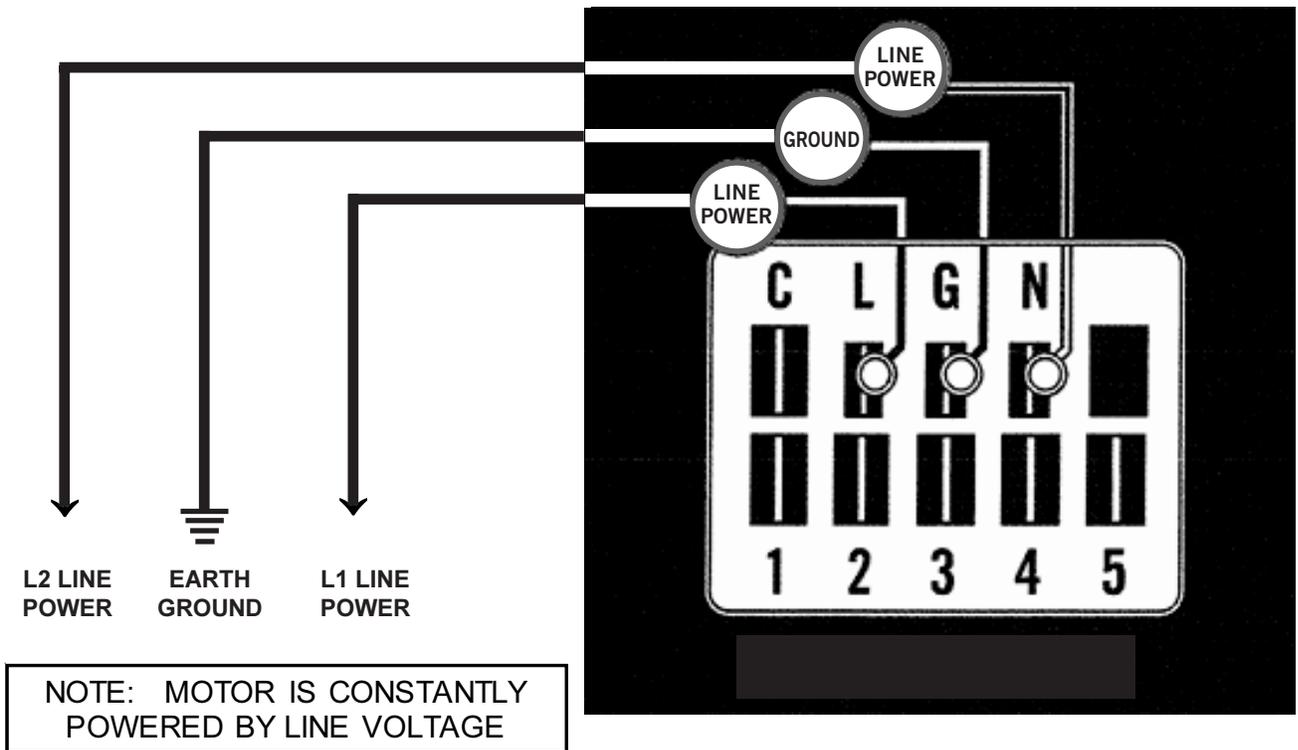
If the Motor Is Running

1. It is normal for the motor to rock back and forth on start up. Do not replace the motor if this is the only problem identified.
2. If the system is excessively noisy, does not appear to change speeds in response to a demand (Heat, Cool, Other) or is having symptoms during the cycle such as tripping limit or freezing coil, check the following:
 - A. Wait for programmed delays to time out.
 - B. Make sure that the motors control inputs are wired as shown in the factory-supplied wiring diagram to ensure motor is getting proper control signals and sequencing.
 - C. Remove the filter and check that all dampers, registers and grilles are open and free flowing. If removing the filters corrects the problem, clean or replace with a less restrictive filter. Also check and clean the blower wheel or coil as necessary.
 - D. Check the external static pressure (total of both supply and return) to ensure it is within the range as listed on the unit serial plate. If higher than allowed, additional duct work is needed.
 - E. If the motor does not shut off at the end of the cycle, wait for any programmed delays to time out (no more than 90 seconds). Also make sure that there is no call for "Continuous Fan" on the G terminal.
 - F. If the above diagnostics do not solve the problem, confirm the voltage checks in the next section below, then continue with the **Model SelecTech Communication Diagnostics**.

If the Motor Is Not Running

1. Check for proper high voltage and ground at the L/L1, G, N/L2 connections at the motor (see Figure 20). Correct any voltage issues before proceeding to the next step. The SelecTech motor is voltage specific. Only the correct voltage should be applied to the proper motor. Input voltage within plus

FIGURE 20
Motor Connections



or minus 10% of the nominal line power VAC is acceptable.

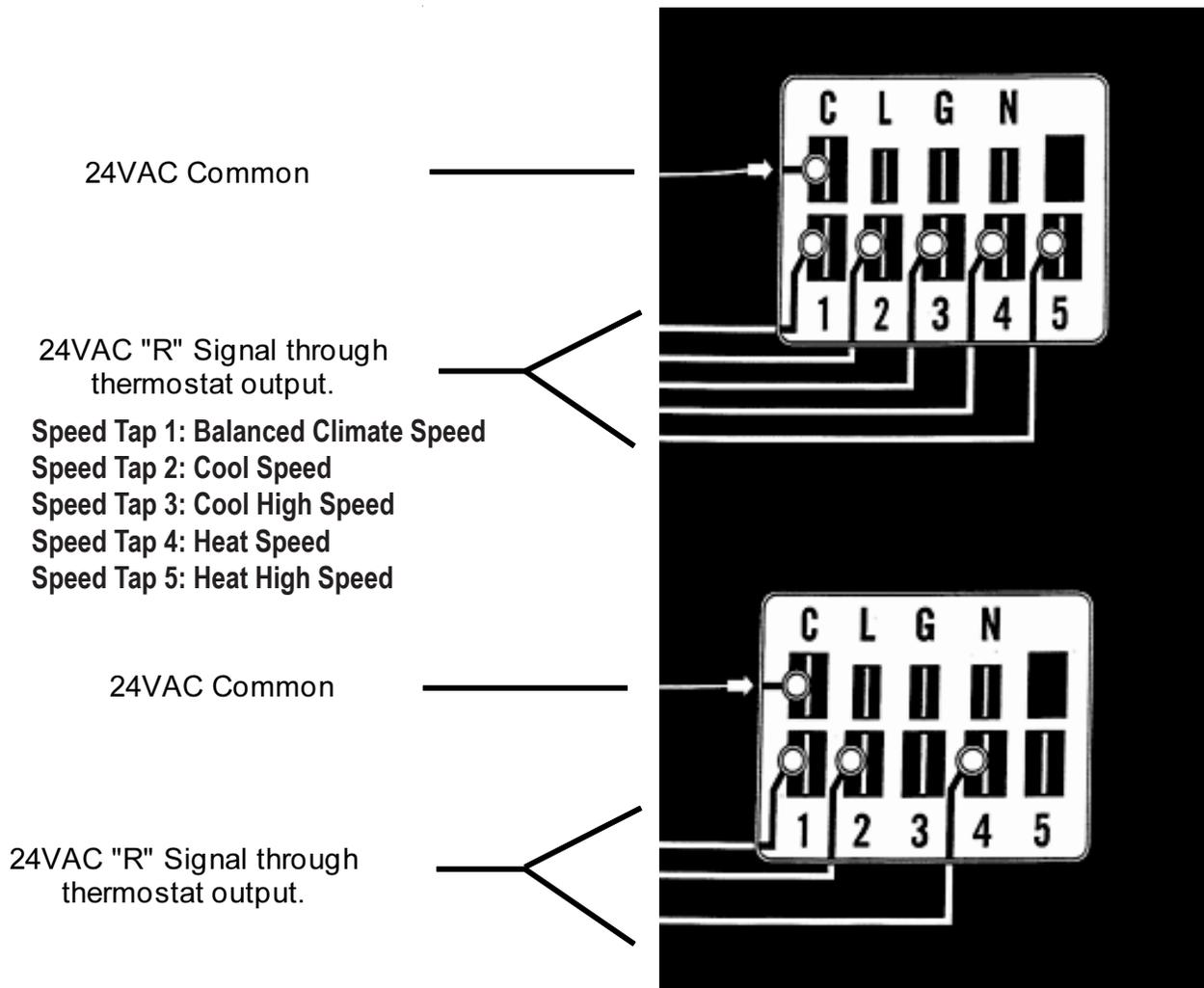
2. If the motor has proper high voltage and ground at the L/L1, G, N/L2 connections, then continue with the **Model SelecTech Communication Diagnostics**.

Model SelecTech Communication Diagnostics

The SelecTech motor is communicated through 24 VAC low voltage (thermostat control circuit wiring).

1. Start with unit wiring diagram to confirm proper connections and voltage (see Figure 21 on page 42).
2. Initiate a demand from the thermostat and check the voltage between the common and the appropriate motor terminal (1-5). (G input is typically on terminal #1, but always refer to wiring diagram.)
 - A. If the low voltage communication is not present, check the demand from the thermostat. Also check the output terminal and wire(s) from the terminal strip or control relay(s) to the motor.
 - B. If the motor has proper high voltage (verified in Step 1 of **If the Motor Is Not Running**), proper low voltage to a programmed terminal and is not operating, the motor is failed and will require replacement.

FIGURE 21
Motor Connections



31. Replacement Parts

WARNING

Use replacement parts listed in Replacement Parts list. Failure to do so could cause improper furnace operation, resulting in property damage, personal injury or death.

Replacement parts for the gas/electric units are available through local distributors.

A replacement parts list manual is supplied with each unit. When ordering parts or making inquires pertaining to any of the units covered by these instructions, it is very important to always supply the **complete**

model number and serial number of the unit. This is necessary to assure that the correct parts (or an approved alternate part) are issued to the service agency.

32. Sequence of Operation – Heating

On a call for heat from the thermostat, the induced draft blower is energized. Once sufficient draft is established, the pressure switch contacts close and the ignition system is energized. The direct spark igniter will be energized allowing gas to flow. At the same time the main valve is energized, a 30-second blower delay timer is activated.

After this delay, the heating speed blower relay energizes. The blower will begin operating and remain in operation until the set delay time after the call for heat has been satisfied. This timing sequence guarantees blower on, blower off operation.

This unit is equipped with a flame roll-out switch, which is wired in series with the control circuit. This is a manual reset switch and is used for the purpose of preventing possible fire hazard in the event of a system malfunction. If this switch has opened the control circuit, there could be a possible system malfunction. Some of the conditions that might cause a roll-out to occur are blockage or sooting of primary heat exchanger, overfiring of furnace due to improper main burner orifices or incorrect manifold pressure, insufficient combustion air or installation deficiencies with respect to return air duct design or sizing.

Once the problem has been resolved, reset the switch by pressing down on the reset button on top of the switch. See Figure 22 for additional information.

33. Sequence of Operation – Cooling

On a call for cooling from the room thermostat, the blower relay will be energized as well as the compressor contactor. Following termination of the cooling cycle, the blower motor will continue to run for one minute.

See Figure 22 for additional information.

The unit may be equipped with a low ambient control for lower outdoor temperature operation in the cooling mode. If equipped with this optional control, the condenser fan will not operate immediately upon compressor start-up, and will cycle on and off until the condensing pressure remains above 180 PSIG. Low ambient control energizes the fan motor at 280 PSIG, de-energizes at 180 PSIG.

FIGURE 22
Sequence of Operation
Electronic Blower Control

Action	System Response
Thermostat calls for heat (W terminal is energized).	<ul style="list-style-type: none"> • Combustion air blower is energized. • Air proving switch makes. Airflow is established. • Ignition system is energized. • Gas valve opens and main burner lights. • Heat fan on delay timing begins. When timing is complete, the circulating fan is energized at heat speed.
Thermostat ends call for heat.	<ul style="list-style-type: none"> • Ignition system is de-energized and gas valve closes. • Combustion air blower is de-energized after postpurge timing. • Heat fan off delay timing begins. When timing is complete, the circulating fan is de-energized.
Thermostat begins call for cool (G and Y terminals energized).	<ul style="list-style-type: none"> • Cooling contactor is energized. • Circulating fan is energized on cool speed after cool fan on delay timing.
Thermostat begins call for fan (G terminal is energized).	<ul style="list-style-type: none"> • Circulating fan is energized.
Limit (flame rollout) opens.	<ul style="list-style-type: none"> • Thermostat and ignition system are de-energized and gas valve closes. • Combustion air blower and circulating fan heat speed are energized.
Limit (auto reset) or flame rollout (manual reset) circuit closed.	<ul style="list-style-type: none"> • Combustion air blower remains energized for postpurge timing. • The circulation fan remains energized for the selected delay off timing. • Normal operation resumes.

34. Setting Unit Airflow

All models have multiple speed direct drive blower motors. If supply and return ducts are connected to the unit, the ducts must be of adequate size. Refer to the appropriate blower tables. See Tables 12, 13, 14, 15, 16 and 17 for maximum static pressures acceptable. Note the minimum CFM for heating and cooling operation.

The unit is set from the factory at the default speed. W**G units have three (3) selectable speeds for cooling and two (2) selectable speeds for heating. First set the airflow for heating. For high static applications, the speed should be set to high. When in doubt, note the allowable air temperature rise listed on the name plate and using the procedure listed in Section 23, "Measuring Air Temperature Rise", measure the air temperature rise. If the temperature rise is above allowable range, the heating airflow must be increased.

To increase the heating airflow speed:

- First disconnect power to the unit.
- Open the control panel and find the furnace control board (see Figure 23).

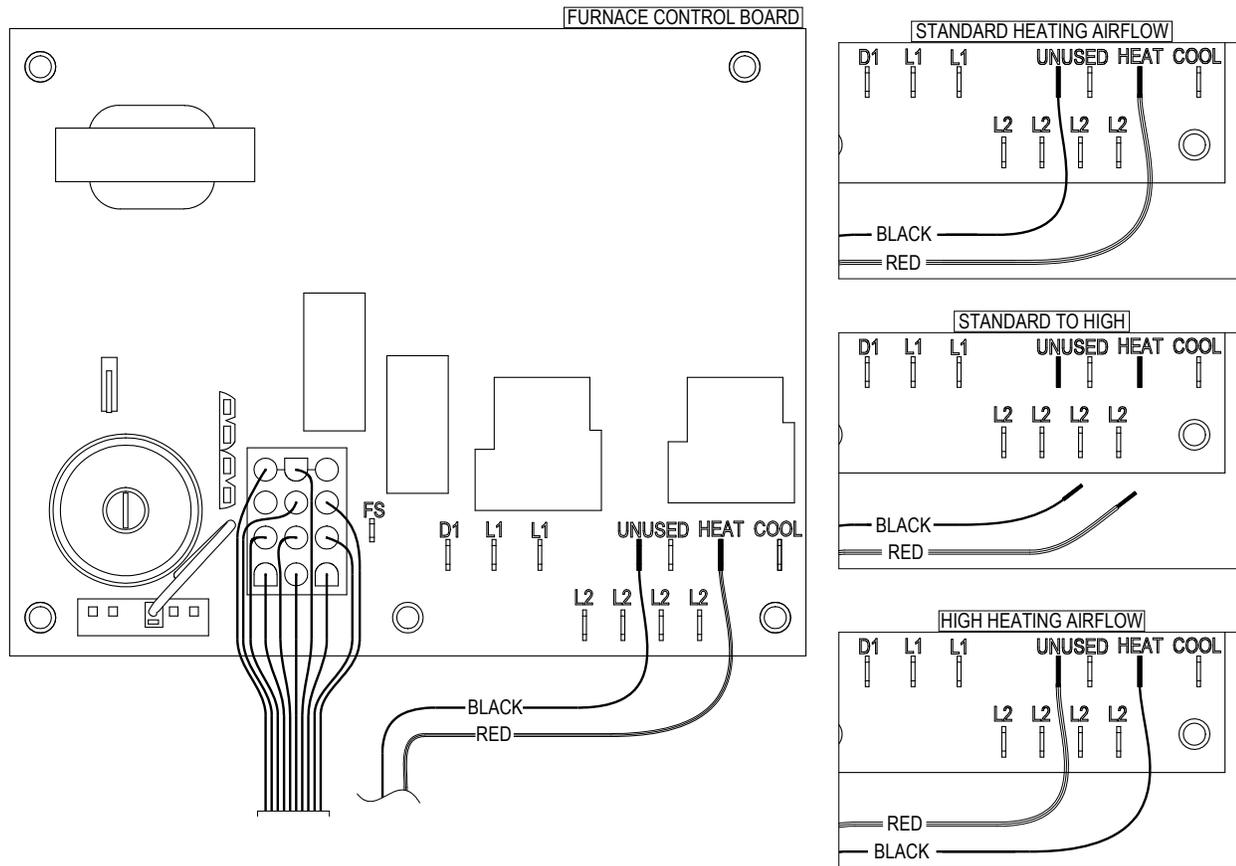
- Remove the black wire from the unused terminal and then remove the red wire from the heat terminal.
- Install the red wire on the unused terminal and the black wire on the heat terminal.
- Close the control panel and repeat the air temperature rise test.
- To reduce the heating airflow speed from high to standard, move the black wire from the heat terminal to the unused terminal and the red wire from the unused terminal to the heat terminal.

The default speed for cooling is the rated cooling speed that is listed in Tables 12, 13, 14, 15, 16 and 17. The higher cooling speed tap can be used for higher duct static applications or to increase the sensible cooling capacity. The higher speeds can also be used when higher sensible cooling is desired.

To increase the cooling airflow speed:

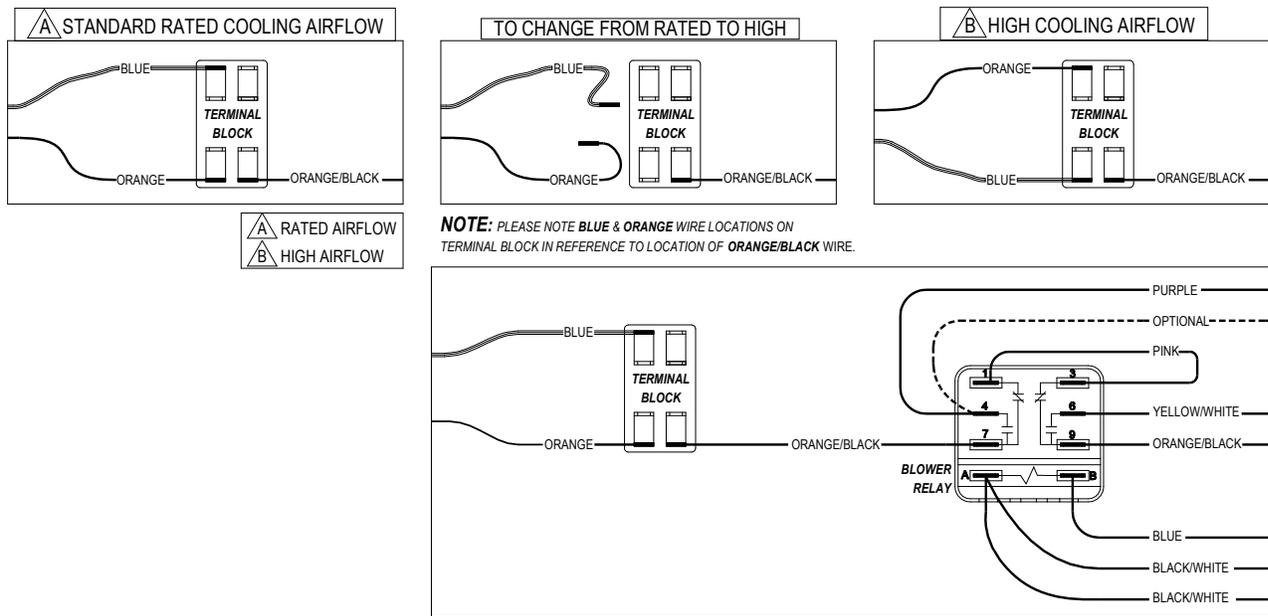
- First disconnect power to the unit.
- Open the control panel and find the terminal block above the blower relay (see Figure 24).

FIGURE 23
Increasing Heating Speed



MIS-4138

FIGURE 24
Increasing Cooling Speed



MIS-4139

- Locate the orange and blue wires on the terminal block below the furnace control board.
- Switch the terminal landings on the terminal block.
- Close the control panel.
- To reduce the cooling airflow speed from high to rated, reverse the blue and orange wires on the terminal block below the furnace control board.

NOTE: Be sure to adjust the system static or blower speed to maintain airflows above the minimum recommendations to prevent freeze up conditions if Balanced Climate mode is activated.

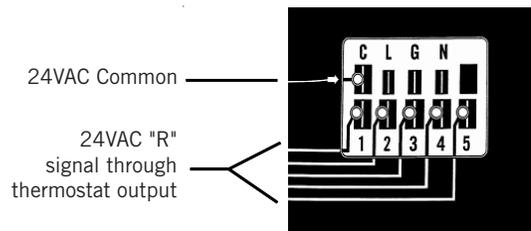
Do not operate the unit in Balanced Climate mode if running high static applications as indicated in the blower performance table. If Balanced Climate mode is activated as described on page 22, the unit will run in this mode at all times unless there is a call for ventilation, electric heat or 2nd stage cooling from a 2-stage thermostat. At that time, the unit will automatically activate a higher speed tap.

Blower Speeds

Five factory programmed speed taps (torque settings) are available for the motor, and are selected through different unit modes of operation. These modes are energized by 24VAC signals from the low voltage terminal block located inside the control panel by a thermostat or other controlling device. Each speed tap is programmed by Bard at the factory to different motor torque settings (see Figure 25).

Multiple motor speed taps may be energized simultaneously by 24VAC power during different modes of operation. The highest number speed tap energized takes priority with 5 being the highest and 1 being the lowest.

FIGURE 25
Speed Taps



- Speed Tap 1: Balanced Climate Speed
- Speed Tap 2: Cool Speed
- Speed Tap 3: Cool High Speed
- Speed Tap 4: Heat Speed
- Speed Tap 5: Heat High Speed

TABLE 12
W24G4 Indoor Blower Performance @ 230 and 460 VOLTS

Recommended W24G cooling airflow range at rated 800 CFM @ 0.10 ESP (WC) is 700 - 910 CFM
Factory set on Rated speed for cooling and Medium speed for heating.

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			90,000 BTU Input		81,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	670	928	1213				
0.1	598	851	1141	1361			
0.2	511	760	1055	1288	1373	1288	
0.3	417	662	962	1214	1324	1214	
0.4	323	564	870	1143	1278	1143	
0.5	235	473	784	1077	1237	1077	1237

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			68,000 BTU Input		61,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	670	928	1213				
0.1	598	851	1141				
0.2	511	760	1055	1288			
0.3	417	662	962	1214			
0.4	323	564	870	1143	1278	1143	
0.5	235	473	784	1077	1237	1077	

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			45,000 BTU Input		41,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	670	928	1213				
0.1	598	851	1141	1361			
0.2	511	760	1055	1288			
0.3	417	662	962	1214	1324		
0.4	323	564	870	1143	1278	1143	
0.5	235	473	784	1077	1237	1077	

SG-3, RG-3, non-ducted application adjustment – Reduce airflow by 100 CFM for SG-3 and RG-3 installations

TABLE 13
W30G4 Indoor Blower Performance @ 230 AND 460 VOLTS

Recommended W30G cooling airflow range at rated 900 CFM @ 0.15 ESP (WC) is 750 - 1150 CFM
 Factory set on Rated speed for cooling and Medium speed for heating.

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			90,000 BTU Input		81,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	850	1022	1157	1281			
0.1	769	953	1098	1237	1375	1237	
0.2	688	883	1038	1188	1329	1188	
0.3	606	812	975	1134	1279	1134	
0.4	523	739	910	1075	1225	1075	1225
0.5	439	664	843	1011	1168	1011	1168

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			68,000 BTU Input		61,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	850	1022	1157	1281			
0.1	769	953	1098	1237			
0.2	688	883	1038	1188			
0.3	606	812	975	1134	1279	1134	
0.4	523	739	910	1075	1225	1075	
0.5	439	664	843	1011	1168	1011	

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			45,000 BTU Input		41,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	850	1022	1157	1281			
0.1	769	953	1098	1237			
0.2	688	883	1038	1188	1329	1188	
0.3	606	812	975	1134	1279	1134	
0.4	523	739	910	1075	1225	1075	
0.5	439	664	843	1011	1168	1011	1168

Dehumidification coil adjustment – Reduce airflow by 35 CFM for dehumidification coil installed

SG-3, RG-3, non-ducted application adjustment – Reduce airflow by 100 CFM for SG-3 and RG-3 installations

TABLE 14
W36G4 Indoor Blower Performance @ 230 AND 460 VOLTS

Recommended W36G cooling airflow range at rated 1100 CFM @ 0.10 ESP (WC) is 940 - 1250 CFM
Factory set on Rated speed for cooling and Medium speed for heating.

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			90,000 BTU Input		81,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	932	1202	1281	1281			
0.1	855	1148	1238	1237	1375	1237	
0.2	776	1091	1190	1188	1329	1188	
0.3	695	1030	1139	1134	1279	1134	
0.4	614	966	1083	1075	1225	1075	1225
0.5	530	898	1022	1011	1168	1011	1168

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			68,000 BTU Input		61,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	932	1202	1281	1281			
0.1	855	1148	1238	1237			
0.2	776	1091	1190	1188			
0.3	695	1030	1139	1134	1279	1134	
0.4	614	966	1083	1075	1225	1075	
0.5	530	898	1022	1011	1168	1011	

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			45,000 BTU Input		41,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	932	1202	1281	1281			
0.1	855	1148	1238	1237			
0.2	776	1091	1190	1188	1329	1188	
0.3	695	1030	1139	1134	1279	1134	
0.4	614	966	1083	1075	1225	1075	
0.5	530	898	1022	1011	1168	1011	1168

SG-3, RG-3, non-ducted application adjustment – Reduce airflow by 100 CFM for SG-3 and RG-3 installations

TABLE 15
W42G4 Indoor Blower Performance @ 230 AND 460 VOLTS

Recommended W42G cooling airflow range at rated 1300 CFM @ .15 ESP (WC) is 1030 - 1480 CFM
 Factory set on Rated speed for cooling and Medium speed for heating.

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			125,000 BTU Input		113,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	1084	1394	1552	1788			
0.1	1011	1335	1498	1734			
0.2	930	1270	1439	1678		1678	
0.3	840	1198	1374	1618		1618	
0.4	741	1119	1305	1557	1811	1557	
0.5	633	1034	1230	1492	1754	1492	

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			100,000 BTU Input		90,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	1084	1394	1552	1788			
0.1	1011	1335	1498	1734		1734	
0.2	930	1270	1439	1678		1678	
0.3	840	1198	1374	1618	1870	1618	
0.4	741	1119	1305	1557	1811	1557	
0.5	633	1034	1230	1492	1754	1492	

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			75,000 BTU Input		68,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	1084	1394	1552	1788			
0.1	1011	1335	1498	1734			
0.2	930	1270	1439	1678		1678	
0.3	840	1198	1374	1618	1870	1618	
0.4	741	1119	1305	1557	1811	1557	
0.5	633	1034	1230	1492	1754	1492	

SG-5, RG-5, non-ducted application adjustment – Reduce airflow by 170 CFM for SG-5 and RG-5 installations

TABLE 16
W48G4 Indoor Blower Performance @ 230 AND 460 VOLTS

Recommended W48G cooling airflow range at rated 1450 CFM @ .20 ESP (WC) is 1150 - 1680 CFM
Factory set on Rated speed for cooling and Medium speed for heating.

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			125,000 BTU Input		113,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	1185	1501	1668	1788			
0.1	1118	1445	1616	1734			
0.2	1042	1384	1560	1678		1678	
0.3	958	1317	1500	1618		1618	
0.4	866	1245	1436	1557	1811	1557	
0.5	766	1167	1368	1492	1754	1492	

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			100,000 BTU Input		90,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	1185	1501	1668	1788			
0.1	1118	1445	1616	1734		1734	
0.2	1042	1384	1560	1678		1678	
0.3	958	1317	1500	1618	1870	1618	
0.4	866	1245	1436	1557	1811	1557	
0.5	766	1167	1368	1492	1754	1492	

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			75,000 BTU Input		68,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	1185	1501	1668	1788			
0.1	1118	1445	1616	1734			
0.2	1042	1384	1560	1678		1678	
0.3	958	1317	1500	1618	1870	1618	
0.4	866	1245	1436	1557	1811	1557	
0.5	766	1167	1368	1492	1754	1492	

SG-5, RG-5, non-ducted application adjustment – Reduce airflow by 170 CFM for SG-5 and RG-5 installations

TABLE 17
W60G4 Indoor Blower Performance @ 230 AND 460 VOLTS

Recommended W60G cooling airflow range at rated 1650 CFM @ .20 ESP (WC) is 1360 - 1850 CFM
 Factory set on Rated speed for cooling and Medium speed for heating.

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			125,000 BTU Input		113,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	1347	1771	1881	1743			
0.1	1272	1708	1823	1682			
0.2	1199	1646	1766	1619	1843	1619	
0.3	1128	1584	1709	1554	1783	1554	
0.4	1060	1523	1652	1486	1721	1486	
0.5	994	1462	1596	1417	1657	1417	1657

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			100,000 BTU Input		90,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	1347	1771	1881	1743			
0.1	1272	1708	1823	1682		1682	
0.2	1199	1646	1766	1619	1843	1619	
0.3	1128	1584	1709	1554	1783	1554	
0.4	1060	1523	1652	1486	1721	1486	1721
0.5	994	1462	1596	1417	1657	1417	1657

ESP Inches H ₂ O	COOLING MODE			MANUAL FAN and HEATING MODE			
	Wet Coil			75,000 BTU Input		68,000 BTU Input	
	Balanced	Rated	High	Medium	High	Medium	High
0	1347	1771	1881	1743			
0.1	1272	1708	1823	1682		1682	
0.2	1199	1646	1766	1619	1843	1619	
0.3	1128	1584	1709	1554	1783	1554	
0.4	1060	1523	1652	1486	1721	1486	1721
0.5	994	1462	1596	1417	1657	1417	1657

SG-5, RG-5, non-ducted application adjustment – Reduce airflow by 170 CFM for SG-5 and RG-5 installations

TABLE 18
Integrated Furnace and Blower Control Operation

IGNITION SEQUENCE CONTROL

Ignition Source	24 VAC DSI
Flame Sensing	Remote
Timings	
- Prepurge	15 seconds
- Postpurge	30 seconds (0 if cycle terminated before valve "on")
- Inter-trial purge	15 seconds
- Pressure switch proving period	60 seconds
- Trials for ignition	3 per ignition sequence
- Trial for ignition	7 seconds total time to prove flame
- Ignition sequence lockout	60 minutes (after 3 trials for ignition), auto reset – can be reset during the 60-minute lockout period by opening thermostat circuit for 3 seconds or more
- Heat blower on - delay	30 seconds (timing starts when ignitor cycles off)
- Heat blower off - delay	90, 120, 150 seconds selectable; factory set at 120
- Cool blower on - delay	7 seconds
- Cool blower off - delay	60 seconds
- Manual fan operations	Operates on selected heating speed and cycles off during ignition or burner start-up sequence.
- High limit control operation	Automatic reset, ignition sequence restart. See Note 1.
- Flame rollout switch operation	Manual reset, ignition sequence initiated after switch is manually reset. See Note 1.

NOTE 1: After the fourth limit trip on a given call for heat, there will be a 1-hour delay before the ignition sequence will restart. After either high limit switch or flame rollout switch actuation, the inducer will operate for the 30-second postpurge and the comfort air blower will operate for the selected off delay. If on Manual Fan operation, the comfort air blower will continue to operate.

SAFETY UNITS

High limit/Rollout	SPST in 24 Volt
Pressure switch	SPST, safe start check

COMFORT FAN CONTROL

Heating Speed Fan

Normal operation	
- ON delay	30 seconds fixed. Timing starts when igniter de-energized.
- OFF delay	3 selectable timings – 120 seconds standard can be changed to 90 or 150 seconds.
Limit Operation	ON when limit OPEN OFF after OFF delay when limit CLOSES
Flame Sense	ON if flame is sensed <i>and</i> there is no call for heat.

Cooling Speed Fan

- ON delay	7 seconds
- OFF delay	60 seconds

Manual Fan

ON continuously on HEATING speed. When call for cool, the fan switches to COOLING speed. Then when thermostat satisfied, the fan switches back to HEATING speed after COOLING OFF delay.

DIAGNOSTIC INDICATOR

A red LED is provided to indicate system faults as follows:

- Steady ON - Control okay in standby, call for heat, cool or fan modes
- Steady OFF - Internal control fault or no power. Also check 3A fuse on control.
- 1 flash - Lockout due to failed ignition or flame dropouts
- 2 flashes - Pressure switch open with inducer on
- 3 flashes - Pressure switch is closed with inducer off
- 4 flashes - Limit switch is open
- 5 flashes - Flame detected with gas valve closed
- 6 flashes - Compressor output delayed from short cycle/staging timer

The flash rate is 0.25 seconds on, 0.25 seconds off with 2.0 seconds pause between flash codes.

35. Pressure Service Ports

High and low pressure service ports are installed on all units so that the system operating pressures can be observed. Table 19 outlines expected pressures at various indoor and outdoor temperatures.

This unit employs high-flow Coremax valves instead of the typical Schrader type valves.

WARNING! Do NOT use a Schrader valve core removal tool with these valves. Use of such a tool could result in eye injuries or refrigerant burns!

To change a Coremax valve without first removing the refrigerant, a special tool is required which can be obtained at www.fastestinc.com/en/SCCA07H. See the replacement parts manual for replacement core part numbers.

TABLE 19
Cooling Pressure Table

Model	Return Air Temperature	Pressure	75°	80°	85°	90°	95°	100°	105°	110°	115°	120°	125°
W24G4	75° DB	Low Side	119.7	122.6	125.3	127.9	130.3	132.8	135.0	137.2	139.1	141.0	142.8
	62° WB	High Side	298.0	318.5	340.2	363.0	386.9	411.8	438.0	465.3	493.6	523.2	553.8
	80° DB	Low Side	128.0	131.1	134.0	136.8	139.4	142.0	144.4	146.7	148.8	150.8	152.7
W30G4	67° WB	High Side	305.6	326.7	348.9	372.3	396.8	422.4	449.2	477.2	506.3	536.6	568.0
	85° DB	Low Side	132.5	135.7	138.7	141.6	144.3	147.0	149.5	151.8	154.0	156.1	158.0
	72° WB	High Side	316.3	338.1	361.1	385.3	410.7	437.2	464.9	493.9	524.0	555.4	587.9
W36G4	75° DB	Low Side	120.1	122.7	125.2	127.6	130.0	132.3	134.5	136.8	138.9	141.0	143.1
	62° WB	High Side	297.7	318.0	339.5	362.0	385.5	410.0	435.5	462.2	489.7	518.4	548.1
	80° DB	Low Side	128.5	131.2	133.9	136.5	139.0	141.5	143.9	146.3	148.6	150.8	153.0
W42G4	67° WB	High Side	305.3	326.2	348.2	371.3	395.4	420.5	446.7	474.0	502.3	531.7	562.2
	85° DB	Low Side	133.0	135.8	138.6	141.3	143.9	146.5	148.9	151.4	153.8	156.1	158.4
	72° WB	High Side	316.0	337.6	360.4	384.3	409.2	435.2	462.3	490.6	519.9	550.3	581.9
W48G4	75° DB	Low Side	124.4	126.8	129.1	131.3	133.4	135.4	137.4	139.1	140.9	142.6	144.2
	62° WB	High Side	312.6	334.9	357.9	381.6	405.9	431.0	456.7	483.1	510.2	538.0	566.5
	80° DB	Low Side	133.1	135.6	138.1	140.4	142.7	144.8	146.9	148.8	150.7	152.5	154.2
W60G4	67° WB	High Side	320.6	343.5	367.1	391.4	416.3	442.0	468.4	495.5	523.3	551.8	581.0
	85° DB	Low Side	137.8	140.3	142.9	145.3	147.7	149.9	152.0	154.0	156.0	157.8	159.6
	72° WB	High Side	331.8	355.5	379.9	405.1	430.9	457.5	484.9	512.8	541.6	571.1	601.3
W24G4	75° DB	Low Side	124.7	127.4	130.0	132.3	134.6	136.7	138.8	140.6	142.3	143.9	145.4
	62° WB	High Side	328.7	350.3	373.0	396.7	421.4	447.1	473.8	501.4	530.1	559.7	590.4
	80° DB	Low Side	133.4	136.3	139.0	141.5	144.0	146.2	148.4	150.4	152.2	153.9	155.5
W30G4	67° WB	High Side	337.1	359.3	382.6	406.9	432.2	458.6	485.9	514.3	543.7	574.1	605.5
	85° DB	Low Side	138.1	141.1	143.9	146.5	149.0	151.3	153.6	155.7	157.5	159.3	
	72° WB	High Side	348.9	371.9	396.0	421.1	447.3	474.7	502.9	532.3	562.7	594.2	
W36G4	75° DB	Low Side	124.9	126.8	128.7	130.4	132.2	134.0	135.8	137.5	139.3	141.0	142.7
	62° WB	High Side	325.9	347.5	369.8	392.9	416.9	441.7	467.2	493.6	520.8	548.9	577.8
	80° DB	Low Side	133.6	135.6	137.6	139.5	141.4	143.3	145.2	147.1	149.0	150.8	152.6
W42G4	67° WB	High Side	334.3	356.4	379.3	403.0	427.6	453.0	479.2	506.3	534.2	563.0	592.6
	85° DB	Low Side	138.3	140.3	142.4	144.4	146.3	148.3	150.3	152.2	154.2	156.1	157.9
	72° WB	High Side	346.0	368.9	392.6	417.1	442.6	468.9	496.0	524.0	552.9	582.7	613.3
W48G4	75° DB	Low Side	123.3	125.1	127.0	128.8	130.6	132.5	134.3	136.1	137.9	139.8	141.6
	62° WB	High Side	309.0	329.6	351.4	374.2	398.2	423.3	449.6	477.0	505.5	535.2	566.0
	80° DB	Low Side	131.9	133.8	135.8	137.8	139.7	141.7	143.6	145.6	147.5	149.5	151.4
W60G4	67° WB	High Side	316.9	338.1	360.4	383.8	408.4	434.2	461.1	489.2	518.5	548.9	580.5
	85° DB	Low Side	136.5	138.5	140.6	142.6	144.6	146.7	148.6	150.7	152.7	154.7	156.7
	72° WB	High Side	328.0	349.9	373.0	397.2	422.7	449.4	477.2	506.3	536.6	568.1	600.8

Low side pressure ± 4 PSIG High side pressure ±10 PSIG

Tables based upon rated CFM (airflow) across the evaporator coil.

If there is any doubt as to correct operating charge being in the system, the charge should be reclaimed, and the system evacuated and recharged to serial plate instruction.

36. R-410A Refrigerant Charge

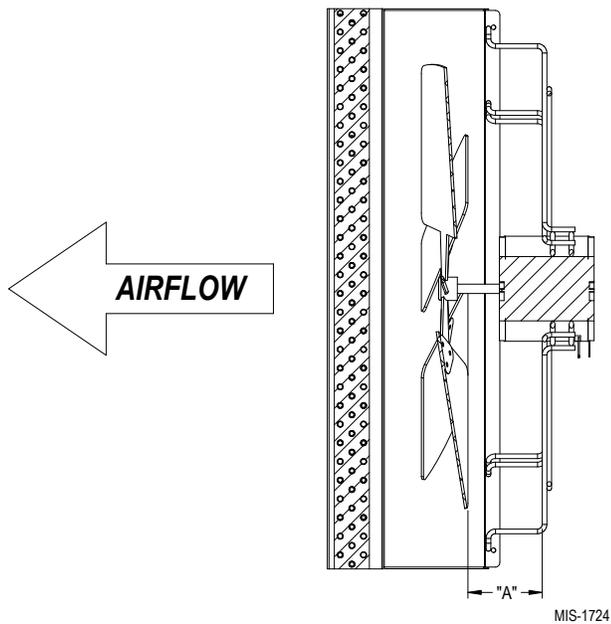
This unit was charged at the factory with the quantity of refrigerant listed on the serial plate. AHRI capacity and efficiency ratings were determined by testing with this refrigerant charge quantity.

Table 19 shows nominal pressures for the units. Since many installation specific situations can affect the pressure readings, this information should only be used by certified technicians as a guide for evaluating proper system performance. They shall not be used to adjust charge. If charge is in doubt, reclaim, evacuate and recharge the unit to the serial plate charge.

37. Fan Blade Setting Dimensions

The correct fan blade setting dimension for proper air delivery across the outdoor coil is shown in Figure 26.

FIGURE 26
Fan Blade



38. Low-NOx Burner Assembly "N" Suffix Models Only – U.S. Installations Only

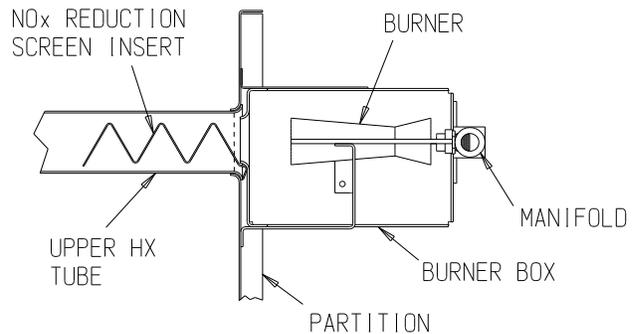
Natural Gas Models Only

Model numbers designated with an "N" are designed for low NOx emissions which comply with all California Air Quality Management District regulations for nitrogen oxide emission levels. Refer to Figure 27 for NOx insert information.

**** IMPORTANT ****

For propane (LP) conversions, the NOx reduction screen inserts shown below must be removed. This is accomplished by removing the burner box assembly and removing the NOx screens. Reassemble unit properly before firing. Failure to remove the NOx screens can result in improper operation and malfunction of the burner system.

FIGURE 27
Low NOx Insert



MIS-1481

TABLE 20
Fan Blade Dimension

Model	Dimension A
W24G	1.25
W30G	1.25
W36G	1.25
W42G	1.75
W48G	1.75
W60G	1.75

INDEX

Wiring Diagrams

Unit Model No.	Basic Wiring Diagram
W24G4-A	4085-177
W24G4-B	4085-277
W24G4-C	4085-400
W30G4-A	4085-177
W30G4-B	4085-277
W30G4-C	4085-400
W36G4-A	4085-177
W36G4-B	4085-277
W36G4-C	4085-400
W42G4-A	4085-177
W42G4-B	4085-277
W42G4-C	4085-400
W48G4-A	4085-177
W48G4-B	4085-277
W48G4-C	4085-400
W60G4-A	4085-175
W60G4-B	4085-275
W60G4-C	4085-398