Installation / Operation

Applies to: **Models YDHA, YDMA, and YDSA Packaged Rooftop Equipment**

R-410A Refrigerant

DANGER:

This unit contains R-410A high pressure refrigerant. Hazards exist that could result in personal injury or death. Installation, maintenance, and service should only be performed by an HVAC technician qualified in R-410A refrigerant and using proper tools and equipment. Due to much higher pressure of R-410A refrigerant, DO NOT USE service equipment or tools designed for R22 refrigerant.

⚠ WARNING:

FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury, death, or property damage.

Be sure to read and understand the installation, operation, and service instructions in this manual.

Improper installation, adjustment, alteration, service, or maintenance can cause serious injury, death, or property damage.

— **Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.**

— **WHAT TO DO IF YOU SMELL GAS**

- **Do not try to light any appliance.**
- **Do not touch any electrical switch; do not use any phone in your building.**
- **Leave the building immediately.**
- **Immediately call your gas supplier from a phone remote from the building. Follow the gas supplier's instructions.**
- **If you cannot reach your gas supplier, call the fire department.**

— **Installation and service must be performed by a qualified installer, service agency, or the gas supplier.**

Table of Contents

1.0 General

1.1 Cautions and Warnings

There are warning labels on the unit, on the front page, and throughout this manual. For your safety, comply with all warnings during installation, operation, and service of this system. Definitions of the hazard intensity levels of the cautions, warnings, and dangers are shown below.

Definitions of Hazard Intensity Levels used in this Manual

HAZARD INTENSITY LEVELS

1. **DANGER: Failure to comply will result in severe personal injury or death and/or property damage.**
2. **WARNING: Failure to comply could result in severe personal injury or death and/or property damage.**
3. **CAUTION: Failure to comply could result in minor personal injury and/or property damage.**

Warnings for Units with a Gas Heat Section

WARNING

Gas-fired appliances are not designed for use in hazardous atmospheres containing flammable vapors or combustible dust, in atmospheres containing chlorinated or halogenated hydrocarbons, or in applications with airborne silicone substances.

WARNING

Should overheating occur, or the gas supply fail to shut off, shut off the manual gas valve to the appliance before shutting off the electrical supply.

WARNING

Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and replace any gas control that has been under water.

1.2 General Information

This booklet includes installation and operation information. Before beginning any procedure, carefully review the information, paying particular attention to the warnings.

If you do not have knowledge of local requirements, check with the local agencies who might have requirements concerning this installation. Become familiar with the requirements of your particular installation and make preparations for necessary supplies, equipment, and manpower.

The installation instructions in this manual apply to Rooftop Models YDHA, YDMA, and YDSA. Other manuals in the literature bag include:

- Form O-Y, Maintenance/Service Manual
- Form CP-Y D21, Manual for Makeup Air Control System Option D21; ***or***
- Form CP-Y D19, Manual for Space Temperature Control System Option D19

1.3 Warranty

Refer to limited warranty information on the warranty form in the "Literature Bag" shipped with this system. If an optional extended warranty applies, keep the extended warranty information for future reference and verification of warranty.

1.4 Installation Codes

These packaged systems are certified by ETL to "Heating Cooling Equipment" (latest edition), UL 1995 / CAN/CSA C22.2 No. 236-05. Electrical characteristics are shown on the system rating plate. All cooling and reheat circuits are factory-charged with R-410A refrigerant.

If the system has a gas heat section, it has an integral gas-fired, power-vented duct furnace. The furnace is certified by ETL to the latest editions of both ANSI Z83.8 and CSA 2.6 for use in the United States and Canada. The ETL label, type of gas, and the firing rate are shown on the heat section rating plate.

California Warning Label

If a gas-fired heat section is included and the system is being installed in the state of California, the installer MUST attach the California warning label on the outside of the heat section access panel. The California Warning label, P/N 196977, is shipped in the "Literature Bag". Select a dry, clean location on the heat section access panel and adhere the label.

Massachusetts Requirements

If being installed in the Commonwealth of Massachusetts, this unit must be installed by a licensed plumber or licensed gas fitter.

2.0 Location and Moving

This outdoor unit is designed to be set on a manufacturer approved matching curb (See Paragraph 5.3.) that will provide either vertical or horizontal discharge airflow. The system must be level for proper operation. When selecting the location, check the following:

- ☐ Installation location must comply with all applicable codes.
- ☐ Location on a roof depends on building structure. Refer to Paragraph 5.1 for information on how to obtain unit weight data.
- ☐ Comply with required clearances in Paragraph 4.1.
- ☐ Position the unit so that the outside air inlet will not be facing into the prevailing wind.
- ☐ Before moving the unit, refer to Paragraph 5.4 for rigging information.

3.0 Receiving, Shipped Separate and Storage

3.1 Receiving

This system was test operated and inspected at the factory and was in operating condition. If the equipment has incurred any damage in shipment, document the damage with the carrier and immediately contact your local distributor.

Check the entire unit for damage paying particular attention to the structural integrity of the lifting points and the condenser fan section. Check the condenser fan guards and the fan blades.

On the inside of the control access door, locate the system rating plate (See **FIGURE 2** on page 7, **FIGURE 3** on page 8 of **FIGURE 4** on page 9). Check the rating plate information for specifications and the electrical characteristics and verify compatibility with the installation site.

If installing a unit with a heat section, check the rating plate on the inside of the heat section door. For a gas heat section, be sure that the rating plate information is compatible with the altitude and the gas supply at the installation site.

3.2 Shipped Separate Accessories and Shipped Loose Parts

Check for shipped-separate accessories and shipped-loose parts. All systems will have a shipped-loose discharge air sensor. The roof curb which is shipped separately (in most cases prior to the unit) requires field assembly. The outside air hood is shipped with the unit in a separate carton for field assembly and installation. (**NOTE**: Install the hood after the unit is in place. See Paragraph 6.1.)

Listed in the tables below are shipped separately & their availability options.

Standard Efficiency Vertical Flue Discharge Extension Options (pipe not included):						
Option	**PN's Included**	**Description**	**H50, H75, H100**	**H200, H300, H400**	**H102, H125, H150, H175, H202**	**H402, H502, H602, H702, H802**
CC3	235320 (small vent tube)	Single furnace kit, Metal	Yes	--	--	--
	235321 (large vent tube)		--	Yes	--	--
CC3D	1005501 (small vent tube)	Dual furnace kit, Metal	--	--	Yes	--
	1005502 (large vent tube)		--	--	--	Yes

HIGH Efficiency Vertical Flue Discharge Extension Options (pipe not included):				
Option	**PN**	**Description**	**G150, G225, G300**	**G302, G372, G452, G525, G602**
CC4	273387	Single furnace kit, PVC	Yes	--
CC4D	273388	Dual furnace kit, PVC	--	Yes

High Efficiency Flue Condensate Handling Options:			
Option	**PN**	**Description**	**G150, G225, G300, G302, G372, G452, G525, G602**
FB1	273277	Condensate Frost Protection	Yes
CSP1	272512	Condensate Pump	Yes
CSN1	272511	Condensate Neutralizer	Yes

Controls Options:					
Option	**PN**	**Description**	**Cabinet Size / Option Availability**		
			1 (a)	**2**	**3**
CL23	257338	24v 2-stage heating/cooling touch screen prog thermostat	Yes	Yes	Yes
CL33	221038	Electronic 24v prog thermostat for up to 3 stages heating and or cooling	Yes	Yes	Yes
CL78	272631	Wall mounted DDC temperature monitor and setpoint adjustment	Yes	Yes	Yes
BD5	42782	Firestat 200°F	Yes	Yes	Yes
BE15	234820	Space CO^2 sensor (range 0-2000 ppm)	Yes	Yes	Yes
BE17	259076	Smoke detector (photoelectric)	Yes	Yes	Yes
RB5	260436	Wall mounted remote monitoring display	Yes	Yes	Yes
RB6	272407	Hand held remote display with cable	Yes	Yes	Yes
(a) Cabinet size 1 not available with YDSA model					

Curb Options:					
Option	**Description**	**Notes**	**Cabinet Size / Option Availability & PN**		
			1 (a)	**2**	**3**
CJ31	16”high full perimeter roof curb, bottom duct connections, exposed external insulation.	Units without Energy Recovery	Yes PN 272399	Yes PN 272403	Yes PN 284223
CJ48	36”high full perimeter curb for pad mounting, horizontal discharge, double wall insulation in air plenum section.	Units without Energy Recover	Yes PN 272400	Yes PN 272404	Yes PN 284224
CJ 34	16”high full perimeter roof curb for units with ERM, bottom duct connections, exposed external insulation.	Units with Energy Recovery	Yes PN 272401	Yes PN 272405	Yes PN 284223
CJ55	36”high full perimeter roof curb for pad mounting for units with ERM, horizontal discharge, double wall insulation in air plenum section.	Units with Energy Recovery	Yes PN 272402	Yes PN 272406	Yes PN 284224
(a) Cabinet size 1 not available with YDSA model					

3.0 Receiving, Shipped Separate and Storage (cont'd)
3.2 Shipped Separate Accessories and Shipped Loose Parts (cont'd)

Outside Air Hood				
Option	Description	Cabinet Size		
		1	2	3
AS16	Outside air hood with permanent prefilters	273283	273373	284598

Exhaust Fan Control Option				
Option	Description	Cabinet Size		
		1	2	3
EFC4	Outside pressure pickup port Room pressure port	234905 234906	234905 234906	234905 234906

Inlet Damper Control Option				
Option	Description	Cabinet Size		
		1	2	3
GF5	Outside pressure pickup port Room pressure port	234905 234906	234905 234906	234905 234906

Fan Control Option				
Option	Description	Cabinet Size		
		1	2	3
VFC3	4"static pressure probe	234821	234821	234821
VFC4	Outside pressure pickup port Room pressure port	--	234905 234906	234905 234906

3.3 Storage

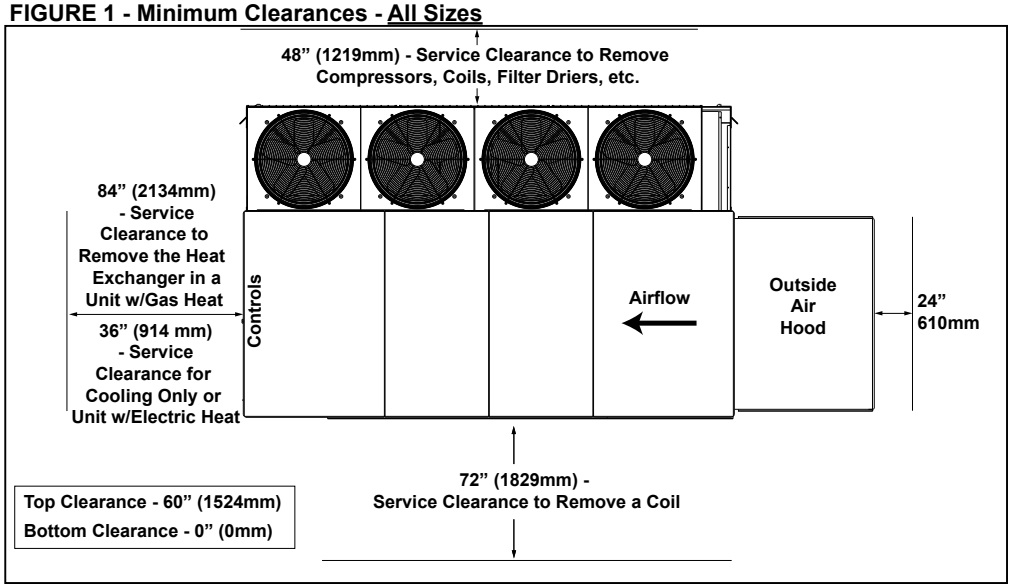
If this system is going to be stored, take precautions to prevent condensate formation inside the electrical compartments and motors. To prevent damage to the unit, do not store sitting on the ground.

4.0 Clearances and Dimensions

IMPORTANT: The area above the condenser fans MUST ALWAYS be totally open space to allow proper airflow through the condenser coils.

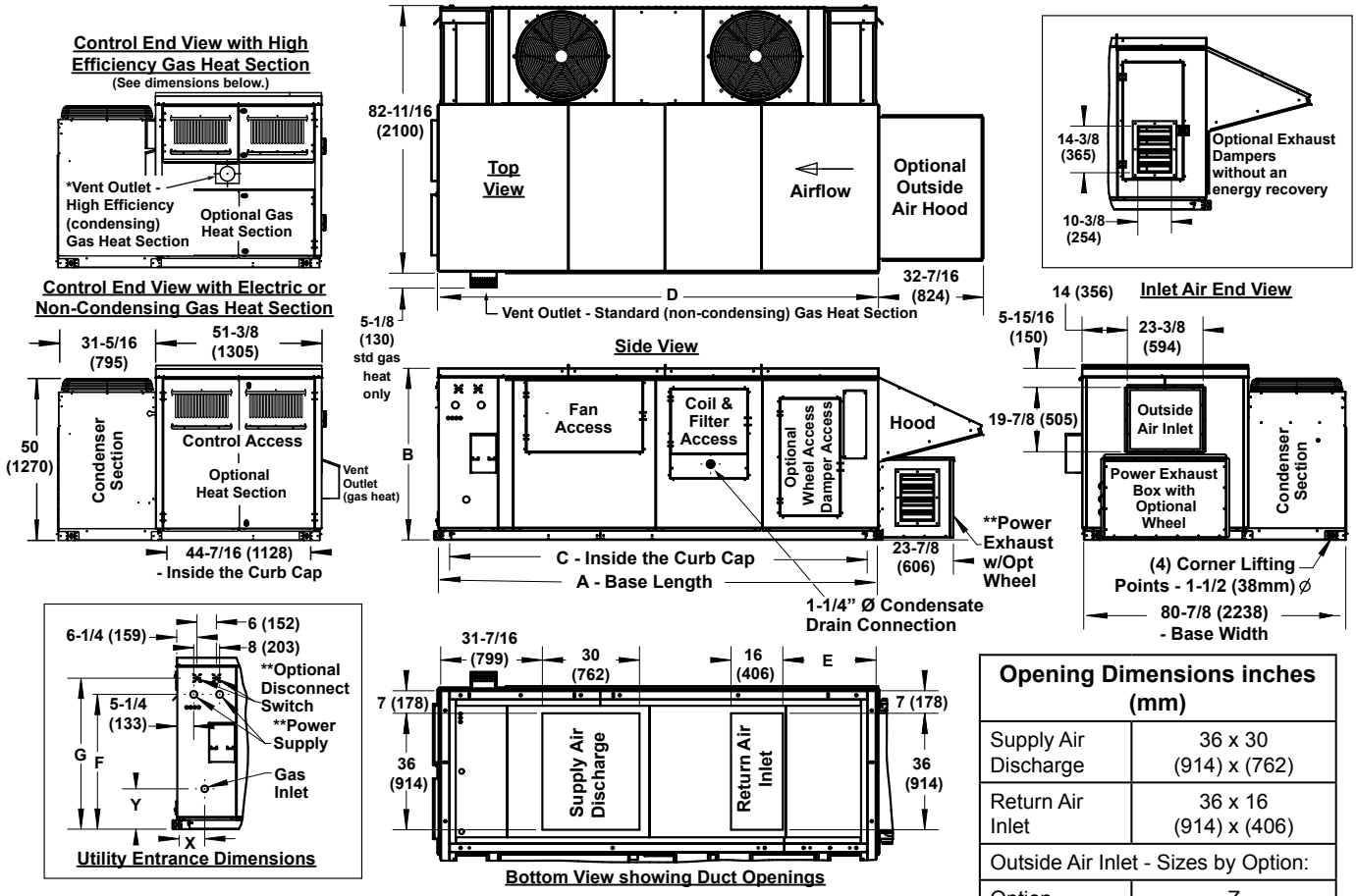
4.1 Clearances

FIGURE 1 - Minimum Clearances - All Sizes



4.2 Dimensions

FIGURE 2 - Cabinet Size 1 Dimensions - inches (mm)



* High-efficiency dual heat sections have two vent outlets.
** Two power supply entrances and two disconnect switches apply only to systems with dual disconnect Option BA7.

Opening Dimensions inches (mm)	
Supply Air Discharge	36 x 30 (914) x (762)
Return Air Inlet	36 x 16 (914) x (406)
Outside Air Inlet - Sizes by Option:	
Option	Z
AR7	8 (203)
AR25, AR2D, AR2H & all other models	19-7/8 (505)

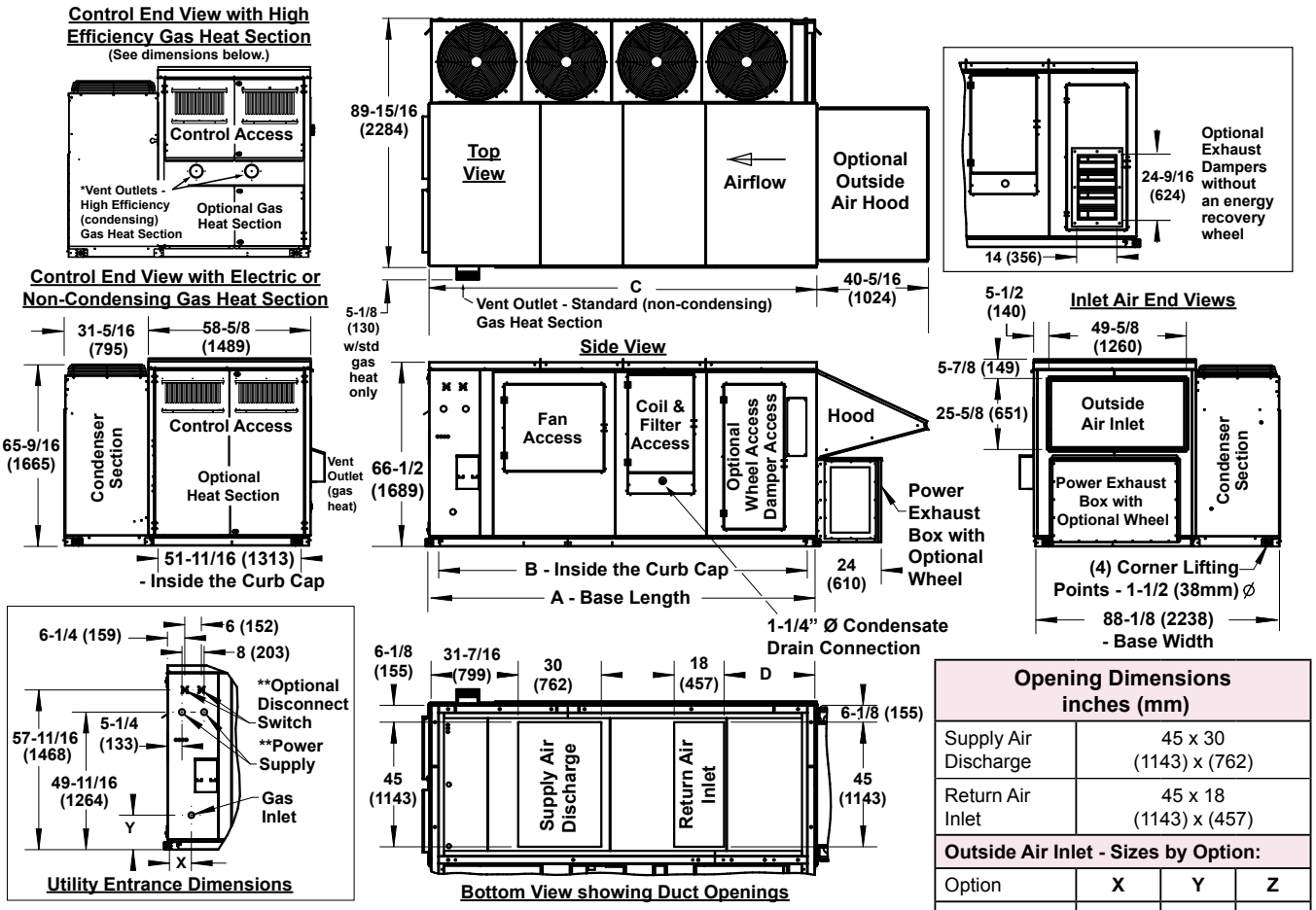
<u>Important NOTE</u>: DO NOT use base dimensions for roof curb. See Paragraph 5.3.

Models and Cooling Sizes	Cabinet Size	System without Energy Recovery Wheel							System with Optional Energy Recovery Wheel						
		A1	B1	C1	D1	E1	F1	G1	A2	B2	C2	D2	E2	F2	G2
		Dimensions - inches							Dimensions - inches						
YDMA & YDHA 060, 090	1A	128-1/2	53-1/32	120-11/16	127-19/32	20-1/2	41-31/32	46-31/32	136-27/32	53-1/32	129	135-15/16	28-13/16	41-31/32	46-31/32
YDMA & YDHA 120, 150	1B		63-1/32				49-21/32	57-21/32		63-1/32				49-21/32	57-21/32
		Dimensions - mm							Dimensions - mm						
YDMA & YDHA 060, 090	1A	3264	1347	3065	3241	521	1066	1193	3476	1347	3277	3452	732	1066	1193
YDMA & YDHA 120, 150	1B		1601				1261	1464		1601				1261	1464

Gas Connection Location and Size for Systems with Optional Gas Heat Section				
Gas Heat Section (H=non-condensing; G=condensing heat section)		**X**	**Y**	**Diameter (NPT)**
Single Furnace	Dual Furnaces (one gas connection)			
H50, H75, H100	H102, H125, H150, H175, H202	10-15/16" (278mm)	13-11/16" (348mm)	1/2"
H200, G150	H402, G302	7-11/16" (195mm)	14" (356mm)	1/2"
H300, H400, G225, G300	G372			3/4"

4.0 Clearances and Dimensions (cont'd)
4.2 Dimensions (cont'd)

FIGURE 3 - Cabinet Size 2 Dimensions - inches (mm)



Opening Dimensions inches (mm)	
Supply Air Discharge	45 x 30 (1143) x (762)
Return Air Inlet	45 x 18 (1143) x (457)

Outside Air Inlet - Sizes by Option:			
Option	X	Y	Z
AR1	49-5/8 (1260)	25-5/8 (651)	5-1/2 (140)
AR7	45-3/4 (1162)	8 (203)	7 (178)
AR25, AR2G, AR2H & all models with Wheel option	49-5/8 (1260)	25-5/8 (651)	5-1/2 (140)

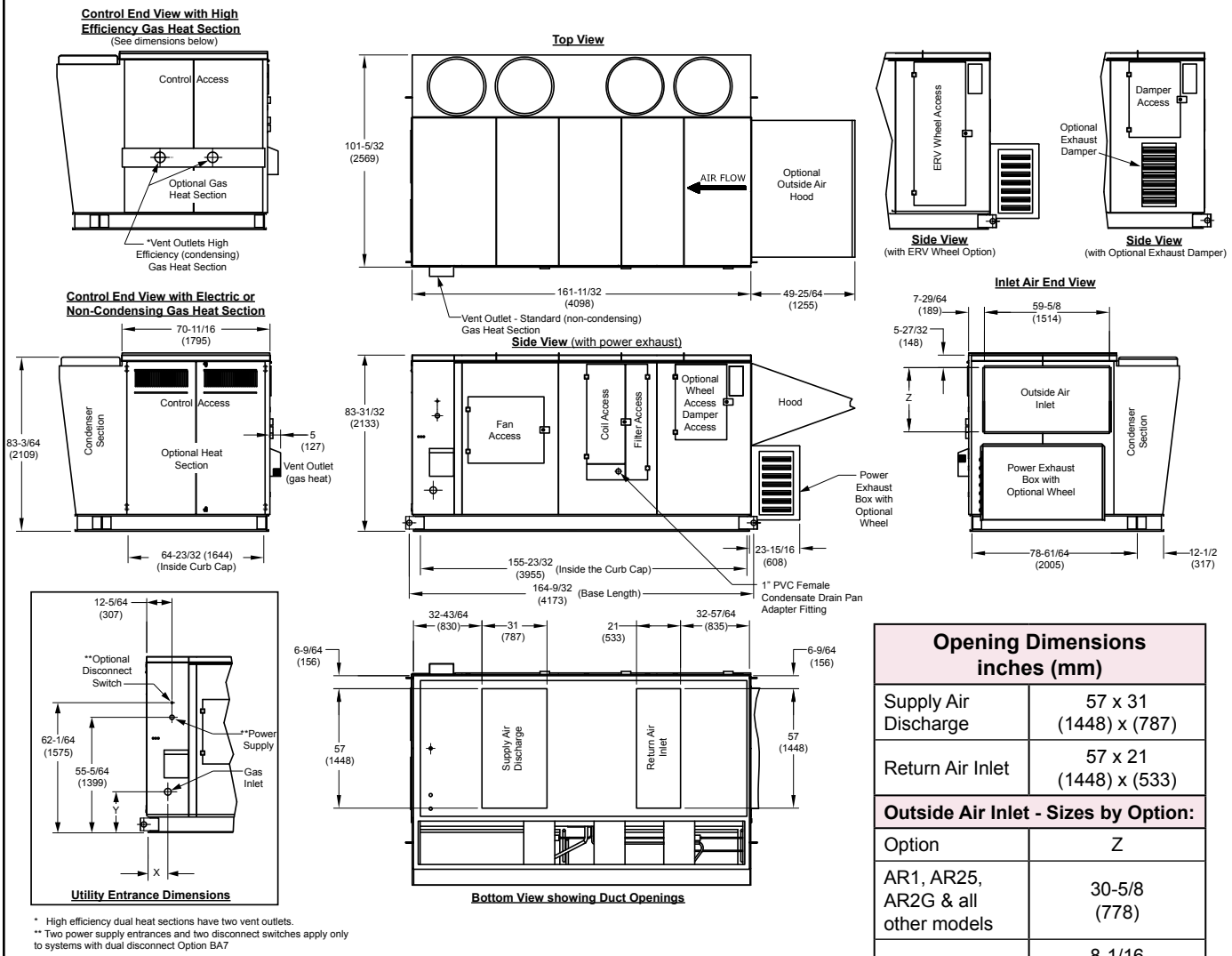
* High-efficiency dual heat sections have two vent outlets.
** Two power supply entrances and two disconnect switches apply only to systems with dual disconnect Option BA7.

<u>Important NOTE</u>: DO NOT use base dimensions for roof curb. See Paragraph 5.3.

Models and Cooling Sizes	Cabinet Size	System <u>without</u> Energy Recovery Wheel				System <u>with</u> Optional Energy Recovery Wheel			
		A1	B1	C1	D1	A2	B2	C2	D2
		Dimensions - inches				Dimensions - inches			
YDMA & YDHA 180, 210, 240 and YDSA 120, 150	2	132-17/32	124-21/32	131-19/32	24-7/16	140-27/32	133	139-31/32	32-25/32
		Dimensions - mm				Dimensions - mm			
YDMA & YDHA 180, 210, 240 and YDSA 120, 150	2	3366	3167	3342	621	3577	3378	3555	833

Gas Connection Location and Size for Systems with Optional Gas Heat Section				
Gas Heat Section (H=non-condensing; G=condensing heat section)		X	Y	Diameter (NPT)
Single Furnace	Dual Furnaces (one gas connection)			
H75, H100	H125, H150, H175, H202	10-15/16" (278 mm)	13-11/16" (348 mm)	1/2"
H200, G150	H402, G302	7-11/16" (195 mm)	14-1/8" (359 mm)	1/2"
H300, H400, G225, G300	G372			3/4"

FIGURE 4 - Cabinet Size 3 Dimensions - inches (mm)



Opening Dimensions inches (mm)	
Supply Air Discharge	57 x 31 (1448) x (787)
Return Air Inlet	57 x 21 (1448) x (533)
Outside Air Inlet - Sizes by Option:	
Option	Z
AR1, AR25, AR2G & all other models	30-5/8 (778)
AR7	8-1/16 (205)

* High efficiency dual heat sections have two vent outlets.
** Two power supply entrances and two disconnect switches apply only to systems with dual disconnect Option BA7

<u>Important NOTE</u>: DO NOT use base dimensions for roof curb. See Paragraph 5.3.

Gas Connection Location and Size for Systems with Optional Gas Heat Section				
Gas Heat Section (H=non-condensing; G=condensing heat section)		**X**	**Y**	**Diameter (NPT)**
Single Furnace	Dual Furnaces (one gas connection)			
G150, H200	G302, H402	9-35/64" (242 mm)	19-5/32" (487 mm)	1/2"
--	H150, H175, H202	12-21/32"	19-5/32" (487 mm)	1/2"
G225, G300, H300, H400	G372, G452, H502, H602	9-13/32" (239 mm)	19-37/64" (497 mm)	3/4"
--	G525, G602, H702, H802			1-1/4"

5.0 Mounting

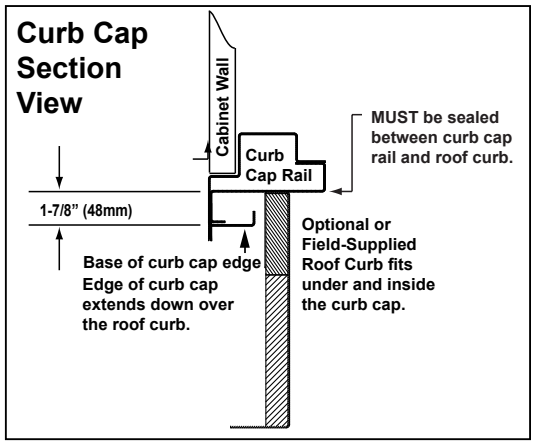
5.1 Unit Weights

For unit weights and or corner weights contact your local distributor. Specific unit weights will be supplied by order number which will include the weights of the options specified for that specific unit.

5.2 Curb Cap Base and Mounting

These packaged systems have a curb cap base designed for use with a full perimeter curb. When on a roof, either a manufacturer-designed roof curb or a field-supplied roof curb is required.

NOTE: A manufacturer approved is roof curb is designed with integral vertical duct work supports and is recommended in order to provide a weatherproof installation. Base design varies by cabinet size.



5.3 Mounting on a Roof Curb

Two types of fully enclosed curbs are available with these systems.

	Option	Optional Energy Recovery Wheel	Description
Roof Curbs	**CJ31**	No	16" (406mm), Down Discharge with Duct Supports in the Curb
	CJ34	Yes	
	CJ48	No	36" (914mm), Horizontal Discharge with Duct Connections in the Curb
	CJ55	Yes	

If the application is sound sensitive, consider installing a field-supplied vibration isolation curb or specialty sound attenuation curb. Whether using an optional roof curb available with the system or a field-supplied speciality curb, the curb must be secured, on square, and level. When the unit is being placed on a roof, location depends on the roof structure and is the responsibility of the installer. For condensate drainage and proper operation, it is important that the installation be level.

When positioning the curb, always comply with the required clearances in Paragraph 4.1. Check the dimensions carefully, remembering that the condenser section will extend 30" (762mm) beyond the edge of the curb. (See orientation in **FIGURE 13,** page 19). Position the curb so that the outside air inlet of the unit will not be facing into the prevailing wind.

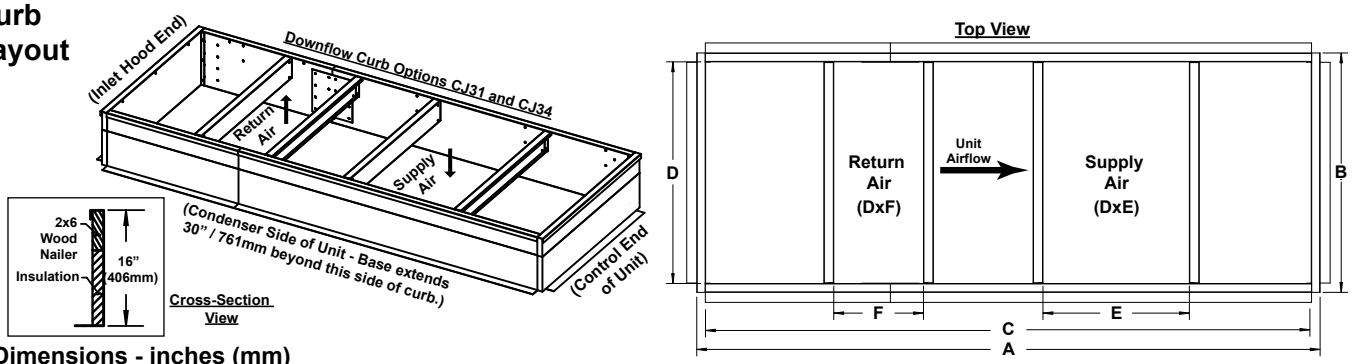
Duct Connections - Optional down discharge roof curbs are designed for duct work to be inserted in the duct connection opening(s) from above the curb prior to setting the unit on the curb.

5.3.1 Down flow Roof Curbs

Both Option CJ31 and CJ34 are 16" (406mm) high roof curbs designed for vertical (down) discharge. These curbs include integral cross supports for supply air and optional return air duct work.

FIGURE 5 - Layout, Dimensions, and Weights of Option CJ31 & CJ34 Roof Curbs

Curb Layout



Dimensions - inches (mm)

Option	Model and Size	Cabinet Size	A (Outside of Curb Rails)	B (Outside of Curb Rails)	C (Area Inside the Curb*)	D (Area Inside the Curb*)	E**	F**	G	H
CJ31 No Energy Wheel	YDHA & YDMA 060, 090, 120, 150	1	119-11/16 (3040)	43-7/16 (1103)	115-15/16 (2945)	39-11/16 (1008)	31 (787)	17 (432)	25-3/4 (654)	14-29/32 (379)
	YDHA & YDMA 180, 210, 240 YDSA 120, 150	2	123-11/16 (3141)	50-11/16 (1287)	119-15/16 (3046)	46-15/16 (1192)	31 (787)	19 (483)	25-13/16 (656)	18-13/16 (478)
	YDHA & YDMA, 300, 360 YDSA 180, 210	3	154-11/16 (3929)	63-11/16 (1618)	150-15/16 (3834)	59-15/16 (1522)	31 (787)	21 (483)	28-7/32 (717)	28 (711)
CJ34 With Energy Wheel	YDHA & YDMA 060, 090, 120, 150	1	128 (3251)	43-7/16 (1103)	124-1/4 (3156)	39-11/16 (1008)	31 (787)	17 (432)	25-3/4 (654)	23-1/4 (591)
	YDHA & YDMA180, 210, 240 YDSA 120, 150	2	132 (3353)	50-11/16 (1287)	128-1/4 (3257)	46-15/16 (1192)	31 (787)	19 (483)	25-13/16 (656)	27-1/8 (689)
	YDHA & YDMA, 300, 360 YDSA 180, 210	3	154-11/16 (3929)	63-11/16 (1618)	150-15/16 (3834)	59-15/16 (1522)	31 (787)	21 (483)	28-7/32 (717)	28 (711)

* Area enclosed by the roof curb must comply with clearance to combustible materials. If the roof is constructed of combustible materials, area within the roof curb must be ventilated, left open, or covered with non-combustible material which has an “R” value of at least 5. If area within curb is left open, higher radiated sound levels may result. **NOTE:** If installing a unit with a high efficiency, condensing gas-fired heat section, the area within the curb must be left open.

** When cutting only duct openings, cut “E” & “F” dimensions 1/4” (6.4mm) in from duct opening to allow clearance. Cut the curb rail sides of the duct opening(s) parallel to the curb rail. For Cabinet Size 1, measure a maximum of 1-1/2” (38mm) in from the side rail. For Cabinet Size 2, measure a maximum of 3/4” (19mm) in from the side rail.

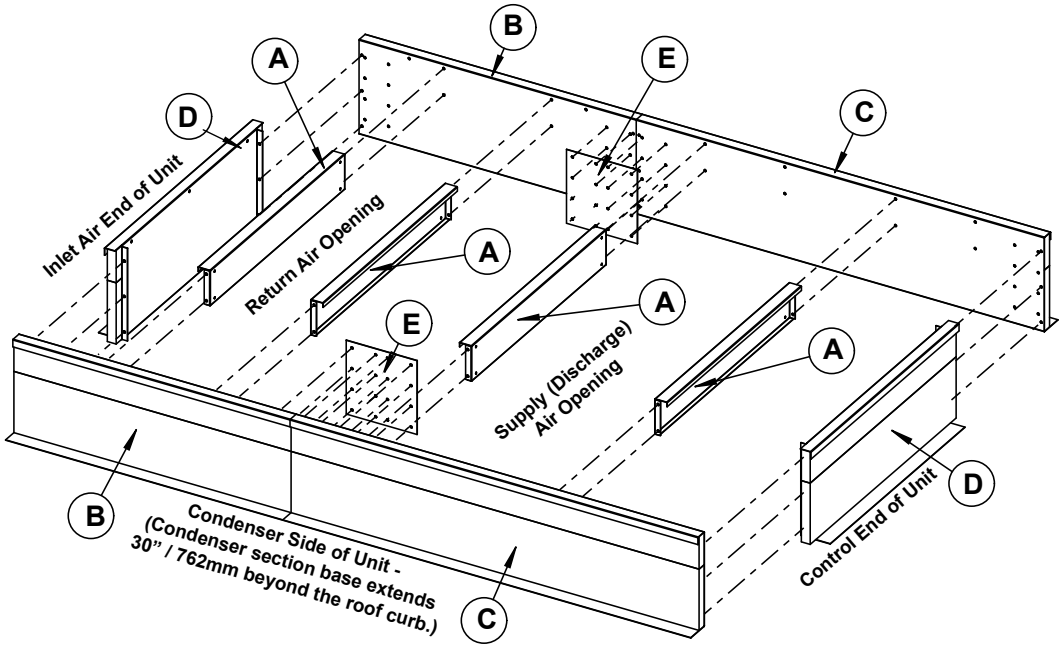
*** See chart on page 68 for cross-reference by Model Size or Model and Heat Size to Cabinet Size.

Weights of Downflow Roof Curb Option CJ31 and CJ34 by Cabinet Size

Roof Curb	Cabinet 1 lbs	Cabinet 1 kg	Cabinet 2 lbs	Cabinet 2 kg	Cabinet 3 lbs	Cabinet 3 kg
Option CJ31	237	108	257	117	322	146
Option CJ34	248	112	268	122	322	146

CAUTION: Before installation, recheck to be sure that the correct curb has been ordered. Be sure that the curb selected matches the unit ordered. Verify the dimensions of the curb received with the appropriate dimension table.

FIGURE 6 - Components (CJ31 & CJ34)



Item	Description	Option CJ31			Option CJ34		
		Cabinet 1	Cabinet 2	Cabinet 3	Cabinet 1	Cabinet 2	Cabinet 3
	Package P/N	**272399**	**272403**	**284223**	**272401**	**272405**	**284223**
A	Cross Supports (for duct work)	271350 (Qty 4)	271689 (Qty 4)	284134 (Qty 4)	271350 (Qty 4)	271689 (Qty 4)	284134 (Qty 4)
B	Side Assy (inlet air end)	271413 (Qty 2)	272034 (Qty 2)	284189 (Qty 2)	271424 (Qty 2)	271391 (Qty 2)	284189 (Qty 2)
C	Side Assy (control end)	271414 (Qty 2)	271392 (Qty 2)	284188 (Qty 2)	271414 (Qty 2)	271392 (Qty 2)	284188 (Qty 2)
D	End Assembly	271415 (Qty 2)	271393 (Qty 2)	284187 (Qty 2)	271415 (Qty 2)	271393 (Qty 2)	284187 (Qty 2)
E	Splice Plates for Sides	271690 (Qty 2)	271690 (Qty 2)	271690 (Qty 2)	271690 (Qty 2)	271690 (Qty 2)	271690 (Qty 2)

Hardware in Options CJ31 and CJ34			
Qty	**P/N**	**Description**	**Use**
28	16243	Lag Screw	For top level screws (1 each corner; 4 each splice; 2 each cross support). Insert screws from inside the curb so that they extend into the wood nailer on the outside.
28	1333	Lock Washer	
32	16247	Cap Screw	For attaching at all points below the wood nailer. Insert screws from outside the curb.
32	1333	Lock Washer	
32	1035	Hex Nut	

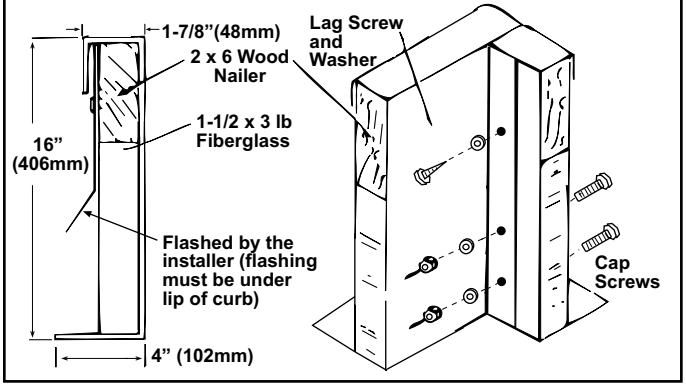
Installation Instructions for Down Discharge Roof Curbs, Option CJ31 and Option CJ34

1. Refer to **FIGURE 6** shown on page 12 and layout the two curb ends (letter D) and four side pieces (letters B &C). Verify the side pieces are in the correct positions (inlet air end vs control end).

2. Attach Curb Corners.

Using the hardware provided, create the corners by attaching the ends to the side pieces.

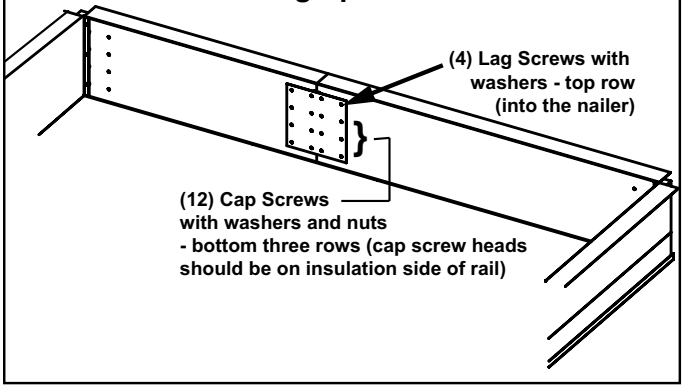
FIGURE 7 - Curb Detail and Corner



3. Attach the Splice Plates.

Use the hardware provided to attach splice plates to join the side rail pieces and create the perimeter of the curb.

FIGURE 8 - Attaching Spice Plates



4. Attach the four Cross Supports.

At the holes in curb sides, line up the cross supports in the orientation illustrated in **FIGURE 6** shown on page 12. Since the cross supports form the duct connections, be certain that the vertical side of each cross support is toward the duct opening.

Using two lag screws with washers, at each end of a cross support, attach the support to the sides. Insert the screws through the side and into the wood nailer. Repeat for the other three cross supports.

5. Check the roof curb for squareness.

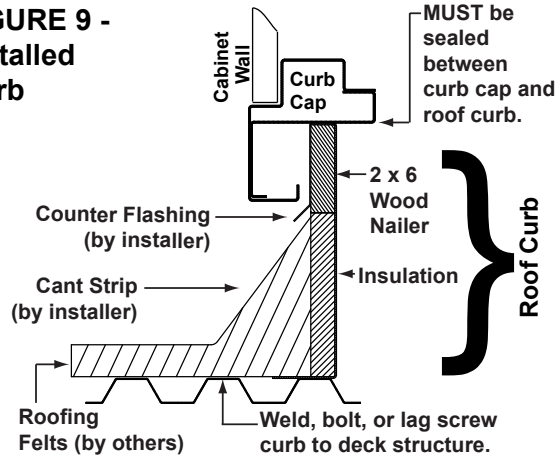
Adjust the curb so that the diagonal measurements are equal within a tolerance of ±1/8"(3mm).

6. Level the roof curb.

To ensure a good weatherproof seal between the cabinet curb cap and the roof curb, the curb must be leveled in both directions with no twist end to end. Shim as required and secure the curb to the roof deck before installing flashing.

7. Install field-supplied flashing.

FIGURE 9 - Installed Curb



8. Before placing the unit on the curb:

☐ Apply 1/4" x 1-1/4" foam sealant tape to both the top surface of the curb rails and the top surface of the cross supports, being sure to make good butt joints at all corners. The sealant tape must be applied to prevent water leakage into the curb area due to blown rain and capillary action.

☐ Slide the duct work down into the supply (discharge) and optional return air openings. See dimensions in **FIGURE 5,** page 11**.** Duct work should have a minimum 2" (51mm) duct flange.

☐ When it is time to lift the unit onto the curb, comply with rigging and lifting information in Paragraph 5.4.

IMPORTANT: Verify that the unit will be placed in the correct airflow orientation to mate properly with the discharge and return air openings. See **FIGURE 13,** page 19.

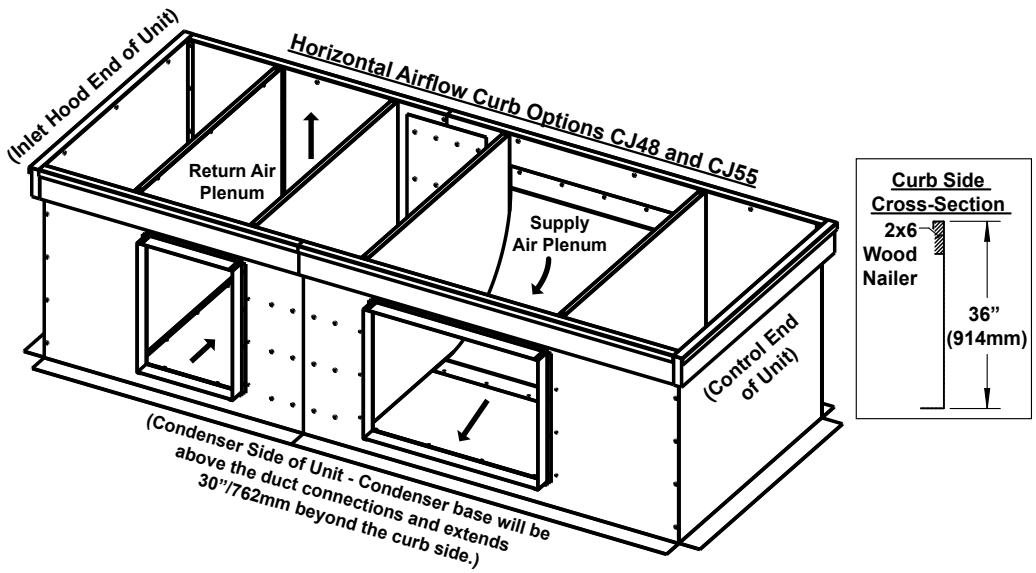
5.0 Mounting (cont'd)
5.3 Mounting on a Roof Curb (cont'd)
5.3.2 Curbs for Horizontal Airflow

CAUTION: Before installation, recheck to be sure that the correct curb has been ordered. Be sure that the curb selected matches the unit ordered. Verify the dimensions of the curb received with the appropriate dimension table.

Options CJ48 and CJ55 are 36" (914mm) high roof curbs designed for horizontal discharge. The curbs include plenum sections for ducting supply air and optional return air to the duct connections in the side of the curb.

FIGURE 10 - Layout, Dimensions, and Weights of Option CJ48 and CJ55 Horizontal Roof Curbs

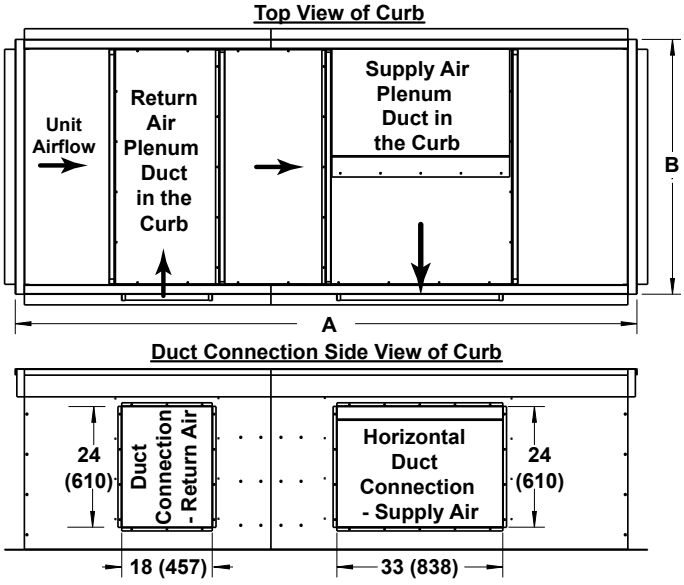
Installation NOTES:
Plenum ducts in the curb have insulated bottom and side panels. Always install all four side panels. If the system does not have return air, attach a field-fabricated cover over the return air opening in the curb. (Without return air, the bottom of the unit is solid.)



Dimensions - inches (mm)

Option	Description	Cabinet Size*	A Dim (Outside of Curb Rails)	B Dim (Outside of Curb Rails)
CJ48	Horizontal Discharge Curb for YDHA, YDMA, or YDSA **without** an energy recovery wheel	1	119-11/16 (3040)	43-7/16 (1103)
		2	123-11/16 (3141)	50-11/16 (1287)
		3	154-11/16 (3929)	63-11/16 (1618)
CJ55	Horizontal Discharge Curb for YDHA, YDMA, or YDSA **with** an energy recovery wheel	1	128 (3251)	43-7/16 (1103)
		2	132 (3353)	50-11/16 (1287)
		3	154-11/16 (3929)	63-11/16 (1618)

* See chart on page 68 for cross-reference by Model Size or Model and Heat Size to Cabinet Size.



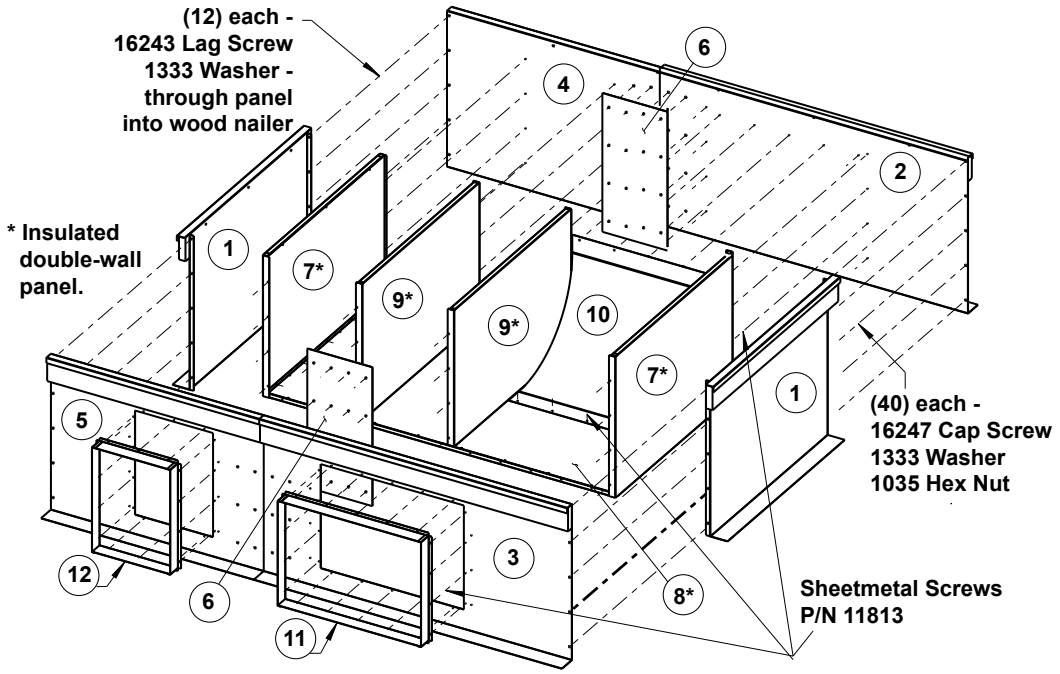
Weights by Cabinet Size - Horizontal Airflow Roof Curb Option CJ48 and CJ55

Roof Curb	*Cabinet 1		*Cabinet 2		*Cabinet 3	
	lbs	kg	lbs	kg	lbs	kg
Option CJ48	555	252	599	272	686	311
Option CJ55	570	259	615	279	686	311

* See chart on page 68 for cross-reference by Model Size or Model and Heat Size to Cabinet Size.

5.3.2 Curbs for Horizontal Airflow (cont'd)

FIGURE 11 - Cabinet Sizes 1 & 2 Components (Horizontal Curb Options CJ48 and CJ55)



Item	Description	Curb Option CJ48		Curb Option CJ55*	
		Cabinet 1	Cabinet 2	Cabinet 1	Cabinet 2
	Package P/N	272400	272404	272402	272406
A	End Assembly	271419 (Qty 2)	271397 (Qty 2)	271419 (Qty 2)	271397 (Qty 2)
B	Side Assy (solid/control end)	271396 (Qty 1)	271396 (Qty 1)	271396 (Qty 1)	271396 (Qty 1)
C	Side Assy w/Supply Air Opening	271399 (Qty 1)	271399 (Qty 1)	271399 (Qty 1)	271399 (Qty 1)
D	Side Assy (solid/inlet air end)	271418 (Qty 1)	272036 (Qty 1)	271427 (Qty 1)	271395 (Qty 1)
E	Side Assy w/Return Air Opening	271417 (Qty 1)	272035 (Qty 1)	271426 (Qty 1)	271398 (Qty 1)
F	Splice Plates for Sides	261887 (Qty 2)	271379 (Qty 2)	261887 (Qty 2)	271379 (Qty 2)
G*	"Outer" Sides - Plenum Ducts	271421 (Qty 2)	271400 (Qty 2)	271421 (Qty 2)	271400 (Qty 2)
H*	Plenum Duct Bottom	271420 (Qty 1)	271401 (Qty 1)	271420 (Qty 1)	271401 (Qty 1)
J*	"Inner" Sides - Plenum Ducts	271422 (Qty 2)	271402 (Qty 2)	271422 (Qty 2)	271402 (Qty 2)
K*	Air Baffle for Supply Air Plenum	268606 (Qty 1)	271386 (Qty 1)	268606 (Qty 1)	271386 (Qty 1)
L	Supply Air Duct Flange	271403 (Qty 1)	271403 (Qty 1)	271403 (Qty 1)	271403 (Qty 1)
M	Return Air Duct Flange	271404 (Qty 1)	271404 (Qty 1)	271404 (Qty 1)	271404 (Qty 1)

* For a unit with an energy recovery wheel

Hardware in Options CJ48 & CJ55			
Qty	P/N	Description	Use
12	16243	Lag Screw	For top level screws (1 each corner; 4 each splice plate). Insert screws from inside the curb so that they extend into the wood nailer on the outside.
12	1333	Lock Washer	
40	16247	Cap Screw	For attaching corners and splice plates below the wood nailer (4 each corner; 12 each splice plate). Insert screws from outside the curb.
40	1333	Lock Washer	
40	1035	Hex Nut	
90	11813	Sheet metal Screws	For attaching duct plenum sides, bottom, and baffle; and duct flanges.

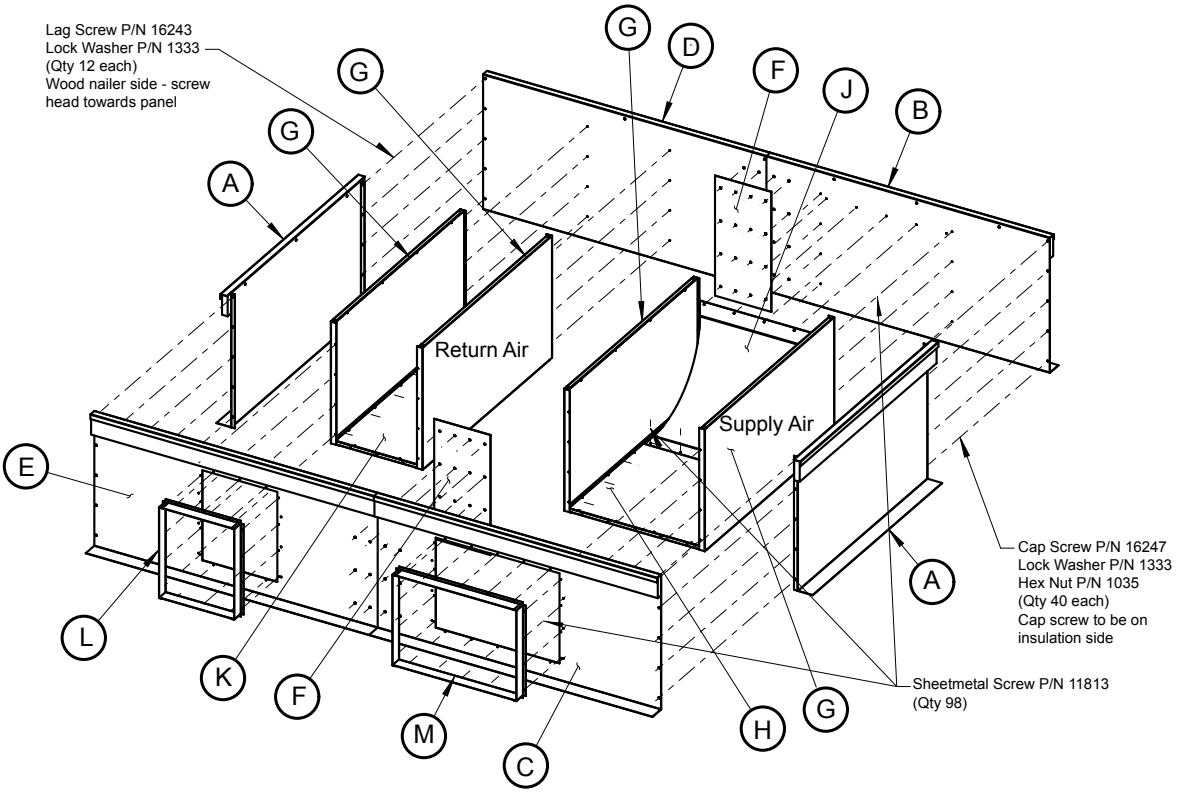
5.0 Mounting (cont'd)
5.3 Mounting on a Roof Curb (cont'd)
5.3.2 Curbs for Horizontal Airflow (cont'd)

Installation Instructions for Cabinet Sizes 1 & 2 Horizontal Airflow Roof Curbs, Option CJ48 and Option CJ55

1. Refer to **FIGURE 11** shown on page 15 and position the two curb ends **(letter A)** and four side pieces **(letters B, C, D, E)**. Verify the side pieces are positioned correctly (shorter piece at the inlet air end and longer piece at the control end of the unit).
2. **Attach Curb Corners.**
   Using the hardware provided (lag screw and washer in top holes; cap screw, washer, and nut in the 4 holes below the wood nailer), create the four corners by attaching the ends to the side pieces.
3. **Attach the two Side Splice Plates (letter F).**
   Use the hardware provided (lag screw and washer in top holes; cap screw, washer, and nut in the 4 holes below the wood nailer) to attach splice plates (**letter F**) joining the side pieces (**letters B&D and letters C&E**) to complete the perimeter of the curb.
4. **Attach the Two Outer Plenum Side Panels (letter G).**
   Position each insulated panel with the wide bottom flange toward the center. Align the panel with the holes in the curb sides and attach with sheet metal screws.
5. **Install the Plenum Duct Bottom Panel (letter H).**
   Lower the insulated bottom panel into the curb, resting it on the flanges of the two panels installed in Step 4. Attach the bottom panel with sheet metal screws.
6. **Install the Two Inner Plenum Side Panels (letter J).**
   Position one insulated side panel as illustrated and align the holes. Attach with sheet metal screws. Repeat to install the other side panel.
7. **Install the Baffle in the Supply Air Plenum (letter K).**
   Position the baffle between the insulated side panels (**letters G & K**) as illustrated and align the holes. Attach with sheet metal screws.
8. **Attach the Duct Flanges (letters L & M).**
   Using sheet metal screws, attach the duct flange **(letter L**) around the supply opening and the smaller duct flange (**letter M**) around the return air opening. If the installation does not have return air, attach a field-fabricated cover over the return air opening.
9. **Check the Squareness, Level the Curb, and Install the Flashing.**
   Adjust the curb so that the diagonal measurements are equal within a tolerance of ±1/8”(3mm).
   To ensure a good weatherproof seal between the cabinet curb cap and the perimeter of the curb, the curb must be leveled in both directions with no twist end to end. Shim as required and secure the curb to the roof deck.
   Install field-supplied flashing.
10. **Before placing the unit on the curb,** apply 1/4” x 1-1/4” foam sealant tape to both the top surface of the curb rails and the top surface of the duct sides.

5.3.2 Curbs for Horizontal Airflow (cont'd)

FIGURE 12 - Cabinet Size 3 Components (Horizontal Curb Options CJ48 and CJ55)



Item	Description	Curb Option CJ48 or CJ55
		Cabinet 1
	Package P/N	284224
A	End Assembly	284173 (Qty 2)
B	Side Assy (solid/control end)	284137 (Qty 1)
C	Side Assy w/Supply Air Opening	284139 (Qty 1)
D	Side Assy (solid/inlet air end)	284135 (Qty 1)
E	Side Assy w/Return Air Opening	284171 (Qty 1)
F	Splice Plates for Sides	271379 (Qty 2)
G	Sides for Plenum Ducts	284175 (Qty 4)
H	Plenum Duct Bottom	284181 (Qty 1)
J	Air Baffle for Supply Air Plenum	284184 (Qty 1)
K	Return Air Duct Bottom	284207 (Qty 1)
L	Return Air Duct Flange	284185 (Qty 1)
M	Supply Air Duct Flange	271403 (Qty 1)

Hardware in Options CJ48 & CJ55			
Qty	P/N	Description	Use
12	16243	Lag Screw	For top level screws (1 each corner; 4 each splice plate). Insert screws from inside the curb so that they extend into the wood nailer on the outside.
12	1333	Lock Washer	
40	16247	Cap Screw	For attaching corners and splice plates below the wood nailer (4 each corner; 12 each splice plate). Insert screws from outside the curb.
40	1333	Lock Washer	
40	1035	Hex Nut	
98	11813	Sheet metal Screws	For attaching duct plenum sides, bottom, and baffle; and duct flanges.

5.0 Mounting (cont'd)
5.3 Mounting on a Roof Curb (cont'd)
5.3.2 Curbs for Horizontal Airflow (cont'd)

Installation Instructions for Cabinet Size 3 Horizontal Airflow Roof Curbs, Option CJ48 and Option CJ55

1. Refer to **FIGURE 12** shown on page 17 and position the two curb ends **(letter A)** and four side pieces **(letters B, C, D, E)**. Verify the side pieces are positioned correctly (shorter piece at the inlet air end and longer piece at the control end of the unit).

2. Attach Curb Corners.
Using the hardware provided (lag screw and washer in top holes; cap screw, washer, and nut in the 4 holes below the wood nailer), create the four corners by attaching the ends to the side pieces.

3. Attach the two Side Splice Plates (letter F).
Use the hardware provided (lag screw and washer in top holes; cap screw, washer, and nut in the 4 holes below the wood nailer) to attach splice plates (**letter F**) joining the side pieces (**letters B&D and letters C&E**) to complete the perimeter of the curb.

4. Assemble the Return Air Plenum.
Position two sides **(letter G)** between the return air duct bottom **(letter K)** align the holes in each and using the sheet metal screws, assemble these three sheet metal pieces. Then using the holes in the curb sides **(letters D & E)**, align the return air plenum sub assembly holes on each end with the holes in the curb sides and attach using the sheet metal screws.

5 Assemble the Supply Air Plenum. Position two sides **(letter G)** between the supply air duct bottom **(letter H)** align the holes in each and using the sheet metal screws, assemble these three sheet metal pieces. Then using the holes in the curb sides **(letters D & E)**, align the supply air plenum sub assembly holes on each end with the holes in the curb sides and attach using the sheet metal screws.

6. Attach the Duct Flanges (letters L & M).
Using sheet metal screws, attach the supply air duct flange **(letter M**) around the supply opening and the smaller return air duct flange (**letter L**) around the return air opening. If the installation does not have return air, attach a field-fabricated cover over the return air opening.

7. Check the Squareness, Level the Curb, and Install the Flashing.
Adjust the curb so that the diagonal measurements are equal within a tolerance of ±1/8”(3mm).

To ensure a good weatherproof seal between the cabinet curb cap and the perimeter of the curb, the curb must be leveled in both directions with no twist end to end. Shim as required and secure the curb to the roof deck.

Install field-supplied flashing.

8. Before placing the unit on the curb, apply 1/4” x 1-1/4” foam sealant tape to both the top surface of the curb rails and the top surface of the duct sides.

5.4 Rigging and Lifting

DANGER

If there is any visible damage or any question about the integrity of a lifting point, DO NOT LIFT the system. Consult the factory.

Refer to Paragraph 5.1 for information on obtaining unit or corner weights. **IMPORTANT NOTE:** ALL systems MUST be loaded and unloaded by lifting. DO NOT attempt to move with a fork lift.

Lifting lugs for attaching rigging are provided at each corner of the base. **ALL lifting points MUST always be used.** Spreader bars **MUST** be used to prevent cabinet damage and to allow the unit to be lifted straight up with vertical force only on the lifting points. Using ALL lifting points is mandatory.

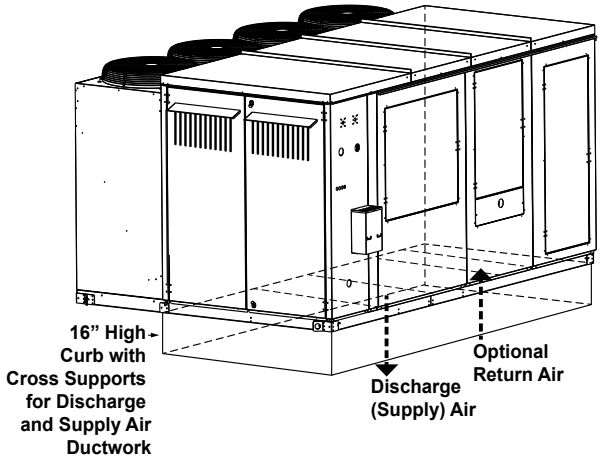
Failure to lift by the manufacturer's instructions could cause damage to the equipment and/or personal injury or death. The equipment manufacturer is not responsible for unsafe rigging or lifting procedures.

In addition to checking the rigging, before lifting the unit, verify the following:

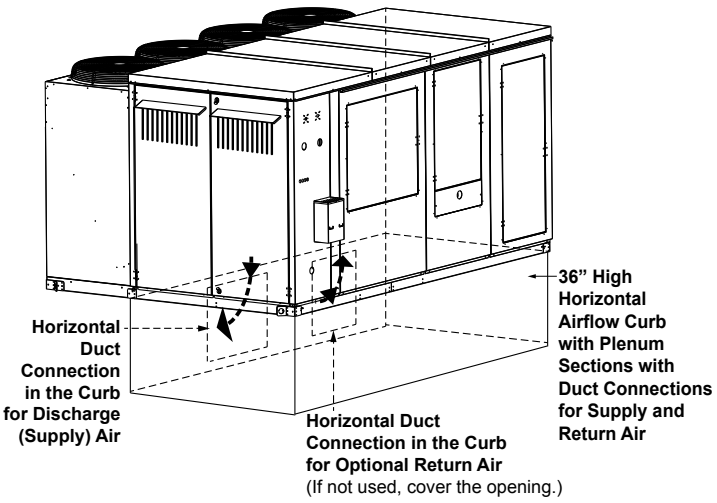
☐ If the unit is being set on a down discharge curb and duct work is being installed from the top, verify that the duct work is installed.

☐ **IMPORTANT:** Verify that the lift operator knows the correct placement of the unit so that the airflow orientation will be correct. To match to the duct openings in the curb, the unit must be positioned as illustrated in **FIGURE 13,** shown below. Note that the condenser section does not set on the curb.

FIGURE 13 - Correct Orientation when Placing the Unit on either a Down flow Curb with Duct Supports or a Curb with Plenum Sections and Duct Connections for Horizontal Airflow



Down flow Roof Curb, Options CJ31 and CJ34



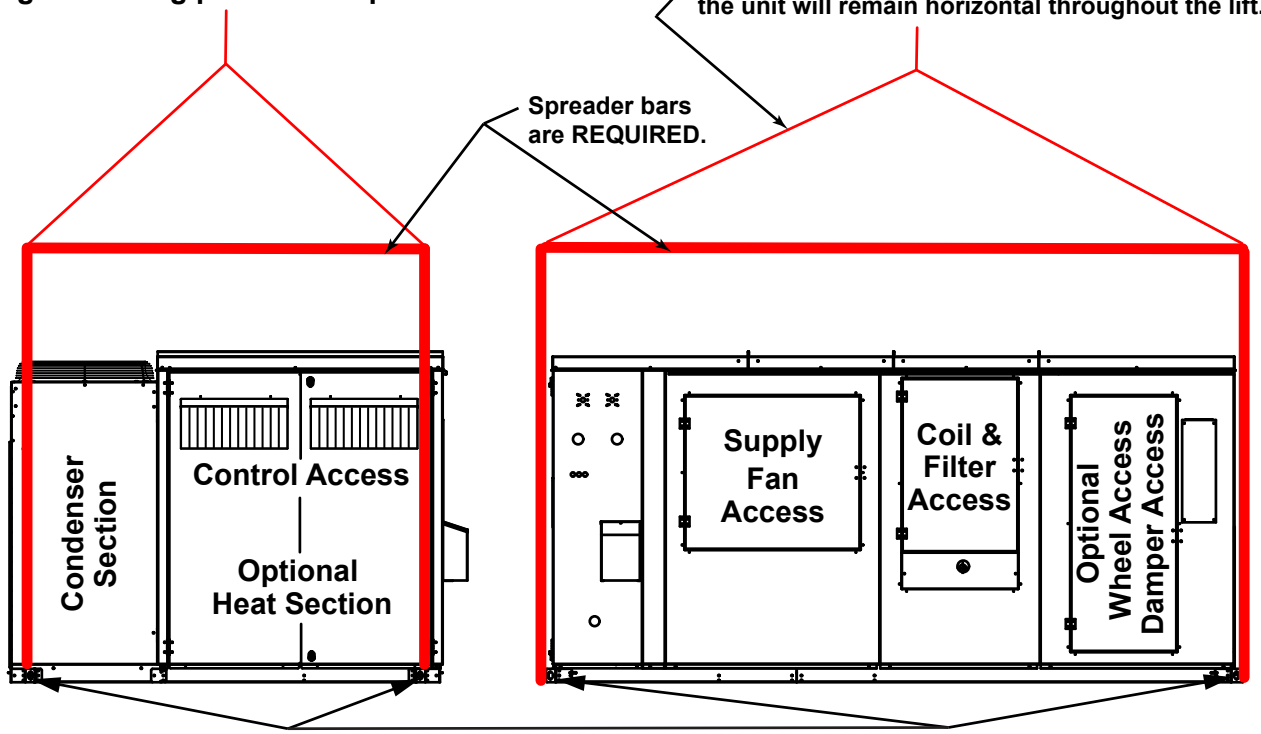
Horizontal Airflow Curb, Options CJ48 and CJ55

DANGER

To prevent death, injury, or equipment damage caused by inadequate or improper rigging, test lift the unit before attempting to install it on the roof. To prevent injury, death, or equipment damage when lifting, use ALL lifting points.

Test lift the unit to be sure that it is secure and the weight is balanced. Lift the unit slowly, following safe lifting procedures.

FIGURE 14 - Rigging and Lifting a Cabinet using four lifting points and spreader bars



(4) Corner Lifting Points - 1-1/2" (38mm) diameter
Lift straight up with vertical force only.

6.0 Mechanical

6.1 Install Hood(s)

To avoid possible damage, it is recommended that the hood(s) be installed after the system has been placed on the roof. Install the hood(s) before the blower is operated. Do not install the hood(s) while the system is in operation. All screw ends should be to the inside of the hood or cabinet.

6.1.1 Inlet Air Hood, Option AS16

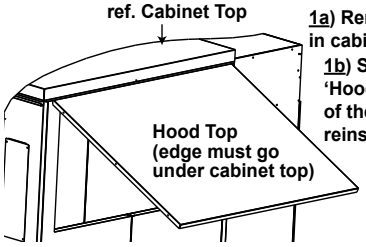
Application and Components by Model and Size

Model YDSA	N/A	120,150	180,210
Models YDHA & YDMA	060, 090, 120, 150	180, 210, 240	300, 360
Pkg P/N	273283	273373	284598
Air Hood Components:			
Top	272476	271116	284449
Right Side	272477	271117	284450
Left Side	272478	271118	284451
Front Cover	272479	271119	284454
Filter Support Assy	272482	268702	284452
Sheet metal Screws	(16) 11813, 1/2"		
Self-Drilling SM Screws	(8) 37661, 1/2"		
Filters	(4) 101607, 16x20x1	(4) 101610, 20x25x1	(8) 101609, 16x25x1

NOTE: Select screws carefully. Use sheet metal screws (slotted head with straight tip) when holes in the cabinet are provided. Use self-drilling screws (head is not slotted with drill-type tip) when cabinet holes are not provided.

FIGURE 14A - Installation Instructions and Dimensions - Inlet Air Hood Option AS16

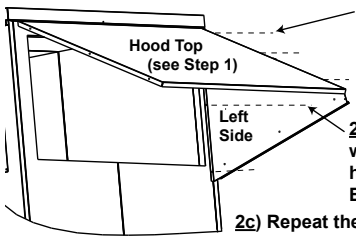
STEP 1 – Attach top of outside air hood. Prepare to attach sides.



1a) Remove screw in cabinet top.

1b) Slide the edge of the 'Hood Top' under the edge of the 'Cabinet Top' and reinsert the screw.

STEP 2 – Attach sides of outside air hood.

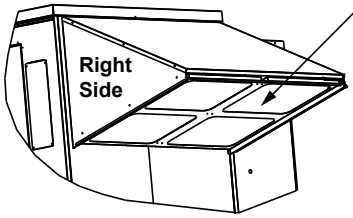


2a) Position the 'Side Panels' inside the 'Hood Top' and attach with a sheet-metal screw. Each side panel requires (3) three screws; 1/2" with slotted head and standard point.

2b) Attach the 'Side Panels' to the 'Cabinet' with self tapping screws. Use the 1/2" hex head/no-slot screws with the drill point. Each side panel requires (3) three screws.

2c) Repeat the procedure to install the 'Right Side'.

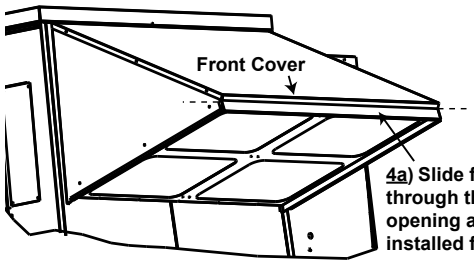
STEP 3 – Attach filter support.



3a) Position the filter support assembly within the hood with filter opening out as indicated.

3b) Attach filter support assembly with sheetmetal screws. Each side requires three screws; 1/2"with slotted head and standard point

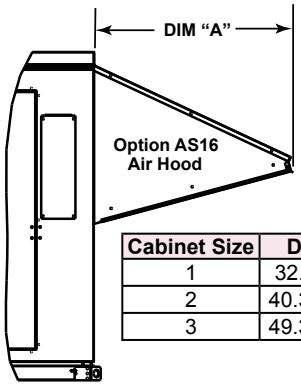
STEP 4 – Install filters and attach the front cover.



4a) Slide filters through the front opening and onto the installed filter support

4b) Position the 'Front Cover' and attach with sheetmetal screws. Each side requires (1) one screw; 1/2" with slotted head and standard point.

Length Dimension of Installed Hood



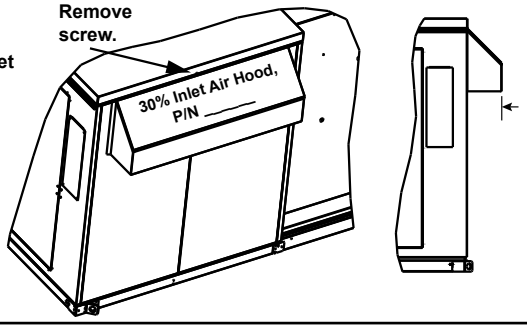
Cabinet Size	Dim "A"
1	32.44 / 824
2	40.31 / 1024
3	49.39 / 1255

6.1.2 30% Inlet Air Hood in Inlet Air Configuration Option AR7

The 30% inlet air hood included in Option AR7 is assembled at the factory and shipped with the unit for field installation. Follow the instructions in **FIGURE 14B,** shown below.

FIGURE 14B - Installing 30% Inlet Air Hood

Instructions:
1) At the center of the cabinet top, remove the screw.
2) Slide the hood under the cabinet top.
4) Re-insert the screw.
5) Attach both sides of the hood with sheetmetal screws.



6.1.3 Exhaust Air Hood - applies to all units with Power Exhaust (Option PE_) or Energy Recovery Wheel (Option EW__)

The exhaust air hood parts are shipped separately for installation at the site. The exhaust location is different depending on whether or not the unit has an energy recovery wheel; the parts are the same. See **FIGURE 14C** shown or **FIGURE 14D**, page 22. (Note complete list of hood components listed in table in section 6.1).

FIGURE 14C - Installing Exhaust Hood with Energy Recovery Wheel Option EW__.

Installing the Exhaust Hood on a Unit with Option EW__ Energy Recovery Wheel
The exhaust fan opening is in the side of the box under the outside air hood.

1) Attach the Hood Top - Above the exhaust opening, remove the screws holding the top of the box. Slide the edge of the hood top under the exhaust fan box top. Align the holes and re-insert the screws.
2) Attach the Hood Sides - Position a side panel to the inside of the hood top, line up with the holes in the box, and attach the side panel. Repeat to attach the other side. On each side of the hood top, insert screws to attach the top to the hood sides.

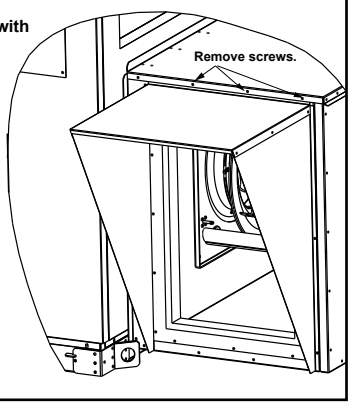
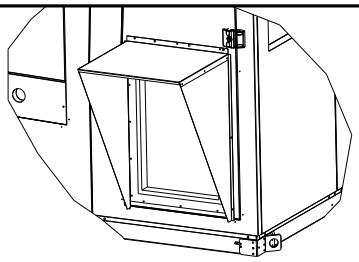


FIGURE 14D - Installing Exhaust Hood for Power Exhaust Option PE__ without a wheel

Installing the Exhaust Hood on a Unit with Option PE_ Power Exhaust

The exhaust opening is in the door panel.

1) Position the hood side to align with the holes in the door panel. Attach with sheetmetal screws.
2) Repeat to attach the other side.
3) Slide the top in place over the side panels. Attach the top to the door and the side panels.



6.2 Duct Connections and Duct work

CAUTION: An external duct system static pressure not within the limits on the rating plate may overload the motor.

Requirements and Suggestions for Installing Ducts

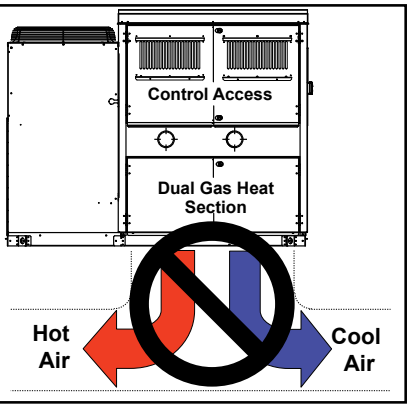
Duct connections are in the roof curb designed for the unit; see **FIGURE 2** on page 7**, FIGURE 3** on page 8 or **FIGURE 4** on page 9 for duct connection sizes. Down flow roof curbs are designed for installing duct work from the top before setting the unit on the curb. Horizontal curbs have return air and supply air duct flanges on the side under the condenser section. See **Figure 5,** page 11 or **FIGURE 10,** page 14 in Paragraph 5.3.

NOTE: All installations require a discharge air temperature sensor. See Paragraph 7.5.3 for placement of the discharge air sensor in the duct work.

FIGURE 15 - When installing a unit with a dual heat section, avoid an immediate "T" in the discharge (supply) duct.

An immediate "T" in the discharge duct may allow stratification of the air resulting in hot air only moving down one segment of the duct.

Avoid this supply duct configuration. If the configuration is not avoidable, provide air mixing devices in the duct work.



- **Type of Duct work** - The type of duct installation to be used depends in part on the construction of the roof (whether wood joist, steel bar joist, steel truss, pre-cast concrete) and the ceiling (whether hung, flush, etc.).
- **Duct work Material** - Rectangular duct should be constructed of not lighter than No. 26 U.S. gauge galvanized steel or No. 24 B & S gauge aluminum.
- **Duct work Structure -** All duct sections 24 inches (610mm) or wider, and over 48 inches (1219mm) in length, should be cross broken on top and bottom and should have standing seams or angle-iron braces. Joints should be S and drive strip, or locked.
- **Through Masonry Walls** - No supply air duct should come in contact with masonry walls. Insulate around all air ducts through masonry walls with not less than 1/2" (13mm) of insulation. 1" (25mm) is recommended.
- **Through Uncooled/Unheated Space** - Insulate all exposed supply air ducts passing through an uncooled or unheated space with at least 1/2" (13mm) of insulation. 1" (25mm) is recommended.
- **Duct Supports** - Suspend all ducts securely from buildings members. Do not support ducts solely by the unit duct connections.
- **Duct Sizing** - Proper sizing of the supply air duct work is necessary to ensure a satisfactory installation. The recognized authority for such information is the Air Conditioning Contractors Association, 2800 Shirlington Road, Suite 300, Arlington, VA 22206 (www.acca.org). A manual covering duct sizing in detail may be purchased directly from them.
- **Duct Connections** - To minimize sound and vibration transmission, use flexible duct connections. Ducts must be attached and sealed to provide airtight connections.
- **Return Air Duct/Grill Size** - Make certain that return air ducting or grill has a free area equal to the return duct size connection.

6.3 Cooling Section Condensate Drain

NOTE: For condensate drain for high-efficiency gas heat section, see Paragraph 9.2.

The cooling section drain pan is below the coil access door in the cooling section. The 1"dia PVC drain connection (P/N 171600) is through the side of the cabinet.

Follow the instructions below to install a trap in the drain. **Do not reduce the drain diameter.** Pitch the drain line at least 1/2" (13mm) for every 10 feet (3M) of horizontal run. Drain lines must not interfere with access panels or doors.

An obstruction in the drain or a poorly designed drain can cause the condensate pan to over flow. Overflow could result in damage to the unit and/or the building.

If the installation or local code requires, run drain into a waste water system.

6.3 Cooling Section Condensate Drain (cont'd)

Condensate Drain Trap in Cooling Coil Drain

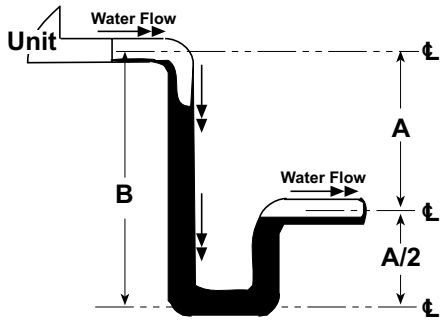
The design of the drain trap is important. Since the condensate drain pan is on the blower inlet side, there is a negative pressure at the drain relative to the ambient. The trap height must account for this static pressure difference. Maximum negative static can be determined by reading the negative pressure at the blower inlet and adding .2" iwc to allow for dirty filters.

If dimension "B" in **FIGURE 16A** shown below is not tall enough, the water seal will not hold, and air will be drawn through the drain pipe into the unit. If the outlet leg of the trap is too tall, water will back up into the drain pan. As condensate forms during normal operation, the water level in the trap rises until there is a constant outflow. **FIGURE 16A** shown below illustrates the appropriate dimensions for trapping a negative pressure system.

FIGURE 16A - Condensate Drain Trap Dimensions

A = 1" (25mm) for each 1" (25mm) of maximum static pressure *plus* 1" (25mm)

B = A + A/2



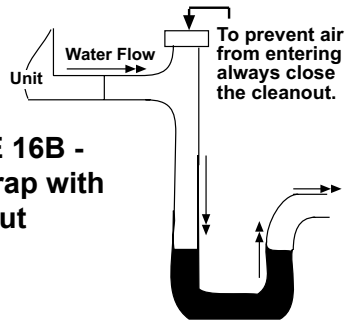


FIGURE 16B - Drain Trap with Clean out

7.0 Electrical and Wiring

7.1 General

All electrical wiring and connections including electrical grounding MUST be made in accordance with local, state and national codes and regulations and with the National Electric Code ANSI/NFPA No. 70 (latest edition) or in Canada the Canadian Electrical Code Part 1 CSA C.22.1. In addition, the installer should be aware of any local ordinances or electric company requirements that might apply.

7.2 Supply Wiring

Check the rating plate for the supply voltage and current requirements. Run a separate line voltage supply directly from the main electrical panel, making connection at the disconnect switch. See **FIGURE 2** on page 7, **FIGURE 3** on page 8 or **FIGURE 4** on page 9 for location of supply wiring entrance.

If the system has dual disconnect switches (Option BA7), two supply wires are required (See **FIGURE 17A,** page 24 **and FIGURE 17B,** page 24).

7.2.1 Disconnect Switch

The system must have a remote disconnect switch, a built-in disconnect switch, or both.

If ordered with a built-in disconnect switch, the system will be factory equipped with one or two built-in non-fusible, lockable disconnect switch(es). The built-in disconnect switch(es) (Option BA6 or BA7) require copper wiring with amp capacity based on 75°C maximum temperature rating at the line side terminals.

If the system does not have a built-in disconnect switch, a field-provided or optional shipped-separate, wall-mounted disconnect switch is required. It is recommended that there is at least four feet (1.2M) of service room between the switch and system access panels. All external wiring must be within approved conduit and have a minimum temperature rise rating of 60°C. **Run conduit so that it does not interfere with the system access panels.** When providing or replacing fuses in a fusible disconnect, use dual element time delay fuses and size according to the rating plate.

WARNING

To prevent injury or death due to electrocution or contact with moving parts, lock an open disconnect switch.

WARNING

If the unit includes a gas furnace, always turn off the gas when you turn off the power supply.

7.0 Electrical and Wiring (cont'd)
7.2 Supply Wiring (cont'd)
7.2.1 Disconnect Switch (cont'd)

FIGURE 17B - Built-in Disconnect Switch Options BA6 and BA7

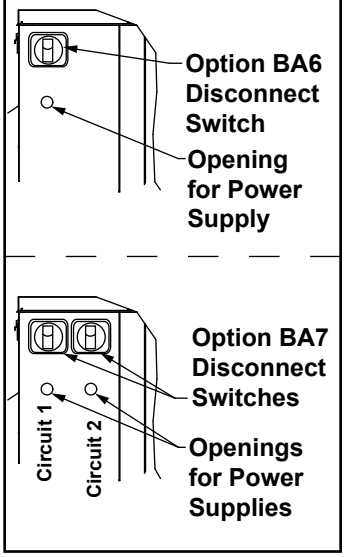
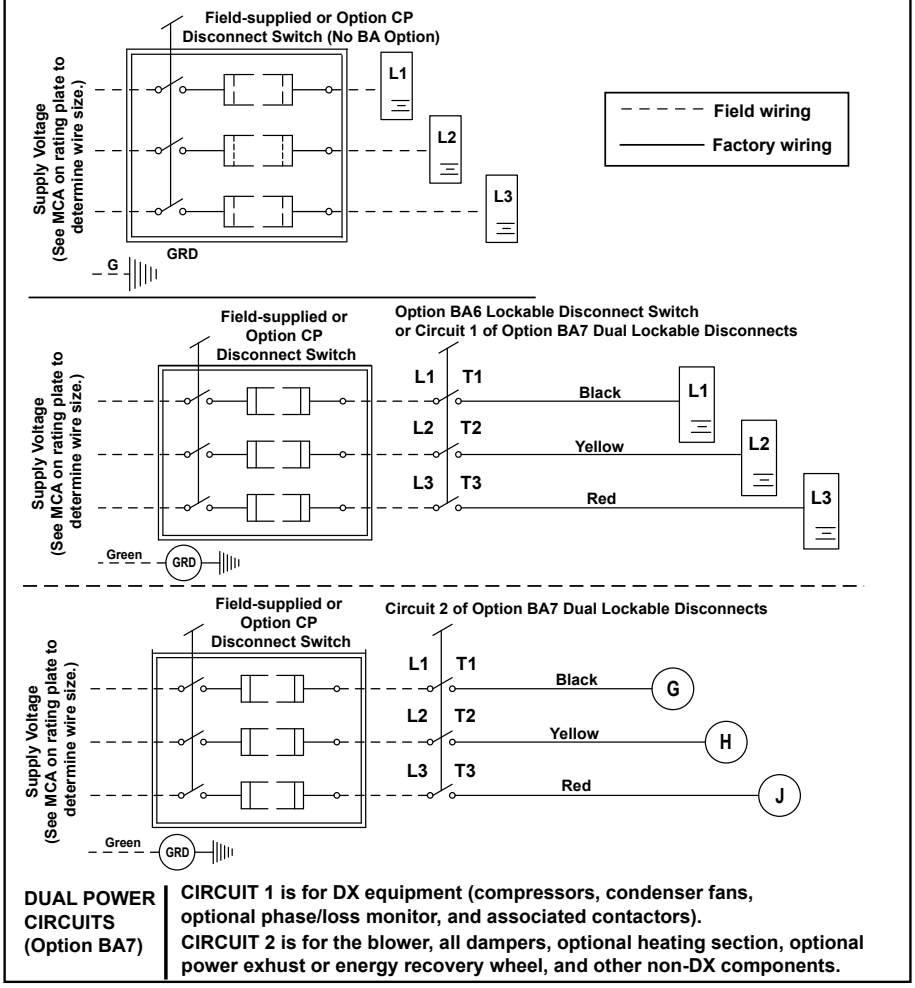


FIGURE 17A - Disconnect Switch Wiring Connections



DUAL POWER CIRCUITS (Option BA7)

CIRCUIT 1 is for DX equipment (compressors, condenser fans, optional phase/loss monitor, and associated contactors).
CIRCUIT 2 is for the blower, all dampers, optional heating section, optional power exhust or energy recovery wheel, and other non-DX components.

7.2.2 Supply Voltage

The electric supply to the unit must meet stringent requirements for the system to operate properly. Voltage supply should be within ±10% or as stated on the rating plate.

Maximum imbalance on a 3-phase system is 2%.

If the power supply is not within these tolerances, contact the power company prior to operating the system.

CAUTION: If this unit is allowed to operate on an electric supply that is not within the specified tolerances, the product warranty shall be void.

Follow instructions below to check.

Check Voltage Supply - See voltage use range on the rating plate. Measure (and record) each supply leg voltage at all line disconnect switches. Readings must fall within the allowable range.

Check Voltage Imbalance - In a 3-phase system, excessive voltage imbalance between phases will cause compressor motors to overheat and eventually fail. Maximum allowable imbalance is 2%. To determine voltage imbalance, use recorded voltage measurements taken above in the following formula.

Key:	V1, V2, V3 = line voltages as measured VA (average) = $\frac{(V1 + V2 + V3)}{3}$ VD = line voltage (V1, V2, or V3) that deviates farthest from average (VA)
Formula:	% Line Voltage Imbalance = $\frac{[100 \times (VA - VD)]}{VA}$

7.2.2 Supply Voltage (cont'd)

Optional Voltage Protection, Option PL4

If the system was ordered with Option PL4 (identified on the wiring diagram), it will have a factory-installed phase loss/reversal and over/under voltage monitor.

The monitor will cause the controller to shut down the unit until the power condition is corrected. This is an auto reset device and will reset when the power condition is corrected.

7.2.3 3-phase Wiring Check

<u>3-Phase Wiring Connection</u> - **There is a chance of unknowingly connecting 3-phase power in such a way as to cause compressor and blower rotation in reverse. To prevent damage to the components, it is important to check this on startup.**

Before initial startup, connect refrigerant pressure gauges to the compressor suction and discharge lines. At startup, observe the gauges. **If the suction pressure rises and discharge pressure drops, the compressor is operating in reverse and should be shut down.**

(**NOTE:** After several minutes of operation in reverse, the compressor's internal protector will trip. If compressors are repeatedly allowed to restart and run in reverse, the compressors will be permanently damaged.)

If correction to 3-phase is required, **turn off the power. At the incoming power connection, switch the 3-phase line voltage wiring connections before restarting the unit. After startup, re-check the pressure gauges.**

CAUTION: Connect pressure gauges to the suction and discharge lines before startup so that compressor rotation can be checked immediately. Scroll compressors will be destroyed if operated in the wrong direction.

7.3 Wiring Diagram, Unit Wiring Requirements, and Optional Convenience Electrical Outlet

Each unit has an order-specific custom wiring diagram in the control compartment. All optional electrical components ordered with the unit are shown on the wiring diagram. Codes for options ordered are listed across the bottom of the diagram. To identify option codes, see list in **APPENDIX**, pages 68 thru 73.

Keep the wiring diagram and all manuals for future reference.

CAUTION: If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 105°C.

Optional Convenience Outlet, Option BC6

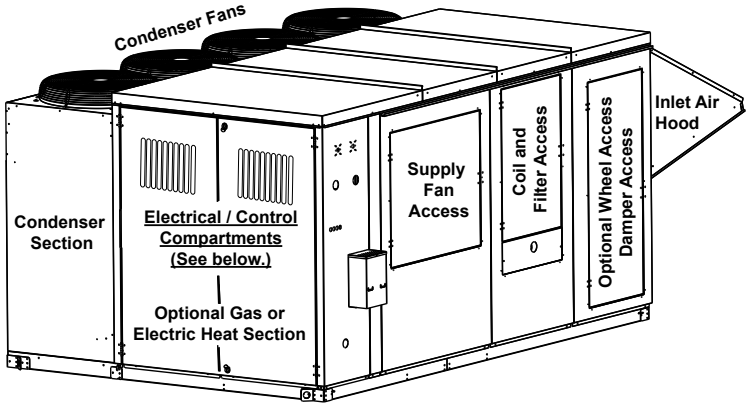
If the system was ordered with an electrically independent 115V electrical outlet (Option BC6), there is a factory-installed 115V outlet mounted on a separate rail inside the electrical compartment (not illustrated in **FIGURE 18** on page 26).

This outlet requires a separate, field-supplied 115 volt power supply. Refer to **FIGURE 19** on page 28, for wiring entrance locations.

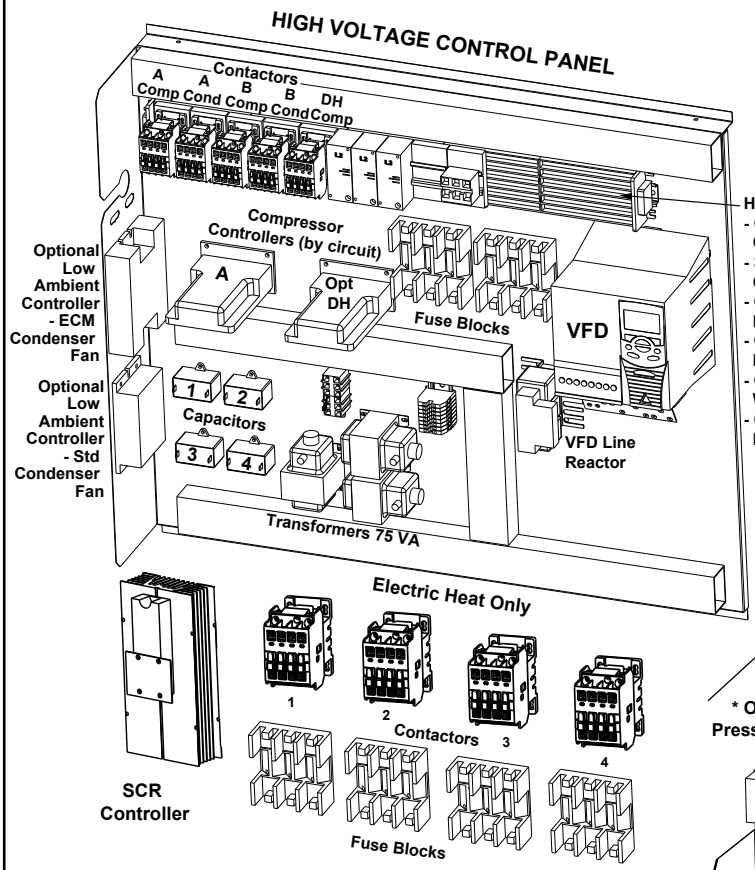
7.0 Electrical and Wiring (cont'd)
7.4 Electrical Compartment - Control Locations

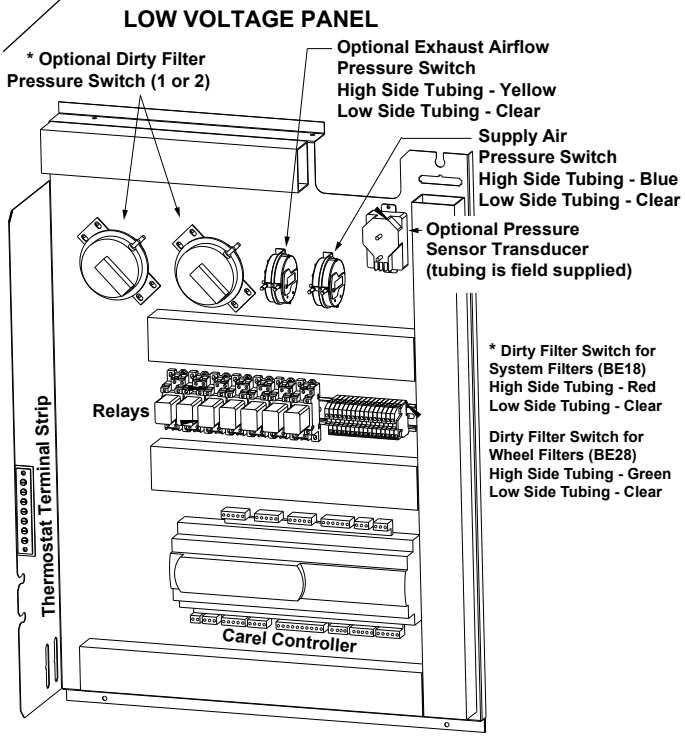
FIGURE 18 - High and Low Voltage Control Panels in the Electrical Compartment

NOTE: Images are representative and do not accurately depict control locations for all sizes.



The high and low voltage panels illustrated below are mounted side-by-side in the electrical control compartment.





Additional Controls for Gas Heat Section
- Ignition controller and combustion air pressure switch are located on the side wall next to the gas manifold and burner. See **FIGURE 25** in Paragraph 9.2.

7.5 Control Wiring

NOTE: For menu sequences, see Form CP-Y-D19 or Form CP-Y-D21, depending on the selected control option.

7.5.1 Digital Controller and Displays

Carel Programmable Digital Controller (in the control compartment)

The digital controller has an integral display allowing for complete access to unit test features, schedules, discharge air set points, fan control, alarms, and other unit operational set points. The following paragraphs illustrate the field-installed wiring required to connect the field-installed sensors to the controller.

Option RB5 - Remote, Wall-Mounted Display

- Allows same access as unit-mounted control
- Field install up to 656 ft (200M) from the unit

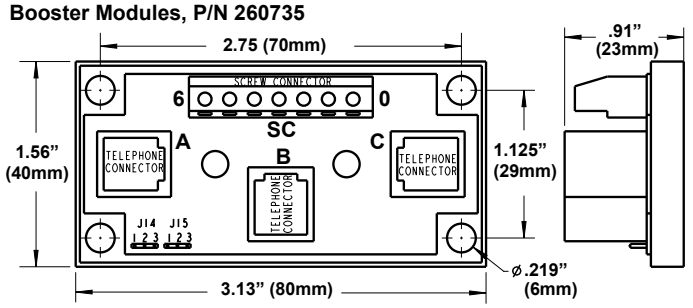
NOTE: If the remote display needs to be mounted more than 656 ft (200M) from the unit, contact the factory about adding a field-supplied power supply required to extend the range up to 1640 ft (500M).

Wall-Mounted Display Package, P/N 260436

P/N	Qty	Description
260178	1	Unit Display
260175	2	6-pin Connection Cable
260735	2	Cable Splitter and Signal Booster Module
273652	1	Instruction Sheet

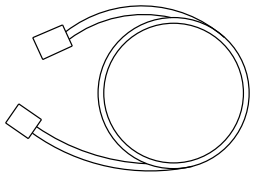
Remote Display, P/N 260178

(2) Cable Splitter and Signal Booster Modules, P/N 260735



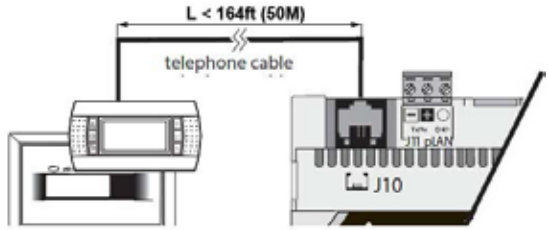
Front and Side Views with Dimensions

(2) 6-pin Connection Cables, P/N 260175



Option RB5 Wiring Connections

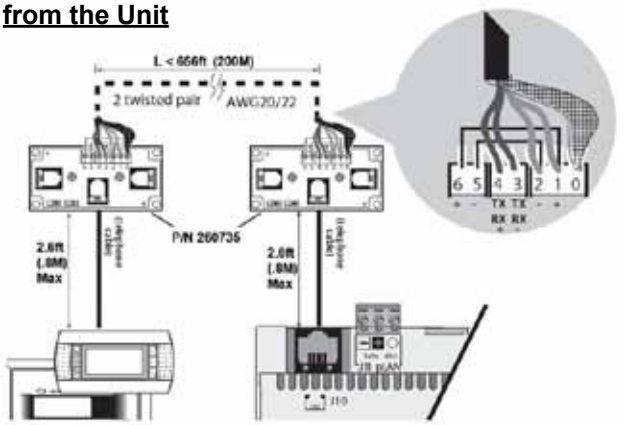
Less than 164ft (50M) from the Unit



Use the 6-pin connection cable to connect the remote display to the J10 terminal on the controller.

NOTE: The splitter/booster modules may be used but are not required under 164ft (50M).

Greater than 164ft (50M); Less than 656ft (200M) from the Unit



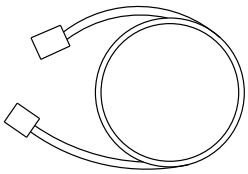
Distance >164ft (50M)<656ft (200M) requires two booster modules connected with field-provided 4-pin shielded cable.

Option RB6 - Remote, Hand-Held Display, Package P/N 272407

- Allows same access as unit-mounted control

Hand-Held Display, P/N 272642

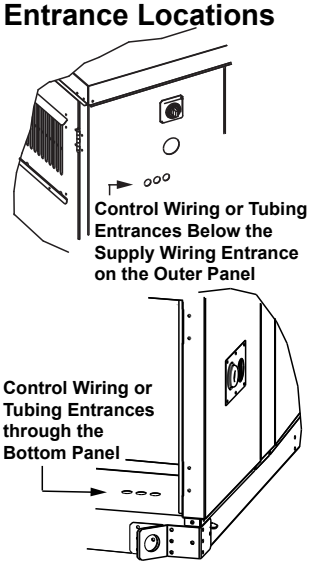
6-pin Connection Cable, P/N 260175



Several of the control options require some field installation and wiring. Follow the manufacturer's instructions for installation. See paragraphs below for field wiring information for each sensor.

7.0 Electrical and Wiring (cont'd)
7.5 Control Wiring (cont'd)
7.5.2 Sensor Wiring

FIGURE 19 - Control Wiring or Tubing Entrance Locations



24V Field Control Wiring Length and Size Requirements	Total Wire Length	Minimum Recommended Wire Size
	150 ft (45M)	#18 gauge shielded wire
	250 ft (76M)	#18 gauge shielded wire
	350 ft (106M)	#14 gauge shielded wire

The manufacturer recommends for optimum temperature control performance that the analog and digital inputs (CO_2 and air quality sensors) that are connected to the main controller have a <3% wattage drop and be routed to the unit in one of the following manners:

1) In separate conduits, isolated from 24 VAC controls and line voltage power to the unit, ***OR***

2) If the digital sensor wires are to be run in the same conduit as the 24 VAC control wiring, the wiring **MUST** be shielded cable and bundled separately from the 24 VAC control wiring. The shield **MUST** be drained at the unit and taped on the opposite end.

Comply with the digital control sensor wire gauge and length requirements in the table below.

Maximum Sensor Wire Length for less than 1°F Signal Error	Wire Gauge	Maximum Sensor Wire Length (Digital Control)
	14 AWG	800 ft (244M)
	16 AWG	500 ft (152M)
	18 AWG	310 ft (94M)

7.5.3 Field Wiring by Control Option

Depending on which field-installed control option was ordered, the unit will operate in response to a signal from the control. Dotted wires (lines) on the diagrams designate field wiring. Factory wiring is shown as a solid line.

The discharge air temperature sensor is shipped with every unit and must be field installed in the duct work. Placement of the discharge air sensor in the duct work is critical to the correct operation of the system in both the cooling and heating modes. Location is especially important when installing a unit with dual heat sections; refer to the information in **FIGURE 15** on page 22.

Discharge Air Temperature Sensor, P/N 222753 - applies to all installations

- Shipped with the unit for installation in the Supply Air Duct

1. Determine the appropriate distance from the unit. Be sure there is sufficient distance from the outlet to have a good mixture of discharge air temperature. According to the latest edition of AMCA Standard 201, in straight ducts, the air is typically well mixed a minimum of five equivalent duct diameters from the discharge of the unit with equivalent duct diameter defined as equal to the square root of 4AB/3.14. “A” and “B” are the duct cross-sectional dimensions.

Example: **Supply duct work cross-sectional dimension is 24" x 12" (610mm x 305mm).**

$$5 \times \sqrt{\frac{4 \times 12 \times 24}{3.14}} = 96 \text{ inches} \qquad 5 \times \sqrt{\frac{4 \times 305 \times 610}{3.14}} = 2435\text{mm}$$

Locate the sensor a minimum of 96" (2435mm) from the outlet of the unit.

NOTE: If the length of the discharge duct is less than 8 ft (2.4M), a mixing vane is recommended for mixing the discharge air.

Do not mount the sensor in the duct work after a split in the supply as that will cause loss of control in the duct that does not house the sensor.

2. Determine the location and orientation of the sensor. The position of the sensor in the duct is also important. In horizontal duct work, locate the sensor assembly in the top, middle of the duct with the sensor probe extending vertically down into the center of the airstream.

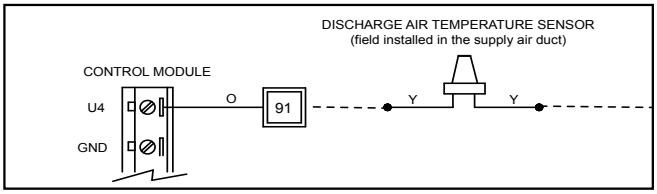
In vertical duct work, locate the sensor assembly in the middle of the side of the duct that corresponds with the top middle of the discharge outlet.

3. Attach the sensor. Mark the selected location and drill a 7/16" hole. Insert the probe into the hole. Be sure that the blue plastic fitting holding the probe is centered in the hole. Attach with two No. 8 sheet metal screws (do not overtighten). Check to be certain that the hole is sealed.

7.5.3 Field Wiring by Control Option (cont'd)

Discharge Air Temperature Sensor (cont'd)

4. Run the sensor wire to the unit. Use field-supplied 2 to 3 pair of 16 to 22 gauge wire.



Digital control inputs are low-current, resistance-based signals. For optimum temperature control performance, it is recommended that the sensor inputs (zone sensors, discharge air sensors, etc.) that are connected to the controller be routed to the unit in one of the following manners:

- In separate field-supplied conduits, isolated from 24 VAC controls and line voltage power to the unit, ***OR***
- If the sensor wires are to be run in the same field-supplied conduit as 24 VAC control wiring, use shielded cable and bundle wires separately from 24 VAC control wiring. The shield must be drained at the unit and taped on the opposite end.

Thermostats

Option CL23

- Electronic, 24 Volt
- 2-stage Heating/Cooling
- Touch-Screen Programmable
- P/N 257338

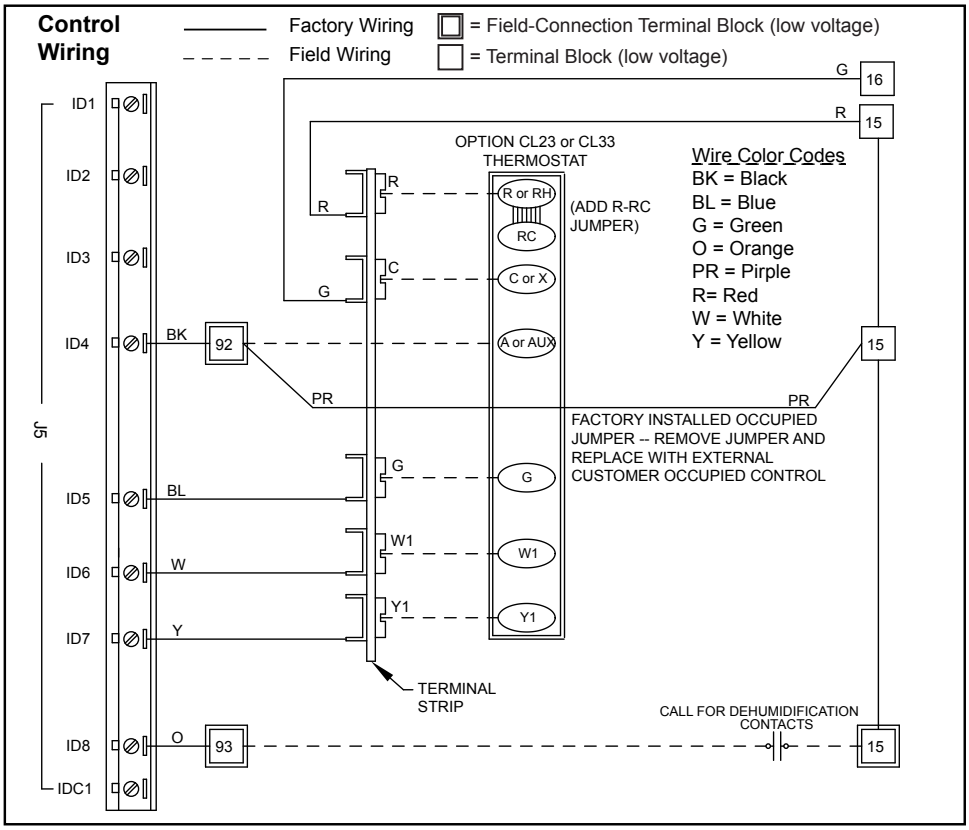
Option CL33

- Electronic, 24 Volt
- 2-stage Heating and/or Cooling
- Programmable
- Auxiliary Relay
- P/N 221038

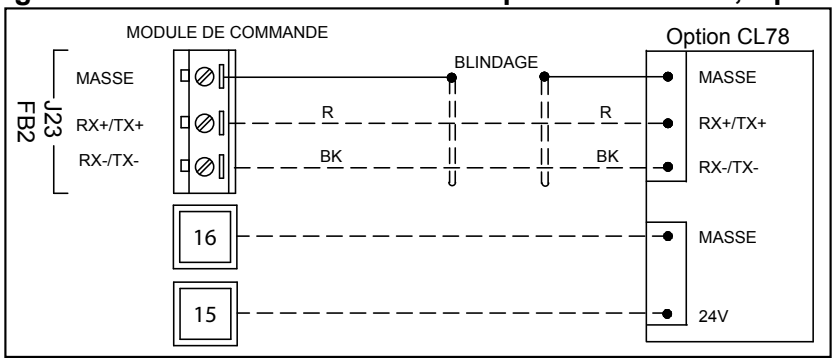
Option CL78

- Space Mounted, DDC Temperature Monitor
- Setpoint Adjustment
- P/N 272631

Wiring Connections - Thermostat Option CL23 or CL33



Wiring Connections - Wall-mounted Temperature Monitor, Option CL78

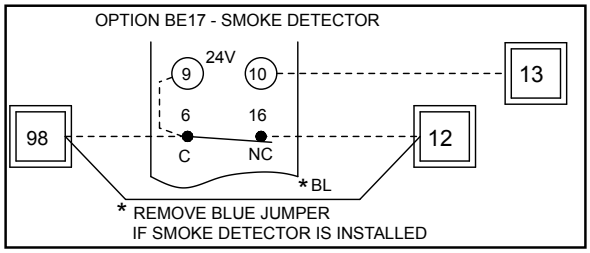


7.0 Electrical and Wiring (cont'd)
7.5 Control Wiring (cont'd)
7.5.3 Field Wiring by Control Option (cont'd)

Option BE17

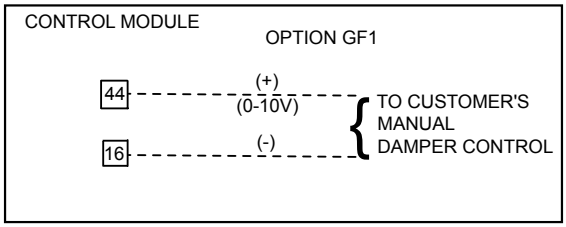
Wiring Connections - DDC Monitored Smoke Detector (photoelectric), Option BE17, P/N 259076

- Field Installed in the supply air duct
- Smoke Detector, P/N 159553, Sampling Tube, P/N 259069



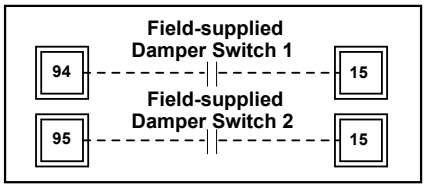
Option GF1

Wiring Connections - Damper Positioning Control from an External 0-10V Input Signal (field provided), Damper Control Option GF1



Option GF4

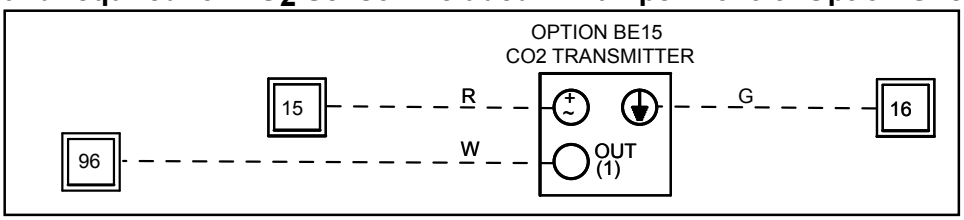
Wiring Connections - Damper Positioning Control from Two field provided Input Switches, Damper Control Option GF4



Option BE15 or Option GF8

- P/N 256957

Wiring Connections - CO_2 Sensor (Range 0-2000 ppm), Option BE15 and required for CO_2 Sensor included in Damper Control Option GF8

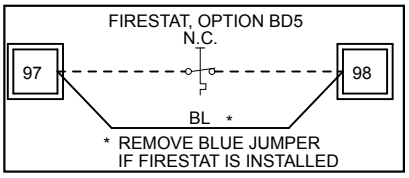


Option BD5

- P/N 42782

Wiring Connections - Firestat, Option BD5

The firestat is shipped separately for field installation in the return air and/or the supply air duct. Comply with local building codes.

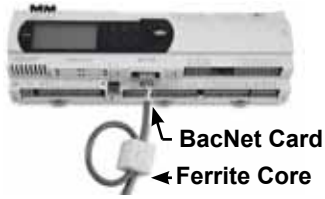


Option BHB7

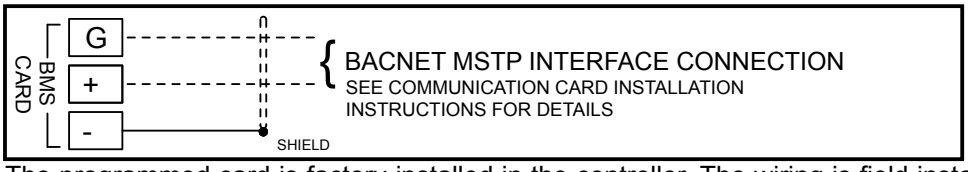
Wiring Connections - LON DDC Communication Bus, Option BHB7

The programmed card is factory-installed in the controller. The wiring is field installed using 22 gauge, twisted shielded pair wire. Be sure to install the shipped-loose Ferrite Core around the communication connection.

Option BHB8



Wiring Connections - BacNet (MSTP) DDC Communication Bus, Option BHB8



The programmed card is factory-installed in the controller. The wiring is field installed using 22 gauge, twisted shielded pair wire. Be sure to install the shipped-loose Ferrite Core around the communication connection.

7.6 Supply Fan with Variable Frequency Drive

Variable Frequency Drive

The supply fan is a plenum fan with backward curve blades and a premium efficiency inverter rated motor. All units are equipped with variable frequency drive. With variable frequency drive control, the supply fan will operate on varying speeds as determined by the electrical frequency.

Depending on which control (Option VFC) was selected, the variable frequency drive is controlled by duct pressure, building pressure, or constant volume speed settings. See control information in Paragraph 8.2.

Generally, high speed is used for cooling and low speed for heating. Maximum allowable temperature rise for a gas heat section is 100°F Model YDMA, 70°F for Model YDHA, or 50°F for Model YDSA.

The VFD is set according to the order specifications. If changes are required, follow the ABB instructions provided to program the settings.

Setting Fan CFM

During startup, the CFM will need to be checked for the supply fan and an optional exhaust fan. Follow the instructions in Paragraph 10.3 to use the unit interface TAB Menu and the airflow / pressure drop chart on pages 69 thru 73 to determine the airflow settings.

7.7 Condenser Fan Motors and Fans

Condenser fan motors are direct-drive, statically and dynamically balanced, and permanently lubricated. Condenser fan motors are either open drip proof motors with external sling protection against water penetration or high efficiency ECM motors with speed control (Option CUF4). All motors have auto reset thermal overload protection.

Area above the fans should always be unrestricted and open.

Condenser Fan Control

The unit has a maximum of four condenser fans.

If ordered with low ambient control (Option BE8), depending on type of condenser fan, the low ambient controller will change the speed of the fan to regulate the head pressure.

7.8 Compressors

All of the compressors are high efficiency hermetic scroll type designed for use with R-410A refrigerant.

Compressor Amps/ Voltage

(For additional information, refer to the Operation/ Maintenance/Service Manual, Form O-Y.)

Mechanical Compressor Protection - A low pressure cutoff (LPCO) switch is used for protection against compressor damage due to a loss of system charge. This protection prevents short cycling on the internal overload (IOL) which can pump the oil out of the compressor.

All compressors also have manual reset high pressure cutouts (HPCO) and frost stats.

Crankcase Heaters - Each compressor has a band-type crankcase heater. **Crankcase heaters must always be energized for at least 24 hours prior to operating the compressor.**

Compressor Modulation - These units have scroll compressors equipped with modulating valves and a digital controller that interfaces the compressor with the system controller. Compressor operation will start based upon a call for cooling and will modulate to maintain the discharge air temperature setpoint. There is a five-minute compressor on/off time.

Compressor Staging - Each system leaves the factory with the compressor staging sequence set. The compressor will start based upon a call for cooling to maintain the discharge air temperature setpoint. There is a minimum 300 second ON and OFF time for each stage (not compressor).

For additional information about compressor operation, see the Operation/Maintenance/ Service Manual, Form O-Y.

Optional Hot Gas Bypass (applies to non-modulating compressors) - If ordered with Option AUC8, the bypass valve will provide expanded compressor modulation at low outside air temperatures by allowing some of the gas from the suction line to

Optional Hot Gas Bypass Valve

be re-routed directly to the evaporator coil. With Option AUC8, at least one circuit per stage has a hot gas bypass valve. Hot gas bypass valves are factory set.

Check Hot Gas Bypass Valve Setting - On the circuit with a hot gas bypass valve, connect a pressure gauge to the suction line and block the entering air to the evaporator coil. Suction pressure will drop, and the hot gas bypass valve should begin to open at approximately 115 psi and will be fully open at 95 psi. When the valve begins to open, it will be hot to the touch (see caution below).

CAUTION: Do not touch the hot gas bypass valve when operating. Use caution when checking and adjusting the valve. Wear appropriate safety gear.

If pressure needs to be adjusted, remove the cap and turn the adjusting stem clockwise to increase the pressure setting or counterclockwise to decrease the pressure setting. Make adjustments in small increments. Allow five minutes between adjustments for the system to stabilize. When finished, replace the cap on the adjustment stem and remove the pressure gauge.

8.0 Controls

8.1 System Controller

The digital controller has an integral display allowing for complete access to unit test features, schedules, discharge air set points, fan control, alarms, and other unit operational set points. The controller is programmed to react to signals from various standard and optional sensors to provide the operation required to maintain the set points.

Space Temperature Control System (Option D19) - applies to ModelsYDSA and YDHA

Sequence of Operation

NOTE: For additional information about Option D19 refer to Form CP-Y-D19.

- Supply air constant volume
- Supply air variable volume
  - »Duct static
  - »Summer/winter fan speed
  - »High Low Speed Control
- Power exhaust control
- Mixed air damper controls
  - »Demand ventilation
  - »Manual & external control
- Energy recovery
- Thermostat control

Neutral Air Control System

(Option D21) - applies to Models YDMA and YDHA

Sequence of Operation

NOTE: For additional information about Option D21 refer to Form CP-Y-D21.

- Neutral air control
- Space temperature reset control
- Tempered air control
- Process control
- Supply air constant volume
- Supply air variable volume
  - »Duct static & building static
  - »Demand ventilation
  - »Exhaust fan matching
  - »Summer/winter fan speed
  - »Space fan speed control
  - »Manual & external control
- Power exhaust control
- Mixed air damper controls
  - »Duct static & building static
  - »Demand ventilation
  - »Exhaust fan matching
  - »Manual & external control
- Energy recovery

8.1 System Controller (cont'd)

Pressure Tubing Color Codes

Factory-installed tubing for pressure sensors is color coded.

Pressure Tap	Std or Optional	Color
Supply Fan Pressure Tap (High Side)	Standard	BLUE
Inlet Plenum Tap (Low Side)	Standard	CLEAR
Exhaust Fan Ring Tap (High Side)	Option PE or EW	YELLOW
Exhaust Fan Inlet Plenum Tap (Low Side)	Option PE or EW	CLEAR
Dirty Filter Switch - High Side	Option BE18	RED
Dirty Filter Switch - Low Side	Option BE18	CLEAR
Dirty Filter Switch for ERV Wheel Filters - High Side	Option BE28 with EW Option	GREEN
Dirty Filter Switch for ERV Wheel Filters - Low Side	Option BE28 with EW Option	CLEAR

8.2 Supply Fan Control

The main controller is programmed to control the fan to operate the unit in two modes: Occupied and Unoccupied

The supply fan (blower) starts/stops automatically through a local time of day schedule or remote contact closure commanding the system to occupied mode. If the controller is connected to a building automation system, other external controllers can control the mode of operation.

Upon a command for occupied mode, the supply fan starts and runs continuously. There is a differential pressure (air proving) switch that indicates proof of fan operation. The supply fan is subject to safety devices, such as duct high limit switches, fire alarm relays, smoke detectors, low temperature limits, fan status, and other devices which can turn the supply fan OFF.

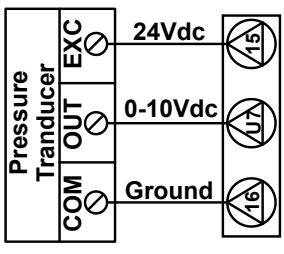
If the unit is in the unoccupied mode, the supply fan is turned OFF and will only run intermittently to maintain night setback/setup space conditions.

Sensor Options for Variable Frequency Drive

Senses	Option	Installation and Function
2 Speed Fan Control Based on Active Heating or Cooling Mode	**VFC1**	Supply airflow is factory set to order specifications but is adjustable via the unit controller.
Duct Static Pressure (0 to 2.5" iwc)	**VFC3**	Requires field installation of sensor in the supply duct. See instructions below and in the sensor manufacturer's installation form.
Building Static Pressure (-0.5 to 0.5" iwc)	**VFC4**	Field installed sensor to monitor building pressure. Requires field installation of tubing and sensor. See instructions below and in the sensor manufacturer's installation form.
Summer/Winter Adjustable Constant Volume Control	**VFC9**	Supply airflow is factory set to order specifications but is adjustable via the unit controller.

Pressure Sensors, Option VFC3 and VFC4

Tranducer in the Control Compartment



Duct pressure sensing (Option VFC3) has a range of 0 to 2.5". Building pressure sensing (Option VFC4) has a range of -0.5 to +0.5". Both pressure transducers sense differential or gauge (static) pressure and convert this pressure difference to a proportional high level analog output (0-10Vdc) for both unidirectional and bidirectional pressure ranges. The transducers are designed to be used with air or nonconducting gases. The operating and compensated temperature limits of the transducers are 0˚F to +150˚F (-18˚C to +65˚C).

The transducer is mounted in the control compartment. Installation of the tubing and pickup tubes must be done at the site. The location and position of the sensor pickups is important. Follow the instructions below and the manufacturer's instructions for installing pickup tubes and tubing.

1. **Tubing Requirements**

   All tubing is field supplied. The transducer is equipped with 1/4" O.D. pressure fittings for the pressure signal connection. Both the positive (high) pressure port and the reference (low) pressure port are located on the front of the transducer, labeled "HIGH" and "LOW" respectively.

   For best results (shortest response times), 3/16" I.D. tubing is suggested for tubing lengths up to 100 feet (30M), 1/4" I.D. for tubing lengths up to 300 feet (91M), and 3/8" I.D. for tubing lengths up to 900 feet (274M).

8.0 Controls (cont'd)
8.2 Supply Fan Control (cont'd)

NOTE: Tubing is field supplied.

Pickup Tube for Duct work, Option VFC3, P/N 234821

2. Pickup Tube Locations

Duct Static (Option VFC3) Pickup Tubes - Mount the pickup tube shipped with the unit approximately 2/3 down the length of the duct work (minimum of 10 duct lengths). At the selected location, drill a 7/16" hole in the side of the duct. Insert the pickup tube being sure that it is centered in the hole and attach with two #8 sheet metal screws. Check to be sure that the hole is sealed. Connect tubing from the sensor in the duct to the "high" connection on the transducer.

To sense atmospheric pressure, route the tubing from the "low" connection on the transducer to one of the small holes in the cabinet panel and install a field-supplied pickup tube designed for outdoors.

Building Pressure Control (Option VFC4) Pickup Tubes - Both pickup tubes for building pressure control are field supplied. Install a pickup tube in the building. To sense atmospheric pressure, route the tubing to one of the small holes in the cabinet panel and install a field-supplied pickup tube designed for outdoors.

As determined by the application, attach the tubing from the positive (high) pressure pickup to the "high" connection on the transducer and the reference (low) pressure pickup tube to the "low" connection on the transducer.

3. Verify Installation and Operation - Be sure that tubing connections are correct and attached securely. On startup, verify that there is a pressure reading displayed on the unit controller.

8.3 Other Optional Controls

Option BD5, Firestat

The firestat is for field installation in either the return air or outlet air duct work. Follow instructions supplied with the control. Comply with local building codes. See Paragraph 7.5.3 for wiring requirements and connections.

Option BD5, Firestat (200°F), P/N 42782

Option BE15, Space CO_2 Sensor

Field installed in the space, the sensor (P/N 234820) has a range of 0-2000 ppm. Follow the manufacturer's instructions for installation. Refer to Paragraph 7.5.3 for wiring requirements and connections.

Option BE17, Photoelectric Duct Smoke Detector and Sampling Tube

The photoelectric smoke detector (**P/N 159553**) used in Option BE17 is field mounted on the duct work. Follow the manufacturer's installation instructions. See Paragraph 7.5.3 for sensor wiring requirements and connections.

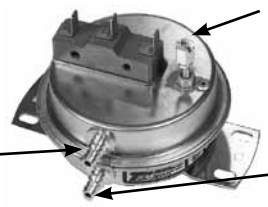
Option BE18 or BE28, Dirty Filter Switch

NOTE: See Tubing Color Chart on page 26.

If dirty filter indicator Option BE18 was ordered, a dirty filter switch is in the electrical compartment with tubing sensors placed on either side of the supply filters. If dirty filter indicator Option BE28 was ordered, two dirty filter switches are in the electrical compartment with tubing sensors placed on either side of the supply air filters and the energy recovery wheel filters.

The pressure switch(es) are in the low voltage electrical compartment. Follow the instructions in **FIGURE 20,** shown below to set the dirty filter switch.

FIGURE 20 - Dirty Filter Switch, P/N 105507



Setscrew (on front of switch) must be manually adjusted after the system is in operation.

Positive pressure connection is toward the "back or bottom" of the switch (senses air inlet side of filters)

Negative pressure connection is toward the "front or top" of the switch (senses blower side of filters)

Instructions for Setting Dirty Filter Switch

With clean filters in place; all doors closed (except electrical compartment); and the blower operating, navigate to Digital Input Screen C.9 which shows point DI02 Filter_Sts.

Increase the pressure setting by adjusting the setscrew on the switch clockwise until the filter status value is reading OFF. At this point, adjust the setscrew three full turns counterclockwise. At this setpoint, the filter light will be activated at approximately 50% filter blockage.

9.0 Optional Equipment including Heat Sections

9.1 Inlet Air and Exhaust Air Options

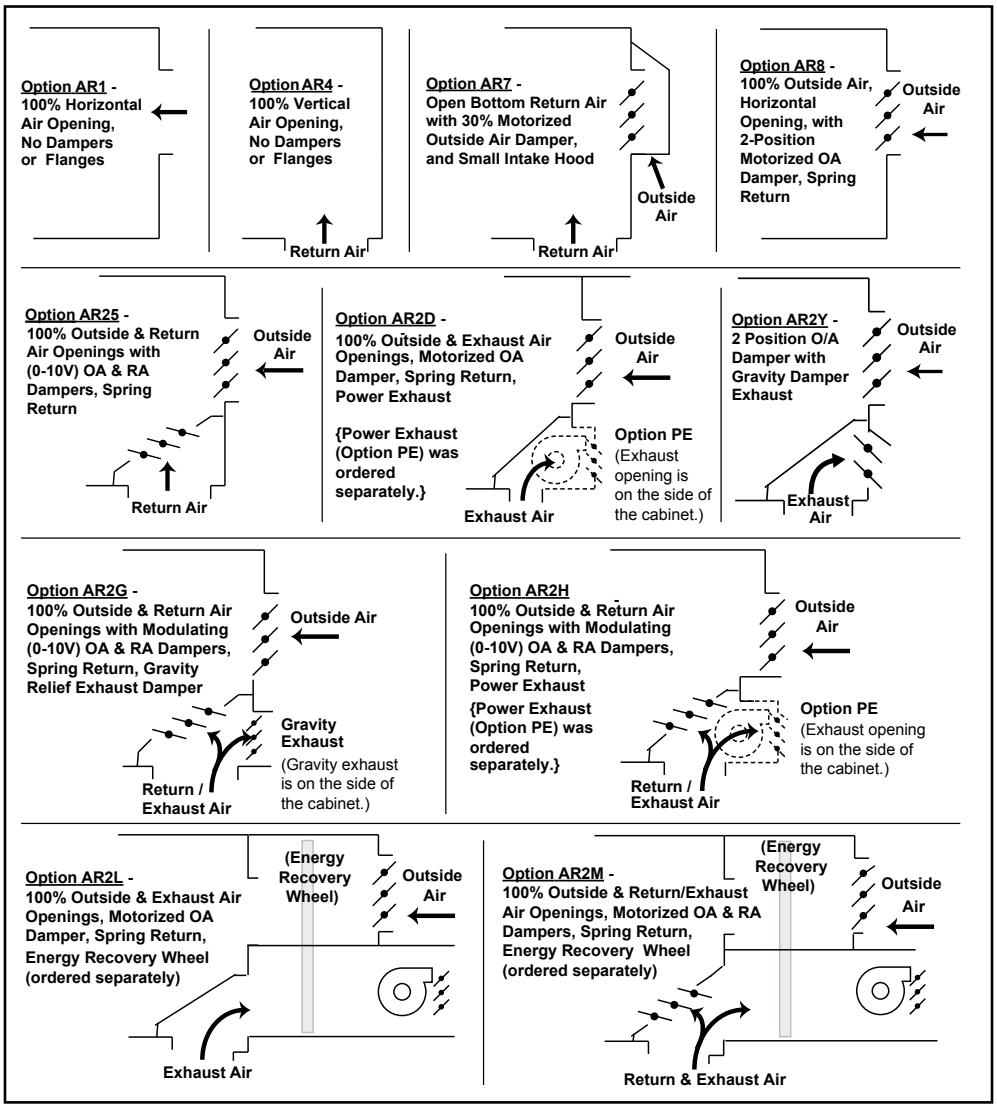
9.1.1 Inlet / Return Air Options

The system may be equipped with a variety of configurations and air control options including 100% outside air, outside and return air, a variety of damper controls, and an energy recovery wheel with exhaust.

Refer to the **FIGURE 21** shown below to identify the appearance of each inlet air configuration. **NOTE:** Option Codes including electrical components are listed on the unit wiring diagram. A list of all electrical option codes is shown on pages 68-69.

Model	Airflow Arrangements and Damper Option Code										
	AR1	AR4	AR7	AR8	AR25	AR2D	AR2G	AR2H	AR2L	AR2M	AR2Y
YDHA			✓		✓	✓	✓	✓	✓	✓	
YDMA	✓			✓	✓	✓	✓	✓	✓	✓	✓
YDSA	✓	✓	✓		✓		✓	✓		✓	

FIGURE 21 - Inlet Air Configurations by AR Option including Power Exhaust and/or Energy Wheel Options



9.0 Optional Equipment including Heat Sections (cont'd)

9.1 Inlet Air and Exhaust Air Options (cont'd)

NOTE: To verify control option selection, check the option listing on the wiring diagram and the option list in the **APPENDIX**, pages 68 thru 73.

Outside Air Only Dampers, Option AR8, AR2D, AR2L, or AR2Y - The damper motor is electrically interlocked with the blower (supply fan) motor via an internal end switch, such that a command to start the fan opens the damper first. When the damper reaches 80% open, the end switch closes, and the supply fan will operate. When the supply fan is called to be OFF, the damper closes

Outside Air & Return Air Dampers, Option AR25, AR2G, AR2H, or AR2M - If outside and return air motorized dampers were ordered, there are a variety of damper control options (Option GF). Some require field installation. If the damper control sensing option requires field installation of components, the components are shipped with the unit and include the manufacturer's instructions. Install according to the instructions and connect the wires according to the unit diagram. Follow the wiring recommendations in Paragraph 7.5.2.

Inlet Air Damper Control Options

Senses	Option	Installation and Function
Remote Damper Control, DDC	**GF1**	Damper position is adjusted by the controller in response to a field-supplied remote 0-10V input signal.
Two Position Damper Control (open/closed), DDC	**GF2**	Sends message to open or close dampers as required. Damper opens to a fixed setpoint during occupied mode and closes during unoccupied mode.
Four-Position Damper Control	**GF4**	Factory installed to provide four damper settings from two switches. Each input represents a position. As the input changes, the controller changes the damper position.
Building Static Pressure	**GF5**	Factory installed to monitor building pressure for damper operation. Requires field-installation of sensor. See instructions in Paragraph 9.1.2 below.
Outside Air Dry Bulb Economizer w/Dual Reference Enthalpy Control	**GF8**	Economizer package, CO_2 & Dual Reference enabled.

9.1.2 Power Exhaust, Option PE__

If equipped with optional power exhaust as illustrated in **FIGURE 21,** page 35 (Option AR2D or AR2H), the power exhaust will then be controlled in response to one of the following control options. Power exhaust opening has gravity dampers.

NOTE: Power exhaust is also a part of airflow configurations that include the energy recovery wheel (Option AR2L and AR2M) discussed in Paragraph 9.1.3.)

Power Exhaust Control Options

Senses	Option	Installation and Function
2 Speed Fan Control Based on Active Heating or Cooling Mode	**EFC1**	Exhaust airflow is factory set to order specifications but is adjustable via the unit controller.
Building Static Pressure	**EFC4**	Factory installed to monitor building pressure for exhaust operation. Requires field-installation of sensor. See instructions below.
Supply Fan Tracking with Adjustable Offset	**EFC7**	Power exhaust is set to operate in relation to the supply fan. The offset is adjustable via the unit controller.
Constant Volume	**EFC9**	Exhaust airflow is factory set to order specifications but is adjustable via the unit controller.

Instructions for Field-Installed Building Static Pressure Sensor in Option GF5 or Option EFC4

Tranducer in the Control Compartment

NOTE: Same type as Option VFC4. For additional information, see Paragraph 8.2.

Tubing Requirements - All tubing is field supplied. The transducer is equipped with 1/4" O.D. pressure fittings for the pressure signal connection. Both the positive (high) pressure port and the reference (low) pressure port are located on the front of the transducer, labeled "HIGH" and "LOW" respectively.

For best results (shortest response times), 3/16" I.D. tubing is suggested for tubing lengths up to 100 feet (30M), 1/4" I.D. for tubing lengths up to 300 feet (91M), and 3/8" I.D. for tubing lengths up to 900 feet (274M)

Building Pressure Control Pickup Tubes **-** Both pickup tubes for building pressure control are field supplied. Install a pickup tube in the building. To sense atmospheric pressure, route the tubing to one of the small holes in the cabinet panel and install a field-supplied pickup tube designed for outdoors.

As determined by the application, attach the tubing from the positive (high) pressure pickup to the "high" connection on the transducer and the reference (low) pressure pickup tube to the "low" connection on the transducer.

Verify Installation and Operation **-** Be sure that tubing connections are correct and attached securely. On startup, verify that there is a pressure reading displayed on the unit controller.

Setting Exhaust Fan CFM

During startup, the CFM will need to be checked for the supply fan and optional exhaust fan. Follow the instructions in Paragraph 10.3 to use the unit interface TAB Menu and the airflow / pressure drop chart on pages 69 thru 73 to determine the airflow settings.

9.1.3 Energy Recovery Wheel, Option EW__

The energy recovery wheel rotates through both the inlet and exhaust airstreams. The function of the wheel is to transfer both sensible (temperature) and latent (moisture) energy from one airstream to the air in the other airstream. This allows the energy recovery module to both cool and dehumidify outdoor makeup air during the cooling season and heat and humidify outdoor makeup air in the heating season before that air enters the unit.

The wheel is rotated by a motor and non-adjustable belt drive. The speed of the rotation is factory set to provide optimum energy transfer. Energy recovery wheel operation is controlled by the system controller.

Outside Air or Outside and Return Air Dampers with Energy Recovery Wheel - There are two airflow configurations available on a unit with an energy recovery wheel. Options AR2L and AR2M (See **FIGURE 21**, page 35.) with motorized dampers are identified on the unit wiring diagram. The outside air damper is always opened prior to operation of the unit blower and the energy recovery wheel. The return air damper in Option AR2M is interlocked with the outside air damper.

Optional Preheat Frost Control, Option PH2A (10kw), PH3A (20kw), or PH4A (30kw) - If equipped with preheat frost control, electric elements heat the outside air before it enters the wheel. The energy recovery preheat output NO16 will operate whenever the supply air temperature to the wheel is less than 33°F/1°C (with a two degree differential) and the outdoor air temperature is below 32°F/1°C (with a two degree differential). Otherwise the electric heat is OFF.

9.2 Gas Heat Section

9.2.1 Gas Supply Piping and Connections

All piping must be in accordance with requirements outlined in the National Fuel Gas Code ANSI/Z223.1a (latest edition) or CSA-B149.1 and B149.2 (latest editions). Gas supply piping installation should conform with good practice and with local codes.

WARNING: PRESSURE TESTING SUPPLY PIPING

This appliance is equipped for a maximum gas supply pressure of 1/2 psi, 3.5 kPa, or 14 inches water column. NOTE: Supply pressures higher than 1/2 psi REQUIRE installation of an additional service regulator external to the unit.

Test pressure ABOVE 1/2 psi (3.5 kPa): Disconnect the heater and the manual valve from the gas supply line which is to be tested. Cap or plug the supply line.

Test pressure EQUAL TO or BELOW 1/2 psi (3.5 kPa): Before testing, close the manual valve at the heater.

Furnaces for natural gas are orificed for operating with gas having a heating value of 1000 (±50) BTU per cubic ft. If the gas at the installation does not meet this specification, consult the factory for proper orifice size.

Pipe joint compounds (pipe dope) shall be resistant to the action of liquefied petroleum gas or any other chemical constituents of the gas being supplied.

WARNING

The operating valve is the prime safety shutoff. All gas supply lines must be free of dirt or scale before connecting the unit to ensure positive closure.

9.0 Optional Equipment including Heat Sections (cont'd)
9.2 Gas Heat Section (cont'd)

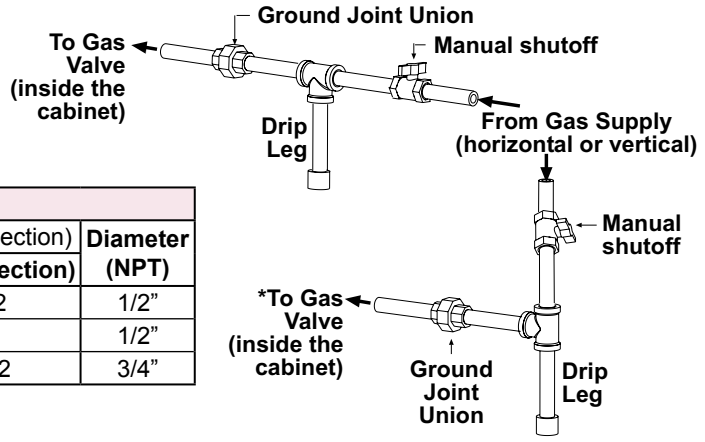
Sizing Gas Supply Lines

Capacity of Piping												
Cubic Feet per Hour based on 0.3" iwc Pressure Drop												
Specific Gravity for Natural Gas -- 0.6 (Natural Gas -- 1000 BTU/Cubic Ft)												
Specific Gravity for Propane Gas -- 1.6 (Propane Gas -- 2550 BTU/Cubic Ft)												
Length of Pipe	**Diameter of Pipe**											
	1/2"		**3/4"**		**1"**		**1-1/4"**		**1-1/2"**		**2"**	
	Natural	**Propane**	**Natural**	**Propane**	**Natural**	**Propane**	**Natural**	**Propane**	**Natural**	**Propane**	**Natural**	**Propane**
20'	92	56	190	116	350	214	730	445	1100	671	2100	1281
30'	73	45	152	93	285	174	590	360	890	543	1650	1007
40'	63	38	130	79	245	149	500	305	760	464	1450	885
50'	56	34	115	70	215	131	440	268	670	409	1270	775
60'	50	31	105	64	195	119	400	244	610	372	1105	674
70'	46	28	96	59	180	110	370	226	560	342	1050	641
80'	43	26	90	55	170	104	350	214	530	323	990	604
90'	40	24	84	51	160	98	320	195	490	299	930	567
100'	38	23	79	48	150	92	305	186	460	281	870	531
125'	34	21	72	44	130	79	275	168	410	250	780	476
150'	31	19	64	39	120	73	250	153	380	232	710	433
175'	28	17	59	36	110	67	225	137	350	214	650	397
200'	26	16	55	34	100	61	210	128	320	195	610	372
Note: When sizing supply lines, consider possibilities of future expansion and increased requirements.												
Refer to National Fuel Gas Code for additional information on line sizing.												

FIGURE 22 - Gas Connection

Depending on Model Size, refer to either **FIGURE 2** on page 7, **FIGURE 3** on page 8 or **FIGURE 4** on page 9 for gas connection location.

Gas Connection Size (NOT gas supply line size)		
Gas Heat Section (H=non-condensing; G=condensing heat section)		**Diameter (NPT)**
Single Furnace	**Dual Furnaces (one gas connection)**	
H50, H75, H100	H102, H125, H150, H175, H202	1/2"
H200, G150	H402, G302	1/2"
H300, H400, G225, G300	H702, H802, G372, G525, G602	3/4"



WARNING

All components of a gas supply system must be leak tested prior to placing equipment in service. NEVER TEST FOR LEAKS WITH AN OPEN FLAME. Failure to comply could result in personal injury, property damage or death.

9.2.2 Checking Gas Pressure

Inlet Pressure (See **Supply Pressure Testing WARNING** on previous page.)

Before attempting to measure or adjust valve outlet gas pressure, the inlet (supply) pressure must be within the specified range both when the heater is in operation and on standby. Incorrect inlet (supply) pressure could cause excessive outlet gas pressure immediately or at some future time. If natural gas inlet (supply) pressure is too high, install a regulator in the supply line before it reaches the heater. If natural gas supply pressure is too low, contact your gas supplier.

Inlet pressure to the valve for natural gas must be a minimum of 5" iwc or as noted on the rating plate and a maximum of 14" iwc

Inlet supply pressure to the valve for propane gas must be a minimum of 11" iwc and a maximum of 14" iwc

9.2.2 Checking Gas Pressure (cont'd)

Measuring Manifold Pressure

Measuring manifold gas pressure cannot be done until the heater is in operation. It is a procedure step included in the "Checklist - Startup" steps, Paragraph 10.5.2. When performing this Startup Step, select and follow the instructions that apply to the gas control option on the unit.

- Two and Four Stage Options AG71 and AG72 (apply to Model YDSA only)
- Electronic Modulation Control Options AG73 and AG74 (apply to Models YDHA, YDMA, and YDSA)

Gas pressure measurements should be done with a digital manometer. Two manometers may be required.

IMPORTANT NOTES: On units with two heat sections, take gas pressure measurements with both sections in operation.

Manifold pressure should be as shown in the table on page 49 for the model size, gas type, and gas control option or as noted on the rating plate.

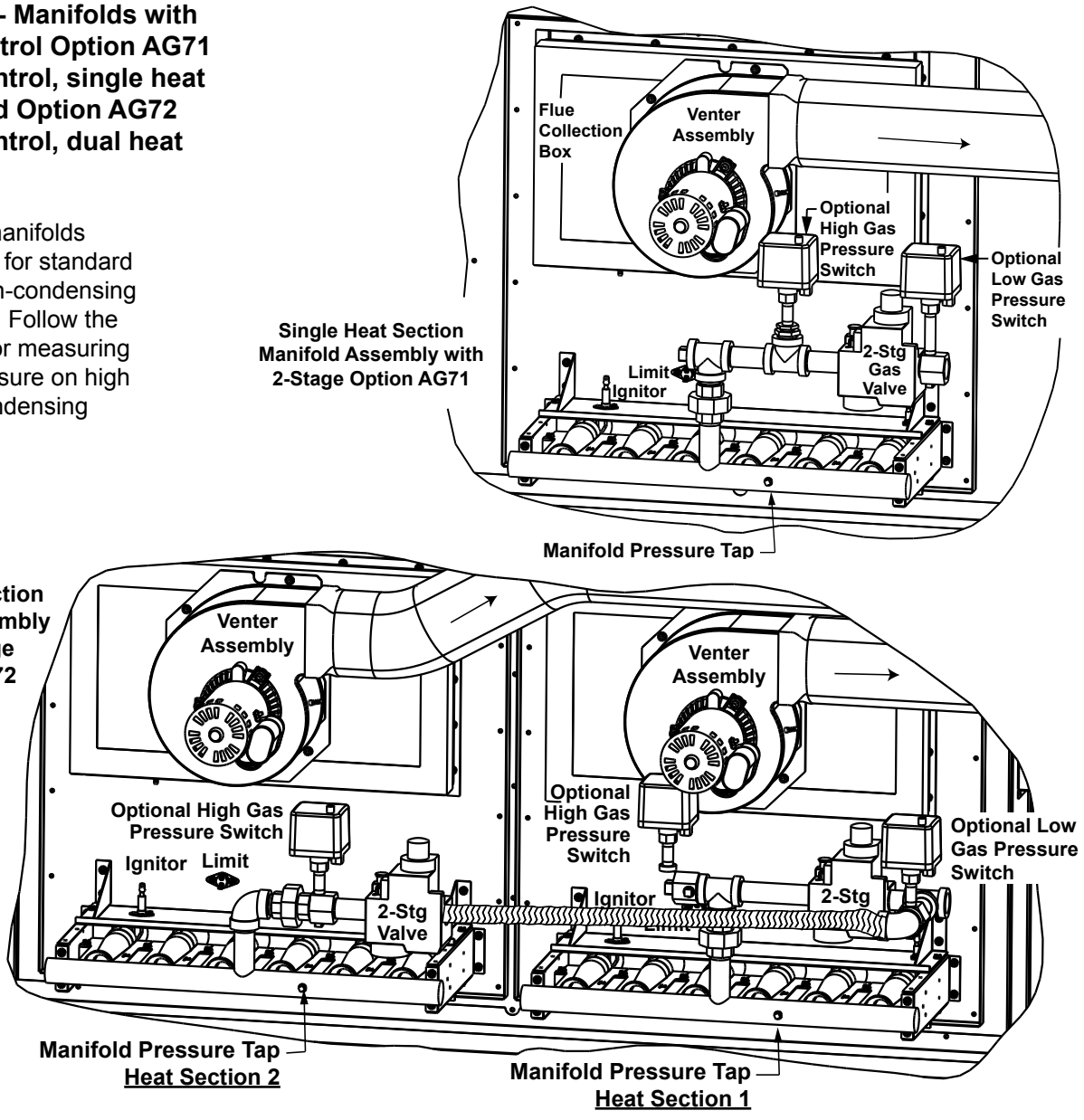
NOTE: If unsure of the Gas Control Option Code (AG71, AG72, AG73, or AG74), check the wiring diagram on the heater. All option codes affected by electrical power are listed on the bottom of the wiring diagram after the unit Model and Size.

WARNING

Manifold pressure must never exceed the value listed in the table on page 49 (or as shown on the rating plate).

FIGURE 23 - Manifolds with Staged Control Option AG71 (2-stage control, single heat section) and Option AG72 (4-stage control, dual heat sections)

NOTE: The manifolds illustrated are for standard efficiency, non-condensing heat sections. Follow the same steps for measuring manifold pressure on high efficiency, condensing heat sections.



9.0 Optional Equipment including Heat Sections (cont'd)
9.2 Gas Heat Section (cont'd)
9.2.2 Checking Gas Pressure (cont'd)

Instructions for Measuring Manifold Pressure - <u>Option AG71 (2-stage with one heat section)</u>

Gas Pressure Tap Location

Locate the 1/8" pressure tap on the manifold. (See **FIGURE 23**, page 39). Close the manual valve and connect a manometer to the 1/8" pressure tap in the manifold. Both high-fire and low-fire pressure can be checked at the manifold pressure tap. Open the manual valve.

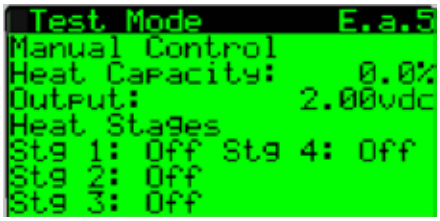
Unit Test Mode Must be Enabled - Refer to Paragraph 10.3 to enable Test Mode

Follow the instructions to enter Test Mode and proceed to Test Mode Screen E.a.5.

Manifold Pressure Measurements

From the Test Mode **Screen E.a.5**:

- Press the enter key until the cursor is flashing on the **Stg 1:** field. Press the up arrow to set the Stg 1 value to ON.
- Press the enter key until the cursor is flashing on the **Stg 2:** field. Press the up arrow to set the Stg 2 value to ON.



<u>Step 1</u> - High-Fire Manifold Pressure Reading

Using the manometer, measure the manifold pressure on high fire. **Check the pressure with the chart on page 49. Normally adjustments to the factory settings should not be necessary.**

- If no adjustment is required, proceed to Step 3.
- If an adjustment is required, proceed to Step 2.

CAUTION: DO NOT bottom out the gas valve regulator adjusting screw. This can result in unregulated manifold pressure causing excess over fire and heat exchanger failure.

<u>Step 2</u> - High Fire Manifold Pressure Adjustment

Remove the cap from the high fire adjustment screw on the two-stage valve. Adjust the pressure setting by turning the regulator screw IN (clockwise) to increase pressure. Turn the regulator screw OUT (counterclockwise) to decrease pressure. Replace cap. Cycle the burner by turning the value of the Stg 2 field OFF and ON to actuate the valve. Recheck the manifold pressure and repeat Step 2 if required. If the pressure reading is correct, set the value of Stg 2 to OFF and proceed to Step 3.

<u>Step 3</u> - Low-Fire Manifold Pressure Reading

Using the manometer, measure the manifold pressure on low fire (Stg 1 ON). **Check the pressure with the chart on page 49. Normally adjustments to the factory settings should not be necessary.**

If no adjustment is required, proceed to Step 5.

If an adjustment is required, proceed to step 4.

<u>Step 4</u> - Low Fire Manifold Pressure Adjustment

Remove the cap from the low fire adjustment screw on the two stage valve. Adjust the pressure setting by turning the regulator screw IN (clockwise) to increase pressure. Turn the regulator screw OUT (counterclockwise) to decrease pressure. Replace the cap. Cycle the burner by turning the value of the Stg 1 field OFF and ON to actuate the valve.

Recheck the manifold pressure and repeat Step 4 if required.

<u>Step 5</u> - Close the manual valve. Remove the manometer. Check for a leak at the pressure tap using a leak-detecting solution.

If further unit component testing is required proceed with the instructions in Paragraph 10.3 for the remaining test mode menu screens. If further unit testing is not required, press the enter key in succession until the cursor is flashing in the uppermost left hand corner of **screen E.a.5** and use the up arrow key to navigate to Test Mode **Screen E.a.1.** Press the enter key to select the **Enable:** field. Press the down arrow key to set the value to OFF.

Instructions for Measuring Manifold Pressure - Option AG72 (4-stage with two heat sections)

NOTE: Two digital manometers may be required.

Manifold Pressure Tap Locations

Locate the 1/8" pressure taps on both manifolds. (See **FIGURE 23**, page 39). Both high-fire and low-fire pressure can be checked at the manifold pressure taps.

With the manual valve turned OFF, connect a manometer to the 1/8" pressure tap on the manifold in Heat Section 1. Open the manual valve.

Unit Test Mode Must be Enabled - Refer to Paragraph 10.3 to enable Test Mode

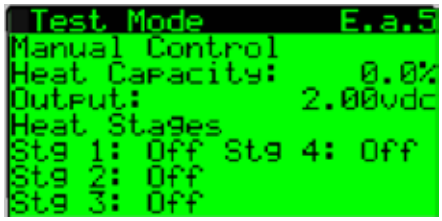
Follow the instructions to enter Test Mode and proceed to Test Mode Screen E.a.5.

Manifold Pressure Measurements

From the Test Mode **Screen E.a.5**:

- Press the enter key until the cursor is flashing on the **Stg 1:** field. Press the up arrow to set the Stg 1 value to ON.
- Press the enter key until the cursor is flashing on the **Stg 2:** field. Press the up arrow to set the Stg 2 value to ON.
- Press the enter key until the cursor is flashing on the **Stg 3:** field. Press the up arrow to set the Stg 3 value to ON.
- Press the enter key until the cursor is flashing on the **Stg 4:** field. Press the up arrow to set the Stg 4 value to ON.

Staging Sequence - Gas Control Option AG72		
Heat Section	**2**	**1**
Stage 1	Off	Low fire
Stage 2	Low fire	Low fire
Stage 3	Low fire	High fire
Stage 4	High fire	High fire



Step 1 - High Fire Manifold Pressure Reading Heat Section 1

Using the manometer, measure the pressure on high fire for heat section 1. **Check the pressure with the chart on page 49. Normally adjustments to the factory settings should not be necessary.**

If no adjustment is required, proceed to Step 3.

If an adjustment is required, proceed to Step 2.

Step 2 - High Fire Manifold Pressure Adjustment Heat Section 1

Remove the cap from the high fire adjustment screw on the two-stage valve. Adjust the pressure setting by turning the regulator screw IN (clockwise) to increase pressure. Turn the regulator screw OUT (counterclockwise) to decrease pressure. Replace the cap.

CAUTION: DO NOT bottom out the gas valve regulator adjusting screw. This can result in unregulated manifold pressure causing excess over fire and heat exchanger failure.

Cycle the burner by turning the value of the Stg 3 field OFF and ON to actuate the valve. Recheck the manifold pressure and repeat Step 2 if required. If the pressure reading is correct proceed to Step 3.

Step 3 - Low Fire Manifold Pressure Reading Heat Section 1

Set the value of Stg 3 to OFF. Heating Stg 1, Stg 2, and Stg 4 will need to remain commanded ON for the low fire pressure measurement on Heat Section 1.

Using the manometer, measure the pressure on low fire for heat section 1. **Check the pressure with the chart on page 49. Normally adjustments to the factory settings should not be necessary.**

If no adjustment is required, proceed to Step 5.

If an adjustment is required, proceed to Step 4.

Step 4 - Low Fire Manifold Pressure Adjustment Heat Section 1

Remove the cap from the low fire adjustment screw on the two stage valve. Adjust the pressure setting by turning the regulator screw IN (clockwise) to increase pressure. Turn the regulator screw OUT (counterclockwise) to decrease pressure. Replace the cap. Cycle the burner by turning the value of the Stg 1 field OFF and ON to actuate the valve.

Recheck the manifold pressure and repeat Step 4 if required. If the pressure reading is correct, proceed to Step 5.

Step 5 - High Fire Manifold Pressure Reading Heat Section 2

Set the value for Stg 1, 2, 3, and 4 to OFF. Close the manual valve. Remove the manometer from Heat Section 1 and connect it to the 1/8" pressure tap on the manifold in Heat Section 2. Open the manual valve.

Set the value for Stg 1, 2, 3, and 4 to ON.

Using the manometer, measure the pressure on high fire for heat section 2. **Check the pressure with the chart on page 49. Normally adjustments to the factory settings should not be necessary.**

If no adjustment is required, proceed to Step 7.

If an adjustment is required, proceed to Step 6.

Step 6 - High Fire Manifold Pressure Adjustment Heat Section 2

Remove the cap from the high fire adjustment screw on the two stage valve. Adjust the pressure setting by turning the regulator screw IN (clockwise) to increase pressure. Turn the regulator screw OUT (counterclockwise) to decrease pressure. Replace the cap. Cycle the burner by turning the value of the Stg 4 field OFF and ON to actuate the valve.

Recheck the manifold pressure and repeat Step 6 if required. If the pressure reading is correct, proceed to Step 7.

Step 7 - Low Fire Manifold Pressure Reading Heat Section 2

Set the value for Stg 4 to OFF. Heating Stg 1, Stg 2, and Stg 3 will need to remain commanded ON for the low fire pressure measurement on Heat Section 2. Using the manometer, measure the pressure on low fire for heat section 2. **Check the pressure with the chart on page 49. Normally adjustments to the factory settings should not be necessary.**

If no adjustment is required, proceed to Step 9.

If an adjustment is required, proceed to Step 8.

Step 8 - Low Fire Manifold Pressure Adjustment Heat Section 2

Remove the cap from the low fire adjustment screw on the two stage valve. Adjust the pressure setting by turning the regulator screw IN (clockwise) to increase pressure. Turn the regulator screw OUT (counterclockwise) to decrease pressure. Replace the cap. Cycle the burner by turning the value of the Stg 2 field OFF and ON to actuate the valve.

Recheck the manifold pressure and repeat Step 8 if required. If the pressure reading is correct, proceed to Step 9.

Step 9 - Close the manual valve. Remove the manometer. Check for a leak at pressure taps using a leak-detecting solution.

If further unit component testing is required, proceed with the instructions in paragraph 10.3 for the remaining test mode menu screens.

If further unit testing is not required, press the enter key in succession until the cursor is flashing in the uppermost left hand corner of **screen E.a.5** and use the up arrow key to navigate to Test Mode **screen E.a.1.** Press the enter key to select the **Enable:** field. Press the down arrow key to set the value to OFF.

FIGURE 24A - Manifolds with Modulating Control Option AG73 (5:1, single heat section) and Option AG74 (10:1, dual heat sections)

NOTE: The manifolds illustrated are for standard efficiency, non-condensing heat sections. Follow the same steps for measuring manifold pressure on high efficiency, condensing heat sections.

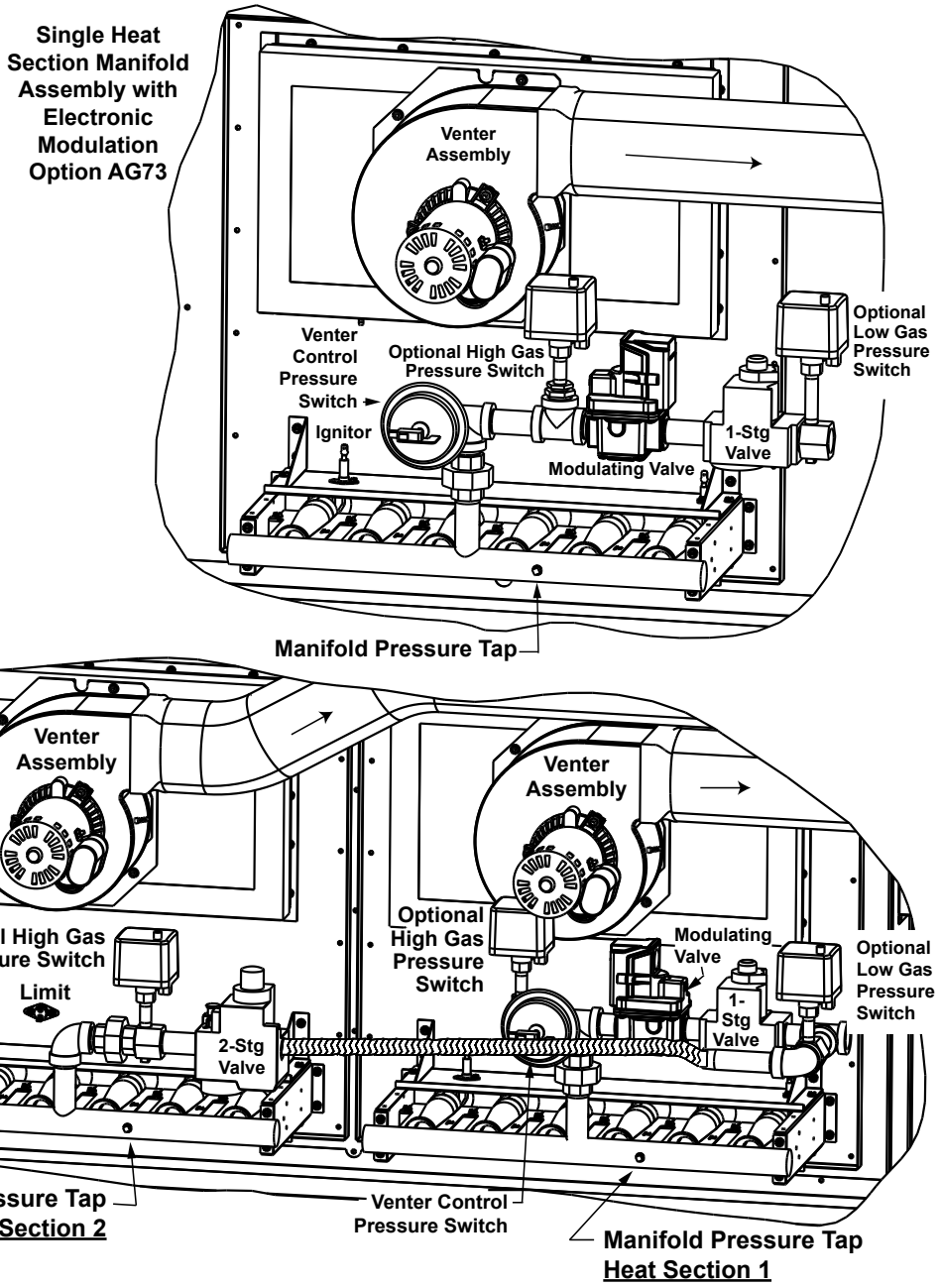
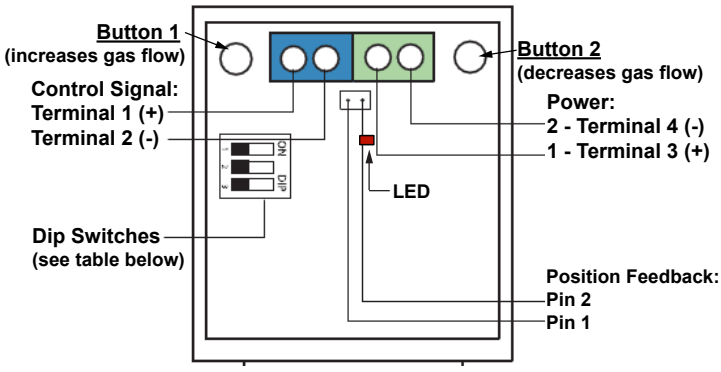


FIGURE 24B - Adjusting Modulating Valve -- Gas Control Option AG73 and Option AG74

a) Remove the two screws holding the cover.

b) Follow the instructions (Steps 4 and 5 shown on page 45); or to set the high fire or low fire pressure.

c) Replace the cover.



LED Light	
High Fire (10V)	Solid Red
Low Fire	Blinking Red
Operating Mode	Off

Dip Switch Position Table

* YD uses the 2-10v signal.

Control Signal	SW1 Signal	SW2 Offset	SW3 Characteristic
0-10v	OFF	OFF	OFF
* 2-10v	* OFF	* ON	* OFF
0-20mA	ON	OFF	OFF
4-20mA	ON	ON	OFF

9.0 Optional Equipment including Heat Sections (cont'd)
9.2 Gas Heat Section (cont'd)
9.2.2 Checking Gas Pressure (cont'd)

Instructions for Measuring Manifold Pressure - Option AG73 (modulation with one heat section)

NOTE: Two digital manometers may be required.

Gas Pressure Tap Location

Locate the 1/8" pressure tap on the manifold (See **FIGURE 24A**, page 43). With the manual valve turned OFF, connect a manometer to the 1/8" pressure tap in the manifold. Both high-fire and low-fire pressure can be checked at the manifold pressure tap. Open the manual valve.

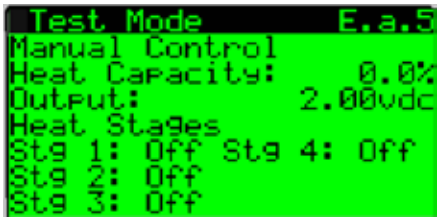
Unit Test Mode Must be Enabled - Refer to Paragraph 10.3 to enable Test Mode

Follow the instructions to enter Test Mode and proceed to Test Mode Screen E.a.5.

Manifold Pressure Measurements

From the Test Mode **Screen E.a.5**:

- Press the enter key until the cursor is flashing on the **Heat Capacity:** field. Adjust the Heat Capacity value to 100% which will result in a signal of 10vdc to the modulating gas valve.
- Press the enter key until the cursor is flashing on the **Stg 1:** field. Press the up arrow to set the Stg 1 value to ON.



Step 1 - High-Fire Manifold Pressure Reading

Using the manometer, measure the pressure on high fire. **Check the pressure with the chart on page 49. Normally adjustments to the factory settings should not be necessary.**

- If no adjustment is required, proceed to Step 5.
- If an adjustment is required, proceed to Step 2.

Step 2 - Single-Stage Valve Output Pressure

Set the value of Stg 1 to OFF. Locate the output pressure tap on the top of the single-stage valve. Close the manual valve and connect a second manometer to the 1/8" output pressure tap on the single-stage valve. Open the manual valve, set the value of Stg 1 to ON, and measure the gas pressure.

If the output from the valve is not correct, remove the cap from the adjustment screw on the single-stage valve. Adjust the output pressure setting by turning the regulator screw IN (clockwise) to increase pressure. Turn the regulator screw OUT (counterclockwise) to decrease pressure. Replace the cap.

CAUTION: DO NOT bottom out the gas valve regulator adjusting screw. This can result in unregulated manifold pressure causing excess over fire and heat exchanger failure.

Cycle the burner by turning the value of the Stg 1 field OFF and ON to actuate the valve.

When the outlet pressure is correct, set the value of Stg 1 to OFF. Close the manual valve and remove the manometer. Open the manual valve and proceed to Step 3.

Step 3 - Rechecking High-Fire Manifold Pressure

Set the value of Stg 1 to ON. Recheck the pressure at the manifold tap in the high fire condition (Heat capacity field 100% 10vdc). **Check the pressure with the chart on page 41. Normally adjustments to the factory settings should not be necessary.**

If no adjustment is required, proceed to Step 5.

If an adjustment is required, proceed to Step 4.

Step 4 - Modulating Valve High-Fire Pressure Adjustment

Follow the procedures in Step 4 to adjust the high fire output pressure of the modulating valve.

Instructions for Measuring Manifold Pressure - Option AG73 (modulation with one heat sections) (cont'd)

Step 4 Modulating Valve Adjustment Instructions (See FIGURE 24B, page 43**) - HIGH FIRE SETTING (BUTTON #1)**

1. To enter the high fire setting mode, press and hold button #1 until the LED lights solid red. Release. The valve is now in the high fire setting mode. Buttons #1 and #2 are used to set desired high fire setting.
2. Press or hold Button #1 to increase gas flow. Each button press equates to the minimum available step size and will increase flow slowly. Holding the button down auto steps and eliminates the need to repeatedly press the button. Use the feature to rapidly increase the flow.

   Press or hold Button #2 to decrease gas flow. Each button press equates to the minimum available step size and will decrease flow slowly. Holding the button down auto steps and eliminates the need to repeatedly press the button. Use this feature to rapidly decrease the flow.
3. To save the high fire setting, simultaneously hold Buttons #1 and #2 until the LED turns off. **NOTE:** Controls left in any setting mode will default to the current settings and return to normal operating mode after 5 minutes of inactivity.
4. When the high-fire pressure measurement is correct, proceed to Step 5 to check low fire pressure. If high fire cannot be accomplished, consult the factory service department.

Step 5 - **Low-Fire Manifold Pressure Reading**

From the Test Mode **Screen E.a.5**:

- Press the enter key until the cursor is flashing on the **Heat Capacity:** field. Adjust the Heat Capacity value to 0% which will result in a signal of 2vdc to the modulating gas valve.

Using the manometer, measure the manifold pressure on low fire. **Check the pressure with the chart on page 49. Normally adjustments to the factory settings should not be necessary.**

Follow the procedure in Step 5 to adjust the low fire output pressure of the modulating valve.

Step 5 Modulating Valve Adjustment Instructions (See FIGURE 24B, page 43.**) - LOW FIRE SETTING (BUTTON #2)**

1. To enter the low fire setting mode, press and hold button #2 until the LED light blinks red. Release. The valve is now in the low fire setting mode. Buttons #1 and #2 are used to set desired low fire setting.
2. Press or hold Button #2 to decrease gas flow. Each button press equates to the minimum available step size and will decrease flow slowly. Holding the button down auto steps and eliminates the need to repeatedly press the button. Use this feature to rapidly decrease the flow.

   Press or hold Button #1 to increase gas flow. Each button press equates to the minimum available step size and will increase flow slowly. Holding the button down auto steps and eliminates the need to repeatedly press the button. Use the feature to rapidly increase the flow.
3. To save the low fire setting, simultaneously hold Buttons #1 and #2 until the LED turns off. **NOTE:** Controls left in any setting mode will default to the current settings and return to normal operating mode after 5 minutes of inactivity.
4. When the low-fire pressure measurement is correct, proceed to Step 6. If low fire setting cannot be accomplished, consult the factory service department.

Step 6 - Close the manual valve. Remove the manometer. Check for a leak at the pressure taps using a leak-detecting solution.

If further unit component testing is required proceed with the instructions in paragraph 10.3 for the remaining test mode menu screens. If further unit testing is not required, press the enter key in succession until the cursor is flashing in the uppermost left hand corner of screen E.a.5 and use the up arrow key to navigate to Test Mode **Screen E.a.1.** Press the enter key to select the **Enable:** field. Press the down arrow key to set the value to OFF.

Instructions for Measuring Manifold Pressure - Option AG74 (modulation with two heat sections)

NOTE: Two digital manometers may be required.

Gas Pressure Tap Location

Locate the 1/8" pressure taps on both manifolds. (See **FIGURE 24B**, page 43). Both high-fire and low-fire pressure can be checked at the manifold pressure taps.

With the manual valve turned OFF, connect a manometer to the 1/8" pressure tap on the manifold in Heat Section 1. Open the manual valve.

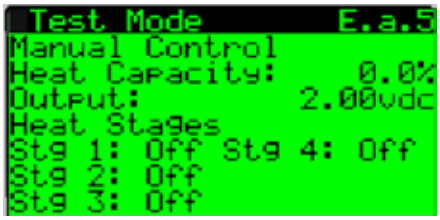
Unit Test Mode Must be Enabled - Refer to Paragraph 10.3 to enable Test Mode

Follow the instructions to enter Test Mode and proceed to Test Mode Screen E.a.5.

Manifold Pressure Measurements

From the Test Mode **Screen E.a.5**:

- Press the enter key until the cursor is flashing on the **Heat Capacity:** field. Adjust the Heat Capacity value to 100% which will result in a signal of 10vdc to the modulating gas valve.
- Press the enter key until the cursor is flashing on the **Stg 1:** field. Press the up arrow to set the Stg 1 value to ON.
- Press the enter key until the cursor is flashing on the **Stg 2:** field. Press the up arrow to set the Stg 2 value to ON.
- Press the enter key until the cursor is flashing on the **Stg 3:** field. Press the up arrow to set the Stg 3 value to ON.



Step 1 - High-Fire Manifold Pressure Reading Heat Section 1

Using the manometer, measure the pressure on high fire. **Check the pressure with the chart on page 49. Normally adjustments to the factory settings should not be necessary.**

- If no adjustment is required, proceed to Step 5.
- If an adjustment is required, proceed to Step 2.

Step 2 - Single-Stage Valve Output Pressure Heat Section 1

Set the value of Stg 1, 2 and 3 to OFF. Locate the output pressure tap on the top of the single-stage valve. Close the manual valve and connect a second manometer to the 1/8" output pressure tap on the single-stage valve. Open the manual valve. Set the value of Stg 1, 2 and 3 to ON and measure the gas pressure.

If the output from the valve is not correct, remove the cap from the adjustment screw on the single-stage valve. Adjust the output pressure setting by turning the regulator screw IN (clockwise) to increase pressure. Turn the regulator screw OUT (counterclockwise) to decrease pressure. Replace the cap.

CAUTION: DO NOT bottom out the gas valve regulator adjusting screw. This can result in unregulated manifold pressure causing excess over fire and heat exchanger failure.

Cycle the burner by turning the value of the Stg 1 field OFF and ON to actuate the valve.

When the outlet pressure is correct, set the value of Stg 1, 2, and 3 to OFF. Close the manual valve and remove the manometer. Open the manual valve and proceed to Step 3.

Step 3 - Rechecking High-Fire Manifold Pressure Heat Section 1

Set the value of Stg 1, 2, and 3 to ON. Recheck the pressure at the manifold tap in the high fire condition (Heat capacity field 100% 10vdc). **Check the pressure with the chart on page 43. Normally adjustments to the factory settings should not be necessary.**

Instructions for Measuring Manifold Pressure - Option AG74 (modulation with two heat sections) (cont'd)

If no adjustment is required, proceed to Step 5.

If an adjustment is required, proceed to Step 4.

Step 4 - Modulating Valve High-Fire Pressure Adjustment Heat Section 1

Follow the procedure in Step 4 to adjust the high fire output pressure of the modulating valve.

Step 4 Modulating Valve Adjustment Instructions (See FIGURE 24B, page 43**) - HIGH FIRE SETTING (BUTTON #1)**

1. To enter the high fire setting mode, press and hold button #1 until the LED lights solid red. Release. The valve is now in the high fire setting mode. Buttons #1 and #2 are used to set desired high fire setting.
2. Press or hold Button #1 to increase gas flow. Each button press equates to the minimum available step size and will increase flow slowly. Holding the button down auto steps and eliminates the need to repeatedly press the button. Use the feature to rapidly increase the flow.

   Press or hold Button #2 to decrease gas flow. Each button press equates to the minimum available step size and will decrease flow slowly. Holding the button down auto steps and eliminates the need to repeatedly press the button. Use this feature to rapidly decrease the flow.
3. To save the high fire setting, simultaneously hold Buttons #1 and #2 until the LED turns off. **NOTE:** Controls left in any setting mode will default to the current settings and return to normal operating mode after 5 minutes of inactivity.
4. When the high-fire pressure measurement is correct, proceed to Step 5 to check low fire pressure. If high fire cannot be accomplished, consult the factory service department.

Step 5 - Low-Fire Manifold Pressure Reading Heat Section 1

From the Test Mode **Screen E.a.5**:

- Press the enter key until the cursor is flashing on the **Heat Capacity:** field. Adjust the Heat Capacity value to 0% which will result in a signal of 2vdc to the modulating gas valve.

Using the manometer, measure the manifold pressure on low fire. **Check the pressure with the chart below. Normally adjustments to the factory settings should not be necessary.**

Follow the procedure in Step 5 to adjust the low fire output pressure of the modulating valve..

Step 5 - Modulating Valve Adjustment Instructions (See FIGURE 24B, page 43**) - LOW FIRE SETTING (BUTTON #2)**

1. To enter the low fire setting mode, press and hold button #2 until the LED light blinks red. Release. The valve is now in the low fire setting mode. Buttons #1 and #2 are used to set desired low fire setting.
2. Press or hold Button #2 to decrease gas flow. Each button press equates to the minimum available step size and will decrease flow slowly. Holding the button down auto steps and eliminates the need to repeatedly press the button. Use this feature to rapidly decrease the flow.

   Press or hold Button #1 to increase gas flow. Each button press equates to the minimum available step size and will increase flow slowly. Holding the button down auto steps and eliminates the need to repeatedly press the button. Use the feature to rapidly increase the flow.
3. To save the low fire setting, simultaneously hold Buttons #1 and #2 until the LED turns off. **NOTE:** Controls left in any setting mode will default to the current settings and return to normal operating mode after 5 minutes of inactivity.
4. When the low-fire pressure measurement is correct, proceed to Step 6. If low fire setting cannot be accomplished, consult the factory service department.

Step 6 - High-Fire Manifold Pressure Reading Heat Section 2

Set the value of Stg 1, 2, and 3 to OFF. Close the manual valve. Remove the manometer from Heat Section 1 and connect it to the 1/8" pressure tap on the manifold in Heat Section 2. Open the manual valve. Set the value for the Heat Capacity: to 100% and set the value of Stg 1, 2, and 3 to ON.

Using the manometer, measure the pressure on high fire for Heat Section 2. **Check the pressure with the chart on page 49. Normally adjustments to the factory settings should not be necessary.**

If no adjustment is required, proceed to Step 8.

If an adjustment is required, proceed to Step 7.

Step 7 - High Fire Manifold Pressure Adjustment Heat Section 2

Remove the cap from the high fire adjustment screw on the two stage valve. Adjust the pressure setting by turning the regulator screw IN (clockwise) to increase pressure. Turn the regulator screw OUT (counterclockwise) to decrease pressure. Replace the cap. Cycle the burner by turning the value of the Stg 3 field OFF and ON to actuate the valve.

Recheck the manifold pressure and repeat Step 7 if required. If the pressure reading is correct, proceed to Step 8.

Step 8 - Low Fire Manifold Pressure Reading Heat Section 2

Set the Value for Stg 3 to OFF. Using the manometer, measure the pressure on low fire for heat section 2. **Check the pressure with the chart shown below. Normally adjustments to the factory settings should not be necessary.**

If no adjustment is required, proceed to Step 10.

If an adjustment is required, proceed to Step 9.

Step 9 - Low Fire Manifold Pressure Adjustment Heat Section 2

Remove the cap from the low fire adjustment screw on the two stage valve. Adjust the pressure setting by turning the regulator screw IN (clockwise) to increase pressure. Turn the regulator screw OUT (counterclockwise) to decrease pressure. Replace the cap. Cycle the burner by turning the value of the Stg 2 field OFF and ON to actuate the valve.

Recheck the manifold pressure and repeat Step 9 if required. If the pressure reading is correct, proceed to Step 10.

Step 10 - Close the manual valve. Remove the manometer. Check for a leak at the pressure taps using a leak-detecting solution.

If further unit component testing is required proceed with the instructions in paragraph 10.3 for the remaining test mode menu screens. If further unit testing is not required, press the enter key in succession until the cursor is flashing in the uppermost left hand corner of **screen E.a.5** and use the up arrow key to navigate to Test Mode **Screen E.a.1.** Press the enter key to select the **Enable:** field. Press the down arrow key to set the value to OFF.

Manifold Pressure Settings (iwc) by Gas Control Option and Type of Gas

BTUH Inputs and Capacities by Altitude (Refer to the rating plate.)

Heat Size	Input (Btuh)	Full Rate (high fire) Outlet Pressure		Two Stage Low Fire Outlet Pressure		Low-Fire Pressure with Electronic Modulation	
		Natural	Propane	Natural	Propane	Natural	Propane
H50	50,000	3.5	N/A	0.9	N/A	0.2	N/A
H75	75,000	3.5	N/A	0.9	N/A	0.2	N/A
H100	100,000	3.5	N/A	0.9	N/A	0.2	N/A
H102	50,000	3.5	N/A	0.9	N/A	N/A	N/A
	50,000	3.5	N/A	0.9	N/A	0.2	N/A
H125	50,000	3.5	N/A	0.9	N/A	N/A	N/A
	75,000	3.5	N/A	0.9	N/A	0.2	N/A
H150	75,000	3.5	N/A	0.9	N/A	N/A	N/A
	75,000	3.5	N/A	0.9	N/A	0.2	N/A
H175	75,000	3.5	N/A	0.9	N/A	N/A	N/A
	100,000	3.5	N/A	0.9	N/A	0.2	N/A
H200	200,000	3.5	10.0	0.9	3.5	0.2	0.5
H202	100,000	3.5	N/A	0.9	N/A	N/A	N/A
	100,000	3.5	N/A	0.9	N/A	0.2	N/A
H300	300,000	3.5	10.0	0.9	3.8	0.2	0.5
H400	400,000	3.5	10.0	0.9	3.8	0.2	0.5
H402	200,000	3.5	10.0	0.9	3.5	N/A	N/A
	200,000	3.5	10.0	0.9	3.5	0.2	0.5
H502	200,000	3.5	10.0	0.9	3.5	N/A	N/A
	300,000	3.5	10.0	0.9	3.8	0.2	0.5
H602	300,000	3.5	10.0	0.9	3.8	N/A	N/A
	300,000	3.5	10.0	0.9	3.8	0.2	0.5
H702	300,000	3.5	10.0	0.9	3.8	N/A	N/A
	400,000	3.5	10.0	0.9	3.8	0.2	0.5
H802	400,000	3.5	10.0	0.9	3.8	N/A	N/A
	400,000	3.5	10.0	0.9	3.8	0.2	0.5
G150	150,000	3.5	N/A	0.9	N/A	0.2	N/A
G225	225,000	3.5	N/A	0.9	N/A	0.2	N/A
G300	300,000	3.5	N/A	0.9	N/A	0.2	N/A
G302	150,000	3.5	N/A	0.9	N/A	N/A	N/A
	150,000	3.5	N/A	0.9	N/A	0.2	N/A
G372	150,000	3.5	N/A	0.9	N/A	N/A	N/A
	225,000	3.5	N/A	0.9	N/A	0.2	N/A
G452	225,000	3.5	N/A	0.9	N/A	N/A	N/A
	225,000	3.5	N/A	0.9	N/A	0.2	N/A
G525	225,000	3.5	N/A	0.9	N/A	N/A	N/A
	300,000	3.5	N/A	0.9	N/A	0.2	N/A
G602	300,000	3.5	N/A	0.9	N/A	N/A	N/A
	300,000	3.5	N/A	0.9	N/A	0.2	N/A

BTUH Inputs and Capacities by Altitude in the United States													
Altitude		Normal Input	Thermal Output Capacity	2-Stage Minimum Input	5:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	2-Stage Minimum Input	5:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	2-Stage Minimum Input	5:1 Modulation Minimum Input
Feet	**Meters**	**H50**				**H75**				**H100**			
0-2000	0-610	50,000	40,000	N/A	10,000	75,000	60,000	N/A	15,000	100,000	80,000	50,000	20,000
2001-3000	611-915	46,000	36,800	N/A	9,200	69,000	55,200	N/A	13,800	92,000	73,600	46,000	18,400
3001-4000	916-1220	44,000	35,200	N/A	8,800	66,000	52,800	N/A	13,200	88,000	70,400	44,000	17,600
4001-5000	1221-1525	42,000	33,600	N/A	8,400	63,000	50,400	N/A	12,600	84,000	67,200	42,000	16,800
5001-6000	1526-1830	40,000	32,000	N/A	8,000	60,000	48,000	N/A	12,000	80,000	64,000	40,000	16,000
6001-7000	1831-2135	38,000	30,400	N/A	7,600	57,000	45,600	N/A	11,400	76,000	60,800	38,000	15,200
7001-8000	2136-2440	36,000	28,800	N/A	7,200	54,000	43,200	N/A	10,800	72,000	57,600	36,000	14,400
8001-9000	2441-2745	34,000	27,200	N/A	6,800	51,000	40,800	N/A	10,200	68,000	54,400	34,000	13,600
Feet	**Meters**	**H200**				**H300**				**H400**			
0-2000	0-610	200,000	160,000	100,000	40,000	300,000	240,000	150,000	60,000	400,000	320,000	200,000	80,000
2001-3000	611-915	184,000	147,200	92,000	36,800	276,000	220,800	138,000	55,200	368,000	294,400	184,000	73,600
3001-4000	916-1220	176,000	140,800	88,000	35,200	264,000	211,200	132,000	52,800	352,000	281,600	176,000	70,400
4001-5000	1221-1525	168,000	134,400	84,000	33,600	252,000	201,600	126,000	50,400	336,000	268,800	168,000	67,200
5001-6000	1526-1830	160,000	128,000	80,000	32,000	240,000	192,000	120,000	48,000	320,000	256,000	160,000	64,000
6001-7000	1831-2135	152,000	121,600	76,000	30,400	228,000	182,400	114,000	45,600	304,000	243,200	152,000	60,800
7001-8000	2136-2440	144,000	115,200	72,000	28,800	216,000	172,800	108,000	43,200	288,000	230,400	144,000	57,600
8001-9000	2441-2745	136,000	108,800	68,000	27,200	204,000	163,200	102,000	40,800	272,000	217,600	136,000	54,400

9.0 Optional Equipment including Heat Sections (cont'd)
9.2 Gas Heat Section (cont'd)

BTUH Inputs and Capacities by Altitude in the United States

Altitude		Normal Input	Thermal Output Capacity	4-Stage Minimum Input	10:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	4-Stage Minimum Input	10:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	4-Stage Minimum Input	10:1 Modulation Minimum Input
Feet	**Meters**	**H102**				**H125**				**H150**			
0-2000	0-610	100,000	80,000	25,000	10,000	125,000	100,000	37,500	15,000	150,000	120,000	37,500	15,000
2001-3000	611-915	92,000	73,600	23,000	9,200	115,000	92,000	32,500	13,000	138,000	110,400	34,500	13,800
3001-4000	916-1220	88,000	70,400	22,000	8,800	110,000	88,000	30,000	12,000	132,000	105,600	33,000	13,200
4001-5000	1221-1525	84,000	67,200	21,000	8,400	105,000	84,000	27,500	11,000	126,000	100,800	31,500	12,600
5001-6000	1526-1830	80,000	64,000	20,000	8,000	100,000	80,000	25,000	10,000	120,000	96,000	30,000	12,000
6001-7000	1831-2135	76,000	60,800	19,000	7,600	95,000	76,000	22,500	9,000	114,000	91,200	28,500	11,400
7001-8000	2136-2440	72,000	57,600	18,000	7,200	90,000	72,000	20,000	8,000	108,000	86,400	27,000	10,800
8001-9000	2441-2745	68,000	54,400	17,000	6,800	85,000	68,000	17,500	8,500	102,000	81,600	25,500	10,200
Feet	**Meters**	**H175**				**H202**				**H402**			
0-2000	0-610	175,000	140,000	50,000	20,000	200,000	160,000	50,000	20,000	400,000	320,000	100,000	40,000
2001-3000	611-915	161,000	128,800	43,000	17,200	184,000	147,200	46,000	18,400	368,000	294,400	92,000	36,800
3001-4000	916-1220	154,000	123,200	39,500	15,800	176,000	140,800	44,000	17,600	352,000	281,600	88,000	35,200
4001-5000	1221-1525	147,000	117,600	36,000	14,400	168,000	134,400	42,000	16,800	336,000	268,800	84,000	33,600
5001-6000	1526-1830	140,000	112,000	32,500	13,000	160,000	128,000	40,000	16,000	320,000	256,000	80,000	32,000
6001-7000	1831-2135	133,000	106,400	29,000	11,600	152,000	121,600	38,000	15,200	304,000	243,200	76,000	30,400
7001-8000	2136-2440	126,000	100,800	25,500	10,200	144,000	115,200	36,000	14,400	288,000	230,400	72,000	28,800
8001-9000	2441-2745	119,000	95,200	22,000	8,800	136,000	108,800	34,000	13,600	272,000	217,600	68,000	27,200
Feet	**Meters**	**H502**				**H602**				**H702**			
0-2000	0-610	500,000	400,000	150,000	60,000	600,000	480,000	150,000	60,000	700,000	560,000	175,000	70,000
2001-3000	611-915	460,000	368,000	130,000	52,000	552,000	441,600	138,000	55,200	644,000	515,200	161,000	64,400
3001-4000	916-1220	440,000	352,000	120,000	48,000	528,000	422,400	132,000	52,800	616,000	492,800	154,000	61,600
4001-5000	1221-1525	420,000	336,000	110,000	44,000	504,000	403,200	126,000	50,400	588,000	470,400	147,000	58,800
5001-6000	1526-1830	400,000	320,000	100,000	40,000	480,000	384,000	120,000	48,000	560,000	448,000	140,000	56,000
6001-7000	1831-2135	380,000	304,000	90,000	36,000	456,000	364,800	114,000	45,600	532,000	425,600	133,000	53,200
7001-8000	2136-2440	360,000	288,000	80,000	32,000	432,000	345,600	108,000	43,200	504,000	403,200	126,000	50,400
8001-9000	2441-2745	340,000	272,000	70,000	28,000	408,000	326,400	102,000	40,800	476,000	380,800	119,000	47,600
Feet	**Meters**	**H802**											
0-2000	0-610	800,000	640,000	200,000	80,000								
2001-3000	611-915	736,000	588,800	184,000	73,600								
3001-4000	916-1220	704,000	563,200	176,000	70,400								
4001-5000	1221-1525	672,000	537,600	168,000	67,200								
5001-6000	1526-1830	640,000	512,000	160,000	64,000								
6001-7000	1831-2135	608,000	486,400	152,000	60,800								
7001-8000	2136-2440	576,000	460,800	144,000	57,600								
8001-9000	2441-2745	544,000	435,200	136,000	54,400								

BTUH Inputs and Capacities by Altitude in the United States

Altitude		Normal Input	Thermal Output Capacity	2-Stage Minimum Input	5:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	2-Stage Minimum Input	5:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	2-Stage Minimum Input	5:1 Modulation Minimum Input
Feet	**Meters**	**G150**				**G225**				**G300**			
0-2000	0-610	150,000	136,500	75000	30,000	225,000	204,750	112500	45,000	300,000	273,000	150,000	60,000
2001-3000	611-915	138,000	125,580	69000	27,600	207,000	188,370	103500	41,400	276,000	251,160	138,000	55,200
3001-4000	916-1220	132,000	120,120	66000	26,400	198,000	180,180	99000	39,600	264,000	240,240	132,000	52,800
4001-5000	1221-1525	126,000	114,660	63000	25,200	189,000	171,990	94500	37,800	252,000	229,320	126,000	50,400
5001-6000	1526-1830	120,000	109,200	60000	24,000	180,000	163,800	90000	36,000	240,000	218,400	120,000	48,000
6001-7000	1831-2135	114,000	103,740	57000	22,800	171,000	155,610	85500	34,200	228,000	207,480	114,000	45,600
7001-8000	2136-2440	108,000	98,280	54000	21,600	162,000	147,420	81000	32,400	216,000	196,560	108,000	43,200
8001-9000	2441-2745	102,000	92,820	51000	20,400	153,000	139,230	76500	30,600	204,000	185,640	102,000	40,800

BTUH Inputs and Capacities by Altitude in the United States

Altitude		Normal Input	Thermal Output Capacity	4-Stage Minimum Input	10:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	4-Stage Minimum Input	10:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	4-Stage Minimum Input	10:1 Modulation Minimum Input
Feet	**Meters**	**G302**				**G372**				**G452**			
0-2000	0-610	300,000	273,000	75,000	30,000	375,000	341,250	112,500	45,000	450,000	409,500	112,500	45,000
2001-3000	611-915	276,000	251,160	69,000	27,600	345,000	313,950	97,500	39,000	414,000	376,740	103,500	41,400
3001-4000	916-1220	264,000	240,240	66,000	26,400	330,000	300,300	90,000	36,000	396,000	360,360	99,000	39,600
4001-5000	1221-1525	252,000	229,320	63,000	25,200	315,000	286,650	82,500	33,000	378,000	343,980	94,500	37,800
5001-6000	1526-1830	240,000	218,400	60,000	24,000	300,000	273,000	75,000	30,000	360,000	327,600	90,000	36,000
6001-7000	1831-2135	228,000	207,480	57,000	22,800	285,000	259,350	67,500	27,000	342,000	311,220	85,500	34,200
7001-8000	2136-2440	216,000	196,560	54,000	21,600	270,000	245,700	60,000	24,000	324,000	294,840	81,000	32,400
8001-9000	2441-2745	204,000	185,640	51,000	20,400	255,000	232,050	52,500	21,000	306,000	278,460	76,500	30,600
Feet	**Meters**	**G525**				**G602**							
0-2000	0-610	525,000	477,750	131,250	52,500	600,000	546,000	150,000	60,000				
2001-3000	611-915	483,000	439,530	120,750	48,300	552,000	502,320	138,000	55,200				
3001-4000	916-1220	462,000	420,420	115,500	46,200	528,000	480,480	132,000	52,800				
4001-5000	1221-1525	441,000	401,310	110,250	44,100	504,000	458,640	126,000	50,400				
5001-6000	1526-1830	420,000	382,200	105,000	42,000	480,000	436,800	120,000	48,000				
6001-7000	1831-2135	399,000	363,090	99,750	39,900	456,000	414,960	114,000	45,600				
7001-8000	2136-2440	378,000	343,980	94,500	37,800	432,000	393,120	108,000	43,200				
8001-9000	2441-2745	357,000	324,870	89,250	35,700	408,000	371,280	102,000	40,800				

BTUH Inputs and Capacities by Altitude in Canada													
Altitude		Normal Input	Thermal Output Capacity	2-Stage Minimum Input	5:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	2-Stage Minimum Input	5:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	2-Stage Minimum Input	5:1 Modulation Minimum Input
Feet	Meters	H50				H75				H100			
0-2000	0-610	50,000	40,000	N/A	10,000	75,000	60,000	N/A	15,000	100,000	80,000	50,000	20,000
2001-4500	611-1373	45,000	36,000	N/A	9,000	67,500	54,000	N/A	13,500	90,000	72,000	45,000	18,000
Feet	Meters	H200				H300				H400			
0-2000	0-610	200,000	160,000	100,000	40,000	300,000	240,000	150,000	60,000	400,000	320,000	200,000	80,000
2001-4500	611-1373	180,000	144,000	90,000	36,000	270,000	216,000	135,000	54,000	360,000	288,000	180,000	72,000

BTUH Inputs and Capacities by Altitude in Canada													
Altitude		Normal Input	Thermal Output Capacity	4-Stage Minimum Input	10:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	4-Stage Minimum Input	10:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	4-Stage Minimum Input	10:1 Modulation Minimum Input
Feet	Meters	H102				H125				H150			
0-2000	0-610	100,000	80,000	25,000	10,000	125,000	100,000	25,000	15,000	150,000	120,000	37,500	15,000
2001-4500	611-1373	90,000	72,000	22,500	9,000	112,500	90,000	22,500	13,500	135,000	108,000	33,750	13,500
Feet	Meters	H175				H202				H402			
0-2000	0-610	175,000	140,000	50,000	20,000	200,000	160,000	50,000	20,000	400,000	320,000	100,000	40,000
2001-4500	611-1373	157,500	126,000	33,750	18,000	180,000	144,000	45,000	18,000	360,000	288,000	90,000	36,000
Feet	Meters	H502				H602				H702			
0-2000	0-610	500,000	400,000	150,000	60,000	600,000	480,000	150,000	60,000	700,000	560,000	175,000	70,000
2001-4500	611-1373	450,000	360,000	90,000	54,000	540,000	432,000	135,000	54,000	630,000	504,000	157,500	63,000
Feet	Meters	H802											
0-2000	0-610	800,000	640,000	200,000	80,000								
2001-4500	611-1373	720,000	576,000	180,000	72,000								

BTUH Inputs and Capacities by Altitude in Canada													
Altitude		Normal Input	Thermal Output Capacity	2-Stage Minimum Input	5:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	2-Stage Minimum Input	5:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	2-Stage Minimum Input	5:1 Modulation Minimum Input
Feet	Meters	G150				G225				G300			
0-2000	0-610	150,000	136,500	75000	30,000	225,000	204,750	112500	45,000	300,000	273,000	150,000	60,000
2001-4500	611-1373	135,000	122,850	67500	27,000	202,500	184,275	101250	40,500	270,000	245,700	135,000	54,000

BTUH Inputs and Capacities by Altitude in Canada													
Altitude		Normal Input	Thermal Output Capacity	4-Stage Minimum Input	10:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	4-Stage Minimum Input	10:1 Modulation Minimum Input	Normal Input	Thermal Output Capacity	4-Stage Minimum Input	10:1 Modulation Minimum Input
Feet	Meters	G302				G372				G452			
0-2000	0-610	300,000	273,000	75,000	30,000	375,000	341,250	112,500	45,000	450,000	409,500	112,500	45,000
2001-4500	611-1373	270,000	245,700	67,500	27,000	337,500	307,125	67,500	40,500	405,000	368,550	101,250	40,500
Feet	Meters	G525				G602							
0-2000	0-610	525,000	477,750	131,250	52,500	600,000	546,000	150,000	60,000				
2001-4500	611-1373	472,500	429,975	118,125	47,250	540,00	491,400	135,000	54,000				

Gas Pressure Safety Switches, Option BP4

See Manifold illustrations, **FIGURE 23, page 39, or FIGURE 24A, page 43**.

The optional gas pressure switches are safety controls designed to protect the manifold and burner from extreme upstream gas piping system failures that would cause an increase or decrease in the regulated gas pressure.

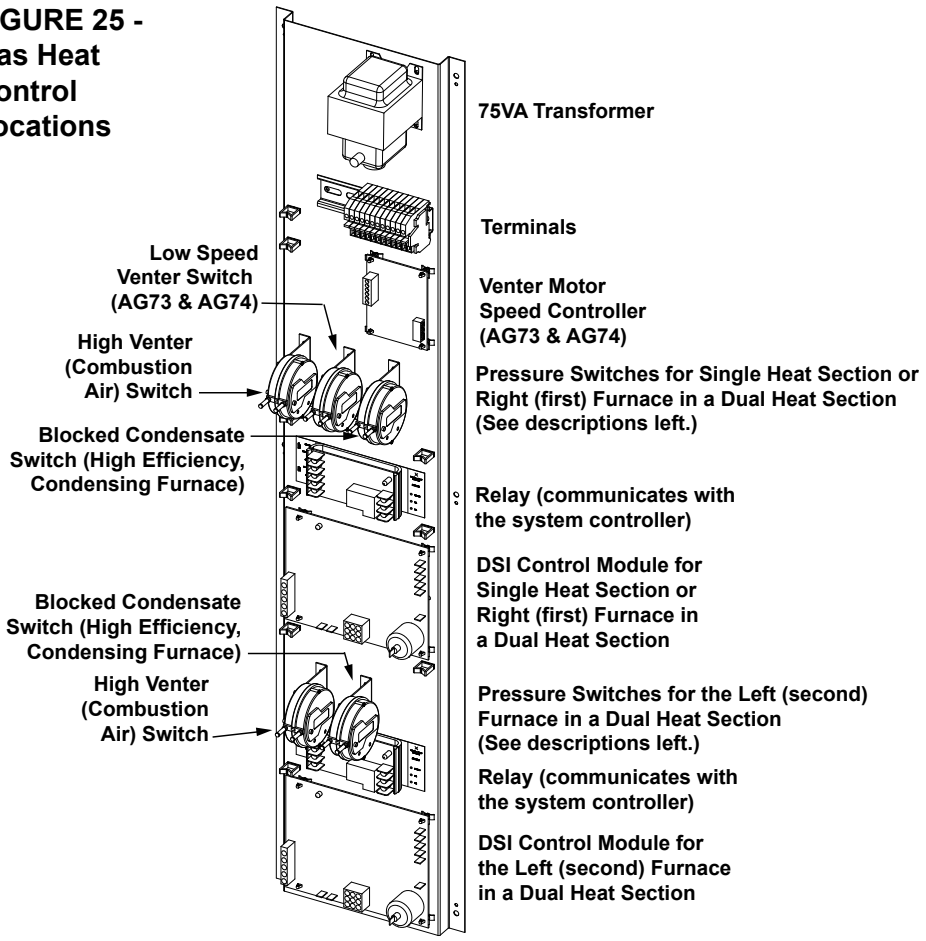
The low gas pressure switch is an automatic reset which is set to activate if the gas pressure is 50% of the minimum as stated on the rating plate.

The high gas pressure switch is a manually reset switch that is set to activate if the gas pressure is 125% of the manifold pressure stated on the rating plate.

9.0 Optional Equipment including Heat Sections (cont'd)
9.2 Gas Heat Section (cont'd)
9.2.3 Heat Section Controls

The gas heat section controls are located on the left wall of the gas heat section.

FIGURE 25 - Gas Heat Control Locations



The ignition sequence depends on whether the heat section has staged control (YDSA only) or modulation control (YDSA, YDHA, or YDMA).

Staged Gas Control (2-stage, Option AG71 or 4-stage, Option AG72 - apply to Model YDSA only)

Sequence of Operation

1) W1 is energized and the controller verifies that the pressure switches are open.
2) Inducer (venter) is energized for pre-purge and the controller verifies that the low pressure switch is closed.
3) After the pre-purge period has elapsed (20 seconds), the controller energizes the trial for ignition period (17 seconds).
4) If W2 is energized, the high gas output will energize.
5) After W1 and W2 are de-energized, the controller will run the blower-off delay (120 seconds) and return to standby mode.

Modulating Gas Control (5:1, Option AG73 or 10:1, Option AG74 - apply to all models)

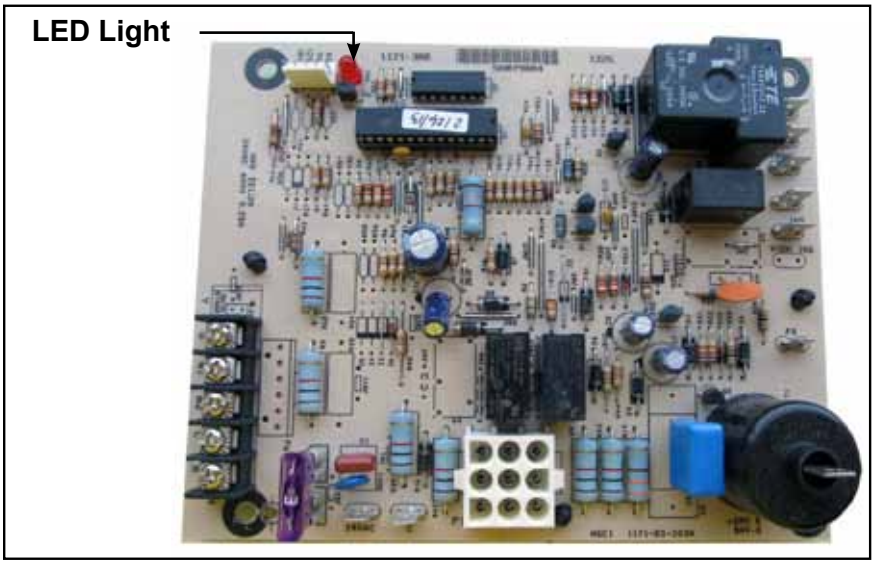
Sequence of Operation

1) W1 is energized and the controller verifies that the pressure switches are open.
2) Inducer (venter) is energized for pre-purge and the controller verifies that the low and high pressure switches are closed.
3) After the pre-purge period has elapsed (20 seconds), the controller energizes the trial for ignition period (17 seconds).
4) If W2 is energized, the high gas output will energize and the control will check for high pressure switch input.
5) After W1 and W2 are de-energized, the controller will run the blower-off delay (120 seconds) and return to standby mode.

DSI Control Module LED Flash Codes

Flash Code	Description
Fast Flash	Normal operation
Steady OFF	No power, blown fuse, or defective board
1	Low pressure switch stuck open
2	Low pressure switch stuck closed
3	High pressure switch stuck open
4	High pressure switch stuck closed
5	Limit switch open
6	Ignition lockout (failed ignition)
7	Too many (5) limit switch losses
8	Too many (5) flame losses
9	Too many (3) high pressure switch losses during one call for heat

FIGURE 26 - DSI Control Module



High Temperature Limit Control

All gas furnaces are equipped with a temperature activated auto reset limit control. Depending on size, the control is factory set at either 200°F or 250°F and is non-adjustable. If the setpoint is reached, the limit control will interrupt the electric supply to the gas valve. This safety device provides protection in the case of a lack of airflow due to dirty filters or a restriction at the inlet or outlet.

The limit control switch is mounted on the side of the heat exchanger (See location in **FIGURE 23,** page 39 or **FIGURE 24A,** page 43).

CAUTION: The auto reset limit control will continue to shut down the heat section until the cause is corrected. Never bypass the limit control; hazardous conditions could result.

Combustion Air and Venting

The gas heat section is power vented. Presence of combustion air pressure is monitored by a combustion air proving switch located in the heat section.

Combustion Air Proving Switch

The combustion air proving switch is a pressure sensitive switch that monitors air pressure to ensure that proper combustion air is available. The switch is single pole/single throw with the normally open contacts closing when the proper airflow is sensed in the system.

On start-up when the heater is cold, the sensing pressure is at the most negative level, and as the heater and flue system warm up, the sensing pressure becomes less negative. After the system has reached equilibrium (about 20 minutes), the sensing pressure levels off.

If a restriction or excessive flue length or turns cause the sensing pressure to be outside the switch setpoint, the pressure switch will function to shut off the main burners. The main burners will remain off until the system has cooled and/or the flue system resistance is reduced. The table below lists the approximate water column negative pressure readings and switch set points for sea level operating conditions.

9.0 Optional Equipment including Heat Sections (cont'd)

9.2 Gas Heat Section (cont'd)

Combustion Air Proving Switch (cont'd)

DANGER

Safe operation requires proper venting flow. Never bypass the combustion air proving switch or attempt to operate the heat section without the venter running and proper flow in the vent system. Hazardous condition could result.

Combustion Air Switches for Sea Level to 6000 ft. (1830 m)

Heat Section Option	Heat Size(s) (Btuh)	High Pressure Switch					Low Pressure Switch (AG73 & AG74 Only)						
		Startup Cold	Equilibrium Hot	Setpoint Off	Label Color	Switch P/N	Startup Cold	Equilibrium Hot	Setpoint Off	Label Color	Switch P/N	230, 460, 575V % Full Speed of Venter Mtr	208V % Full Speed of Venter Mtr
		Negative Pressure (iwc)					Negative Pressure (iwc)						
H50	50,000	3.10	2.00	1.50	Yellow	273360	3.50	1.30	0.75	Yellow	205443	74	82
H75	75,000	3.30	1.60	1.40	Red	201159	3.30	1.30	1.00	Brown	201160	74	82
H100	100,000	3.40	1.70	1.40	Red	201159	3.40	1.20	1.00	Brown	201160	74	82
H102*	50,000	3.10	2.00	1.50	Yellow	273360	3.50	1.30	0.75	Yellow	205443	74	82
H125*	50,000	3.10	2.00	1.50	Yellow	273360	(No low pressure switch on this furnace)						
	75,000	3.30	1.60	1.40	Red	201159	3.30	1.30	1.00	Brown	201160	74	82
H150*	75,000	3.30	1.60	1.40	Red	201159	3.30	1.30	1.00	Brown	201160	74	82
H175*	75,000	3.30	1.60	1.40	Red	201159	(No low pressure switch on this furnace)						
	100,000	3.40	1.70	1.40	Red	201159	3.40	1.20	1.00	Brown	201160	74	82
H200	200,000	3.80	1.80	1.40	Red	201159	3.80	0.90	0.75	Yellow	205443	42	54
H202*	100,000	3.40	1.70	1.40	Red	201159	3.40	1.20	1.00	Brown	201160	74	82
H300	300,000	3.90	1.90	1.50	Yellow	273360	3.90	0.90	0.75	yellow	205443	48	56
H400	400,000	3.80	1.80	1.50	Yellow	273360	3.80	1.00	0.80	Gray	197078	58	64
H402*	200,000	3.80	1.80	1.40	Red	201159	3.80	0.90	0.75	Yellow	205443	42	54
H502*	200,000	3.80	1.80	1.40	Red	201159	(No low pressure switch on this furnace)						
	300,000	3.90	1.90	1.50	Yellow	273360	3.90	0.90	0.75	Yellow	205443	48	56
H602*	300,000	3.90	1.90	1.50	Yellow	273360	3.90	0.90	0.75	Yellow	205443	42	56
H702	300,000	3.90	1.90	1.50	Yellow	273360	(No low pressure switch on this furnace)						
	400,000	3.80	1.80	1.50	Yellow	273360	3.80	1.00	0.80	Gray	197078	58	64
H802	400,000	3.80	1.80	1.50	Yellow	273360	3.80	1.00	0.80	Gray	197078	58	64
G150	150,000	2.70	2.20	1.40	Red	201159	2.70	1.70	0.10	White	234712	61	74
G225	225,000	2.90	2.50	1.40	Red	201159	2.90	1.30	0.10	White	234712	61	74
G300	300,000	2.70	2.50	1.30	White	201161	2.70	0.90	0.10	White	234712	61	74
G302*	150,000	2.70	2.20	1.40	Red	201159	2.70	1.70	0.10	White	234712	61	74
G372*	150,000	2.70	2.20	1.40	Red	201159	(No low pressure switch on this furnace)						
	225,000	2.90	2.50	1.40	Red	201159	2.90	1.30	0.10	White	234712	61	74
G452*	225,000	2.90	2.50	1.40	Red	201159	2.90	1.30	0.10	White	234712	61	74
G525*	225,000	2.90	2.20	1.40	Red	201159	(No low pressure switch on this furnace)						
	300,000	2.70	2.50	1.30	White	201161	2.70	0.90	0.10	White	234712	61	74
G602*	300,000	2.70	2.50	1.30	White	201161	2.70	0.90	0.10	White	234712	61	74

Combustion Air Switches for Above 6000 ft. (1830 m)

Heat Section Option	Heat Size(s) (Btuh)	High Pressure Switch		
		Setpoint Off	Label Color	Switch P/N
		Negative Pressure (iwc)		
H50	50,000	1.45	Orange	273555
H75	75,000	1.35	Green	273554
H100	100,000	1.35	Green	273554
H102*	50,000	1.45	Orange	273555
H125*	50,000	1.45	Orange	273555
	75,000	1.35	Green	273554
H150*	75,000	1.35	Green	273554

Heat Section Option	Heat Size(s) (Btuh)	High Pressure Switch		
		Setpoint Off	Label Color	Switch P/N
		Negative Pressure (iwc)		
H602*	300,000	1.45	Orange	273555
H702*	300,000	1.45	Orange	273555
	400,000	1.45	Orange	273555
H802	400,000	1.45	Orange	273555
G150	150,000	1.35	Green	273554
G225	225,000	1.35	Green	273554
G300	300,000	1.25	Blue	273553
G302	150,000	1.35	Green	273554

Combustion Air Switches for Above 6000 ft. (1830 m) - (cont'd)									
Heat Section Option	Heat Size(s) (Btuh)	High Pressure Switch			Heat Section Option	Heat Size(s) (Btuh)	High Pressure Switch		
		Setpoint Off	Label Color	Switch P/N			Setpoint Off	Label Color	Switch P/N
		Negative Pressure (iwc)					Negative Pressure (iwc)		
H175*	75,000	1.35	Green	273554	G372*	150,000	1.35	Green	273554
	100,000	1.35	Green	273554		225,000	1.35	Green	273554
H200	200,000	1.35	Green	273554	G452*	225,000	1.35	Green	273554
H202*	100,000	1.35	Green	273554	G452*	225,000	1.35	Green	273554
H300	300,000	1.45	Orange	273555	G525	225,000	1.35	Green	273554
H400	400,000	1.45	Green	273555		300,000	1.25	Blue	273553
H402*	200,000	1.35	Green	273554	G602	300,000	1.25	Blue	273553
H502*	200,000	1.35	Green	273554					
	300,000	1.45	Orange	273555					

***** Heat sections with dual furnaces. When only one size is listed, both furnaces are the same size and two identical high pressure switches are used. Dual furnace heat sections with electronic modulation Option AG74 have one low pressure switch.

Two-Speed Venter System

A proprietary electronically controlled venter system provides the required volume of combustion air and correct gas pressure to maintain thermal efficiency during periods of modulation. Change of venter speed is controlled by an electronic board located in the heat section.

The venter system always operates at high speed during pre-purge and post-purge periods. Speed selection occurs after there is a call for burner ignition.

Location of Combustion Air Inlet Openings and Vent Outlets

Vent location depends on the type of gas heat section. Refer to **FIGURE 27A,** shown below **or FIGURES 28A & 28B,** page 56 for vent outlet locations and installation requirements that apply.

The combustion air inlet openings are located in the doors on the control end of the unit. Keep all openings clean and free of obstructions.

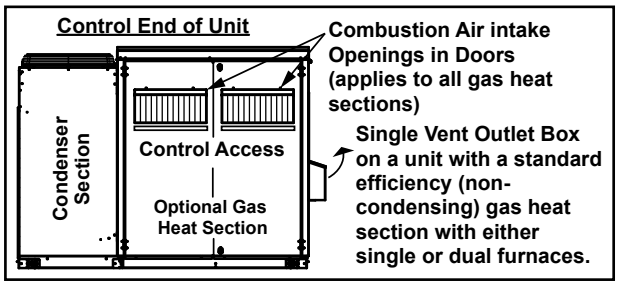
Vent Temperature Limit Switch

All furnaces in the high-efficiency gas heat section are equipped with a temperature activated, manually reset switch to limit the temperature of the vent gases to below 145°F. The switch is attached to the side of each venter housing (single heat sections have one; dual heat sections have two). See location in **FIGURE 25,** page 52.

If the setpoint is reached, the switch will activate to interrupt the electric supply to the gas valve. If the vent temperature switch is activated, identify and correct the cause before resetting the switch. Refer to the Maintenance Section in Form O-Y for information on probable causes and instructions on resetting the switch.

Venting a Standard (non-condensing) Gas Heat Section

FIGURE 27A - Vent Outlet and Combustion Air Inlet Locations



A unit with a standard efficiency (non-condensing) heat section has a vent outlet box as shown in **FIGURE 27A** on the left.

If an extension is required, see Option CC3 or CCD3 below.

Vertical Vent Extension, Option CC3 or CCD3 - applies to standard (non-condensing) gas-fired heat section

If local code requires 4-ft (1.2M) vertical clearance between the flue outlet and the fresh air intake of the heating system or the building, install a vertical vent extension kit. The option package includes the vertical vent box assembly, vent cap(s) and end cap (CC3). The vent pipe is field supplied. Remove the vent box assembly and install the vertical vent box assembly. The vent pipe must be the same diameter as the vent connection.

Venting a High-Efficiency (condensing) Gas Heat Section

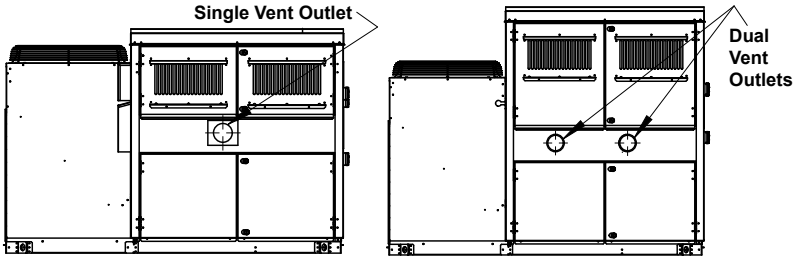
The high-efficiency heat section vents through a Schedule 40 PVC pipe that extends from the unit in the locations shown in **FIGURE 28A** shown on page 56. The vent must be terminated with a field-provided 45° elbow of Schedule 40 PVC or CPVC vent pipe. **NOTE:** In Canada, all PVC vent pipe must be approved to ULC S636.

Attach the 45° elbow at each vent outlet in the orientation illustrated so that the flue products are directed downward. (**NOTE:** Elbow(s) must be 45°.)

9.0 Optional Equipment including Heat Sections (cont'd)
9.2 Gas Heat Section (cont'd)

Combustion Air and Venting (cont'd)

FIGURE 28A - Attach a field-supplied 45° elbow at each vent outlet.



Unit with one high-efficiency (condensing) furnace in the heat section has one vent outlet.

Unit with two high-efficiency (condensing) furnaces in the heat section has two vent outlets.

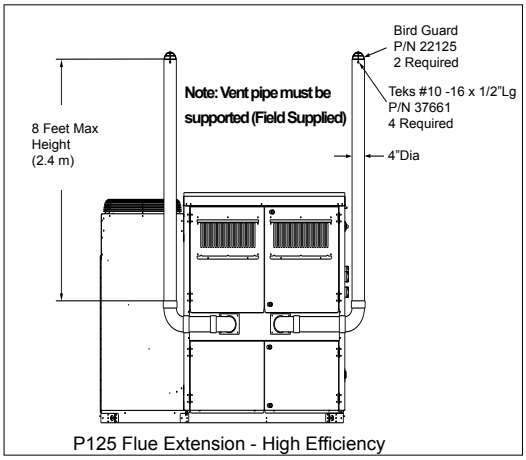
Vertical Vent Extension, Option CC4 or CCD4 - applies to high-efficiency (condensing) gas-fired heat section

If local code requires 4-ft (1.2M) vertical clearance between the flue outlet and the fresh air intake of the heating system or the building, install an optional vertical vent. The option package includes the bird guard for covering the vent outlet. The Schedule 40 PVC or CPVC vent pipe is field supplied. The vent pipe should be the same diameter as the vent outlet. **NOTE:** In Canada, all PVC vent pipe must be approved to ULC S636.

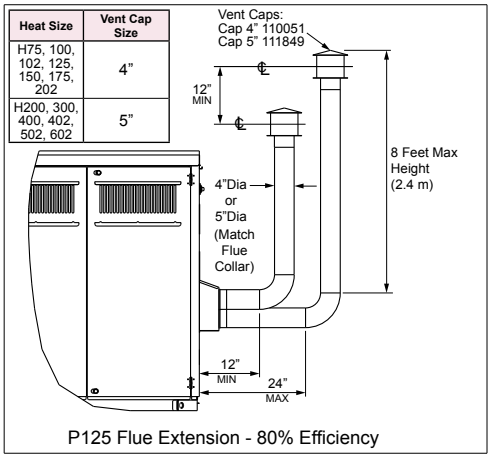
Option CC4 for units with one high-efficiency heat section includes one bird guard, P/N 221215, and two #10x1/2" Teks, P/N 37661, for attaching the guard.

Option CCD4 for units with dual high-efficiency heat sections includes two bird guards, P/N 221215, and four #10x1/2" Teks, P/N 37661, for attaching the guards.

FIGURE 28B - Field-installed Vertical Vent Extension



P125 Flue Extension - High Efficiency



P125 Flue Extension - 80% Efficiency

High Efficiency Heat Section Condensate Drain

A unit with a high efficiency, condensing gas heat section requires a condensate drain from the vent area. Depending on the heat section size, there are either one or two, 1/2" PVC connections. See **FIGURE 29A,** page 57 for drain connection locations.

Downstream from the trap, the condensate drain from the heat section may be connected to a sanitary drain within the building if permitted by code. (Condensate from the heater has a ph of 6 and is not harmful to a sanitary drain. **NOTE:** Actual ph may vary ±1 depending upon fuel and combustion air.)

	Size	Gallons	Liters
Approximate Condensate Produced per Hour	G150	1.0	3.7
	G225	1.5	5.6
	G300/G302	2.0	7.5
	G375	2.5	9.5
	G452	3.0	11.3
	G525	3.5	13.1
	G602	4.0	15.0

Condensate Drain Requirements and Accessories

(**NOTE:** If any of these condensate drain accessories (neutralizer kit, condensate pump, or frost protection) are required but were not ordered with the unit, contact your distributor.

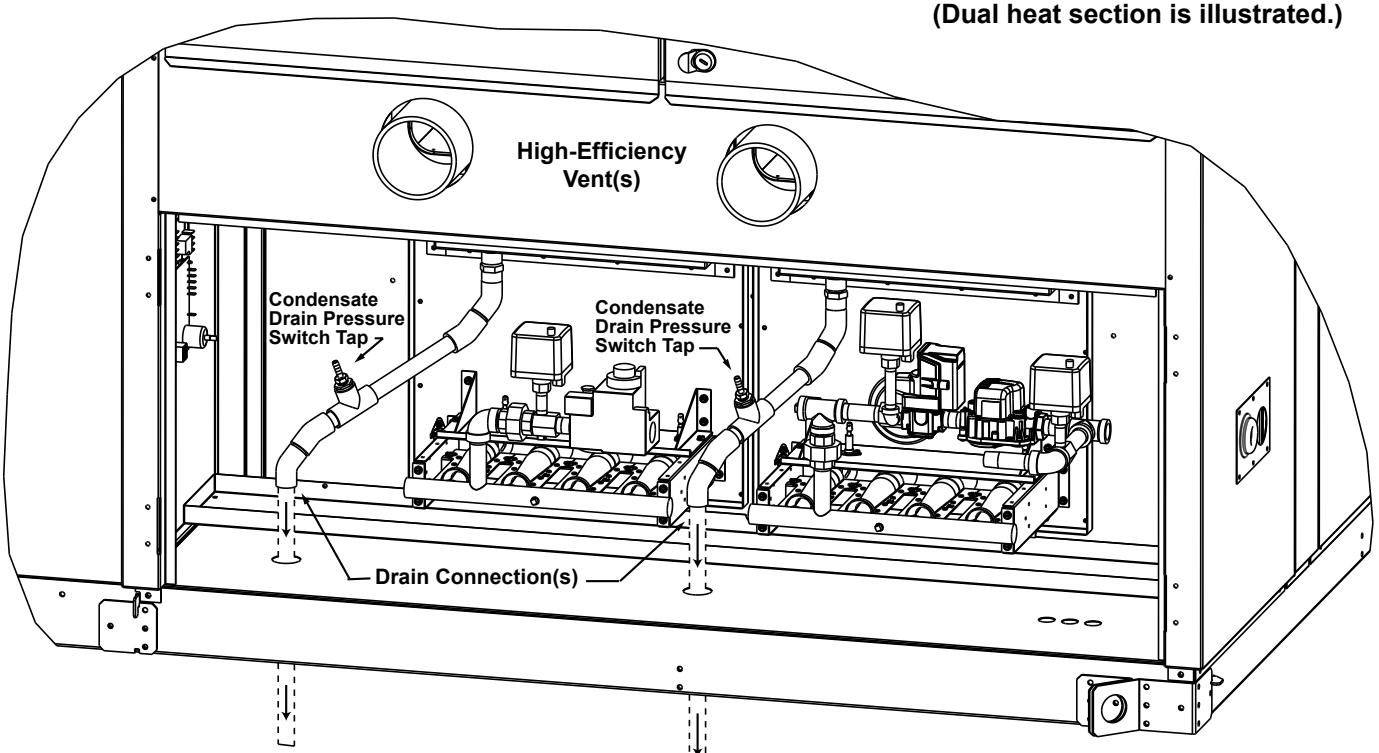
Since this drain will be used during the heating season, it is mandatory that the drain be run through the inside of the roof curb and into the heated space. The drain must always be installed in a space that remains above 32°F(0°C). Refer to **FIGURE 29A,** shown below and **FIGURE 29B,** page 58 and follow the instructions below to install the condensate drain including the freeze-resistant trap. **If additional frost protection Option FB1 is being installed,** follow the instructions that are provided with the heat tape. A 115V power supply is required.

If a condensate neutralizer kit Option CSN1 is being installed, follow the instructions provided with the kit. When a condensate neutralizer is used, an overflow must be provided so that the condensate will be directed to the drain in the event the neutralizer becomes plugged. Install a barb "T" in the drain line prior to the inlet of the neutralizer and run a clear flexible PVC line from the horizontal outlet of the barb "T" to the drain. Follow the manufacturer's instructions to recharge the neutralizer tube.

A condensate disposal system that relies on gravity should be satisfactory for most installations since units are normally installed on the roof. **If a gravity system is not possible, install an Option CSP1 condensate pump**. Follow the pump manufacturers instructions included with the pump. The pump requires a 115V electrical supply.

FIGURE 29A - Location of the Condensate Drain Connection(s) in a High Efficiency Heat Section

(Dual heat section is illustrated.)



For units with one heat section (Sizes G150, G225, and G300), follow the instructions in FIGURE 29B to install the freeze-resistant trap.

For units with two heat sections (Sizes G302, G372, and G452), join the two PVC drain pipes with a tee before installing the trap. Follow the instructions in FIGURE 29B.

- - - - - = Field-supplied 1/2" PVC pipe(s)

Freeze Resistant Trap, P/N 271064, is shipped with the unit to be installed in the condensate drain.

It is mandatory that the drain be run through the inside of the roof curb and into the heated space. The drain must always be installed in a space that remains above 32°F(0°C).

NOTE: All PVC drain pipe is provided by the installer.

9.0 Optional Equipment including Heat Sections (cont'd)
9.2 Gas Heat Section (cont'd)

High Efficiency Heat Section Condensate Drain (cont'd)

Instructions for Installing High Efficiency Heat Section Condensate Drain

1) Attach the field-provided 1/2" PVC pipe to the condensate drain connection(s) as shown in **FIGURE 29A,** page 57. If the units has dual heat sections, connect a PVC pipe to each drain. If there are two drains, join the drains with a field-provided tee before installing the trap.

2) Install the freeze resistant trap, **P/N 271064 (FIGURE 29A,** page 57**)**. Refer to **FIGURE 29B,** shown below and follow the manufacturer's instructions to install and maintain the trap.

3) Continue the line from the trap inside the building and into a sanitary drain.

FIGURE 29B - Condensate Drain Trap for High-Efficiency Heat Section Drain

Trap Installation:

Install the trap as shown in either illustration. The trap must be installed vertically with the float above the spring as shown. DO NOT INSTALL THE TRAP HORIZONTALLY.

(**NOTE**: Check kit contents; some connections shown and all straight PVC parts are field supplied.)

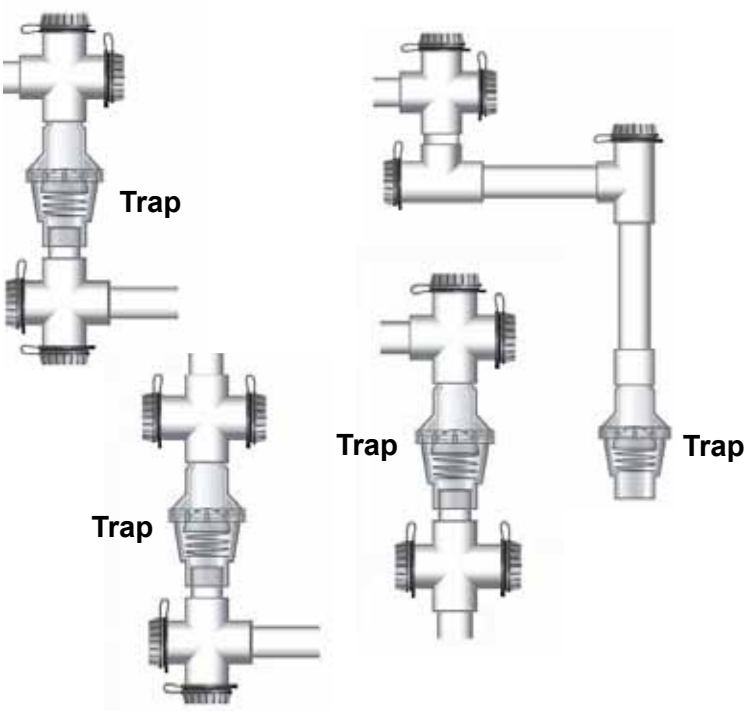
Trap Maintenance:

Open the cleaning ports and use the brush provided to clean the drain.

To clean the trap and float, unscrew the retaining ring and remove the bottom section of the trap. Remove float and spring. Clean all parts with soapy water.

Re-assemble by inserting the spring and float into the bottom trap section, position the bottom section into the top, and secure with the retaining ring.

Sample Configurations -- Trap may be installed in a variety of configurations but MUST be vertical.



9.3 Electric Heat Section

A unit with an electric heat section is equipped to provide from 30 to 120 kw of electric heat. The electric elements are located in the discharge airstream and are accessible through the electrical compartment.

An electric heat section in a Model YDSA may have either two to four stage control or SCR modulating control. Models YDHA and YDMA are equipped with SCR modulating control. Call for heat and staging are controlled by the unit controller.

SCR Controller

Modulating Electric Heat

Modulating heating operation is controlled by an SCR modulating control. There will be one or two SCR controllers located on an electrical panel in the electric heat section.

WARNING

The heatsink on the SCR power controller is hot to the touch.

DANGER

High voltages are present on the terminals of the SCR power controller(s).

10.0 Commissioning and Startup

10.1 Preparation and Startup Requirements

Follow the procedures listed in Paragraphs 10.2 - 10.4 and fill in the Startup Form in the **APPENDIX**, pages 68 thru 73.

IMPORTANT: Failure to maintain, misuse of the unit, or wrong startup procedures will void the warranty

NOTE: Verify cooling startup procedures when the cooling season begins. Refer to maintenance procedures in Form O-Y.

Before actual startup, become familiar with the applicable control information in Paragraph 8.0 and test mode and fan setting procedures in Paragraph 10.3.

Perform all of the preparation checks. On startup, be prepared to check compressor rotation to verify correct 3-phase wiring connection (Paragraph 7.1), and to set the fan speeds (Paragraph 10.3).

Assumptions: All connections are made; actual startup is imminent. Site is clean; all excess supplies, scraps, and debris have been removed. Clean filters are in place. Doors are open for checks.

DANGER

To prevent injury or death due to electrocution or contact with moving parts, lock disconnect switch open when doing checks prior to startup.

10.2 Checklist Prior to Startup

10.2.1 System Checklist Prior to Startup:

- ☐ Check clearances. All clearances must be as illustrated in Paragraph 4.1.
- ☐ Verify the electrical supply matches the unit. (Refer to the rating plate.)
- ☐ Check the wiring for loose connections or damaged wire. Tighten connections. Replace damaged wiring. (See Paragraph 7.0 or the wiring diagram for replacement wiring requirements.)
- ☐ Check all field wiring against the wiring diagram. Be sure all field-installed controls are in place. Be sure that wire gauges are as required for the electrical load. All field wiring must comply with the National Electric Code and local regulations.
- ☐ Be certain that all electrical entrances are sealed against the weather.
- ☐ Check that fuses or circuit breakers are in place and sized correctly.
- ☐ Remove compressor tiedowns and all other shipping supports and restraints.
- ☐ Verify that all field-installed options including the outside air hood, vertical vent extension, condensate drain protection, compressor sound blanket, etc. are installed.
- ☐ Check free rotation of condenser fans.
- ☐ If equipped with an energy recovery wheel, verify that the wheel is aligned and rotates freely.
- ☐ Be certain optional manual reset controls (DX high pressure switch, optional high gas pressure switch; and/or field-installed firestat) are reset.
- ☐ Verify that condensate drain(s) are open and properly trapped. Fill cooling coil drain trap with water. See Paragraph 6.5.
- ☐ Crankcase heaters must be allowed to warm up for at least 24 hours prior to startup. Do not startup the system until after allowing power to the crankcase heaters for 24 hours.

10.2.2 Additional Gas Heat Checklist Prior to Startup:

- ☐ Verify the altitude of the installation matches the rating plate.
- ☐ Check gas piping for leaks and proper supply gas pressure. Bleed gas lines of trapped air. (Refer to Paragraph 9.2 for supply and manifold pressures.)
  - a) Turn manual shutoff valve to OFF position.
  - b) Turn gas supply ON.
  - c) Observe the gas meter for movement or attach a pressure gauge readable to 0.1" iwc and after turning gas on for ten seconds, turn gas supply off. No change in pressure should occur over a three-minute period.
  - d) If either method in c) indicates a leak, locate the leak by brushing a soapy solution on all fittings. Bubbles will appear at the leak. Repair and repeat test.

10.0 Commissioning and Startup (cont'd)

10.2 Checklist Prior to Startup (cont'd)

10.2.2 Additional Gas Heat Checklist Prior to Startup (cont'd)

- ☐ Check that combustion air inlet and flue discharge openings are free of obstructions.
- ☐ If installed in California, verify that the California Warning Label is displayed. See Paragraph 1.4.
- ☐ If equipped with a high-efficiency gas heat section, verify that the condensate drain is installed. See Paragraph 9.2.

10.3 Unit Test Mode and Setting Fan CFM

Test Mode Instructions

The test mode is accessed via the service menu and can only be entered when the unit is in the OFF state. Once the test mode is enabled, it remains active for a 2-hour time period adjustable from 0 to 4 hours. When the timer expires or test mode is disabled, the unit will return to the OFF state.

In the Test Mode, all sequences of operation stop. Upon the Test Mode being enabled, the following devices shall be automatically commanded:

1. The Unit Damper Position Y1 shall be automatically commanded to = 100%.
2. The Unit Supply Fan NO1 will be automatically commanded ON.
3. The optional unit Exhaust Fan will be automatically commanded ON via modbus.
4. The Unit Supply Fan Speed Y2 and optional unit Exhaust fan via modbus communication will be automatically commanded to their maximum Speed % setpoint values. (The maximum Fan Speed % setpoint values are initially set at the factory and will need to be verified in the field.)

Once supply airflow is proven via Unit Supply Fan Status ID1, the user can manually select all of the remaining controller outputs to be commanded ON and OFF or modulated between 0-100% with the exceptions shown in the Compressor Test State Automatic Interlock Table.

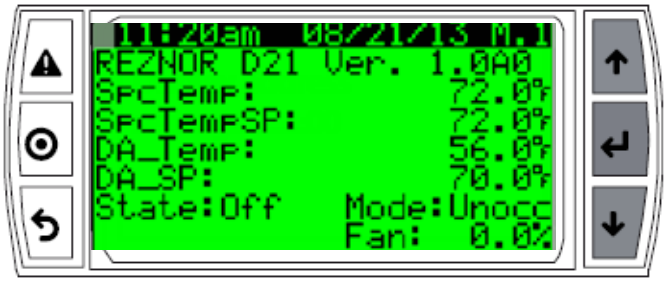
Compressor Test State Automatic Interlock Table

Output Terminal	Output Point Name	Output Description	Interlocked Output
Y3	Comp_Mod_Cap	DX Capacity Modulation	Condenser Fan Section A NO5 = ON When Y3 greater than 1.44 vdc
NO2	Compressor_Stg2	DX Compressor Stage 2 Start/Stop	Condenser Fan Section B NO6 = ON
NO3	Compressor_Stg3	DX Compressor Stage 3 Start/Stop	Condenser Fan Section B NO6 = ON
NO4	Compressor_Stg4	DX Compressor Stage 4 Start/Stop	Condenser Fan Section B NO6 = ON

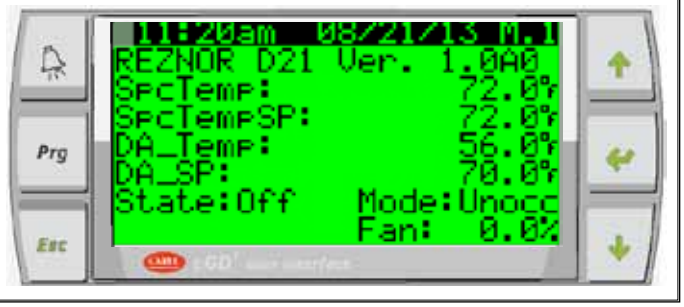
Function Key Displays

The function keys will be referred to throughout the following procedures. The unit controller display or the optional remote display may be used. The function key symbols for Alarm, Prg, and Esc differ on the remote display. See examples below for clarification.

Example of Unit Controller Display Key Symbols



Example of Remote Controller Display (Option RB5 or RB6) Key Symbols



Function Key Identification	Alarm	Prg	Esc	Up	Enter	Down
Function Key Display on the System Controller	⚠	⊙	↩	↑	↵	↓
Function Key Display on the Remote Controller	🔔	***Prg***	***Esc***	↑	↵	↓

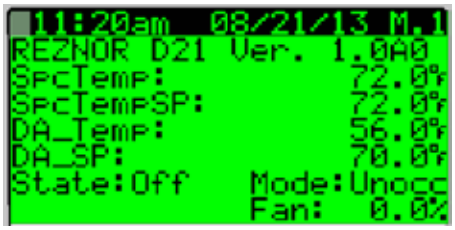
Test Mode Detailed Description

With the unit de-energized, open and secure the supply fan access door and the damper access door.

Turn on the main unit disconnect to energize the unit. The unit digital controller will take two to three minutes to initialize.

1. From the **Main Screen** check to ensure that the unit is in the OFF state. If the unit is in the OFF state, proceed to **Step 4**.

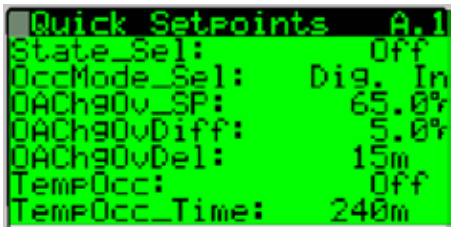
If the unit is not in the OFF state, proceed to **Step 2.**



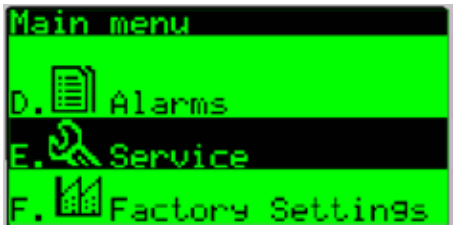
2. Press the Program Key to access the main menu and then press the up or down arrow keys to navigate to the **A. Quick Set points** submenu.

Press the enter key to select.

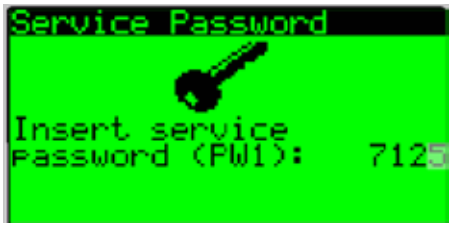
3. Press the enter key until the cursor is blinking on the **State_Sel:** field and press the down arrow key to set the unit to the OFF state.



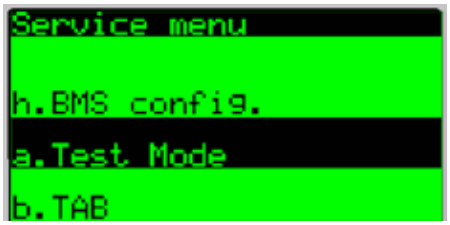
4. Press the escape key to access the main menu and use the up or down arrow keys to navigate to the **E. Service** submenu. Press the enter key to select.



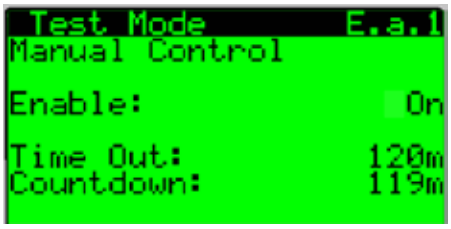
When prompted to enter the Service Password, use the up or down arrow keys and enter the service password of 7125, and press the enter key.



5. Use the up or down arrow keys to navigate to the **a.Test Mode** menu and press the enter key to select.



6. From the test mode **Screen E.a.1**, press the enter key to select the **Enable:** field, and press the up or down arrow key to turn the test mode ON.



Once enabled ON, press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to navigate to the next Test Mode **Screen E.a.2**.

7. If applicable, visibly check that the optional unit dampers have actuated to the full open position (Outside Air) and full closed position (Return Air). NOTE: The damper actuators will have up to a 120 second time period for full stroke.

If the unit is equipped with damper(s) and they have not actuated to the appropriate positions, refer to Form O-Y for instructions.

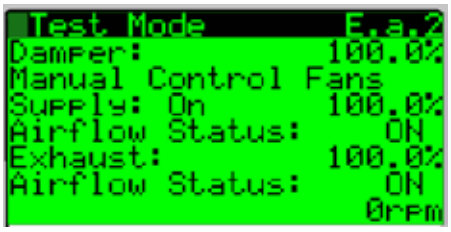
NOTE: Damper operation is required in order to complete the Test Mode.

With proper damper operation, close the damper access door and resume the test at Step 8.

8. Visibly check the rotation decal in the unit fan compartment to verify proper rotation of the unit supply fan. If the fan rotation is incorrect, the main unit electrical supply must be de-energized. Once de-energized, the electrical phasing will need to be switched at the main unit disconnect. After the unit phasing is corrected, re-verify the unit supply fan rotation.

With proper supply fan rotation, close the supply fan access door, and resume the test mode at Step 9.

9. From the Test Mode **Screen E.a.2**, verify that the **Supply Fan Airflow Status:** and the **Exhaust Airflow Status:** (if applicable) are reading ON.



(continued)

10.0 Commissioning and Startup (cont'd)

10.3 Unit Test Mode and Setting Fan CFM (cont'd)

Test Mode Detailed Description (cont'd)

If the airflow status values are not reading ON, refer to Form O-Y for instructions.

NOTE: Proof of supply fan airflow is required in order to complete the Test Mode.

10. Instructions for Setting Fans to Test and Balance Airflow

Adjusting the unit fan speeds to achieve the desired airflow performance is accomplished on Test Mode **screen E.a.2**. Reference the fan airflow tables (APPENDIX, pages 68 thru 73) for setting the maximum fan speeds.

Using field-supplied tees, connect a manometer to the appropriate set of pressure tap tubes associated with the fan -- (Blue and Clear tubes for the Supply Fan) (Yellow and Clear tubes for the Exhaust Fan).

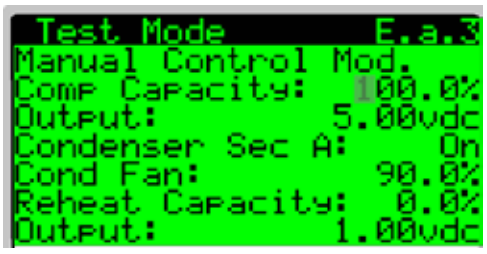
Measure the actual fan differential pressure and compare it to the appropriate fan airflow table. If an adjustment is required, use the Supply: % and the Exhaust: % modifiable fields and the up and down keys to increase or decrease the commanded fan speed until the differential pressure matches the differential pressure from the fan airflow table.

If an adjustment is made, the adjusted values will need to be saved in the TAB Menu. Instructions for saving setpoint values are in Step 17 at the end of the Test Mode Description instructions.

Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to navigate to the next Test Mode **Screen E.a.3**.

11. From Test Mode **Screen E.a.3**, press the enter key until the cursor is flashing on the **Comp Capacity:** field. Press the up arrow key to set the Comp Capacity value to 100%.

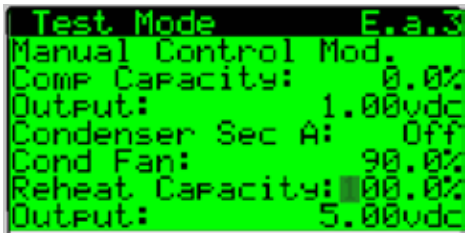
Using a digital volt meter, check for the appropriate line voltage on the load side of the "A" circuit compressor contactor to verify that it has energized, and visibly check that the Condenser Section "A" Fan is operating. When verified, press the down arrow key to set the Comp Capacity value back to zero.



If no voltage is present or the Condenser Section "A" Fan is not operable, refer to Form O-Y for instructions.

12. If the unit is equipped with an optional reheat circuit, from Test Mode **Screen E.a.3**, press the enter key until the cursor is flashing on the **Reheat Capacity:** field. Press the up arrow key to set the Comp Capacity value to 100%.

Using a digital volt meter, check for the appropriate line voltage on the load side of the reheat circuit compressor contactor to verify that it has energized. When verified, press the down arrow key to set the **Reheat Capacity** value back to zero.

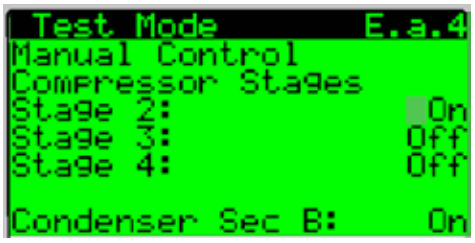


If no voltage is present, refer to Form O-Y for instructions.

Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to navigate to the next Test Mode **Screen E.a.4**.

13. From Test Mode **Screen E.a.4**, press the enter key until the cursor is flashing on the **Stage 2:** field. Press the up arrow key to set the Stage 2 value to ON.

Using a digital volt meter, check for the appropriate line voltage on the load side of the Stage 2 contactor to verify that it has energized and visibly check that the Condenser Section "B" Fan is operating. Once verified, press the down arrow key to set the Stage 2 value back to OFF.



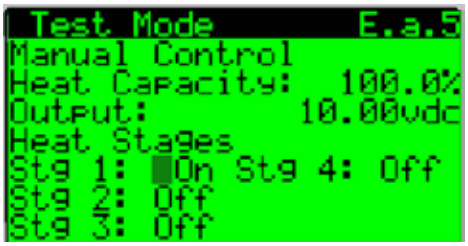
If no voltage is present, or the Condenser Section "B" Fan is not operable, refer to Form O-Y for instructions.

Depending upon configuration, the unit may be equipped with up to 4 stages of cooling. If applicable, perform the same procedure for the compressors associated with Stages 3 and 4.

Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to navigate to the next Test Mode **Screen E.a.5**.

14. **Electric Heat Only** - From Test Mode **Screen E.a.5**, press the enter key until the cursor is flashing on the **Heat Capacity:** field. Press the up arrow key to set the Heat Capacity value to 100% and press the enter key until the cursor is flashing on the **Stg 1:** field. Press the up arrow to set the Stg 1 value to ON.

    Using a digital volt meter, check for the appropriate line voltage on the load side of the Stg 1 contactor to verify that it has energized. Once verified, press the down arrow key to set the Stg 1 value back to OFF.



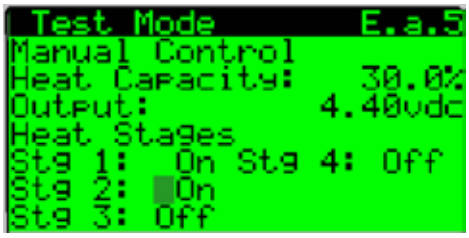
    If no voltage is present, refer to Form O-Y for instructions.

    Depending upon configuration the unit may be equipped with up to 6 stages of electric heating. Perform the same procedure for the remaining applicable heating stages.

    NOTE: The **heat capacity:** field is only associated with Stg 1.

15. **Gas Heat Only** - If the unit is equipped with gas control system Option AG73 or AG74, the modulating gas valve and its associated heat capacity value will need to be used to verify and (if required) adjust the manifold pressure settings. See paragraph 9.2 for checking gas pressure.

    To test staged flame proving, see the following instructions.



    From the Test Mode **Screen E.a.5**, press the enter key until the cursor is flashing on the Heat Capacity Field:

    - Option AG73 or AG74 only - Press the up arrow key to set the Heat Capacity value to 30%.
    - Press the enter key until the cursor is flashing on the **Stg 1:** field.
    - Press the up arrow to set the Stg 1 value to ON.

    NOTE: Depending on the gas control option (Option AG71, AG72. AG73, or AG74), the unit may be equipped with up to 4 stages of gas heating turned on via the controller menu. If applicable, perform the following step for stage 2.

    - Press the enter key until the cursor is flashing on the **Stg 2:** field.
    - Press the up arrow to set the Stg 2 value to ON.

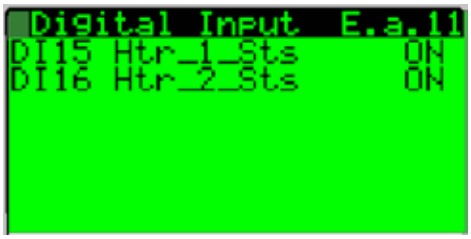
    Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to advance to the Test Mode **Screen E.a.11**.

    If the gas heating section(s) have proved flame, the associated DI15 (and DI16 if applicable) will show status ON.

    NOTE: Allow a 3-minute period for flame proving.

    Once verified, press the down arrow key to set the Stg 1 and Stg 2 values back to OFF.

    If the DI15 (and DI16) fail to show status ON, refer to Form O-Y for instructions.

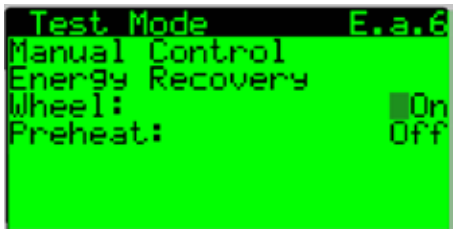


    Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the up arrow key to navigate to the Test Mode **Screen E.a.6**.

16. **Optional Energy Recovery with or without Optional Preheat** - From Test Mode **Screen E.a.6**, press the enter key until the cursor is flashing on the **Wheel:** field.

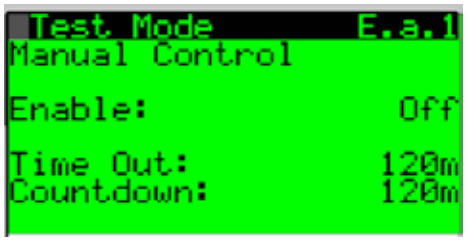
    Press the up arrow key to set the wheel value to ON. Press the enter key to select the **Preheat:** field. Press the up arrow to set the preheat value to ON.

    Using a digital volt meter, check for the appropriate line voltage on the load side of the wheel contactor and preheat contactor (if applicable) to verify that they have energized. Once verified, set the values for the **Wheel**: field and the **Preheat:** field to OFF.



    If no voltage is present at the contactor(s), refer to Form O-Y for instructions.

    Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the up arrow key to navigate to Test Mode **Screen E.a.1.** Press the enter key to select the **Enable:** field. Press the down arrow key to set the value to OFF.



(continued)

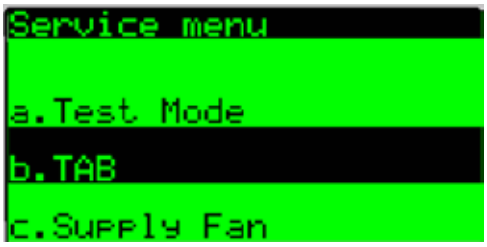
10.0 Commissioning and Startup (cont'd)

10.3 Unit Test Mode and Setting Fan CFM (cont'd)

Test Mode Detailed Description (cont'd)

17. **Saving Maximum Fan Speed Values Adjusted in Step 10**

Press the escape key to return to the service menu and navigate to the TAB sub menu.



Press the enter key to access the **TAB menu screen E.b.1**

This screen is used to save all adjustable unit parameters. The Set Max SF Spd? and Set Max EF Spd? Modifiable fields are used to set the optional Summer / Winter and High/ /Low fan speed set points for saving to the maximum fan speed values determined in Step 10.

Press the enter key to navigate to the **Set SF Max Spd?** Modifiable field and press the up key to set the value to YES. After a two-second period, the value will automatically return to the NO state.

If applicable, press the enter key to advance to the **Set Max EF Spd?** Modifiable field and press the up key to set the value to YES. After a two-second period, the value will automatically return to the NO state.

To save unit and fan speed parameters press the enter key to navigate to the **Save?** Modifiable field and press the up key to set the value to YES. After a two-second period, the value will automatically return to the NO state.

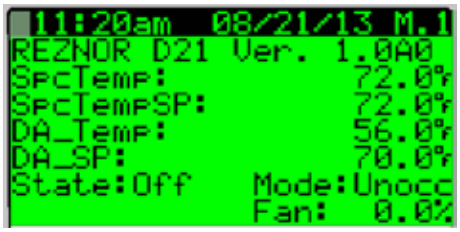
Unit parameters have now been successfully saved to the controller permanent memory. From this point forward the **most recently saved** unit parameters can be restored using the **Restore?** Modifiable field.

The unit test and setting fan speed procedure is now complete. Press The escape key in succession to return to the main screen.

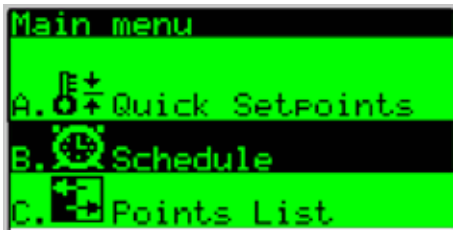
10.4 Other Control Settings

10.4.1 Set the Date and Time on the Controller Clock

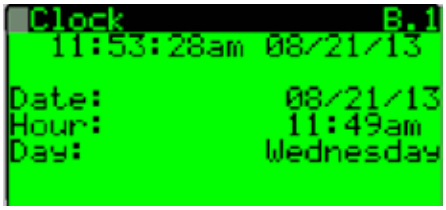
1. From the **Main Screen**, press the program key to access the main menu.



Press the up or down arrow keys to navigate to the **B. Schedule** submenu and press the enter key to select.



2. From **Screen B.1,** press the enter key to access the modifiable date and time fields and set them to the current date and time.



3. Once set, press the enter key in succession until the cursor is blinking in the uppermost left hand corner of the screen and press the down arrow key to advance to **Screen B.2**.

From **Screen B.2,** press the enter key to access the modifiable DST fields and set the values accordingly.

Once set, press the escape key in succession to return to the main screen.

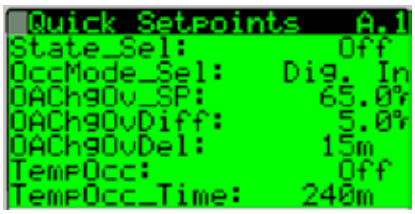
10.4.2 Setting the Unit for Operation via the Digital Input Closure or Time Schedule - Option D21

From the **Main Menu**, press the up or down arrow keys to navigate to the **A. Quick Set points** submenu and press the enter key to select.

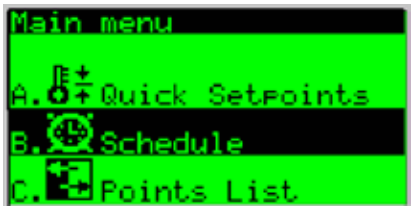
DIGITAL INPUT SELECTION - From **Screen A.1,** press the enter key to access the **State_Sel:** field and set the value to either the **Heat, Cool, or Auto** state. Press the enter key to select the **OccMode_Sel:** field and use the up or down arrow key to set the value to **Dig. In**.

The unit ships with a jumper wired on the occupied digital input. The unit will remain on until the occupied jumper is removed and replaced with an external field supplied contact.

SCHEDULE SELECTION - From **Screen A.1,** press the enter key to access the **State_Sel:** field and set the value to either the **Heat, Cool, or Auto** state. Press the enter key to select the **OccMode_Sel:** field and use the up or down arrow key to set the value to **Schedule**.



Press the escape to return to the main menu and select the B. Schedule sub menu. Press the enter key to enter the B. Schedule sub menu.

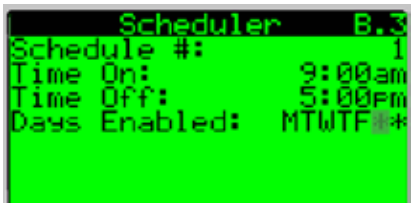


Press the down arrow to advance to **screen B.3**

NOTE: The following screen B.3 does not apply to control Option D19.

From **Screen B.3** press the enter Key to access the modifiable Schedule fields and set the desired Time

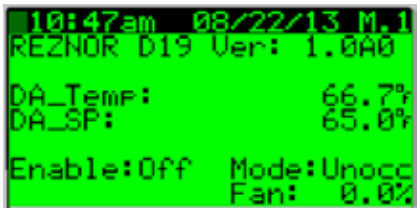
From **Screen B.3** press the enter Key to access the modifiable Schedule fields and set the desired Time ON, Time OFF, and Days Enabled values. Press the program Key to return to the main menu.



NOTE: Multiple weekly and holiday schedules are available. See control manual for additional information.

10.4.3 Setting the Unit for Operation with the D19 Control Sequence.

From the **Main Screen**, press the program key to access the main menu.

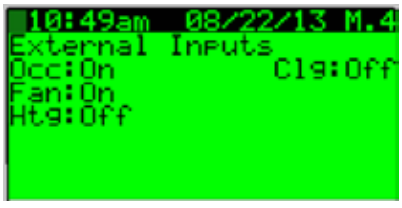


From the **Main Menu**, press the up or down arrow keys to navigate to the **A. Quick Set points** submenu and press the enter key to select.

From the Quick Set points **Screen A.1,** press the enter key to access the **System Enable:** field and set the value to **ON**.

Press the escape key in succession to return to the main screen.

The unit will control according to the inputs provided by a conventional thermostat or other external source. The status of the unit contacts can be viewed from main **screen M.4**.



10.5 Checklist - Startup

10.5.1 System Startup

Assumptions: All prior-to-startup checks including Test Mode and setting CFM have been completed satisfactorily and all doors are closed. Compressors with crankcase heaters have been allowed to warm up for at least 24 hours.

NOTE: Verify startup procedures when the cooling season begins. See maintenance procedures in Form O-Y.

☐ If there is a gas heat section, turn on the gas.

☐ Adjust the system controller so that a call for cooling exists. Observe for complete sequencing.

CAUTION: Crankcase heaters must be allowed to warm up for at least 24 hours prior to startup. Disable cooling controls before turning on power to warm up crankcase heaters.

Power Supply Voltage Phasing

Fan Rotation - If fan rotation is not correct, reverse by interchanging two wires on the 3-phase field supply connection. (See Paragraph 7.2.)

Compressors

☐ Connect refrigerant pressure gauges to the suction and discharge lines of the compressors and an electric meter to the power supply.

CAUTION: Be sure to connect pressure gauges to the suction and discharge lines before system startup so that compressor rotation can be checked immediately. Scroll compressors will be destroyed if allowed to operate in the wrong direction.

IMPORTANT: All refrigeration checks must be made by a qualified R-410A refrigeration technician.

☐ Record the ambient temperature. Adjust the system controller so that a call for cooling exists.

NOTE: Outdoor ambient lockouts may prevent mechanical cooling. Temporarily override lockouts by lowering the cooling setpoint. When testing is complete, reset the controller.

☐ **Because it is possible to unknowingly connect 3-phase power in such a way as to cause the scroll compressor or blower to rotate in reverse, it is very important to check this on startup.** See below and Paragraph 7.2.3.

Check Compressors - Immediately at startup, observe the gauges. If the suction pressure rises and discharge pressure drops, the compressor is operating in reverse and must be shut down. Turn off the power and switch the 3-phase line voltage wiring connections before restarting the unit.

(Important NOTE: If allowed to operate for several minutes in reverse, the compressor's internal protector will trip. If a compressor is repeatedly allowed to restart and run in reverse, the compressor will be permanently damaged.)

☐ If the system is equipped with an optional hot gas bypass, check the valve. Follow the instructions in Paragraph 7.8.

☐ If the system is equipped with an optional dirty filter switch(es), set the switch(es). Follow the instructions in Paragraph 8.1.2.

☐ Establish a call for heat. Observe for changeover and complete sequencing.

10.5.2 Startup Checklist for Unit with a Gas Heat Section

Sequence of Gas Heat Operation:

NOTE: Outdoor ambient lockouts will prevent mechanical gas heating. Temporarily override lockouts by raising the cooling mode lockout setting to 95°F and the discharge air heating setpoint to 95°F. When testing is complete, reset set points as required by the application. (For instructions on changing settings on the programmable control, refer to Form CP-Y-D19 or CP-Y-D21 in the Literature Bag.)

The installation must obtain a temperature rise within the range specified on the furnace rating plate. Depending on the model, maximum temperature rise is 50°F, 70°F, or 100°F.

Formulas for calculating CFM:

Standard (non-condensing) heat section

CFM = (Input rate x .80) divided by (1.08 x temperature rise)

High-efficiency (condensing) heat section

CFM = (Input rate x .91) divided by (1.08 x temperature rise)

1. Set the discharge temperature heating control at its highest setting.
   a) Firing rate is controlled by the discharge sensor.
   b) Blower motor operation is continuous.
2. On a call for gas heat
   a) The venter motor is energized after 18-second (approximate) time delay
   b) Combustion air pressure switch switches from N.O. to N.C. contacts, firing the unit. The sensing probe proves the presence of the flame at the 1st burner section.
3. If the flame is extinguished during burner operation, the ignition system circuit board closes the main valve and must be reset by interrupting the power to the control circuit (See Lighting Instructions on the furnace).

☐ Measure manifold pressure. Follow the appropriate instructions in Paragraph 9.2.2.

☐ Turn the unit off and on, pausing two minutes between each cycle. Observe for smooth ignition.
Manipulate discharge temperature setpoint up and down to see if furnace is staging or modulating properly. **NOTE:** Be sure control is returned to proper settings.

☐ Close all panels tightly. With the heater on, check limit control by completely blocking off distribution air. The limit control should open within a few minutes, shutting off the gas supply to the burner.

DANGER

The gas burner in the optional gas-fired heat section is designed to provide safe, complete combustion. However, if the installation does not permit the burner to receive the proper supply of combustion air, complete combustion may not occur. The result is incomplete combustion which produces carbon monoxide, a poisonous gas that can cause death. NEVER RESTRICT OR OTHERWISE ALTER THE SUPPLY OF COMBUSTION AIR TO ANY HEATER.

Safe operation of indirect-fired gas burning equipment requires a properly operating vent system which vents all flue products to the outside atmosphere. FAILURE TO PROVIDE PROPER VENTING WILL RESULT IN A HEALTH HAZARD WHICH COULD CAUSE SERIOUS PERSONAL INJURY OR DEATH.

10.6 Checklist After Startup:

Assumptions: All checks have been successfully performed and system is operating properly. All panels and doors are secure.

☐ Place "Literature/Parts Bag" containing Limited Warranty information, this booklet, the operation/maintenance/service manual, control instructions, and any information on optional controls in an accessible location.

Appendix

Cabinet Size 1, 2 or 3 by Model and Model Size Cross-Referenced to Heat Section Size and Type

Model		YDHA									YDMA									YDSA				
Size		60	90	120	150	180	210	240	300	360	60	90	120	150	180	210	240	300	360	120	150	180	210	
Nominal Cooling Capacity (Tons)		5	7.5	10	12.5	15	17.5	20	25	30	5	7.5	10	12.5	15	17.5	20	25	30	10	12.5	15	17.5	
	Opt Code																							Opt Code
Standard Efficiency Gas Heat Section	H50	1	1	1	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	H50
	H75	1	1	1	1	2	--	--	--	--	1	1	1	--	--	--	--	--	--	--	--	--	--	H75
	H100	1	1	1	1	2	2	2	--	--	1	1	1	1	--	--	--	--	--	2	--	--	--	H100
	H102*	1	1	1	1	2	2	2	--	--	1	1	1	1	--	--	--	--	--	2	--	--	--	H102*
	H125*	1	1	1	1	2	2	2	--	--	1	1	1	1	2	--	--	--	--	2	2	--	--	H125*
	H150*	1	1	1	1	2	2	2	--	--	1	1	1	1	2	2	--	--	--	2	2	3	--	H150*
	H175*	1	1	1	1	2	2	2	--	--	1	1	1	1	2	2	2	--	--	2	2	3	3	H175*
	H200	--	1	1	1	2	2	2	3	3	1	1	1	1	2	2	2	3	3	2	2	3	3	H200
	H202*	--	1	1	1	2	2	2	3	3	1	1	1	1	2	2	2	3	3	2	2	3	3	H202*
	H300	--	1	1	1	2	2	2	3	3	--	1	1	1	2	2	2	3	3	2	2	3	3	H300
	H400	--	--	1	1	2	2	2	3	3	--	--	1	1	2	2	2	3	3	2	2	3	3	H400
	H402*	--	--	1	1	2	2	2	3	3	--	--	1	1	2	2	2	3	3	2	2	3	3	H402*
	H502*	--	--	--	--	2	2	2	3	3	--	--	--	--	2	2	2	3	3	--	--	3	3	H502*
	H602*	--	--	--	--	2	2	2	3	3	--	--	--	--	2	2	2	3	3	--	--	---	3	H602*
	H702*	--	--	--	--	--	--	--	3	3	--	--	--	--	--	--	--	3	3	--	--	--	--	H702*
	H802*	--	--	--	--	--	--	--	3	3	--	--	--	--	--	--	--	3	3	--	--	--	--	H802*
High Efficiency Gas Heat Section	G150	1	1	1	1	2	2	2	--	--	1	1	1	1	2	2	2	--	--	2	2	3	3	G150
	G225	1	1	1	1	2	2	2	3	3	1	1	1	1	2	2	2	3	3	2	2	3	3	G225
	G300	--	1	1	1	2	2	2	3	3	--	--	1	1	2	2	2	3	3	2	2	3	3	G300
	G302*	--	1	1	1	2	2	2	3	3	--	--	1	1	2	2	2	3	3	2	2	3	3	G302*
	G372*	--	--	--	--	2	2	2	3	3	--	--	--	--	2	2	2	3	3	--	2	3	3	G372*
	G452*	--	--	--	--	2	2	2	3	3	--	--	--	--	2	2	2	3	3	--	--	3	3	G452*
	G525*	--	--	--	--	--	--	--	3	3	--	--	--	--	--	--	--	3	3	--	--	--	--	G525*
	G602*	--	--	--	--	--	--	--	3	3	--	--	--	--	--	--	--	3	3	--	--	--	--	G602*
Electric Heat Section	E20	1	1	1	1	2	2	2	--	--	1	1	1	1	2	2	2	--	--	2	2	3	3	E20
	E30	1	1	1	1	2	2	2	3	3	1	1	1	1	2	2	2	3	3	2	2	3	3	E30
	E40	--	1	1	1	2	2	2	3	3	--	1	1	1	2	2	2	3	3	2	2	3	3	E40
	E50	--	1	1	1	2	2	2	3	3	--	1	1	1	2	2	2	3	3	2	2	3	3	E50
	E60	--	1	1	1	2	2	2	3	3	--	1	1	1	2	2	2	3	3	2	2	3	3	E60
	E70	--	--	1	1	2	2	2	3	3	--	--	1	1	2	2	2	3	3	2	2	3	3	E70
	E80	--	--	1	1	2	2	2	3	3	--	--	1	1	2	2	2	3	3	2	2	3	3	E80
	E90	--	--	1	1	2	2	2	3	3	--	--	1	1	2	2	2	3	3	2	2	3	3	E90
	E120	--	--	--	--	2	2	2	3	3	--	--	--	--	2	2	2	3	3	--	--	3	3	E120

*** Gas heat sections with dual furnaces.**

Wiring Diagram Option Identification

The Option Codes for these electrical options are shown on the wiring diagram.

Option	Brief Description	Installed
A10	VFD Direct Drive Medium Static Plenum Fan	Factory
A10E	VFD Direct Drive High Static Plenum Fan	Factory
A11	Backward incline direct drive high static fan	Factory
AG71	2-stage On/Off Gas Control	Factory
AG72	4-stage On/Off Gas Control	Factory
AG73	Single Heat Section, 5:1 Modulation	Factory
AG74	Dual Heat Section, 10:1 Modulation	Factory
AK3	230/1 Supply Voltage	Factory
AK5	208/3 Supply Voltage	Factory
AK6	230/3 Supply Voltage	Factory
AK7	460/3 Supply Voltage	Factory
AK8	575/3 Supply Voltage	Factory
AR7	Open Bottom Return Air & Motorized 30% Outside Horizontal Air Inlet	Factory
AR8	Horizontal 100% Outside Air with Motorized Damper	Factory
AR25	Modulating OA/RA Dampers requires Option GF control	Factory
AR2D	100% Outside Air Damper and Power Exhaust	Factory
AR2G	Modulating OA/RA Dampers and gravity exhaust damper (requires Option GF control)	Factory

Option	Brief Description	Installed
AR2H	Modulating OA/RA Dampers w/power exhaust (requires Option GF control)	Factory
AR2L	100% Outside Air (no dampers) with Energy Recovery including Power Exhaust	Factory
AR2M	Modulating OA/RA Dampers with Energy Recovery including Power Exhaust (requires Option GF control)	Factory
AR2Y	Two-position OA Damper with Gravity Exhaust	Factory
AUC8	Main Coil Hot Gas Bypass (fixed circuit only)	Factory
BA6	Unit Mounted disconnect on/off switch	Factory
BA7	Dual Mounted disconnect on/off switches	Factory
BC6	Convenience Outlet (requires separate power supply)	Fld&Fctry
BD5	Firestat, 200°F (field installed)	Field
BE8	DX Cooling Low Ambient Control (r/a only)	Factory
BE15	Space Mounted CO^2 Sensor	Field
BE17	Photoelectric Smoke Detector	Field
BE18	Dirty Filter Pressure Switch for Main Filters only	Factory
BE22	Relay for Remote Exhaust Fan Start/Stop	Factory

Appendix (cont'd)
Wiring Diagram Option Identification (cont'd)

Option	Brief Description	Installed
BE28	Dirty Filter Pressure Switch for Main & ER Filters	Factory
BHB7	Lon DDC Communication Bus	Factory
BHB8	BacNet DDC Communication Bus	Fld&Fctry
BP4	High and Low Gas Pressure Switches	Factory
BUC3	Duct Pressure Sensor for VVT (Opt D23)	Field
CL23	Thermostat, 2-stg Heat/Cool, 24V, Touch Screen Programmable	Field
CL33	Thermostat, 2-stg Heat/Cool, 24v, Electronic Programmable with Relay for Damper control	Field
CL78	Space DDC Temperature Monitor w/setpoint adjustment	Field
CP__	Disconnect Switch	Field
CUF3	Standard Efficiency Single-Speed Condenser Fans	Factory
CUF4	High Efficiency Condenser Fans with Speed Control	Factory
D19	Space Temperature Control	Fld&Fctry
D20	Space Temperature and Humidity Control	Fld&Fctry
D21	Make-up Air Control	Fld&Fctry
D22	Variable Air Volume Control with Duct Temperature Sensor	Fld&Fctry
D23	Variable Air Volume Control with Space Sensor	Fld&Fctry
E20	20kw Electric Heat Section	Factory
E30	30kw Electric Heat Section	Factory
E40	40kw Electric Heat Section	Factory
E50	50kw Electric Heat Section	Factory
E60	60kw Electric Heat Section	Factory
E70	70kw Electric Heat Section	Factory
E80	80kw Electric Heat Section	Factory
E90	90kw Electric Heat Section	Factory
E120	120kw Electric Heat Section	Factory
EC90	90kw Electric Heat Section	Factory
EC120	120kw Electric Heat Section	Factory
EFC1	Power Exhaust Control by Adjustable Constant Volume	Factory
EFC4	Power Exhaust Building Pressure Control	Fld & Fctry
EFC7	Power Exhaust Control by Supply Fan Tracking with Adjustable Offset	Factory
EFC9	Power Exhaust Control by Adjustable Constant Volume	Factory

Option	Brief Description	Installed
EG3	Electric Heat Section 2-4 Stage Control	Factory
EG4	Electric Heat Section SCR Modulation Control	Factory
ER2A_	Energy Recovery (Total Enthalpy Wheel)	Factory
ER2B	Energy Recovery (Total Enthalpy Wheel)	Factory
ER2C	Energy Recovery (Total Enthalpy Wheel)	Factory
GF1	External DDC Damper Control (0-10V input signal)	Fld&Fctry
Option	**Brief Description**	**Installed**
GF2	DDC Two-Position Damper Control	Fld&Fctry
GF4	DDC Four-Position Damper Control based on two input switches	Fld&Fctry
GF5	DDC Damper Control with Building Pressure Monitor	Fld&Fctry
GF8	Economizer Package (CO_2 single or dual reference)	Fld&Fctry
PE4_	Power Exhaust 0-4000 cfm	Fld&Fctry
PE5_	Power Exhaust 0-6000 cfm	Fld&Fctry
PE6_	Power Exhaust 0-8000 cfm	Fld&Fctry
PH2A	10kw Heater for Energy Wheel Frost Control	Factory
PH3A	20kw Heater for Energy Wheel Frost Control	Factory
PH4A	30kw Heater for Energy Wheel Frost Control	Factory
Option	**Brief Description**	**Installed**
RB5	Wall-mounted Remote Monitoring Display	Field
RB6	Hand-held Remote Monitoring Display	Field
RPLE	Reheat Control - High OA Enthalpy	Factory
RPHE	Reheat Control - Low OA Enthalpy	Factory
VFC1	Fan Control by VFD from Adjustable Constant Volume Control	Factory
VFC2	Fan Control by VFD from External 0-10V Input Signal	Fld&Fctry
VFC3	Fan Control by VFD from Duct Static Pressure Sensor (0 to 2.5" iwc)	Fld&Fctry
VFC4	Fan Control by VFD from Building Static Pressure Sensor Control (-0.5 to 0.5" iwc)	Fld&Fctry
VFC6	Fan Control by VFD from constant SCFM (mass) control	Fld&Fctry
VFC9	Fan Control by VFD from Adjustable Constant Volume Control	Fld&Fctry

Supply Fan Airflow (cfm) / Pressure Drop (iwc) Tables by Fan and Unit Size

Static Pressure (iwc)	Supply Fan Airflow (cfm) - by Model and Size																						Static Pressure (iwc)
	YDSA				YDHA									YDMA									
	120	150	180	210	60	90	120	150	180	210	240	300	360	60	90	120	150	180	210	240	300	360	
0.5	---	---	---	---	---	---	---	---	---	2630	2630	---	---	---	---	---	---	---	2630	2630	---	---	**0.5**
0.6	---	---	---	---	---	---	---	---	---	2685	2685	---	---	---	---	---	---	---	2685	2685	---	---	**0.6**
0.7	---	---	---	---	---	---	---	---	---	2739	2739	---	---	---	---	---	---	---	2739	2739	---	---	**0.7**
0.8	---	---	---	---	---	---	---	---	---	2793	2793	---	---	---	---	---	---	---	2793	2793	---	---	**0.8**
0.9	---	---	---	---	---	---	---	---	---	2847	2847	---	---	---	---	---	---	---	2847	2847	---	---	**0.9**
1.0	2901	2901	---	---	773	2084	2084	2084	2084	2901	2901	3038	3038	773	773	2084	2084	2084	2901	2901	3038	3038	**1.0**
1.2	3007	3007	---	---	803	2191	2191	2191	2191	3007	3007	3193	3193	803	803	2191	2191	2191	3007	3007	3193	3193	**1.2**
1.4	3112	3112	---	---	833	2298	2298	2298	2298	3112	3112	3345	3345	833	833	2298	2298	2298	3112	3112	3345	3345	**1.4**
1.6	3216	3216	---	---	862	2403	2403	2403	2403	3216	3216	3495	3495	862	862	2403	2403	2403	3216	3216	3495	3495	**1.6**
1.8	3319	3319	---	---	891	2507	2507	2507	2507	3319	3319	3642	3642	891	891	2507	2507	2507	3319	3319	3642	3642	**1.8**
2.0	3421	3421	---	---	920	2611	2611	2611	2611	3421	3421	3786	3786	920	920	2611	2611	2611	3421	3421	3786	3786	**2.0**
2.2	3521	3521	---	---	949	2714	2714	2714	2714	3521	3521	3927	3927	949	949	2714	2714	2714	3521	3521	3927	3927	**2.2**
2.4	3620	3620	---	---	978	2816	2816	2816	2816	3620	3620	4067	4067	978	978	2816	2816	2816	3620	3620	4067	4067	**2.4**
2.6	3718	3718	---	---	1007	2917	2917	2917	2917	3718	3718	4203	4203	1007	1007	2917	2917	2917	3718	3718	4203	4203	**2.6**
2.8	3815	3815	---	---	1035	3018	3018	3018	3018	3815	3815	4338	4338	1035	1035	3018	3018	3018	3815	3815	4338	4338	**2.8**
3.0	3911	3911	4470	4470	1063	3117	3117	3117	3117	3911	3911	4470	4470	1063	1063	3117	3117	3117	3911	3911	4470	4470	**3.0**
3.2	4006	4006	4599	4599	1091	3216	3216	3216	3216	4006	4006	4599	4599	1091	1091	3216	3216	3216	4006	4006	4599	4599	**3.2**
3.4	4099	4099	4727	4727	1119	3314	3314	3314	3314	4099	4099	4727	4727	1119	1119	3314	3314	3314	4099	4099	4727	4727	**3.4**
3.6	4192	4192	4852	4852	1146	3411	3411	3411	3411	4192	4192	4852	4852	1146	1146	3411	3411	3411	4192	4192	4852	4852	**3.6**
3.8	4283	4283	4975	4975	1174	3507	3507	3507	3507	4283	4283	4975	4975	1174	1174	3507	3507	3507	4283	4283	4975	4975	**3.8**

Supply Fan Airflow (cfm) / Pressure Drop (iwc) Tables by Fan and Unit Size (Cont'd)

Static Pressure (iwc)	Supply Fan Airflow (cfm) - by Model and Size																					3603
	YDSA				YDHA									YDMA								
	120	150	180	210	60	90	120	150	180	210	240	300	360	60	90	120	150	180	210	240	300	360	
4.0	4373	4373	5096	5096	1201	3603	3603	3603	3603	4373	4373	5096	5096	1201	1201	3603	3603	3603	4373	4373	5096	5096	4.0
4.2	4462	4462	5215	5215	1228	3698	3698	3698	3698	4462	4462	5215	5215	1228	1228	3698	3698	3698	4462	4462	5215	5215	4.2
4.4	4550	4550	5331	5331	1255	3791	3791	3791	3791	4550	4550	5331	5331	1255	1255	3791	3791	3791	4550	4550	5331	5331	4.4
4.6	4636	4636	5446	5446	1282	3884	3884	3884	3884	4636	4636	5446	5446	1282	1282	3884	3884	3884	4636	4636	5446	5446	4.6
4.8	4721	4721	5559	5559	1308	3977	3977	3977	3977	4721	4721	5559	5559	1308	1308	3977	3977	3977	4721	4721	5559	5559	4.8
5.0	4806	4806	5671	5671	1335	4068	4068	4068	4068	4806	4806	5671	5671	1335	1335	4068	4068	4068	4806	4806	5671	5671	5.0
5.2	4889	4889	5780	5780	1361	4159	4159	4159	4159	4889	4889	5780	5780	1361	1361	4159	4159	4159	4889	4889	5780	5780	5.2
5.4	4971	4971	5888	5888	1387	4248	4248	4248	4248	4971	4971	5888	5888	1387	1387	4248	4248	4248	4971	4971	5888	5888	5.4
5.6	5051	5051	5994	5994	1412	4337	4337	4337	4337	5051	5051	5994	5994	1412	1412	4337	4337	4337	5051	5051	5994	5994	5.6
5.8	5131	5131	6098	6098	1438	4425	4425	4425	4425	5131	5131	6098	6098	1438	1438	4425	4425	4425	5131	5131	6098	6098	5.8
6.0	5209	5209	6201	6201	1463	4513	4513	4513	4513	5209	5209	6201	6201	1463	1463	4513	4513	4513	5209	5209	6201	6201	6.0
6.2	5286	5286	6303	6303	1489	---	---	---	4599	5286	5286	6303	6303	1489	1489	---	---	---	5286	5286	6303	6303	6.2
6.4	5363	5363	6402	6402	1514	---	---	---	4685	5363	5363	6402	6402	1514	1514	---	---	---	5363	5363	6402	6402	6.4
6.6	5437	5437	6501	6501	1538	---	---	---	4769	5437	5437	6501	6501	1538	1538	---	---	---	5437	5437	6501	6501	6.6
6.8	5511	5511	6598	6598	1563	---	---	---	4853	5511	5511	6598	6598	1563	1563	---	---	---	5511	5511	6598	6598	6.8
7.0	5584	5584	6694	6694	1588	---	---	---	4936	5584	5584	6694	6694	1588	1588	---	---	---	5584	5584	6694	6694	7.0
7.2	5655	5655	6788	6788	1612	---	---	---	5019	5655	5655	6788	6788	1612	1612	---	---	---	5655	5655	6788	6788	7.2
7.4	5725	5725	6882	6882	1636	---	---	---	5100	5725	5725	6882	6882	1636	1636	---	---	---	5725	5725	6882	6882	7.4
7.6	5794	5794	6974	6974	1660	---	---	---	5181	5794	5794	6974	6974	1660	1660	---	---	---	5794	5794	6974	6974	7.6
7.8	5862	5862	7065	7065	1683	---	---	---	5261	5862	5862	7065	7065	1683	1683	---	---	---	5862	5862	7065	7065	7.8
8.0	5929	5929	7155	7155	1707	---	---	---	5340	5929	5929	7155	7155	1707	1707	---	---	---	5929	5929	7155	7155	8.0
8.2	---	---	7245	7245	1730	---	---	---	5418	5997	5997	7245	7245	1730	1730	---	---	---	5997	5997	7245	7245	8.2
8.4	---	---	7333	7333	1753	---	---	---	5495	6064	6064	7333	7333	1753	1753	---	---	---	6064	6064	7333	7333	8.4
8.6	---	---	7420	7420	1776	---	---	---	5572	6132	6132	7420	7420	1776	1776	---	---	---	6132	6132	7420	7420	8.6
8.8	---	---	7507	7507	1799	---	---	---	5648	6199	6199	7507	7507	1799	1799	---	---	---	6199	6199	7507	7507	8.8
9.0	---	---	7592	7592	1821	---	---	---	5723	6267	6267	7592	7592	1821	1821	---	---	---	6267	6267	7592	7592	9.0
9.2	---	---	7677	7677	---	---	---	---	---	---	---	7677	7677	---	---	---	---	---	---	---	7677	7677	9.2
9.4	---	---	7762	7762	---	---	---	---	---	---	---	7762	7762	---	---	---	---	---	---	---	7762	7762	9.4
9.6	---	---	7846	7846	---	---	---	---	---	---	---	7846	7846	---	---	---	---	---	---	---	7846	7846	9.6
9.8	---	---	7929	7929	---	---	---	---	---	---	---	7929	7929	---	---	---	---	---	---	---	7929	7929	9.8
10.0	---	---	8011	8011	---	---	---	---	---	---	---	8011	8011	---	---	---	---	---	---	---	8011	8011	10.0
10.2	---	---	8094	8094	---	---	---	---	---	---	---	8094	8094	---	---	---	---	---	---	---	8094	8094	10.2
10.4	---	---	8175	8175	---	---	---	---	---	---	---	8175	8175	---	---	---	---	---	---	---	8175	8175	10.4
10.6	---	---	8257	8257	---	---	---	---	---	---	---	8257	8257	---	---	---	---	---	---	---	8257	8257	10.6
10.8	---	---	8338	8338	---	---	---	---	---	---	---	8338	8338	---	---	---	---	---	---	---	8338	8338	10.8
11.0	---	---	8419	8419	---	---	---	---	---	---	---	8419	8419	---	---	---	---	---	---	---	8419	8419	11.0
11.2	---	---	8500	8500	---	---	---	---	---	---	---	8500	8500	---	---	---	---	---	---	---	8500	8500	11.2
11.4	---	---	8581	8581	---	---	---	---	---	---	---	8581	8581	---	---	---	---	---	---	---	8581	8581	11.4
11.6	---	---	8661	8661	---	---	---	---	---	---	---	8661	8661	---	---	---	---	---	---	---	8661	8661	11.6
11.8	---	---	8742	8742	---	---	---	---	---	---	---	8742	8742	---	---	---	---	---	---	---	8742	8742	11.8
12.0	---	---	8822	8822	---	---	---	---	---	---	---	8822	8822	---	---	---	---	---	---	---	8822	8822	12.0
12.2	---	---	8903	8903	---	---	---	---	---	---	---	8903	8903	---	---	---	---	---	---	---	8903	8903	12.2
12.4	---	---	8984	8984	---	---	---	---	---	---	---	8984	8984	---	---	---	---	---	---	---	8984	8984	12.4
12.6	---	---	9064	9064	---	---	---	---	---	---	---	9064	9064	---	---	---	---	---	---	---	9064	9064	12.6
12.8	---	---	9146	9146	---	---	---	---	---	---	---	9146	9146	---	---	---	---	---	---	---	9146	9146	12.8
13.0	---	---	9227	9227	---	---	---	---	---	---	---	9227	9227	---	---	---	---	---	---	---	9227	9227	13.0
13.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13.2
13.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13.4
13.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13.6
13.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13.8
14.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	14.0
14.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	14.2
14.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	14.4
14.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	14.6
14.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	14.8
15.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	15.0

Appendix (cont'd)
PE4 Airflow (cfm) / Pressure Drop (iwc) Tables by Fan and Unit Size

Static Pressure (iwc)	Power Exhaust PE4 Airflow (cfm) - by Model and Size																						Static Pressure (iwc)
	YDSA				YDHA									YDMA									
	120	150	180	210	60	90	120	150	180	210	240	300	360	60	90	120	150	180	210	240	300	360	
0.2	595	595	378	378	1051	1051	1051	1051	595	595	595	378	378	1051	1051	1051	1051	595	595	595	378	378	0.2
0.4	830	830	553	553	1154	1154	1154	1154	830	830	830	553	553	1154	1154	1154	1154	830	830	830	553	553	0.4
0.6	1051	1051	723	723	1255	1255	1255	1255	1051	1051	1051	723	723	1255	1255	1255	1255	1051	1051	1051	723	723	0.6
0.8	1257	1257	886	886	1354	1354	1354	1354	1257	1257	1257	886	886	1354	1354	1354	1354	1257	1257	1257	886	886	0.8
1.0	1449	1449	1043	1043	1451	1451	1451	1451	1449	1449	1449	1043	1043	1451	1451	1451	1451	1449	1449	1449	1043	1043	1.0
1.2	1629	1629	1195	1195	1546	1546	1546	1546	1629	1629	1629	1195	1195	1546	1546	1546	1546	1629	1629	1629	1195	1195	1.2
1.4	1795	1795	1341	1341	1639	1639	1639	1639	1795	1795	1795	1341	1341	1639	1639	1639	1639	1795	1795	1795	1341	1341	1.4
1.6	1950	1950	1481	1481	1730	1730	1730	1730	1950	1950	1950	1481	1481	1730	1730	1730	1730	1950	1950	1950	1481	1481	1.6
1.8	2094	2094	1616	1616	1819	1819	1819	1819	2094	2094	2094	1616	1616	1819	1819	1819	1819	2094	2094	2094	1616	1616	1.8
2.0	2227	2227	1746	1746	1905	1905	1905	1905	2227	2227	2227	1746	1746	1905	1905	1905	1905	2227	2227	2227	1746	1746	2.0
2.2	2349	2349	1872	1872	1990	1990	1990	1990	2349	2349	2349	1872	1872	1990	1990	1990	1990	2349	2349	2349	1872	1872	2.2
2.4	2463	2463	1992	1992	2072	2072	2072	2072	2463	2463	2463	1992	1992	2072	2072	2072	2072	2463	2463	2463	1992	1992	2.4
2.6	2567	2567	2108	2108	2153	2153	2153	2153	2567	2567	2567	2108	2108	2153	2153	2153	2153	2567	2567	2567	2108	2108	2.6
2.8	2663	2663	2219	2219	2231	2231	2231	2231	2663	2663	2663	2219	2219	2231	2231	2231	2231	2663	2663	2663	2219	2219	2.8
3.0	2752	2752	2327	2327	2307	2307	2307	2307	2752	2752	2752	2327	2327	2307	2307	2307	2307	2752	2752	2752	2327	2327	3.0
3.2	2834	2834	2430	2430	2382	2382	2382	2382	2834	2834	2834	2430	2430	2382	2382	2382	2382	2834	2834	2834	2430	2430	3.2
3.4	2909	2909	2530	2530	2454	2454	2454	2454	2909	2909	2909	2530	2530	2454	2454	2454	2454	2909	2909	2909	2530	2530	3.4
3.6	2978	2978	2625	2625	2524	2524	2524	2524	2978	2978	2978	2625	2625	2524	2524	2524	2524	2978	2978	2978	2625	2625	3.6
3.8	3043	3043	2718	2718	2592	2592	2592	2592	3043	3043	3043	2718	2718	2592	2592	2592	2592	3043	3043	3043	2718	2718	3.8
4.0	3103	3103	2807	2807	2658	2658	2658	2658	3103	3103	3103	2807	2807	2658	2658	2658	2658	3103	3103	3103	2807	2807	4.0
4.2	3159	3159	2892	2892	2722	2722	2722	2722	3159	3159	3159	2892	2892	2722	2722	2722	2722	3159	3159	3159	2892	2892	4.2
4.4	3211	3211	2975	2975	2784	2784	2784	2784	3211	3211	3211	2975	2975	2784	2784	2784	2784	3211	3211	3211	2975	2975	4.4
4.6	3261	3261	3055	3055	2843	2843	2843	2843	3261	3261	3261	3055	3055	2843	2843	2843	2843	3261	3261	3261	3055	3055	4.6
4.8	3309	3309	3133	3133	2901	2901	2901	2901	3309	3309	3309	3133	3133	2901	2901	2901	2901	3309	3309	3309	3133	3133	4.8
5.0	3356	3356	3208	3208	2957	2957	2957	2957	3356	3356	3356	3208	3208	2957	2957	2957	2957	3356	3356	3356	3208	3208	5.0
5.2	3401	3401	3281	3281	3010	3010	3010	3010	3401	3401	3401	3281	3281	3010	3010	3010	3010	3401	3401	3401	3281	3281	5.2
5.4	3447	3447	3351	3351	3062	3062	3062	3062	3447	3447	3447	3351	3351	3062	3062	3062	3062	3447	3447	3447	3351	3351	5.4
5.6	3493	3493	3420	3420	3111	3111	3111	3111	3493	3493	3493	3420	3420	3111	3111	3111	3111	3493	3493	3493	3420	3420	5.6
5.8	3539	3539	3487	3487	3158	3158	3158	3158	3539	3539	3539	3487	3487	3158	3158	3158	3158	3539	3539	3539	3487	3487	5.8
6.0	3588	3588	3553	3553	3204	3204	3204	3204	3588	3588	3588	3553	3553	3204	3204	3204	3204	3588	3588	3588	3553	3553	6.0
6.2	3639	3639	3617	3617	3247	3247	3247	3247	3639	3639	3639	3617	3617	3247	3247	3247	3247	3639	3639	3639	3617	3617	6.2
6.4	3692	3692	3680	3680	3288	3288	3288	3288	3692	3692	3692	3680	3680	3288	3288	3288	3288	3692	3692	3692	3680	3680	6.4
6.6	3749	3749	3742	3742	3327	3327	3327	3327	3749	3749	3749	3742	3742	3327	3327	3327	3327	3749	3749	3749	3742	3742	6.6
6.8	3811	3811	3803	3803	3364	3364	3364	3364	3811	3811	3811	3803	3803	3364	3364	3364	3364	3811	3811	3811	3803	3803	6.8
7.0	3877	3877	3863	3863	3399	3399	3399	3399	3877	3877	3877	3863	3863	3399	3399	3399	3399	3877	3877	3877	3863	3863	7.0
7.2	3948	3948	3923	3923	3432	3432	3432	3432	3948	3948	3948	3923	3923	3432	3432	3432	3432	3948	3948	3948	3923	3923	7.2
7.4	4025	4025	3983	3983	3463	3463	3463	3463	4025	4025	4025	3983	3983	3463	3463	3463	3463	4025	4025	4025	3983	3983	7.4
7.6	4109	4109	4043	4043	3491	3491	3491	3491	4109	4109	4109	4043	4043	3491	3491	3491	3491	4109	4109	4109	4043	4043	7.6
7.8	4200	4200	4102	4102	3518	3518	3518	3518	4200	4200	4200	4102	4102	3518	3518	3518	3518	4200	4200	4200	4102	4102	7.8
8.0	4298	4298	4162	4162	3542	3542	3542	3542	4298	4298	4298	4162	4162	3542	3542	3542	3542	4298	4298	4298	4162	4162	8.0
8.2	---	---	4222	4222	---	---	---	---	---	---	---	4222	4222	---	---	---	---	---	---	---	4222	4222	8.2
8.4	---	---	4283	4283	---	---	---	---	---	---	---	4283	4283	---	---	---	---	---	---	---	4283	4283	8.4
8.6	---	---	4344	4344	---	---	---	---	---	---	---	4344	4344	---	---	---	---	---	---	---	4344	4344	8.6
8.8	---	---	4407	4407	---	---	---	---	---	---	---	4407	4407	---	---	---	---	---	---	---	4407	4407	8.8
9.0	---	---	4470	4470	---	---	---	---	---	---	---	4470	4470	---	---	---	---	---	---	---	4470	4470	9.0
9.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	9.2
9.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	9.4
9.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	9.6
9.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	9.8
10.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10.0
10.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10.2
10.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10.4
10.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10.6
10.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10.8
11.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	11.0

PE5 Airflow (cfm) / Pressure Drop (iwc) Tables by Fan and Unit Size

Static Pressure (iwc)	Power Exhaust PE5 Airflow (cfm) by Model and Size												Static Pressure (iwc)
	YDSA			YDHA					YDMA				
	150	180	210	180	210	240	300	360	210	240	300	360	
0.2	1059	1059	1059	1059	1059	1059	1059	1059	1059	1059	1059	1059	0.2
0.4	1497	1497	1497	1497	1497	1497	1497	1497	1497	1497	1497	1497	0.4
0.6	1833	1833	1833	1833	1833	1833	1833	1833	1833	1833	1833	1833	0.6
0.8	2117	2117	2117	2117	2117	2117	2117	2117	2117	2117	2117	2117	0.8
1.0	2367	2367	2367	2367	2367	2367	2367	2367	2367	2367	2367	2367	1.0
1.2	2593	2593	2593	2593	2593	2593	2593	2593	2593	2593	2593	2593	1.2
1.4	2801	2801	2801	2801	2801	2801	2801	2801	2801	2801	2801	2801	1.4
1.6	2994	2994	2994	2994	2994	2994	2994	2994	2994	2994	2994	2994	1.6
1.8	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	1.8
2.0	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	3347	2.0
2.2	3511	3511	3511	3511	3511	3511	3511	3511	3511	3511	3511	3511	2.2
2.4	3667	3667	3667	3667	3667	3667	3667	3667	3677	3667	3667	3667	2.4
2.6	3817	3817	3817	3817	3817	3817	3817	3817	3817	3817	3817	3817	2.6
2.8	3961	3961	3961	3961	3961	3961	3961	3961	3961	3961	3961	3961	2.8
3.0	4100	4100	4100	4100	4100	4100	4100	4100	4100	4100	4100	4100	3.0
3.2	4234	4234	4234	4234	4234	4234	4234	4234	4234	4234	4234	4234	3.2
3.4	4365	4365	4365	4365	4365	4365	4365	4365	4365	4365	4365	4365	3.4
3.6	4491	4491	4491	4491	4491	4491	4491	4491	4491	4491	4491	4491	3.6
3.8	4614	4614	4614	4614	4614	4614	4614	4614	4614	4614	4614	4614	3.8
4.0	4734	4734	4734	4734	4734	4734	4734	4734	4734	4734	4734	4734	4.0
4.2	4851	4851	4851	4851	4851	4851	4851	4851	4851	4851	4851	4851	4.2
4.4	4965	4965	4965	4965	4965	4965	4965	4965	4965	4965	4965	4965	4.4
4.6	5077	5077	5077	5077	5077	5077	5077	5077	5077	5077	5077	5077	4.6
4.8	5186	5186	5186	5186	5186	5186	5186	5186	5186	5186	5186	5186	4.8
5.0	5293	5293	5293	5293	5293	5293	5293	5293	5293	5293	5293	5293	5.0
5.2	5398	5398	5398	5398	5398	5398	5398	5398	5398	5398	5398	5398	5.2
5.4	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5.4
5.6	5601	5601	5601	5601	5601	5601	5601	5601	5601	5601	5601	5601	5.6
5.8	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5700	5.8
6.0	5798	5798	5798	5798	5798	5798	5798	5798	5798	5798	5798	5798	6.0
6.2	5894	5894	5894	5894	5894	5894	5894	5894	5894	5894	5894	5894	6.2
6.4	5988	5988	5988	5988	5988	5988	5988	5988	5988	5988	5988	5988	6.4
6.6	6081	6081	6081	6081	6081	6081	6081	6081	6081	6081	6081	6081	6.6
6.8	6172	6172	6172	6172	6172	6172	6172	6172	6172	6172	6172	6172	6.8
7.0	6262	6262	6262	6262	6262	6262	6262	6262	6262	6262	6262	6262	7.0
7.2	6351	6351	6351	6351	6351	6351	6351	6351	6351	6351	6351	6351	7.2
7.4	6439	6439	6439	6439	6439	6439	6439	6439	6439	6439	6439	6439	7.4
7.6	6525	6525	6525	6525	6525	6525	6525	6525	6525	6525	6525	6525	7.6
7.8	6611	6611	6611	6611	6611	6611	6611	6611	6611	6611	6611	6611	7.8
8.0	6695	6695	6695	6695	6695	6695	6695	6695	6695	6695	6695	6695	8.0

Appendix (cont'd)
PE6 Airflow (cfm) / Pressure Drop (iwc) Tables by Fan and Unit Size

Static Pressure (iwc)	Power Exhaust PE6 Airflow (cfm) by Model and Size				Static Pressure (iwc)
	YDHA		YDMA		
	300	360	300	360	
0.2	1236	1236	1236	1236	0.2
0.4	1747	1747	1747	1747	0.4
0.6	2139	2139	2139	2139	0.6
0.8	2470	2470	2470	2470	0.8
1.0	2762	2762	2762	2762	1.0
1.2	3025	3025	3025	3025	1.2
1.4	3268	3268	3268	3268	1.4
1.6	3493	3493	3493	3493	1.6
1.8	3705	3705	3705	3705	1.8
2.0	3905	3905	3905	3905	2.0
2.2	4096	4096	4096	4096	2.2
2.4	4278	4278	4278	4278	2.4
2.6	4453	4453	4453	4453	2.6
2.8	4621	4621	4621	4621	2.8
3.0	4783	4783	4783	4783	3.0
3.2	4940	4940	4940	4940	3.2
3.4	5093	5093	5093	5093	3.4
3.6	5240	5240	5240	5240	3.6
3.8	5383	5383	5383	5383	3.8
4.0	5523	5523	5523	5523	4.0
4.2	5660	5660	5660	5660	4.2
4.4	5793	5793	5793	5793	4.4
4.6	5923	5923	5923	5923	4.6
4.8	6050	6050	6050	6050	4.8
5.0	6175	6175	6175	6175	5.0
5.2	6298	6298	6298	6298	5.2
5.4	6417	6417	6417	6417	5.4
5.6	6535	6535	6535	6535	5.6
5.8	6650	6650	6650	6650	5.8
6.0	6764	6764	6764	6764	6.0
6.2	6876	6876	6876	6876	6.2
6.4	6986	6986	6986	6986	6.4
6.6	7095	7095	7095	7095	6.6
6.8	7201	7201	7201	7201	6.8
7.0	7306	7306	7306	7306	7.0
7.2	7410	7410	7410	7410	7.2
7.4	7512	7512	7512	7512	7.4
7.6	7613	7613	7613	7613	7.6
7.8	7713	7713	7713	7713	7.8
8.0	7811	7811	7811	7811	8.0

Start-Up Information Form

STARTUP FORM

Applies to: **Models YDHA, YDMA, and YDSA**

Job Name _____ **Contractor** _____

Street _____ **Contact** _____ **Phone** _____

City, ST, Zip _____ **Model** _____ **Size** _____

Date _____ **Tag** _____ **Serial No.** _____

Startup Check List - General Checks

- ☐ Inspect unit for damage.
- ☐ Verify shipping brackets are removed.
- ☐ Check clearances.
- ☐ Seal electrical entrances.
- ☐ Check condenser fans for free movement.
- ☐ Verify outside air hood is installed.
- ☐ Verify inlet air filters are installed.
- ☐ Check coil condensate drain and trap.
- ☐ Verify all copper tubing is isolated and does not rub.
- ☐ Check and tighten all electrical terminals.
- ☐ Check for voltage imbalance.
- ☐ Check fuses/breakers/disconnects for correct sizing (Check unit rating plate for requirements.)
- ☐ Check discharge and space sensors.
- ☐ Check for manual resets (DX high pressure switch; optional firestat, optional high gas pressure switch)
- ☐ Inspect optional dampers.

Option Check List

- ☐ Makeup air control (Option D21) - field-installed sensor.
- ☐ Space Control (Option D19) - field-installed sensor and thermostat.
- ☐ Disconnect Switch (required) - factory or field installed.
- ☐ Smoke detector (field installed).
- ☐ Firestat (field-installed/manual reset).
- ☐ DDC Phase loss (factory installed).
- ☐ Dirty filter switch(es) - factory installed / setting required.
- ☐ Convenience outlet - 115v supply required.

Supply Fan and Optional Exhaust Fan

	DP*	CFM	Voltage (at the contactors) L1 - L2	L2 - L3	L3 - L1
Supply Fan - Cooling					
Supply Fan - Optional Heating (Gas or Electric)					
Optional Exhaust Fan					

* Inlet Ring Differential Static Pressure

☐ Set supply fan CFM using Test Mode. ☐ Set optional exhaust fan CFM using Test Mode.

Supply Fan Control

- ☐ Constant Volume
- ☐ Duct Pressure (field-installed sensor and tubing)
- ☐ Building Pressure (field-installed tubing and pressure ports)

Optional Exhaust Fan Control

- ☐ Constant Volume
- ☐ Building Pressure (field-installed tubing and pressure ports)
- ☐ Supply Fan Tracking

Condenser Fans

Nameplate HP _____

Volts _____

FLA _____

	Voltage (at the contactors) L1 - L2	L2 - L3	L3 - L1	Amperage FLA-1	FLA-2	FLA-3
Fan 1						
Fan 2						
Fan 3						
Fan 4						

Optional Condenser Fan Control

- ☐ Low ambient phase control
- ☐ Low ambient modulating control

Compressors

NOTE: Crankcase heaters must be allowed to warm up for at least 24 hours prior to startup.

☐ Check Rotation.

Outdoor Air Conditions: Entering Dry Bulb _____ Entering Wet Bulb, Dewpoint, or % RH _____

Circuit	Voltage (at the contactors) L1 - L2	L2 - L3	L3 - L1	Amperage FLA-1	FLA-2	FLA-3	Nameplate RLA	Head Pressure PSIG	Suction Pressure PSIG	Superheat	Subcooling	DAT
Compressor A												
Compressor B												
D or Reheat DH												

☐ Check optional hot gas bypass valve setting.

Optional Gas Heat Section

- ☐ Natural Gas ☐ Sea Level
- ☐ Propane ☐ High Altitude
- ☐ Purge air from lines
- ☐ Leak test all piping

Inlet Gas Pressure _____

Measure Manifold Pressure

Modulating Control	Low	High
Heat Section 1		
Heat Section 2		

Staged Control	Low	High
Heat Section 1		
Heat Section 2		

High Efficiency Heat Section

- ☐ Condensate Drain(s) and Trap
- ☐ Vent
- ☐ Optional Heat Tape
- ☐ Optional Condensate Pump
- ☐ Optional Neutralizer Kit

Optional Electric Heat Section

	Voltage (at the contactors) L1 - L2	L2 - L3	L3 - L1	Amperage FLA-1	FLA-2	FLA-3
1						
2						
3						
4						

Electric Heat Control

- ☐ Staged
- ☐ Modulating (SCR)

Optional Energy Recovery Wheel

- ☐ Rotation and Alignment
- ☐ Belt tension

Optional Electric Pre-Heat

☐ 10kw ☐ 20kw ☐ 30kw

Voltage L1 - L2	L2 - L3	L3 - L1	Amperage FLA-1	FLA-2	FLA-3

References

(Catalogs and instruction manuals are available from your local distributor)

Airflow Pressure Drops.....See Sales/Technical Catalog C-YD
Airflow Ranges .....See Sales/Technical Catalog C-YD
Amp Loads .....See Sales/Technical Catalog C-YD
Blower Charts (RPM/BHP) .....See Sales/Technical Catalog C-YD
Control Instructions...See Doc No D300534 for CP-Y-D19 or Doc No D300535 for CP-Y-D21
Installation - Roof Curbs Options CJ31, CJ34, CJ48, CJ55..... See Doc No 303068
Installation - Outside Air Hood Options AS16..... See Doc No 303067
Operation/Maintenance/Service .....See Form O-Y
Wiring Diagram.....With the Unit

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INSTALLATION RECORD - to be completed by the installer:

Installer:

Name _____

Company _____

Address _____

_____

_____

Phone _____

Distributor (company from which the unit was purchased):

Company _____

Contact _____

Address _____

_____

_____

Phone _____

Model _____ Serial No._____Date of Installation _____

SPECIFIC INSTALLATION NOTES: (i.e. Location, Amps, Gas Pressure, Temperature, Voltage, Adjustments, Warranty, etc.)

_____

_____

_____

_____

_____

BUILDING OWNER OR MAINTENANCE PERSONNEL:

For service or repair

- Contact the installer listed above.
- If you need additional assistance, contact the Distributor listed above.
- For more information, contact your Local Representative.

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