REZNOR®

MAPS®

MAPS® dH™

Form I-MAPS II (Version B)

Obsoletes Form I-MAPS II (Version A)

Installation/Operation

Applies to: **MAPS II Model Series RCA, RDA, RDCA, RDDA, RECA, REDA, and JHUP Modular Air Processing Systems**

MAPS® II
Model RDCA

WARNING:

All MAPS® II modular air processing systems contain either chlorodifluoromethane (HCFC-22) or a hydro-fluorocarbon blend (HFC-407C). HCFC-22 is believed to harm the public health and environment by destroying ozone in the upper atmosphere. Do not release HCFC-22 to the atmosphere. The U. S. Clean Air Act requires the recovery of any residual refrigerant.

WARNING:

Improper installation, adjustment, alteration, service, or maintenance can cause property damage, injury, or death. Read the installation, operation, and maintenance instructions thoroughly before installing or servicing this equipment.

FOR YOUR SAFETY

If you smell gas:
- **Open windows.**
- **Do not touch any electrical switches.**
- **Extinguish any open flame.**
- **Immediately call your gas supplier.**

FOR YOUR SAFETY

The use and storage of gasoline or other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.

Table of Contents

1. 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 Models RCDA and RDDA with 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. See Hazard Levels, above.

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. Handling of refrigerant should only be performed by a certified HVAC technician in compliance with all codes and requirements of authorities having jurisdiction.

The instructions in this manual apply to the following MAPS® II models:

Model	Description
RCA	Makeup Air Cooling Packaged System, 800-10000 CFM
RDCA	Makeup Air Cooling Packaged System, 800-10000 CFM, with Gas Heat Section (100-700 MBH)
RECA	Makeup Air Cooling Packaged System, 800-10000 CFM, with Electric Heat Section (5-88 kw)
RDA	Makeup Air Cooling and Dehumidification Reheat Cycle Packaged System, 800-10000 CFM
RDDA	Makeup Air Cooling and Dehumidification Reheat Cycle Packaged System, 800-10000 CFM, with a Gas Heat Section (100-700 MBH)
REDA	Makeup Air Cooling and Dehumidification Reheat Cycle Packaged System, 800-10000 CFM, with an Electric Heat Section (5-88 kw)
JHUP	Supplemental Gas-Fired Duct Furnace

Read this booklet and become familiar with the installation requirements of your particular model. If you do not have knowledge of local requirements, check with the local agencies who might have requirements concerning this installation. Before beginning, make preparations for necessary supplies, tools, and manpower.

Some information is by cabinet size; see cross-reference table in the APPENDIX, page 58.

1. General (cont'd)

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

Approval and Installation Codes

These packaged systems are certified by ITS to Heating Cooling Equipment (latest edition), UL 1995 / CAN/CSA C22.2 No. 236. Electrical characteristics are shown on the system rating plate. All cooling and dehumidification reheat cycle circuits are factory-charged with R-22 or R407C refrigerant.

Model RDCA and Model RDDA include a gas heat section. The system includes a power-vented gas-fueled duct furnace. The gas-fired furnace using the Reznor® TCORE2® combustion system is available in 13 sizes from 100 to 700 MBH for use with either natural or propane gas. The furnace is certified by ITS to both ANSI Z83.8b and CSA 2.6b-M. The ETL label, type of gas, and the firing rate are shown on the heat section rating plate.

Model RECA and Model REDA include an electric heat section. The electric heat section is available in 21 sizes from 5 to 88 kw with single or three-stage control. Refer to the system rating plate for electrical requirements. Models RECA and REDA require only a single-point electrical supply.

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 a warning label on the outside of the heat section access panel. The California Warning label is shipped in the "Literature Bag". If installation is in California, 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. Location

All of these packaged systems are designed to be mounted on a roof or slab using a manufacturer designed curb. Both downflow and horizontal curbs are available.

When the unit is being placed on a roof, location depends on the roof structure.

Position the curb so that the air inlet of the unit will not be facing into the prevailing wind.

Always comply with the clearances in Paragraph 4.3.

For condensate drainage and proper operation, it is important the installation be level.

3. Receiving, Moving, and Storage

3.1 Receiving and Moving

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

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

- **Lifting Lugs** - Inspect the points of attachment of the lifting lugs.
- **Condenser Fan Section** - On the side of the system, check the condenser fan guards and the fan blades.

<u>IMPORTANT NOTE</u>: Sizes 176, 226, 230, 280, 292, 346, 374, 428, and 446 have a "C" Size Cabinet and MUST be loaded and unloaded using all six lifting lugs with a spreader bar. DO NOT attempt to move a "C" size cabinet system with a fork lift.

Rating Plate

On the inside of the door of the high voltage electrical compartment, locate the system rating plate (See **FIGURE 1A**, below, and **FIGURE 2A or 2B**, page 7 or 8). Check the specifications and the electrical characteristics and verify compatibility with the electric supply at the installation site. Check fuses/breakers for correct sizing.

If installing a Model RDCA, RDDA, RECA, or REDA, check the rating plate on the inside cover of the heat section. Be sure that the rating plate information is compatible with the electric and/or gas supply at the installation site. (See **FIGURE 1B** for a sample of a gas-fired heat section rating plate.)

FIGURE 1A - Sample of System Rating Plate (applies to all models)

System Rating Plate Key:

A = Model
B = Manufacturing Date (Month/Year)
C = Blower Motor HP
D = Volts/Phase/Hertz
E = Full Load Amps of Blower Motor
F = Minimum Circuit Ampacity
G = Maximum Fuse Size
H = Quantity - Compressor A
I = Rated Load Amps of Compressor A
J = Locked Rotor Amps of Compressor A
K = Quantity - Compressor B
L = Rated Load Amps of Compressor B
M = Locked Rotor Amps of Compressor B
N = Quantity - Compressor C
O = Rated Load Amps of Compressor C
P = Locked Rotor Amps of Compressor C
Q = Quantity - Compressor D
R = Rated Load Amps of Compressor D
S = Locked Rotor Amps of Compressor D
T = Quantity Condenser Fan Motors
U = Rated Load Amps of Condenser(s)
V = Refrigerant Charge (lbs) - Circuit A
W = Refrigerant Charge (lbs) - Circuit B
X = Refrigerant Charge (lbs) - Circuit C
Y = Refrigerant Charge (lbs) - Circuit D
Z = Condenser Fan Motor HP
AA = Test Pressure High (psig)
BB = Test Pressure Low (psig)
CC = SCFM Airflow
DD = External Static Pressure (" w.c.)
EE = Drive (Option AM)
FF = Wiring Diagram No.

REZNOR
MERCER, PA., U.S.A. 16137

RCA or RDA MADE IN USA
FOR INDUSTRIAL/COMMERCIAL USE ONLY
SUITABLE FOR OUTDOOR USE
MODEL [A] **[B]**
SERIAL NO. [ ]
ELECTRICAL
[D] VOLTS +/- 10% **[D]** PHASE **[D]** HZ
MINIMUM CIRCUIT AMPACITY(MCA) **[F]** AMPS
MAXIMUM FUSE SIZE/*CKT BREAKER **[G]** AMPS

	QTY	FLA(EA)	HP(EA)
SUPPLY AIR BLOWER MOTOR	1	[E]	[C]
CONDENSER FAN MOTOR (S)	[T]	[U]	[Z]

	QTY	RLA (EA)	LRA (EA)
COMPRESSOR(S) A	[H]	[I]	[J]
COMPRESSOR(S) B	[K]	[L]	[M]
COMPRESSOR(S) C	[N]	[O]	[P]
COMPRESSOR(S) D	[Q]	[R]	[S]

	CIRCUITS A	B	C	D
REFRIGERANT - [ ] CHARGE - LBS	[V]	[W]	[X]	[Y]

TEST PRESSURES HIGH **[AA]** PSIG LOW **[BB]** PSIG
EQUIPPED FOR OPERATION AT AN AIR FLOW OF **[CC]** SCFM
AGAINST A STATIC PRESSURE OF **[DD]** INCHES WATER COLUMN.
DRIVE RPM **[EE]**
WIRE DIAGRAM **[FF]**
REFER TO RATING PLATE IN THE FURNACE SECTION (WHEN USED)
FOR ADDITIONAL INFORMATION.
*HACR TYPE REQUIRED PER NEC

3. Receiving, Moving, and Storage (cont'd)

3.1 Receiving and Moving (cont'd)

FIGURE 1B - Sample of a Gas-Fired Heat Section Rating Plate (applies to Models RDCA and RDDA)

Gas Heat Section Rating Plate Key:

A = ANSI Standard Date
B = CSA Standard Date
C = Model No.
D = Amps
E = Type of Gas (natural or propane)
F = Orifice Size of Large Burner
G = Orifice Size of Small Burner
H = Normal BTUH Input (sea level)
I = Thermal Output BTUH (sea level)
J = Minimum BTUH Input (sea level)
K = Manifold Pressure
L = Minimum Gas Supply Pressure
M = Maximum Throughput
N = Minimum Throughput
P = Manufacturing Date (Month/Year)
Q = Altitude in Feet
R = Altitude in Meters

REZNOR
MERCER, PA USA 16137
DUCT FURNACE/GÉNÉRATEUR D'AIR CHAUD À GAINE
CATEGORY III/CATÉGORIE III
FOR INDUSTRIAL/COMMERCIAL USE ONLY
POUR USAGE INDUSTRIEL/COMMERCIAL
ANSI Z83.8b - [**A**]
CGA 2.6b-M [**B**] DUCT FURNACE/GÉNÉRATEUR D'AIR CHAUD À GAINE
MODEL/MODÈLE [**C**] **[P]**
SERIAL NO./#DE SÉRIE: [ ]
230 VOLTS 1 PH 60 HZ MAXIMUM TOTAL INPUT [**D**] AMPS
CONSOMMATION TOTALE MAX. DE [**D**] A
TYPE OF GAS/TYPE DE GAZ: [**E**]
ALTITUDE **[Q]** FEET/PIEDS, **[R]** MÈTRES
LARGE BURNER ORIFICE SIZE [**F**] DRILL HAS BEEN FACTORY ADJUSTED
GRAND BRULEUR DIMENSION DE L'ORIFICE [**F**] FORET
SMALL BURNER ORIFICE SIZE [**G**] DRILL HAS BEEN FACTORY ADJUSTED
PETIT BRULEUR DIMENSION DE L'ORIFICE [**G**] FORET
NORMAL INPUT/ENTRÉE NORMALE [**H**] BTU/HR
THERMAL OUTPUT CAPACITY/RENDEMENT THERMIQUE [**I**] BTU/HR
MINIMUM INPUT/ENTRÉE MIN. [**J**] BTU/HR
NORMAL MANIFOLD PRESSURE [**K**] IN.W.C.
PRESSION NORMALE DE LA TUB [**K**] PO/COL D'EAU
MIN. PERMISSIBLE GAS SUPPLY PRESSURE
FOR PURPOSE OF INPUT ADJUSTMENT. [**L**] IN.W.C.
PRES. D'ALIM. MIN. ACCEPTABLE DE GAZ POUR
DES FIN DE RÉGLAGE DE L'ENTRÉE [**L**] PO/COL D'EAU
MAXIMUM THROUGHPUT / MINIMUM THROUGHPUT [**M**] / [**N**] C.F.M.
CONSOMMATION MAXIMUM / MINIMUM [**M**] / [**N**] PI3/MN

NOTE: Same type of rating plate applies to a Model JHUP-0250 Curb Duct Furnace.

Shipped-Separate Accessories and Shipped-Loose Parts

Check for shipped-separate accessories and shipped-loose parts.

All heating systems and cooling only systems with Option DU1 have a discharge sensor temporarily installed in the control compartment for the convenience of the installer at startup. (NOTE: Cooling only systems without Option DU1 have a discharge air sensor installed in a permanent location.) Depending on the application and optional controls, a sensor installed in a temporary location will have to either be relocated to the ductwork.

The roof curb is shipped separately (See Paragraph 5.2), and in most cases, in advance of the unit. A Model JHUP-0250 duct furnace curb section, an outside air hood, hood for optional power exhaust, optional economizer, or optional energy recovery module are shipped separately for field installation.

If ordered as options or components of options, other items that are shipped separately include a remote console, a disconnect switch, a discharge temperature control, a space temperature control, a space reheat override, an override thermostat, a room humidistat, a duct smoke detector, and/or a firestat.

3.2 Storage and Installation Checks

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.

After the system has been moved to its installation site, remove all of the shipping brackets and check all of the fans for free movement. See the check lists in Paragraph 10 before starting the unit and complete the Startup Form (shipped in the literature envelope).

4. Dimensions and Clearances

4.1 Dimensions - Models RCA, RDA, RDCA, RDDA

FIGURE 2A - General Arrangement and Dimensions (inches/mm) of Models RCA, RDA, RDCA, and RDDA

Dimensions are shown by Cabinet Size. For a cross-reference of cabinet size and model size, refer to the Appendix, pages 58.

Dimensions - inches (±1/8")

Cabinet Size	Illustration Codes										Outside Air Inlet Opening
	A	B	C	D	E	F	G	H	J	K	
A	72-5/16	42-5/16	46-1/2	39-1/2	43-7/8	76-5/16	26-3/4 without power exhaust; 44 with power exhaust	73-5/8	48-1/8	3	24 W x 20 H
B	87-5/16	57-5/16	61-1/2	54-1/2							36 W x 20 H
C	100-23/32	68-7/8	68-9/16	66	62	105-1/4	38	102-1/2	66-5/8	9-1/8	49-5/8 W x 25-5/8 H

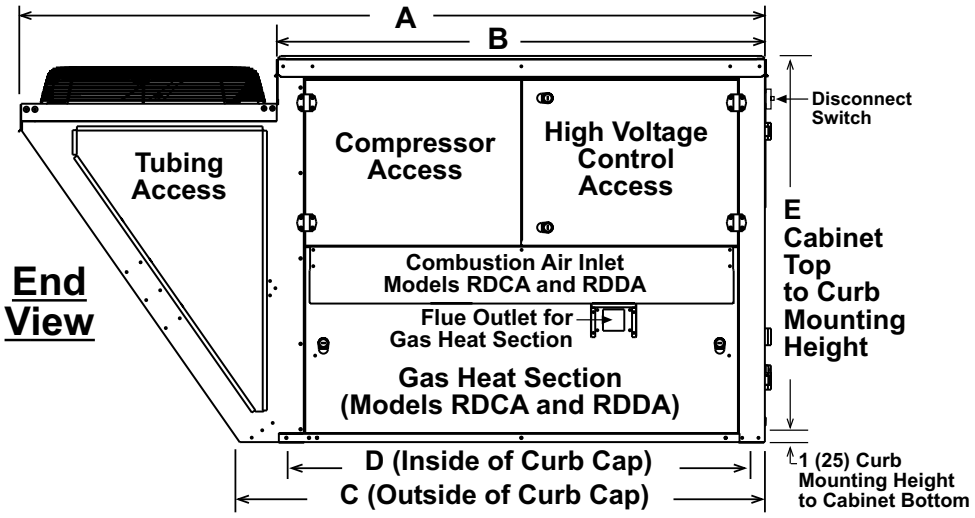
Dimensions - mm (±3mm)

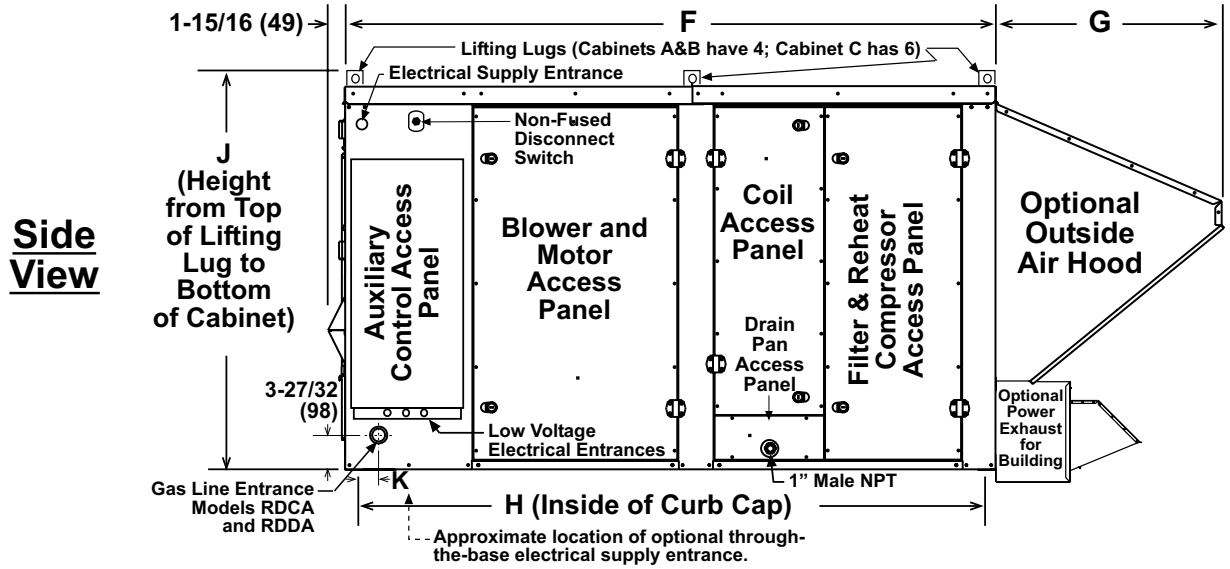
Cabinet Size	Illustration Codes										Outside Air Inlet Opening
	A	B	C	D	E	F	G	H	J	K	
A	1837	1075	1181	1003	1114	1938	679 without power exhaust; 1118 with power exhaust	1870	1222	76	610 W x 508 H
B	2218	1456	1562	1384							914 W x 508 H
C	2558	1749	1742	1677	1575	2673	965	2604	1692	232	1260 W x 651 H

<u>IMPORTANT NOTE</u>: Sizes 176, 226, 230, 280, 292, 346, 374, 428, and 446 have a "C" Size Cabinet and MUST be loaded and unloaded by the lifting lugs. DO NOT attempt to move a "C" size cabinet system with a fork lift.

NOTE: Illustration is of a Cabinet A or B; Cabinet C has some slight variations in appearance.

NOTE: References to heat section apply only to Models RDCA and RDDA.





4. Dimensions and Clearances (cont'd)

4.2 Dimensions - Models RECA, REDA

FIGURE 2B - General Arrangement and Dimensions (inches/mm) of Models RECA and REDA

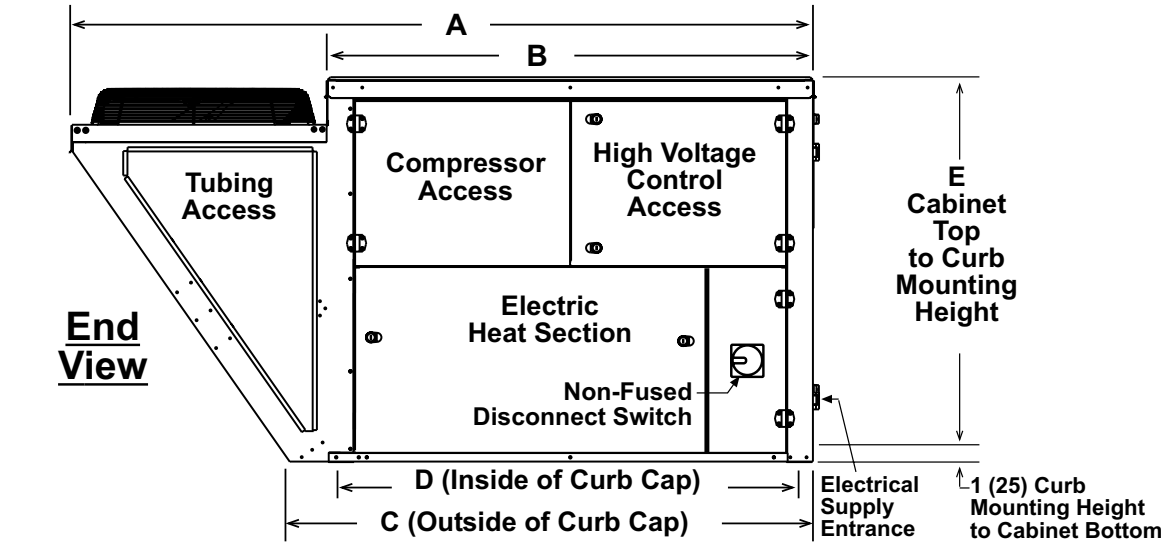
Dimensions are shown by Cabinet Size. For a cross-reference of cabinet size and model size, refer to Appendix, page 58. **IMPORTANT NOTE: "C" Size Cabinets MUST be loaded and unloaded by the lifting lugs. DO NOT attempt to move a "C" size cabinet system with a fork lift.**

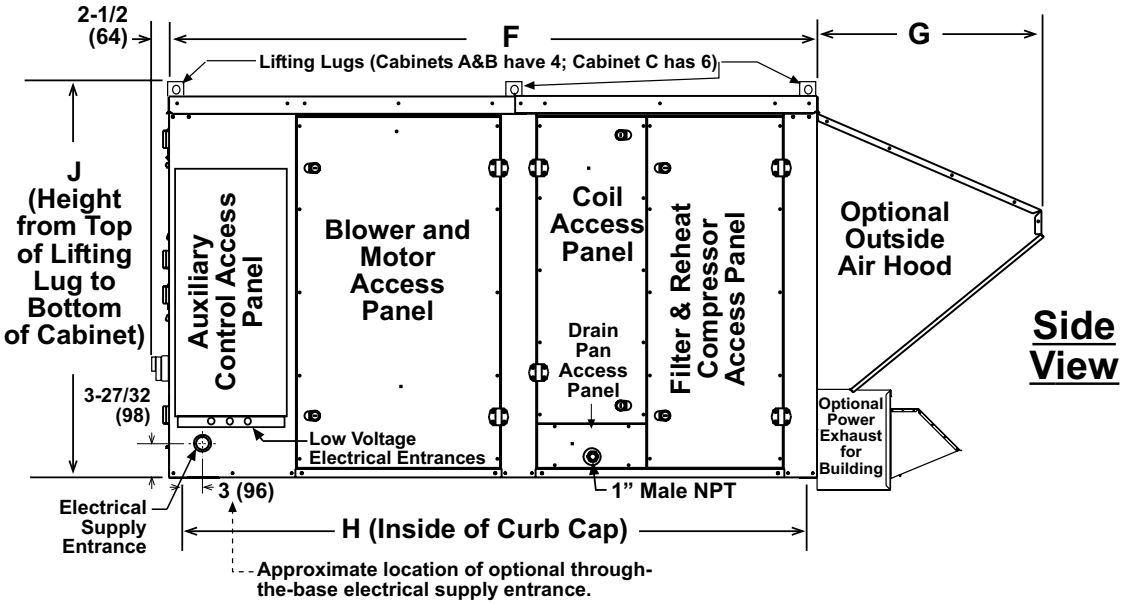
Dimensions - inches (±1/8")

Cabinet Size	Illustration Codes									Outside Air Inlet Opening
	A	B	C	D	E	F	G	H	J	
A	72-5/16	42-5/16	46-1/2	39-1/2	43-7/8	76-5/16	26-3/4 w/o power exhaust; 44 with power exhaust	73-5/8	48-1/8	24 W x 20 H
B	87-5/16	57-5/16	61-1/2	54-1/2	43-7/8	76-5/16		73-5/8	48-1/8	36 W x 20 H
C	100-23/32	68-7/8	68-9/16	66	62	105-1/4	38	102-1/2	66-5/8	49-5/8 W x 25-5/8 H

Dimensions - mm (±3mm)

Cabinet Size	Illustration Codes									Outside Air Inlet Opening
	A	B	C	D	E	F	G	H	J	
A	1837	1075	1181	1003	1114	1938	679 w/o power exhaust; 1118 with power exhaust	1870	1222	610 W x 508 H
B	2218	1456	1562	1384	1114	1938		1870	1222	914 W x 508 H
C	2558	1749	1742	1677	1575	2673	965	2604	1692	1260 W x 651 H



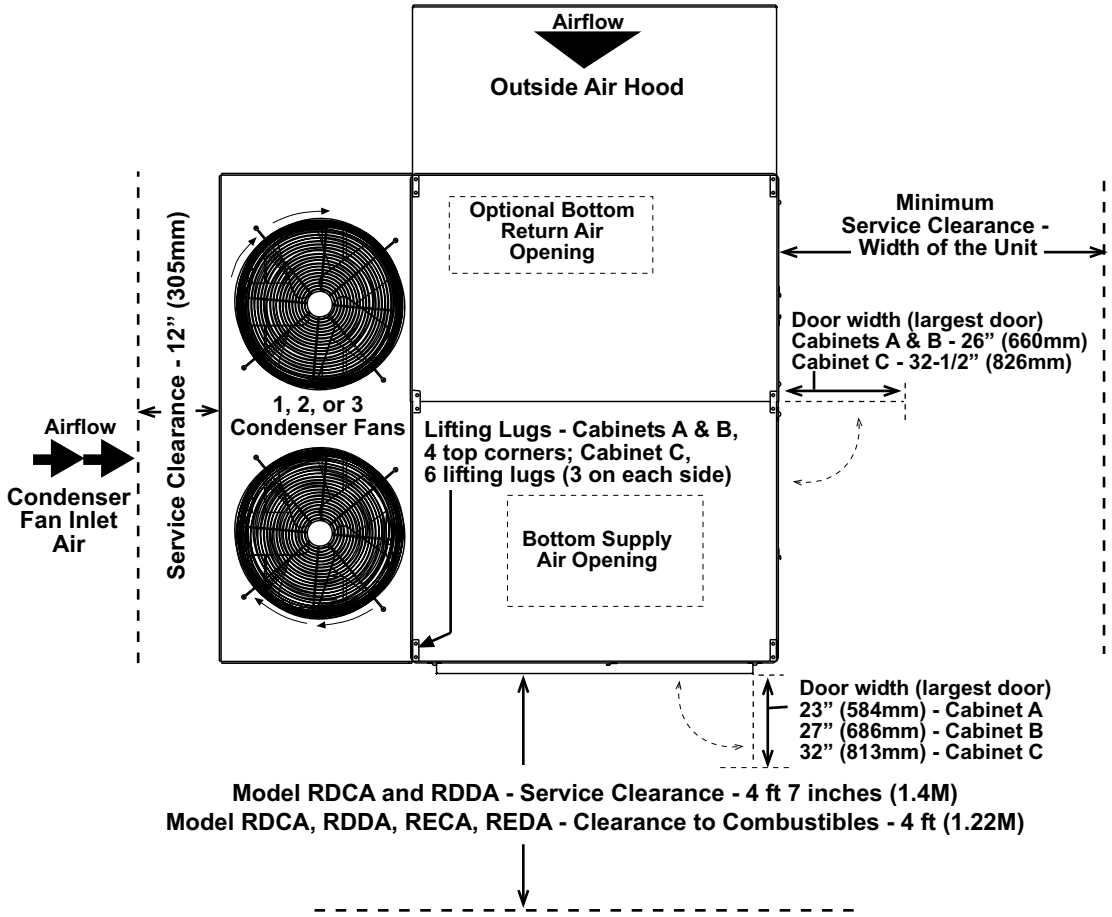


4.3 Clearances

Provide minimum clearances as shown in **FIGURE 3**. Minimum clearances are required to ensure proper operation and access for service. If a heat section is included, clearances to combustibles are required. Clearance to combustibles is defined as the minimum distance from the heater to a surface or object that is necessary to ensure that a surface temperature of 90°F above the surrounding ambient temperature is not exceeded.

The area above the condenser fans MUST always be totally open space.

FIGURE 3 - Clearances



Additional Heat Section Clearance Information

Gas Heat Section - If installing a Model RDCA or RDDA, the 4 ft (1.22M) service clearance provides for clearance to combustibles and required space for combustion air inlet and venting.

Vent terminal must be 4 feet (1.22M) from gas and electric meters, regulators, and relief equipment.

Electric Heat Section - If installing a Model RECA or REDA, provide a 4 ft (1.22M) service clearance.

5. Mounting

5.1 Approximate Weights

5.1.1 Accessory Weights

Refer to the system weight charts on page 10 or 11 to determine Cabinet Size. Add the accessory weight to the system weight for model and size.

Optional building power exhaust is not listed because weight varies with motor horsepower. Additional motor only weight would be from 23-70 lbs (10-32 kg).

Accessory Weights (add to system weight in tables on page 10 or 11)

Cabinet Size	A		B		C	
Optional Accessory	**lbs**	**kg**	**lbs**	**kg**	**lbs**	**kg**
Outside Air Hood (Option AS16 or AS19)	35	16	45	20	80	36
Model JHUP-0250 Curb Duct Furnace	■		530	240	■	
Downflow Roof Curb (Option CJ31)	93	42	105	48	235	107
32" (813mm) High Horizontal Flow Roof Curb (Option CJ50)	210	95	240	109	530	240
36" (914mm) High Horizontal Flow Roof Curb (Option CJ49)	■		■		575	261

5. Mounting (cont'd)

5.1 Approximate Weights (cont'd)

NOTE: If approximate unit corner weights are required, refer to www.RezSpec.com, Form C-PC, Sales and Technical Catalog. Corner weights for Model JHUP-0250 curb duct furnace are in Paragraph 5.3.

5.1.2 Weights - Models RCA and RDA

Model RCA and Model RDA Weight (lbs)

Model RCA Cooling Only	**Size**	**025**	**037**	**059**	**060**	**077**	**078**	**090**	**108**	**109**	**120**	**139**	**164**	**166**	**176**	**184**	**198**	**226**	**292**	**374**
	Cabinet	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**B**	**A**	**B**	**C**	**B**	**B**	**C**	**C**	**C**
	-000	689	700	815	775	857	904	915	894	1010	1019	1160	1139	1280	1891	1348	1416	1891	2276	2601

Model RDA Cooling w/ Reheat	**Size**	**102**	**114**	**126**	**144**	**188**	**220**	**230**	**234**	**280**	**346**	**428**	**446**
	Cabinet	**A**	**A**	**A**	**A**	**B**	**B**	**C**	**B**	**C**	**C**	**C**	**C**
	-000	982	993	972	1097	1372	1440	1968	1508	1968	2353	2677	2706

Model RCA and Model RDA Weight (kg)

Model RCA Cooling Only	**Size**	**025**	**037**	**059**	**060**	**077**	**078**	**090**	**108**	**109**	**120**	**139**	**164**	**166**	**176**	**184**	**198**	**226**	**292**	**374**
	Cabinet	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**B**	**A**	**B**	**C**	**B**	**B**	**C**	**C**	**C**
	-000	313	318	370	352	389	410	415	406	458	462	526	517	581	858	611	642	858	1032	1180

Model RDA Cooling w/ Reheat	**Size**	**102**	**114**	**126**	**144**	**188**	**220**	**230**	**234**	**280**	**346**	**428**	**446**
	Cabinet	**A**	**A**	**A**	**A**	**B**	**B**	**C**	**B**	**C**	**C**	**C**	**C**
	-000	445	450	441	498	622	653	893	684	893	1067	1214	1227

5.1.3 Weights - Models RDCA and RDDA

Model RDCA and Model RDDA Weight (lbs)

Size	**Model RDCA Cooling with Gas Heat Section**												
	Cabinet A			**Cabinet B**		**Cabinet C**							
	-100	**-150**	**-200**	**-250**	**-300**	**-350**	**-400**	**-450**	**-500**	**-550**	**-600**	**-650**	**-700**
025	756	776	798	■	■	■	■	■	■	■	■	■	■
037	767	787	809	■	■	■	■	■	■	■	■	■	■
059	881	904	926	■	■	■	■	■	■	■	■	■	■
060	842	862	884	■	■	■	■	■	■	■	■	■	■
077	924	946	968	■	■	■	■	■	■	■	■	■	■
078	970	992	1014	1129	1153	■	■	■	■	■	■	■	■
090	981	1003	1025	1140	1164	■	■	■	■	■	■	■	■
108	961	981	1003	1120	1144	■	■	■	■	■	■	■	■
109	■	1098	1120	■	■	■	■	■	■	■	■	■	■
120	1087	1107	1129	1243	1270	■	■	■	■	■	■	■	■
139	■	■	■	1385	1411	■	■	■	■	■	■	■	■
164	■	1228	1250	■	■	■	■	■	■	■	■	■	■
166	■	■	■	1506	1530	■	■	■	■	■	■	■	■
176	■	■	■	■	■	2094	2094	2140	2140	2203	2203	2347	2347
184	■	■	■	1574	1598	■	■	■	■	■	■	■	■
198	■	■	■	1640	1667	■	■	■	■	■	■	■	■
226	■	■	■	■	■	2094	2094	2140	2140	2203	2203	2347	2347
292	■	■	■	■	■	2479	2479	2525	2525	2589	2589	2732	2732
374	■	■	■	■	■	2804	2804	2850	2850	2913	2913	3057	3057
Size	**RDDA Cooling with Reheat and Gas Heat Section**												
	Cabinet A			**Cabinet B**		**Cabinet C**							
	-100	**-150**	**-200**	**-250**	**-300**	**-350**	**-400**	**-450**	**-500**	**-550**	**-600**	**-650**	**-700**
102	1049	1070	1092	1207	1232	■	■	■	■	■	■	■	■
114	1060	1081	1103	1218	1243	■	■	■	■	■	■	■	■
126	1039	1060	1082	1197	1222	■	■	■	■	■	■	■	■
144	■	1185	1207	1322	1347	■	■	■	■	■	■	■	■
188	■	■	■	1502	1527	■	■	■	■	■	■	■	■
220	■	■	■	1570	1595	■	■	■	■	■	■	■	■
230	■	■	■	■	■	2221	2221	2267	2267	2330	2330	2474	2474
234	■	■	■	1638	1663	■	■	■	■	■	■	■	■
280	■	■	■	■	■	2221	2221	2267	2267	2330	2330	2474	2474
346	■	■	■	■	■	2606	2606	2652	2652	2715	2715	2859	2859
428	■	■	■	■	■	2930	2930	2976	2976	3039	3039	3183	3183
446	■	■	■	■	■	2959	2959	3005	3005	3068	3068	3212	3212

Model RDCA and Model RDDA Weight (kg)

Size	**Model RDCA Cooling with Gas Heat Section**												
	Cabinet A			**Cabinet B**		**Cabinet C**							
	-100	**-150**	**-200**	**-250**	**-300**	**-350**	**-400**	**-450**	**-500**	**-550**	**-600**	**-650**	**-700**
025	343	352	362	■	■	■	■	■	■	■	■	■	■
037	348	357	367	■	■	■	■	■	■	■	■	■	■
059	400	410	420	■	■	■	■	■	■	■	■	■	■
060	382	391	401	■	■	■	■	■	■	■	■	■	■
077	419	429	439	■	■	■	■	■	■	■	■	■	■
078	440	450	460	512	523	■	■	■	■	■	■	■	■
090	445	455	465	517	528	■	■	■	■	■	■	■	■
108	436	445	455	508	519	■	■	■	■	■	■	■	■
109	■	498	508	■	■	■	■	■	■	■	■	■	■
120	493	502	512	564	576	■	■	■	■	■	■	■	■
139	■	■	■	628	640	■	■	■	■	■	■	■	■
164	■	557	567	■	■	■	■	■	■	■	■	■	■
166	■	■	■	683	694	■	■	■	■	■	■	■	■
176	■	■	■	■	■	950	950	971	971	999	999	1065	1065
184	■	■	■	714	725	■	■	■	■	■	■	■	■
198	■	■	■	744	756	■	■	■	■	■	■	■	■
226	■	■	■	■	■	950	950	971	971	999	999	1065	1065
292	■	■	■	■	■	1125	1125	1146	1146	1174	1174	1239	1239
374	■	■	■	■	■	1272	1272	1293	1293	1321	1321	1387	1387
Size	**RDDA Cooling with Reheat and Gas Heat Section**												
	Cabinet A			**Cabinet B**		**Cabinet C**							
	-100	**-150**	**-200**	**-250**	**-300**	**-350**	**-400**	**-450**	**-500**	**-550**	**-600**	**-650**	**-700**
102	476	485	495	547	559	■	■	■	■	■	■	■	■
114	481	490	500	552	564	■	■	■	■	■	■	■	■
126	471	481	491	543	554	■	■	■	■	■	■	■	■
144	■	538	547	60	611	■	■	■	■	■	■	■	■
188	■	■	■	681	693	■	■	■	■	■	■	■	■
220	■	■	■	712	723	■	■	■	■	■	■	■	■
230	■	■	■	■	■	1007	1007	1028	1028	1057	1057	1122	1122
234	■	■	■	743	754	■	■	■	■	■	■	■	■
280	■	■	■	■	■	1007	1007	1028	1028	1057	1057	1122	1122
346	■	■	■	■	■	1182	1182	1203	1203	1232	1232	1297	1297
428	■	■	■	■	■	1329	1329	1350	1350	1379	1379	1444	1444
446	■	■	■	■	■	1342	1342	1363	1363	1392	1392	1457	1457

5.1.4 Weights - Models RECA and REDA

Model RECA and Model REDA Weight (lbs)

Model RECA Cooling with Electric Heat Section

Size	Cabinet A											Size	Cabinet B										Cabinet C				
	05S	10S	15S	20S	24S	15	20	25	30	35	39		15	20	25	30	35	39	50	60	75	88	39	50	60	75	88
025	■	■	■	■	■	719						025	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
037	■	■	■	■	■	730						037	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
059	■	■	■	■	■	844						059	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
060	789					805						060	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
077	■	■	■	■	■	886						077	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
078	■	919				935	■	935		■	935	078	■	1030	■	■	1030	■	1058			■	■	■	■	■	■
090	■	930				946	■	946		■	946	090	■	1041	■	■	1041	■	1069				■	■	■	■	■
108	■	908				924	■	924		■	924	108	■	1019	■	■	1019	■	1049				■	■	■	■	■
109	■	■	■	■	■	■	1041					109	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
120	■	1034				1049	■	1049		■	1049	120	■	1144	■	■	1144	■	1175				■	■	■	■	■
139	■	■	■	■	■	■	■	■	■	■	■	139	1285						1314				■	■	■	■	■
164	■	■	1153			1168						164	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
166	■	■	■	■	■	■	■	■	■	■	■	166	1310						1340				■	■	■	■	■
176	■	■	■	■	■	■	■	■	■	■	■	176	■	■	■	■	■	■	■	■	■	■	1931	1971			
184	■	■	■	■	■	■	■	■	■	■	■	184	1378						1409				■	■	■	■	■
198	■	■	■	■	■	■	■	■	■	■	■	198	■	1446					1477				■	■	■	■	■
226	■	■	■	■	■	■	■	■	■	■	■	226	■	■	■	■	■	■	■	■	■	■	1931	1971			
292	■	■	■	■	■	■	■	■	■	■	■	292	■	■	■	■	■	■	■	■	■	■	2316	2356			
374	■	■	■	■	■	■	■	■	■	■	■	374	■	■	■	■	■	■	■	■	■	■	2641	2681			

Model REDA Cooling with Reheat and Electric Heat Section

Size	Cabinet A											Size	Cabinet B										Cabinet C				
	05S	10S	15S	20S	24S	15	20	25	30	35	39		15	20	25	30	35	39	50	60	75	88	39	50	60	75	88
102	■	996				1011	■	1011		■	1011	102	■	1107	■	■	1107	■	1138				■	■	■	■	■
114	■	1008				1023	■	1023		■	1023	114	■	1118	■	■	1118	■	1149				■	■	■	■	■
126	■	■	988			1001	■	1001		■	1001	126	■	1093	■	■	1093	■	1127				■	■	■	■	■
144	■	■	1111			1126	■	1126		■	1126	144	■	1221	■	■	1221	■	1252				■	■	■	■	■
188	■	■	■	■	■	■	■	■	■	■	■	188	1402						1433				■	■	■	■	■
220	■	■	■	■	■	■	■	■	■	■	■	220	■	1470					1499				■	■	■	■	■
230	■	■	■	■	■	■	■	■	■	■	■	230	■	■	■	■	■	■	■	■	■	■	2058	2098			
234	■	■	■	■	■	■	■	■	■	■	■	234	■	1539					1567				■	■	■	■	■
280	■	■	■	■	■	■	■	■	■	■	■	280	■	■	■	■	■	■	■	■	■	■	2058	2098			
346	■	■	■	■	■	■	■	■	■	■	■	346	■	■	■	■	■	■	■	■	■	■	2443	2483			
428	■	■	■	■	■	■	■	■	■	■	■	428	■	■	■	■	■	■	■	■	■	■	2767	2807			
446	■	■	■	■	■	■	■	■	■	■	■	446	■	■	■	■	■	■	■	■	■	■	2796	2836			

Model RECA and Model REDA Weight (kg)

Model RECA Cooling with Electric Heat Section

Size	Cabinet A											Size	Cabinet B										Cabinet C				
	05S	10S	15S	20S	24S	15	20	25	30	35	39		15	20	25	30	35	39	50	60	75	88	39	50	60	75	88
025	■	■	■	■	■	326						025	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
037	■	■	■	■	■	331						037	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
059	■	■	■	■	■	383						059	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
060	358					365						060	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
077	■	■	■	■	■	402						077	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
078	■	417				424	■	424		■	424	078	■	467	■	■	467	■	480			■	■	■	■	■	■
090	■	422				429	■	429		■	429	090	■	472	■	■	472	■	485				■	■	■	■	■
108	■	412				419	■	419		■	419	108	■	462	■	■	462	■	476				■	■	■	■	■
109	■	■	■	■	■	■	472					109	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
120	■	469				476	■	476		■	476	120	■	519	■	■	519	■	533				■	■	■	■	■
139	■	■	■	■	■	■	■	■	■	■	■	139	583						596				■	■	■	■	■
164	■	■	523			530						164	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
166	■	■	■	■	■	■	■	■	■	■	■	166	594						608				■	■	■	■	■
176	■	■	■	■	■	■	■	■	■	■	■	176	■	■	■	■	■	■	■	■	■	■	876	894			
184	■	■	■	■	■	■	■	■	■	■	■	184	925						639				■	■	■	■	■
198	■	■	■	■	■	■	■	■	■	■	■	198	■	656					670				■	■	■	■	■
226	■	■	■	■	■	■	■	■	■	■	■	226	■	■	■	■	■	■	■	■	■	■	876	894			
292	■	■	■	■	■	■	■	■	■	■	■	292	■	■	■	■	■	■	■	■	■	■	1051	1069			
374	■	■	■	■	■	■	■	■	■	■	■	374	■	■	■	■	■	■	■	■	■	■	1198	1216			

Model REDA Cooling with Reheat and Electric Heat Section

Size	Cabinet A											Size	Cabinet B										Cabinet C				
	05S	10S	15S	20S	24S	15	20	25	30	35	39		15	20	25	30	35	39	50	60	75	88	39	50	60	75	88
102	■	452				459	■	459		■	459	102	■	502	■	■	502	■	516				■	■	■	■	■
114	■	457				464	■	464		■	464	114	■	507	■	■	507	■	521				■	■	■	■	■
126	■	■	448			454	■	454		■	454	126	■	496	■	■	496	■	511				■	■	■	■	■
144	■	■	504			511	■	511		■	511	144	■	554	■	■	554	■	568				■	■	■	■	■
188	■	■	■	■	■	■	■	■	■	■	■	188	636						650				■	■	■	■	■
220	■	■	■	■	■	■	■	■	■	■	■	220	■	667					680				■	■	■	■	■
230	■	■	■	■	■	■	■	■	■	■	■	230	■	■	■	■	■	■	■	■	■	■	933	952			
234	■	■	■	■	■	■	■	■	■	■	■	234	■	698					711				■	■	■	■	■
280	■	■	■	■	■	■	■	■	■	■	■	280	■	■	■	■	■	■	■	■	■	■	933	952			
346	■	■	■	■	■	■	■	■	■	■	■	346	■	■	■	■	■	■	■	■	■	■	1108	1126			
428	■	■	■	■	■	■	■	■	■	■	■	428	■	■	■	■	■	■	■	■	■	■	1255	1273			
446	■	■	■	■	■	■	■	■	■	■	■	446	■	■	■	■	■	■	■	■	■	■	1268	1286			

5. Mounting (cont'd)

All of these packaged systems are designed to be mounted on a roof or slab using a manufacturer designed curb. Both downflow and horizontal curbs are available.

5.2 Roof Curb

When the unit is being placed on a roof, location depends on the roof structure.

Position the curb so that the air inlet of the unit will not be facing into the prevailing wind. Always comply with the clearances in Paragraph 4.3. For condensate drainage and proper operation, it is important that the installation be level.

5.2.1 Downflow Roof Curb, Option CJ31

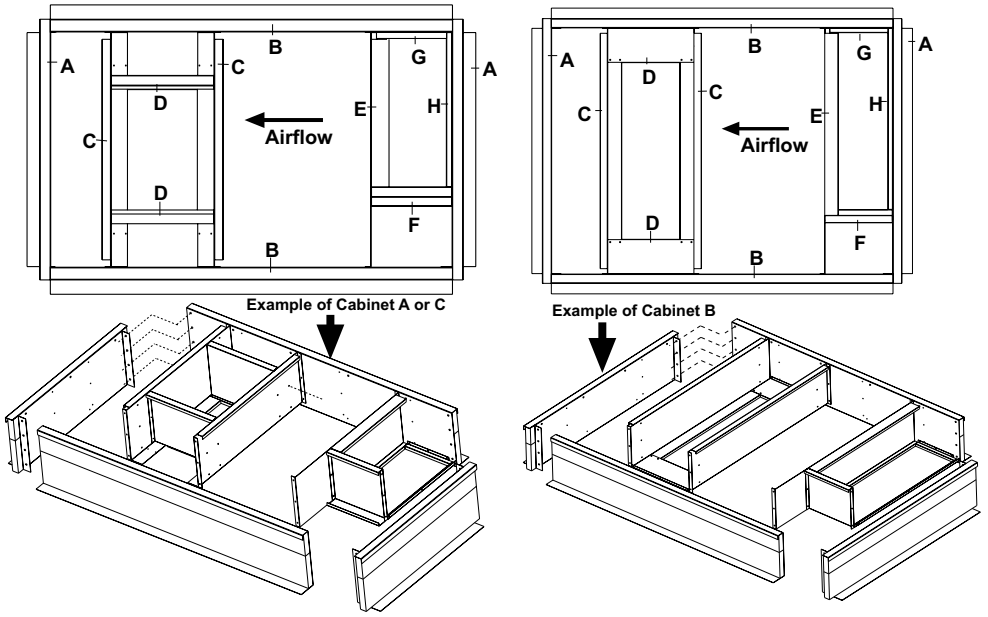
The downflow roof curb designed for this system is a 14" high insulated curb. The curb includes integral duct connections for supply air and optional return air as illustrated in **FIGURE 4**. See curb dimensions in **FIGURE 5** and assembly instructions on page 14.

Components

FIGURE 4 - Roof Curb Components and Layout

All curbs include corner hardware as shown on page 14 and screws for attaching duct pieces.

Top View Showing Field Assembly of Downflow Roof Curb, Option CJ31
Roof curb height is 14" (356mm).



Option CJ31 Components

Code	Components:	Qty
A & B	Curb End and Side Assemblies	2 ends; 2 sides
C & D	Parts to create the supply air duct through the curb. Pieces mate to the cabinet or heat exchanger discharge and provide a duct flange for installing ductwork.	2 ends; 2 sides (may be same or different depending on size of system)
E, F, G, & H	Parts to create the optional return air duct through the curb. Pieces mate to the cabinet and provide a duct flange for installing ductwork. If the system does not include optional return air, these pieces may be installed but are not required and will serve no function.	4 pieces - a side, an end, a side angle, and an end angle

Option CJ31 Roof Curb P/N's

Before installing, verify the appropriate P/N with table below. Follow the instructions on page 14.

	Cabinet Size *	Model Sizes *	Pkg P/N
Option CJ31 for Cooling Only Models RCA, RDA	A	* All except Size 164	205661
		Size 164	205662
	B	* All	205664
	C	176, 226, 230, 280	208854
		292, 374, 346, 428, 446	208856

	Cabinet Size *	Model Size	Option CJ31 Roof Curb Pkg P/N
Option CJ31 for Models RECA and REDA	A	All	205661
	B	All	205664
	C	All	208856

*See Appendix, page 58, for cross-reference by Cabinet Size and Model Size.

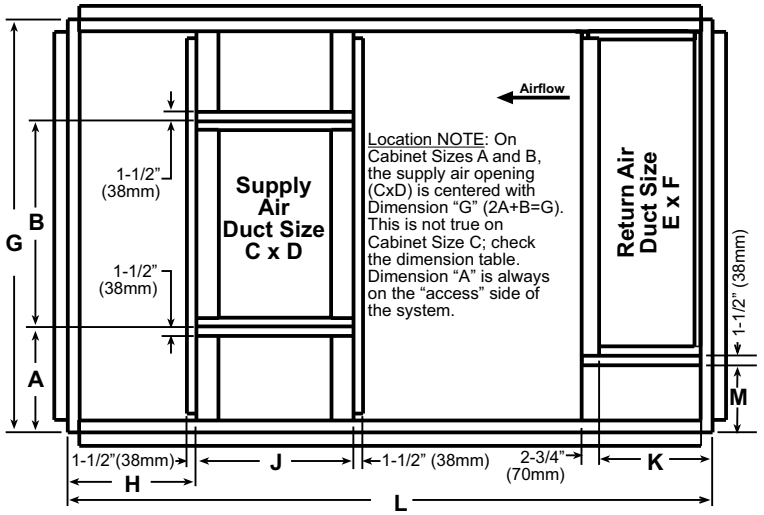
Option CJ31 for Models RDCA and RDDA	Option CJ31 Roof Curb Pkg P/N's by Gas Heat Section Size												
	100	150	200	250	300	350	400	450	500	550	600	650	700
	205660	205661	205662	205663	205664	208854		208855		208856		208857	

Dimensions - Downflow Roof Curb Option CJ31

FIGURE 5 - Roof Curb and Duct Opening Dimensions

IMPORTANT NOTES: Area enclosed by 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.

If area inside curb is open, roof opening dimensions must be no greater than:
Cabinet A - 34-13/16" x 69" (884 x 1753mm);
Cabinet B - 49-13/16" x 69" (1265 x 1753mm);
Cabinet C - 61-5/16" x 97-7/8" (1557 x 2486mm).
NOTE: See Appendix, page 58, for cross-reference by Model Size and Cabinet Size.



When cutting only duct openings, cut opening 1" (25mm) larger than duct size to allow clearance for installation.

Cabinet Size	RCA Model Size	RDA Model Size	Illustration Codes - FIGURE 5 A	B	C	D	E	F	G	H	J	K	L	M
Curb Dimensions for Cooling Only Model RCA, RDA by Cabinet Size, Model Size - inches (±1/8)														
A	025, 037, 059, 060, 077, 078, 090, 108, 109, 120	102, 114, 126, 144	6-1/8	26-1/2	24	12	24	12	38-5/8	13-1/4	17-1/2	12-7/8	72-3/4	12-1/4
	164	--	N/A	N/A	24	12	24	12	38-5/8	13-1/4	17-1/2	12-7/8	72-3/4	12-1/4
B	078, 090, 108, 120, 139, 166, 184, 198	102, 114, 126, 144, 188, 220, 234	N/A	N/A	36	12	36	12	53-5/8	13-1/4	17-1/2	12-7/8	72-3/4	12-1/4
C	176, 226	230, 280	19-3/8	32-3/8	30	18	46	15	65-1/8	20-1/4	24-3/4	17-7/8	101-5/8	13-1/4
	292, 374	346, 428, 446	10-3/4	49-1/2	47	18	46	15	65-1/8	20-1/4	24-3/4	17-7/8	101-5/8	13-1/4
Curb Dimensions for Cooling Only Model RCA, RDA by Cabinet Size, Model Size - mm (±3)														
A	025, 037, 059, 060, 077, 078, 090, 108, 109, 120	102, 114, 126, 144	156	673	610	305	610	305	981	337	445	327	1848	311
	164	--	N/A	N/A	610	305	610	305	981	337	445	327	1848	311
B	078, 090, 108, 120, 139, 166, 184, 198	102, 114, 126, 144, 188, 220, 234	N/A	N/A	914	305	914	305	1362	337	445	327	1848	311
C	176, 226	230, 280	492	822	762	457	1168	381	1654	514	629	454	2581	337
	292, 374	346, 428, 446	273	1257	1194	457	1168	381	1654	514	629	454	2581	337

Cabinet Size *	RDCA Model Size*	RDDA, Model Size*	Gas Heat Size *	Illustration Codes - FIGURE 5 A	B	C	D	E	F	G	H	J	K	L	M
Curb Dimensions for Cooling/Gas Heat Makeup Air Model RDCA, RDDA by Cabinet Size, Model Size - inches (±1/8)															
A	025, 037, 059, 060, 077, 078, 090, 108, 109, 120, 164	102, 114, 126, 144	100	9-7/8	19	18	12	24	12	38-5/8	13-1/4	17-1/2	12-7/8	72-3/4	12-1/4
			150	6-1/8	26-1/2	24	12	24	12	38-5/8	13-1/4	17-1/2	12-7/8	72-3/4	12-1/4
			200	N/A	N/A	24	12	24	12	38-5/8	13-1/4	17-1/2	12-7/8	72-3/4	12-1/4
B	078, 090, 108, 120, 139, 166, 184, 198	102, 114, 126, 144, 188, 220, 234	250	6-1/8	41-1/2	36	12	36	12	53-5/8	13-1/4	17-1/2	12-7/8	72-3/4	12-1/4
			300	N/A	N/A	36	12	36	12	53-5/8	13-1/4	17-1/2	12-7/8	72-3/4	12-1/4
C	176, 226, 292, 374	230, 280, 346, 428, 446	350, 400	19-3/8	32-3/8	30	18	46	15	65-1/8	20-1/4	24-3/4	17-7/8	101-5/8	13-1/4
			450, 500	13-1/4	44-1/2	42	18	46	15	65-1/8	20-1/4	24-3/4	17-7/8	101-5/8	13-1/4
			550, 600	10-3/4	49-1/2	47	18	46	15	65-1/8	20-1/4	24-3/4	17-7/8	101-5/8	13-1/4
			650, 700	8-1/4	55	52	18	46	15	65-1/8	20-1/4	24-3/4	17-7/8	101-5/8	13-1/4
Curb Dimensions for Cooling/Gas Heat Makeup Air Model RDCA, RDDA by Cabinet Size, Model Size - mm (±3)															
A	025, 037, 059, 060, 077, 078, 090, 108, 109, 120, 164	102, 114, 126, 144	100	251	483	457	305	610	305	981	337	445	327	1848	311
			150	156	673	610	305	610	305	981	337	445	327	1848	311
			200	N/A	N/A	610	305	610	305	981	337	445	327	1848	311
B	078, 090, 108, 120, 139, 166, 184, 198	102, 114, 126, 144, 188, 220, 234	250	156	1054	914	305	914	305	1362	337	445	327	1848	311
			300	N/A	N/A	914	305	914	305	1362	337	445	327	1848	311
C	176, 226, 292, 374	230, 280, 346, 428, 446	350, 400	492	822	762	457	1168	381	1654	514	629	454	2581	337
			450, 500	337	1130	1067	457	1168	381	1654	514	629	454	2581	337
			550, 600	273	1257	1194	457	1168	381	1654	514	629	454	2581	337
			650, 700	210	1397	1321	457	1168	381	1654	514	629	454	2581	337

Cabinet Size*	RECA Model Size *	REDA Model Size *	* Electric Heat Size	Illustration Codes - FIGURE 5 A	B	C	D	E	F	G	H	J	K	L	M
Curb Dimensions for Cooling/Electric Heat Makeup Air Model RECA, REDA by Cabinet Size, Model Size - inches (±1/8)															
A	025, 037, 059, 060, 077, 078, 090, 108, 109, 120, 164	102, 114, 126, 144	All	N/A	N/A	24	12	24	12	38-5/8	13-1/4	17-1/2	12-7/8	72-3/4	12-1/4
B	078, 090, 108, 120, 139, 166, 184, 198	102, 114, 126, 144, 188, 220, 234	All	N/A	N/A	36	12	36	12	53-5/8	13-1/4	17-1/2	12-7/8	72-3/4	12-1/4
C	176, 226, 292, 374	230, 280, 346, 428, 446	All	10-3/4	49-1/2	47	18	46	15	65-1/8	20-1/4	24-3/4	17-7/8	101-5/8	13-1/4
Curb Dimensions for Cooling/Electric Heat Makeup Air Model RECA, REDA by Cabinet Size, Model Size - mm (±3)															
A	025, 037, 059, 060, 077, 078, 090, 108, 109, 120, 164	102, 114, 126, 144	All	N/A	N/A	610	305	610	305	981	337	445	327	1848	311
B	078, 090, 108, 120, 139, 166, 184, 198	102, 114, 126, 144, 188, 220, 234	All	N/A	N/A	914	305	914	305	1362	337	445	327	1848	311
C	176, 226, 292, 374	230, 280, 346, 428, 446	All	273	1257	1194	457	1168	381	1654	514	629	454	2581	337

* See Appendix, page 58, for cross-reference by Model Size/Heat Size and Cabinet Size

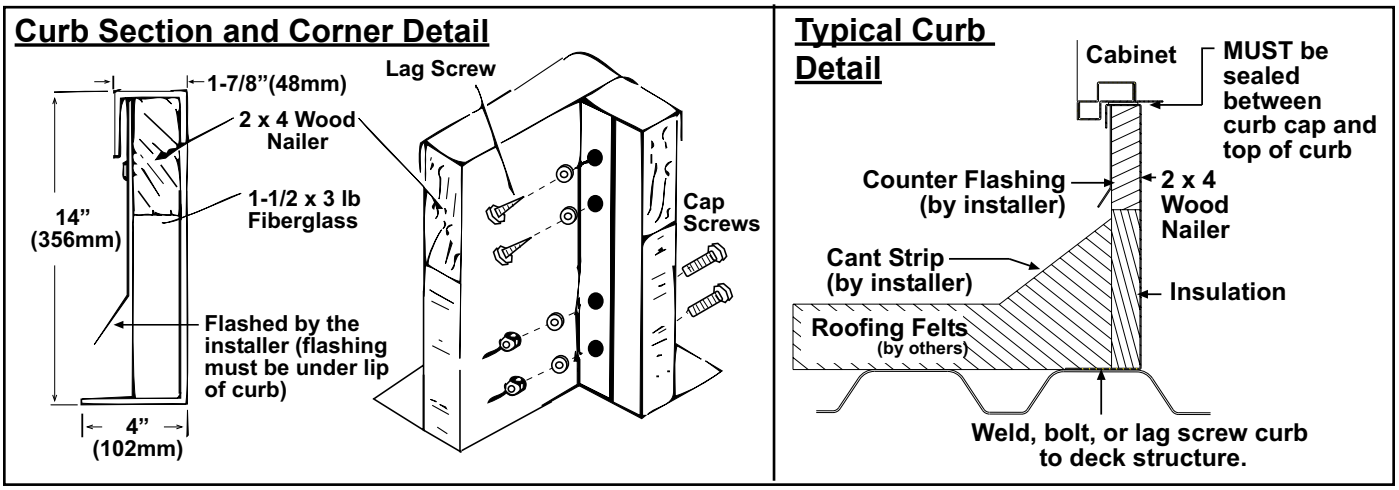
5.2 Roof Curb (cont'd)

5.2.1 Downflow Roof Curb, Option CJ31 (cont'd)

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 dimension table in FIGURE 5.

1. Position the roof curb end assemblies and side assemblies as shown in the drawing in **FIGURE 4,** page 12. Fasten with bolts and lag screws as illustrated in the corner detail (**FIGURE 6,** below).
2. Attach duct sides and ends to create the internal ductwork. Use the sheet-metal screws to attach the ductwork pieces. (Refer to **FIGURE 4**). Attach the return air duct angles to the attached end and side and to the roof curb. **NOTE:** If the system does not have a return air opening, the return air ductwork may be installed in the curb but is not required.
3. Check the roof curb for squareness. The curb must be adjusted so that the diagonal measurements are equal within a tolerance of ± 1/8" (3mm).
4. 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 curb to the roof deck before installing flashing (See Curb Detail in **FIGURE 6**).
5. Install field-supplied flashing.
6. 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 perimeter of the duct opening(s), being sure to make good butt joints at all corners. The sealant tape must be applied to the curb rails to prevent water leakage into the curb area due to blown rain and capillary action.

FIGURE 6 - Option CJ31 Downflow Roof Curb Cross Section and Corner Detail



5.2.2 Curbs for Horizontal Airflow (Option CJ50 and Option CJ49)

Option CJ50 is a 32" (813mm) high curb designed to provide horizontal airflow into the side of a building or at a location through the roof that is not directly under the unit. Option CJ49 is the same design but is 36" (914mm) high. Both curbs are NRCA approved and are constructed of 14 gauge steel with a 2x4 full perimeter wood nailer strip.

Option CJ49 and CJ50 curbs are shipped in sections and require field assembly. Position the curb so that the air inlet of the unit will not be facing into the prevailing wind. Always comply with the clearances in Paragraph 4.3. Verify that the curb is the correct size and follow the assembly and installation instructions shipped with the curb.

For condensate drainage and proper operation, it is important that the installation be level. To ensure a good weatherproof seal between the unit curb cap and the curb, the curb must be leveled in both directions with no twist end to

end. Shim as required and secure curb before installing flashing. Flashing is field supplied.

If Option CJ50 or CJ49 curb was ordered to arrive prior to the heater, it will be identified by the following P/N's. Verify the appropriate P/N before installing the curb.

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 sides and the top surface of the perimeter of the duct opening(s), being sure to make good butt joints at all corners.

Option CJ50 and CJ49 curbs should only be used for the Models and Sizes for which they are designed. The supply duct panels are insulated so should not be used in an installation that prohibits insulation in the supply duct.

Horizontal Airflow Roof Curb P/N's

Option CJ50 for Models RCA, RDA, RECA, REDA	Cabinet Size*	P/N
	A	206116
	B	206118
	C	208944

Option CJ50 for Models RDCA and RDDA	with Gas Heat Section Size											
	100	150	200	250	300	350	400	450	500	550	600	650	700
	206116			206118		208944							

Option CJ49 for Models RCA, RDA, RECA, REDA	Cabinet Size*	P/N
	C	208943

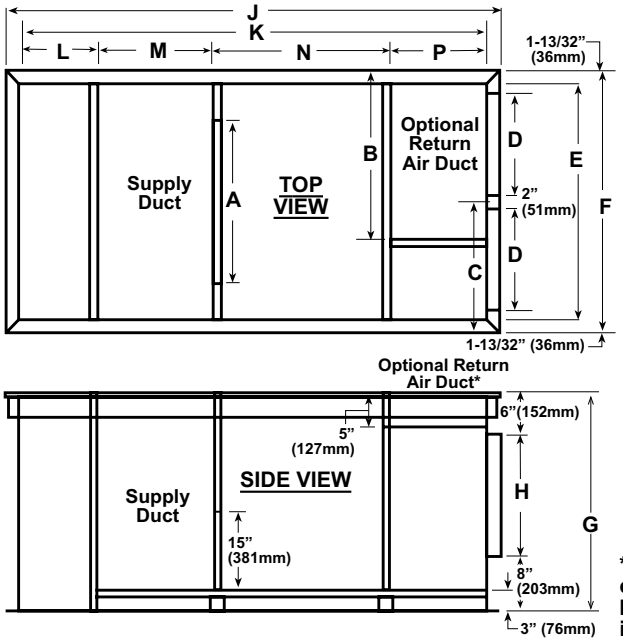
Option CJ49 for Models RDCA and RDDA	with Gas Heat Section Size											
	100	150	200	250	300	350	400	450	500	550	600	650	700
	N/A					208943							

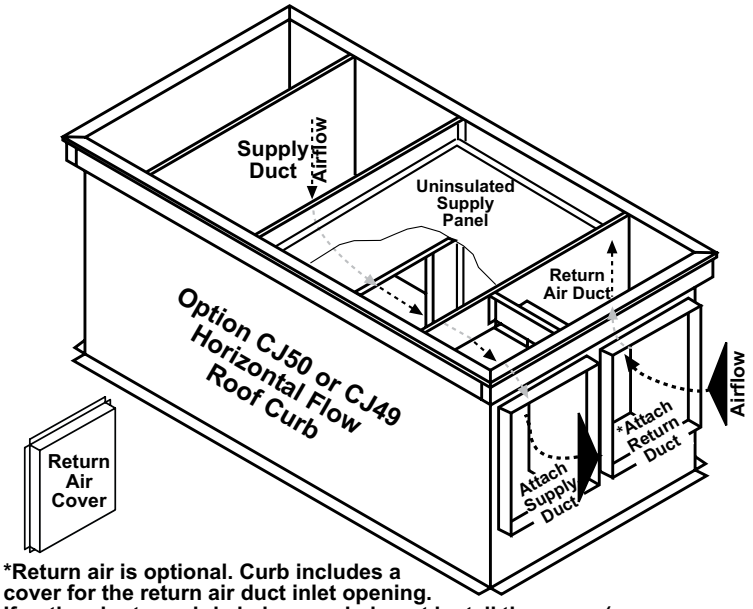
*See cross-reference by Model Size and Cabinet Size in the APPENDIX, page 58.

Dimensions

FIGURE 7A - P/N's, Dimensions, and Airflow of Horizontal Curbs, Option CJ50 and CJ49

Dimensions are shown by Cabinet Size; see cross-reference of cabinet size and model size, Appendix, page 58.





***Return air is optional. Curb includes a cover for the return air duct inlet opening. If optional return air is being used, do not install the cover (or remove if already installed). If return air is not being used, install the return air cover (or do not remove if already installed).**

Dimensions of Horizontal Airflow Curb, Options CJ49 and CJ50, by Cabinet Size - inches (±1/8)

Cabinet Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P
A	24	22-15/16	17-13/32	15	34-13/16	38-9/16	32	18	72-3/4	69	11-3/8	17-1/2	29-1/8	11-1/8
B	36	37-15/16	24-29/32	22-1/2	49-13/16	53-9/16	32	18	72-3/4	69	11-3/8	17-1/2	29-1/8	11-1/8
C	52	50-3/8	32-1/2	28-1/4	61-11/32	65-3/32	32 (CJ50)	18 (CJ50)	101-37/64	97-7/8	18-7/16	24-3/4	38-5/8	16
							36 (CJ49)	22 (CJ49)						

Dimensions of Horizontal Airflow Curb, Options CJ49 and CJ50, by Cabinet Size - mm (±3)

Cabinet Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P
A	610	583	442	381	884	979	813	457	1848	1753	289	445	740	283
B	914	964	633	572	1265	1360	813	457	1848	1753	289	445	740	283
C	1321	1280	826	718	1558	1653	813 (CJ50)	457 (CJ50)	2580	2486	468	629	981	406
							914 (CJ49)	559 (CJ49)						

5. Mounting (cont'd)

5.2 Roof Curb (cont'd)

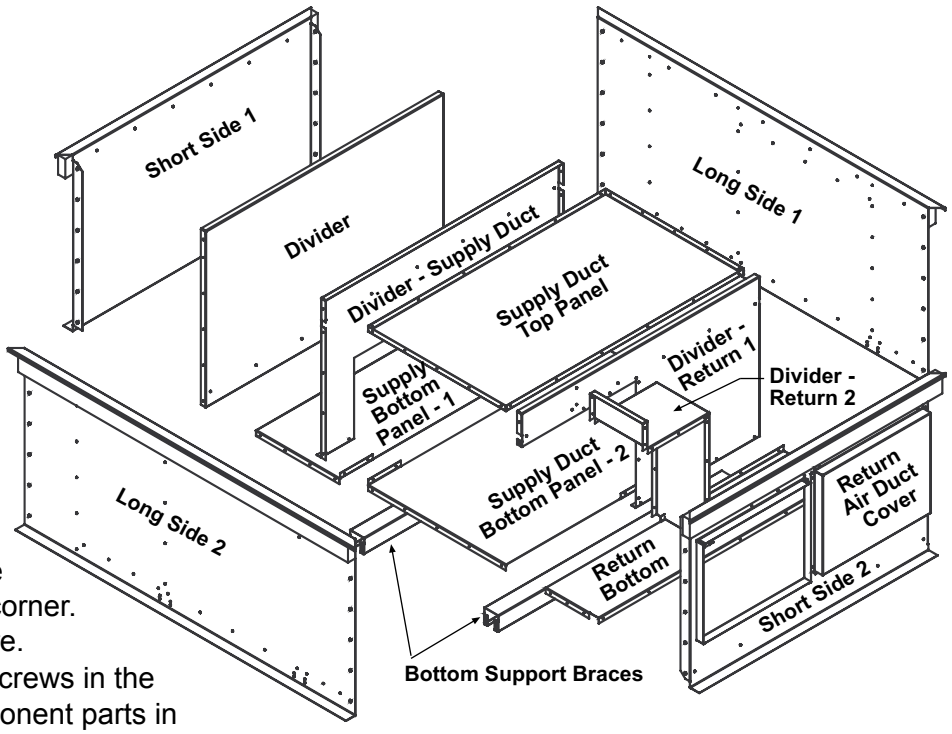
5.2.2 Curbs for Horizontal Airflow (Option CJ50 and Option CJ49) (cont'd)

Assembly and Installation Instructions for Option CJ49 and CJ50, Curbs for Horizontal Airflow

CAUTION: Before installing, recheck to be sure that the correct curb has been ordered and received. Be sure that the curb selected matches the unit ordered. Verify the dimensions of the curb received with the dimension table in FIGURE 7A.

Verify all the components and be sure that the curb is correct for the system being installed. A short version of the installation instructions is included in this manual. When assembling, follow the complete step-by-step illustrated instructions included with the curb.

FIGURE 7B - Exploded View of Horizontal Airflow Curb Assembly Showing all Components



Hardware Package	
Qty	Description
24	1/4-20 x 1/2 Hex Bolts with Nuts
24	1/4 Split Lock Washers
24	1/4 Flat Washers
88	10-16 x 1/2 Hex Screws
1	3/4" x 1-1/4" x 14' Gasket

Instructions

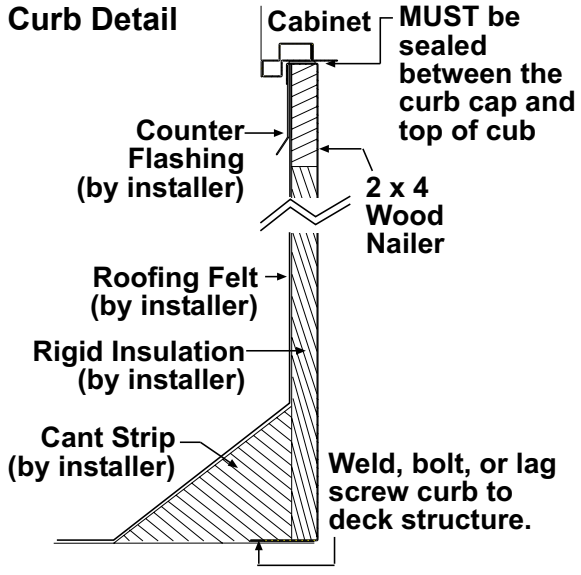
Layout the four curb sides.
Join the corners using six of the bolts and washer sets at each corner.
Be sure curb assembly is square.
Line up the holes and use the screws in the hardware kit to attach the component parts in the following order:

1 - Two bottom support braces
2 - Divider panel
3 - 3 Bottom panels (supply bottom 1 and 2 and return bottom)
4 - Supply duct divider
5 - Return divider - 1
6 - Supply duct top panel
7 - Return divider - 2
8 - Return air cover (Install only if the application does not require return air. If the application includes return air, this cover is not used.)

Complete curb installation with the following field supplied items: counter flashing, roofing felt, rigid insulation, and cant strip. See **FIGURE 7C**.

Before placing the unit on the curb, apply the 3/4" x 1-1/4" gasket to both the top surface of the curb rails and the top surface of the perimeter of the duct opening(s), being sure to make good butt joints at all corners.

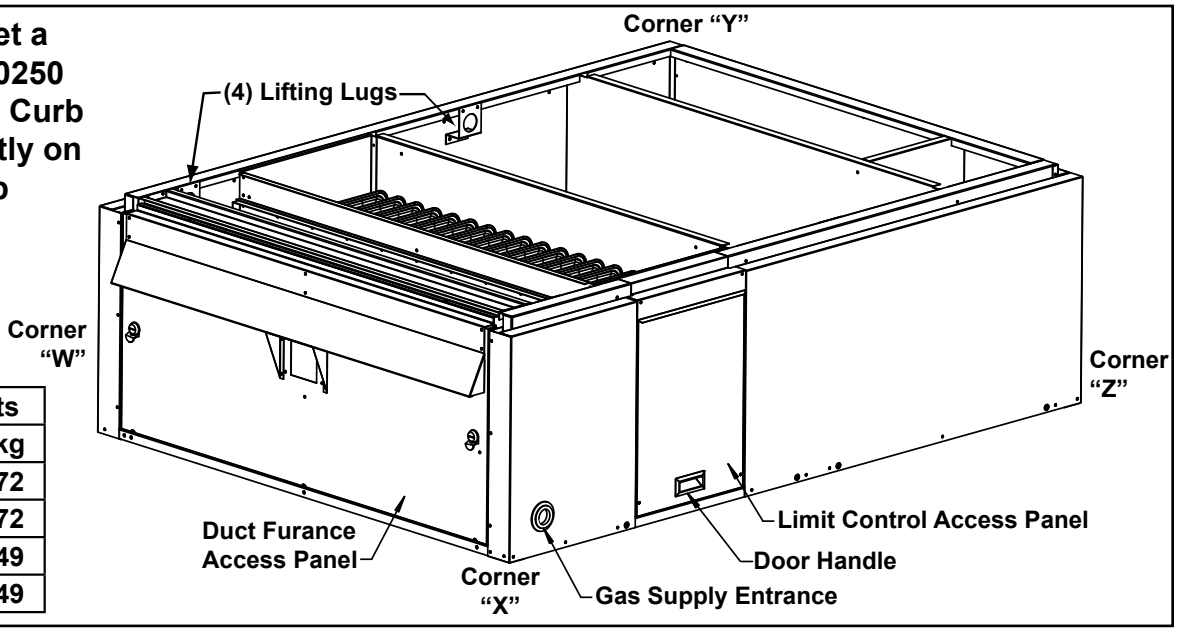
FIGURE 7C - Curb Detail



5.3 Duct Furnace Curb Section, Model JHUP-0250

If a Model JHUP-0250 duct furnace curb section in included in the installation, it must be set on a Cabinet B roof curb before placing the Model RDDA or Model RDCA system. Verify that gasketing has been applied to the top surfaces of the installed roof curb. Using all four lifting lugs and being sure the ductwork matches, set the duct furnace curb section on the roof curb. Refer to **FIGURE 8** and the lifting information in Paragraph 5.4.

FIGURE 8 - Set a Model JHUP-0250 Duct Furnace Curb Section directly on the Roof Curb



Corner Weights		
Corner	lbs	kg
"W"	158	72
"X"	158	72
"Y"	107	49
"Z"	107	49

Follow the wiring diagram and instructions in Paragraph 9.4 for making gas and electrical connections.

Before setting the Model RDDA or RDCA unit on top of the duct furnace curb section, apply gasket strips to the top perimeter and to the duct connections of the duct furnace curb section.

5.4 Rigging and Lifting the Unit

DANGER: If there is any visible damage or any question about the integrity of the lifting lugs, *DO NOT LIFT* the system. Consult the factory. See Hazard Intensity Levels, page 2.

See approximate net weights in Paragraph 5.1. If corner weights are required, refer to Sales/Technical Catalog Form C-PC (available on the Website, www.RezSpec.com). **IMPORTANT NOTE:** "C" Cabinet systems MUST be loaded and unloaded by the lifting lugs. Due to size, DO NOT attempt to move a "C" cabinet system with a fork lift.

Check to be sure that gasketing has been applied to the curb or duct furnace curb section prior to lifting the unit.

Lifting lugs are provided for rigging. Cabinets A and B have four lifting lugs -- one on each corner. Cabinet C has six lifting lugs -- three on each side. Inspect the lugs and their attachment points. If there is any doubt about the integrity of the lifting lugs or their attachment points, contact the factory.

DANGER: To prevent injury, death, or equipment damage when lifting, use ALL lifting lugs. See Hazard Intensity Levels, page 2.

The unit MUST be lifted with appropriate spreader bars that lift the unit straight up with vertical force only on the lifting lugs. Using ALL lifting lugs (4 or 6) is mandatory.

5. Mounting (cont'd)

5.4 Rigging and Lifting (cont'd)

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

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.

DANGER: To prevent injury, death, or equipment damage caused by inadequate or improper rigging, test lift the unit before attempting to install it on the roof. See Hazard Intensity Levels, page 2.

6. Mechanical

6.1 Duct Connections

Supply and optional return air duct connections are made at the curb and can be made prior to the unit being set on the curb. See **FIGURE 5** for downflow roof curb or **FIGURE 7** for horizontal flow curb.

To facilitate startup, on systems with a heat section or in cooling only systems with Option DU1, the discharge temperature sensor is factory-installed temporarily in the outlet. Depending on the controls, the sensor must either be re-located to the supply ductwork or disconnected. Because of the split burner system, ductwork configuration and location of the sensor are especially important on units with a gas heat section. See Paragraph 8.1 on ductwork configuration requirements and instructions about re-locating the sensor.

CAUTION: An external duct system static pressure not within the limits shown on the rating plate, or improper motor pulley or belt adjustment, may overload the motor. See Hazard Levels, page 2.

Requirements and Suggestions for Installing Ducts

- **Type of Ductwork** - The type of duct installation to be used depends in part on the type of construction of the roof (whether wood joist, steelbar joist, steel truss, pre-cast concrete) and the ceiling (whether hung, flush, etc.).
- **Ductwork Material** - Rectangular duct should be constructed of not lighter than No. 26 U.S. gauge galvanized iron or No. 24 B & S gauge aluminum.
- **Ductwork 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" (1" is recommended) of insulation.
- **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 ductwork 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.

6.2 Condensate Drain

A slide-out, removable drain pan with a 1" male NPT drain connection is located below the coil cabinet (See **FIGURE 2A** or **FIGURE 2B**, page 7 or 8). When connecting the drain line, provide a means of disconnecting the line at or near the cabinet connection to allow the drain pan to be removed for cleaning.

Ensure the system is level and install a trap in the drain (see **FIGURE 9A**). Pitch the drain line at least 1/2" (13mm) for every 10 feet (3M) of horizontal run. Drain lines must not interfere with drain pan or access panels. An obstruction in the drain or a poorly designed drain can cause condensate pan to over flow. Overflow could result in unit or building damage.

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

Condensate Drain Trap

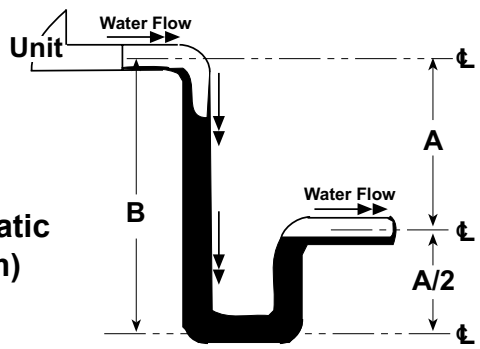
The design of the drain trap is important. Since the condensate drain pan is on the blower inlet side, there is a negative pressure at the drain relative to the ambient. The trap height must account for this static pressure difference. Maximum negative static can be determined by reading the negative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

If dimension "B" in **FIGURE 9A** is not tall enough, the water seal will not hold, and air will be drawn through the drain pipe into the system. 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 9A** illustrates the appropriate dimensions for trapping a negative pressure system.

FIGURE 9A - Condensate Drain Trap Dimensions

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

B = A + A/2



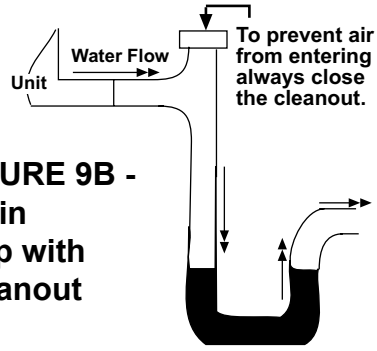


FIGURE 9B - Drain Trap with Cleanout

Improper trap design accounts for some condensate drainage system failures, but incorrect use and maintenance of condensate drain traps can also cause problems. The combination of airborne particles and moisture in the air handler can result in algae formation in the drain pan and traps. The traps must be cleaned regularly to avoid blockage that can slow or stop water flow, resulting in backup into the system.

If drains have a cleanout opening (**FIGURE 9B**), be sure to close the opening after cleaning.

Condensate Drain Use

Seasonal Usage - At the beginning of the cooling season, inspect and clean the entire cooling coil cabinet including the condensate drain pan. Thoroughly clean dirt, algae, grease, and other contaminates. Inspect condensate drain pans, traps, and piping; fill traps with water to ensure proper operation. During a wintertime shutdown of the cooling system it may be desirable to disconnect and remove all water from the traps and drains to prevent freeze damage. If local building codes permit, traps may be filled with an antifreeze solution. Or, piping may be designed with freeze plugs or other freeze protection methods (such as a heat tape).

Year Round Usage - Climates or applications with cooling requirements year round require more frequent inspections of the cooling coil cabinet and condensate drains. Depending on climate, freeze protection of traps may be required during non-cooling hours.

6. Mechanical (cont'd)

6.3 Inlet Air Hood

The outside air inlet hood is a weatherized hood with permanent aluminum filters, designed to be field assembled and installed around the horizontal inlet air opening of the cabinet.

CAUTION: It is recommended that the inlet to the outside air hood NOT be facing into the prevailing wind. Allow 14" minimum clearance from the bottom of the air hood to the mounting surface.

Option AS16 or AS19, Inlet Air Hood, Installation Instructions

Installation NOTE: If equipped with a power exhaust option, attach the power exhaust hood(s) before installing the outside air hood. See Paragraph 9.2, pages 38-39.

To avoid possible damage, it is recommended that the outside air hood be installed after the system has been placed on the roof. The air hood should be installed before the blower is operated. Do not install the hood while the system is in operation.

All screw ends should be inside the air hood. Remove plastic film from painted parts before installing. Refer to the illustration that applies:

FIGURE 10A for Cabinet Sizes A and B without a power exhaust option

FIGURE 10B for Cabinet Size A with a power exhaust option

FIGURE 10C for Cabinet Size B with a power exhaust option

FIGURE 10D for Cabinet Size C with or without a power exhaust option

(**NOTE:** See Model Size/Cabinet Size cross-reference tables in the Appendix on page 58.)

<u>Instructions</u> (apply to all FIGURES except where noted):

1. **Install Top Panel** - On the air inlet of the cabinet, remove and save the factory-installed screws attaching the system top. Slide the hood top panel underneath the edge of the cabinet top. **The edge of the hood top panel must be between the cabinet top and the end panel.** Reinsert all of the sheetmetal screws.
2. **Install Left Side Panel (right when facing the unit)** - Locate the vertical row of cabinet screws to the right of the opening that attach the condenser section. Remove and save those screws.
   Position the hood left side panel under and to the **inside** of the hood top panel. Reinsert the screws to attach the side panel.
   Attach the hood side panel to the hood top with sheetmetal screws.
3. **Install Right Side Panel (left when facing the unit)** - Position the hood right side panel under and to the inside of the hood top panel. Attach to the unit using the required number of **self-drilling screw**s.
4. **<u>FIGURE 10C</u> - Install Top Panel Slope Section** - Position the slope panel against the top panel and over the side panels. Attach to the top panel and both sides with sheetmetal screws.
5. **Install Bottom Support** - Position the hood bottom support so that it is to the **inside** of the two side panels.
   <u>FIGURES 10A and 10D</u> - Attach to the cabinet using the required number of **self-drilling screws**. Attach to both side panels with sheetmetal screws.
   <u>FIGURES 10B and 10C</u> - Attach to both side panels with sheetmetal screws.
6. **Install the Filter Assembly**
   FIGURE 10A, <u>Cabinet Sizes A and B without a power exhaust option</u> - Attach the center support and the two side filter angles. Attach the filter spacer with wing screw receptacle. Position the four filters in the opening. Secure the filters with the filter clamp and the wing screws.
   FIGURES 10B and 10C, <u>Cabinet Size A or B with a power exhaust option</u> - Install the filter frame with filters in place. Position the filter frame assembly in the inlet opening of the hood. Attach at the front and back holes with 1/2" sheetmetal screws. Insert a 3/4" sheetmetal screw at each of the center holes (one on each side).

<u>NOTES</u>:

- Inlet air hood painted parts are shipped with a protective plastic covering. As parts are being installed, remove the protective plastic covering.
- Select screws carefully. Use sheetmetal 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 10A - Installation of Outside Air Hood, Option AS16, on Cabinet Sizes A and B without an optional power exhaust

(For a cross-reference of cabinet size and model size, refer to the Appendix, page 58.)

Filter Sizes

Cabinet A - (4) 1x16x20

Cabinet B - (4) 1x16x25

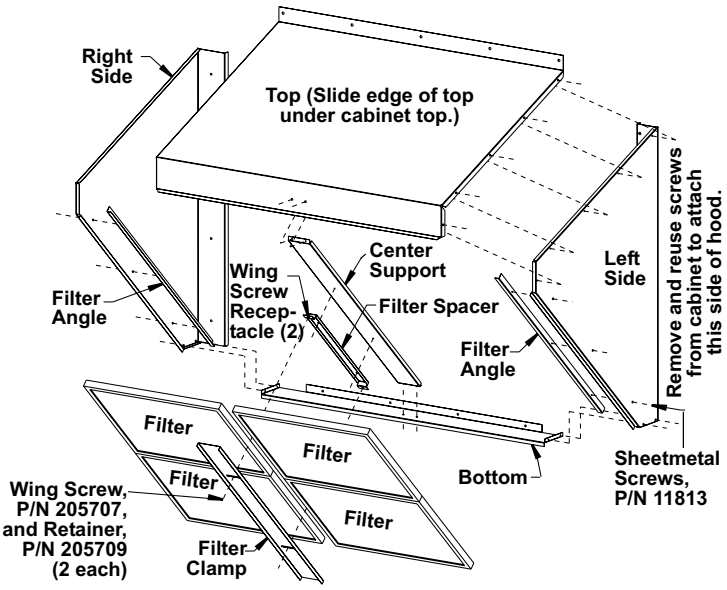
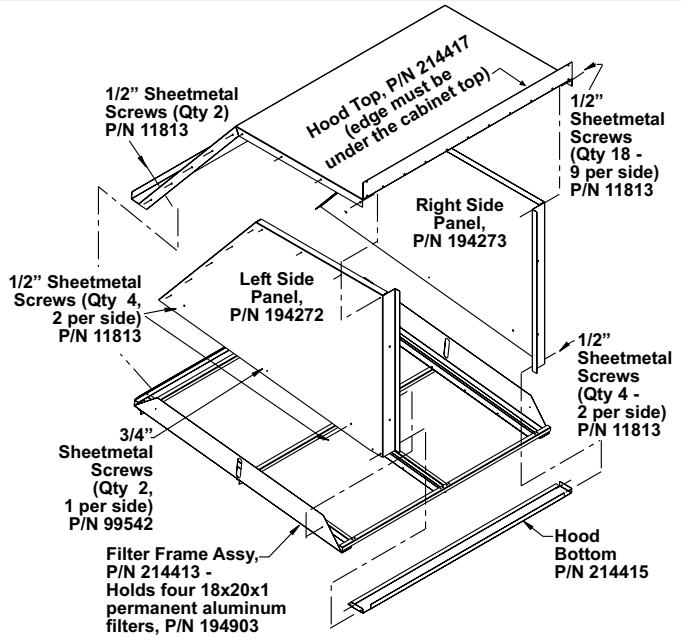


FIGURE 10B - Installation of Outside Air Hood, Option AS19, on Cabinet Size A with an optional power exhaust (Option PE1)

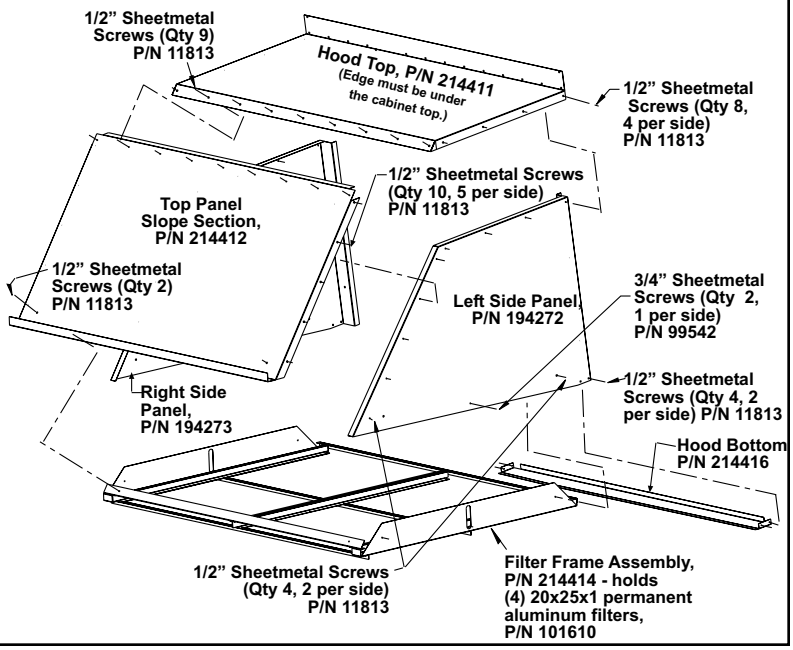
(For a cross-reference of cabinet size and model size, refer to the Appendix, page 58.)



NOTE: If filter tray is mistakenly installed without filters in place, see instructions in Form O-MAPS for installing filters.

FIGURE 10C - Installation of Outside Air Hood, Option AS19, on Cabinet Size B with an optional power exhaust (Option PE2)

(For a cross-reference of cabinet size and model size, refer to the Appendix, page 58.)



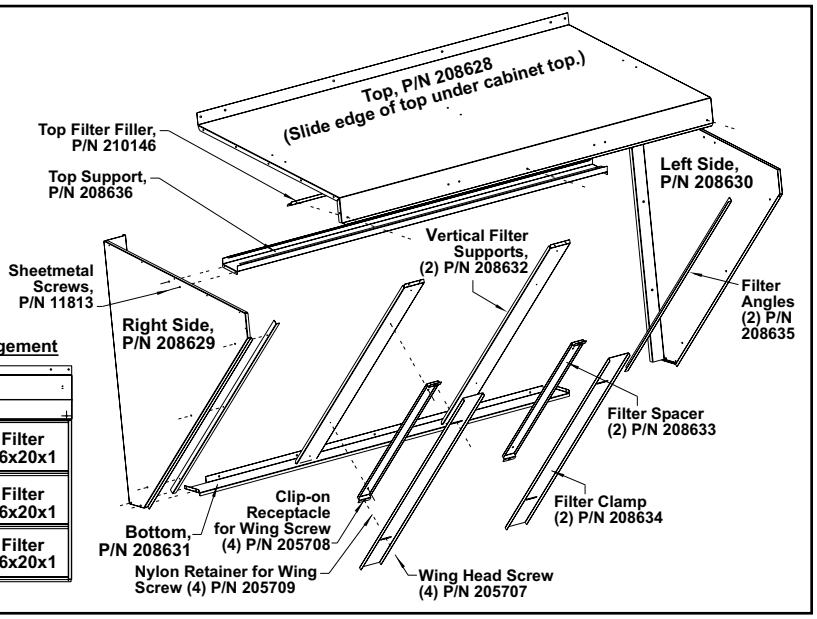
6. Mechanical (cont'd)

6.3 Inlet Air Hood (cont'd)

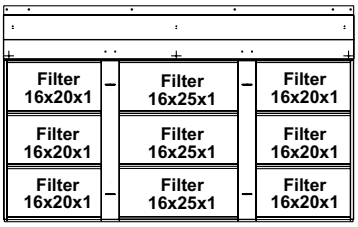
FIGURE 9D - <u>Cabinet Size C with or without a power exhaust option</u> - Attach the top filter filler, the two vertical filter supports and the two side filter angles. Attach the two inner filter spacers with wing screw receptacles. Position the nine filters in the opening as shown. Secure the filters with the filter clamps and the wing screws.

FIGURE 10D - Installation of Outside Air Hood, <u>Option AS16 or Option AS19</u>, on Cabinet Size C (Model Sizes 176, 226, 230, 280, 292, 346, 374, 428, and 446 are always Cabinet C.

For a cross-reference of cabinet size and model size, refer to the Appendix, page 58.)



Inlet View Showing Filter Arrangement



6.4 Blowers, Belts, and Drives

FIGURE 11 - Belt Tension

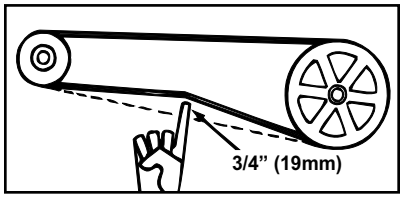
NOTE: The information in Paragraph 6.4 also applies to an optional power exhaust blower.

WARNING: All setscrews and locking collars must be tightened before applying power.

<u>Pulley/Shaft Setscrews</u> - Wrench torque 110 in-lb minimum to 130 in-lb maximum.

<u>Bearing Hub</u> - Socket size 5/16"; Torque 165 in-lbs.

6.4.1 Belts and Belt Tension



Blower systems with 1/2 to 5HP motors are equipped with either Power Twist Plus® linked blower belts or solid belts. The linked belts are designed in sections allowing for easy sizing and adjustment. Blower systems with 7-1/2 or 10 HP motors have solid V-belts. The belt is sized at the factory for the proper tension. Check belt tension. Proper belt tension is important to the long life of the belt and motor. A loose belt will cause wear and slippage. Too much tension will cause excessive motor and blower bearing wear.

<u>Linked Belts</u> - If the belt needs tightening, the recommended method of tightening the belt length is to count the number of links and remove one link for every 24. (A link is made up of two joining sections of belt. For easier removal of links, turn the belt inside out. But be sure to turn it back before installing. If belt is removed or replaced, be sure to align directional arrows on the belt to the proper drive rotation.) The belt tension should be checked after the first 24 hours of running at full load and at regular maintenance inspections.

<u>Solid Belts</u> - Adjust the belt tension by turning the adjusting screw on the motor base until the belt can be depressed 3/4" (19mm). (See **FIGURE 11**.) After correct tension is achieved, re-tighten the locknut on the adjustment screw. Be sure that the belt is aligned in the pulleys.

6.4.2 Adjusting Blower Speed

The blower speed may be adjusted to achieve the desired outlet temperature. If the system includes a gas heat section, any adjustment must be within the temperature rise and the static pressure limits shown on the furnace rating plate. Temperature rise is the difference between the inlet air temperature and the discharge air temperature at high fire. Allowable temperature rise range for a gas heat section is 45 to 100°F. Motors are factory set between maximum and minimum blower speeds.

If the duct resistance is low, the blower may deliver too high an air volume. If the resistance is very low, the blower may deliver enough excess air to over-

amp the motor, causing the overload protector to cycle the motor. Reducing the blower speed will correct these conditions. If ductwork is added to an installation, it may be necessary to increase the blower speed. Decreasing blower speed will increase outlet temperature (heating) or decrease outlet temperature (cooling); increasing blower speed will decrease outlet temperature (heating) or increase outlet temperature (cooling).

At final adjustment, amperes should not exceed motor nameplate amp rating. If gas heat section is included, the temperature rise must be within the 45°F to 100°F range specified on the furnace rating plate. If temperature rise is not in the approved range, blower speed must be adjusted and gas supply pressure checked (See Paragraph 9.2.2.1).

Motors are equipped with adjustable pitch pulleys which permit adjustment of blower speed.

To make adjustments to units with less than a 5HP motor, follow these instructions:

1. If equipped with gas heat, turn off the gas. Always disconnect the electric power.
2. Loosen belt tension and remove the belt.
3. Loosen the set screw on the side of the pulley away from the motor.
4. **To increase the blower speed,** turn the adjustable half of the pulley inward. **To decrease the blower speed,** turn the adjustable half of the pulley outward. One turn of the pulley will change the speed 8-10%.
5. Tighten the set screw on the flat portion of the pulley shaft.
6. Replace the belt and adjust the belt tension. Adjust tension by turning the adjusting screw on the motor base until the belt can be depressed 3/4". (See **FIGURE 11**.) Re-tighten the lock nut on the adjusting screw. Be sure that the belts are aligned in the pulley grooves properly and are not angled from pulley to pulley.
7. Turn on the gas and electric. Light the heater following the instructions on the lighting instruction plate.
8. Check the motor amps with an amp meter. The maximum motor amp rating on the motor nameplate must not be exceeded.
9. When service is complete, check for proper operation. When service is complete, check for proper operation.

For units with 5 HP and larger motor, follow these instructions for adjusting RPM:

1. If equipped with gas heat, turn off the gas. Always disconnect the electric power.
2. Slack off all belt tension by moving motor towards driven shaft until belts are free of grooves. For easiest adjustment, remove the belts from the grooves.
3. On the outer locking ring, locate the two locking screws that are directly across from each other. Loosen these two screws, but do not remove them. Do not loosen any other screws.
4. Adjust sheave to desired pitch diameter by turning the outer locking ring. One complete turn of the outer locking ring will result in .233" change in pitch diameter. To decrease blower speed, increase diameter; to increase blower speed, decrease diameter.

CAUTION: Sheaves should not be adjusted in either direction to the point where movable and stationary flanges are in contact.

5. After completing adjustment, tighten both locking screws in the outer locking ring (loosened in Step 2).
6. Replace belts and move motor away from the driven shaft to apply sufficient belt tension to prevent slippage. (See **FIGURE 11**.) Proper belt tension is important to the long life of the belt and motor. A loose belt will cause wear and slippage. Too much tension will cause excessive motor

6. Mechanical (cont'd)

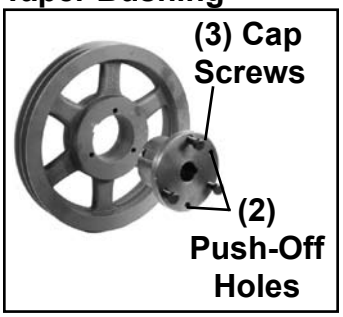
6.4 Blowers (cont'd)

6.4.2 Adjusting Blower Speed (cont'd)

and blower bearing wear. Be sure that the belts are aligned in the pulley grooves and are not angled from pulley to pulley.

7. Check motor amps with an amp meter. The maximum motor amp rating on the nameplate must not be exceeded.
8. When service is complete, check for proper operation.

FIGURE 12 - Split Taper Bushing



6.4.3 Blower Pulley

Some blower pulleys require the use of a split taper bushing in the blower pulley. These split taper bushings must be loosened in order to remove the pulley. Follow these instructions to loosen the bushing:

a) Notice that there are three cap screws in the bushing and two holes without screws, called push-off holes. (See **FIGURE 12**.)

b) Remove the three cap screws.

c) Put two of the cap screws into the two push-off holes. Tighten these two screws evenly until the pulley is loosened.

d) Pulley may now be removed from the shaft.

6.4.4 Blower Bearings

The blower on systems with less than a 10 HP motor are permanently lubricated cartridge ball bearings and do not require greasing. The bearings on systems with a 10HP motor are pillow block ball bearings and are equipped with a grease fitting. Refer to Form O-MAPS for maintenance instructions.

6.4.5 Blower Rotation

Each blower housing is marked for proper rotation. Check blower rotation with the arrow on the housing. If actual rotation is not correct, interchange the two wires on the 3-phase supply connections at the terminal block. Do not change load side wiring.

7. Electrical and Wiring

All electrical wiring and connections, including electrical grounding MUST be made in accordance with the National Electric Code ANSI/NFPA No. 70 (latest edition). In addition, the installer should be aware of any local ordinances or electric company requirements that might apply.

Check and tighten all electrical terminals.

7.1 General, Wiring Diagram, and Unit Wiring Requirements

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. See Hazard Levels, page 2.

Each unit has a custom wiring diagram in the control compartment. All optional electrical components ordered with the unit are shown on that wiring diagram. Codes for those options are listed across the bottom of the diagram. To identify option codes, see the list in the **APPENDIX**, page 58.

After all field wiring is completed, seal all electrical entrances.

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 factory-supplied disconnect switch. The built-in disconnect switch requires copper wiring with ampacity based on 60°C maximum temperature rating at the line side terminals. All external wiring must be within approved conduit and all other external wiring must have a minimum temperature rise rating of 60°C. Run conduit so that it does not interfere with the system access panels. See **FIGURE 2A or 2B**, page 7 or 8, for location of supply wiring entrance.

Through-the-Base Electrical Entrance

Or, if the system is equipped with an optional through-the-base electrical supply entrance (Option AVC1), run the wiring from underneath, through the hole in the cabinet bottom, and up to the disconnect switch.

Voltage

NOTE: If the system was ordered with a voltage loss safety switch (Option BF14, **FIGURE 16B**) that monitors voltage balance, the circuit to the compressors will be opened in the event of voltage imbalance. In six minutes, the switch will recheck the circuit. If the problem is eliminated, the circuit will be re-activated.

The electric supply to the unit must meet stringent requirements for the system to operate properly. Voltage supply and voltage imbalance between phases should be within the tolerances listed below. If the power is not within these voltage tolerances, contact the power company prior to operating the system.

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 on the rating plate.

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

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

7.3 Disconnect Switch

The system is equipped with a built-in non-fusible, lockable disconnect switch (**FIGURE 13**). If an additional optional fusible disconnect is ordered, it will be shipped separately for field installation (or may be field supplied).

When running electrical conduit, be careful that it is clear of all access panels. The built-in disconnect switch requires copper wiring with ampacity based on 60°C maximum temperature rating at the line side terminals.

If field installing an additional disconnect switch, it is recommended that there is at least four feet (1.2M) of service room between the switch and 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.

FIGURE 13 - Built-in, non-fusible, lockable Disconnect Switch

NOTE: Illustration shows disconnect used for cooling only and cooling with a gas heat section. Cooling with electric heat requires a larger disconnect.

DANGER: To prevent injury or death due to electrocution or contact with moving parts, lock disconnect switch open. See Hazard Levels, page 2.

WARNING: If an optional gas furnace is included, if you turn off the power supply, turn off the gas.

7.4 Control Wiring

Wire 24 volt controls according to the wiring diagram. Refer to the chart on the right for minimum control wire gauge by length.

Field Control Wiring Length/Gauge				
Total Wire Length		Distance from Unit to Control		Minimum Recommended Wire Gauge
ft	M	ft	M	
150	46	75	23	18
250	76	125	38	16
350	107	175	53	14

Digital Control Wiring

Wire Gauge	Maximum Sensor Wire Length (Digital Control)	
AWG	Feet	Meters
14	800	244
16	500	152
18	310	94
20	200	61
22	124	38

Digital control inputs are low-current, resistance-based signals. The manufacturer recommends for optimum temperature control performance that the analog and digital inputs (zone sensors, discharge air sensors, etc.) that are connected to the FX05 or FX06 controller be routed in one of the following manners:

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

NOTE: If wire is included with the digital sensor, it is 22 AWG.

7. Electrical and Wiring (cont'd)

7.5 Blower Motor

Check the unit rating plate or motor name plate to verify voltage, HP, and type. Use an amp meter to check motor amps. Amps may be adjusted downward by reducing blower RPM or increasing duct system static pressure.
Blower motors over 3HP and all motors on systems using 575V include a starter. 1/2-3HP, 208, 230, and 460 volt motors have internal overload protection but may be equipped with an optional starter (Option AN10); check the wiring diagram.

7.6 Condenser Fan Motors and Fans

All systems have one, two, or three direct-drive, statically and dynamically balanced, permanently lubricated, condenser fan motors. Condenser fan motors are open dripproof motors with external sling protection against water penetration and have auto reset thermal overload protection.
Maintain minimum clearances around the fans as illustrated in **FIGURE 3** on page 9. Above the fans should always be unrestricted, open area.

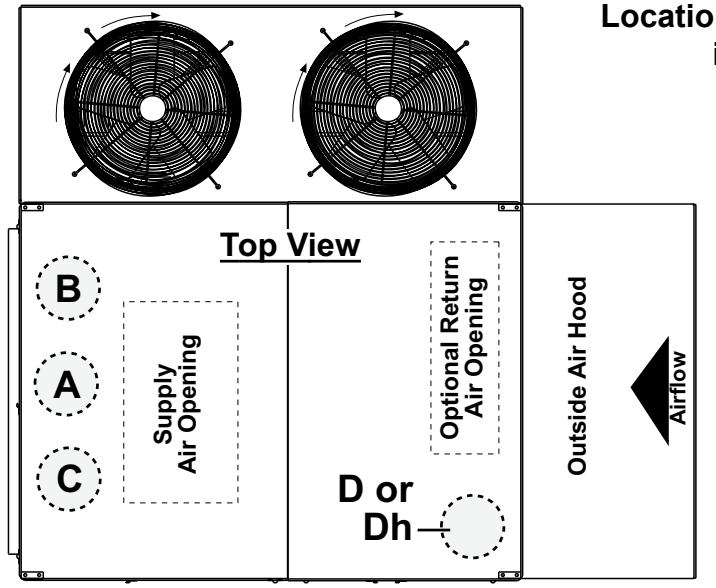
7.7 Compressors

All of the compressors are high efficiency hermetic scroll type. Circuit A, B, and C cooling compressors are in the Compressor Section (see **FIGURE 2A or 2B**, page 7 or 8). Circuit D or Dh compressor (D for cooling or Dh for re-heat heat pump) is located in the cabinet filter section.

FIGURE 14A - Compressor

(For additional information, see Operation/ Maintenance/Service Manual, Form O-MAPS II.)

FIGURE 14B - Top View Showing Approximate Location of Compressors inside the Cabinet



Access compressors **A**, **B**, and **C** through compressor section door. Access **D or Dh** through the filter section door. See **FIGURE 20 or 21**, page 33.

Compressor Amps/ Voltage

Compressor Model	ARI Tonnage	RLA 230 V	LRA 230 V	RLA 460 V	LRA 460 V	RLA 575 V	LRA 575 V
ZR22K3	2	7.9	45	3.9	22.4	N/A	N/A
ZR36K3	3	11.4	77	5.7	39	4.7	31
ZR54KC	4.5	16.4	124	8.2	59.6	6.6	49.4
ZR72KC	6.2	20.7	156	10	70	8.2	54
ZR144KC	12	47.1	245	19.6	125	15.8	100
ZR125KC	10	42	239	19.2	125	13.8	80
Note: Model ZRT144KC uses two ZR72KC compressors in tandum (6.2t).							

Compressor Staging

Each Model system leaves the factory with the compressor staging sequence shown in the table. Models RDCA and RECA have the same staging as Model RCA. Models RDDA and REDA have the same staging as Model RDA.

Model RCA	Model RDA	Cabinet Size	ARI Tonnage	Compressor Circuit ID	Staging Sequence (Refer to locations in FIGURE 14B.)			
					RDA Staging Sequence (Y1) - ALWAYS CKT Dh	1st Stage (Y2)	2nd Stage (Y3) - 1st Stage disabled	3rd Stage (Y2 + Y3)
Model RCA and RDA Sizes Designed for Temperate/Semi-Humid Climates								
060	**N/A**	A	3	CKT A	N/A	B	A	A + B
			2	CKT B				
078	**102**	A&B	4.5	CKT A	CKT Dh	B	A	A + B
			2	CKT B				
090	**114**	A&B	4.5	CKT A	CKT Dh	B	A	A + B
			3	CKT B				
108	**126**	A&B	6.2	CKT A	CKT Dh	B	A	A + B
			3	CKT B				
120	**144**	A&B	6.2	CKT A	CKT Dh	B	A	A + B
			4.5	CKT B				
164	**N/A**	A	3	CKT D	N/A	B	A + D	A + B + D
			4.5	CKT B				
			6.2	CKT A				
166	**188**	B	3	CKT C	CKT Dh	A	B + C	A + B + C
			4.5	CKT A				
			6.2	CKT B				
184	**220**	B	4.5	CKT C	CKT Dh	A	B + C	A + B + C
			4.5	CKT A				
			6.2	CKT B				
198	**234**	B	6.2	CKT C	CKT Dh	B	A + C	A + B + C
			4.5	CKT A				
			6.2	CKT B				
176	**230**	C	4.5	CKT A	CKT Dh	A	B	A + B
			10.0	CKT B				
226	**280**	C	6.2	CKT C	CKT Dh	A	B + C	A + B + C
			6.2t	CKT A & B				
			6.2t					
292	**346**	C	6.2t	CKT A & B	CKT Dh	A	A + B	A + B + C
			6.2t					
			12.0	CKT C				
374	**428**	C	10.0	CKT C	CKT Dh	A	B + C	A + B + C
			10.0	CKT A				
			10.0	CKT B				
	446	C	10.0	CKT C	CKT Dh	A	B + C	A + B + C
			10.0	CKT A				
			10.0	CKT B				
Model RCA Sizes Designed for Dry Climate, Approved for up to 125°F Ambient Temperature								
059	N/A	A	3	CKT A	N/A	B	A	A + B
			2*	CKT B				
077	N/A	A	4.5	CKT A	N/A	B	A	A + B
			2*	CKT B				
109	N/A	A	6.2	CKT A	N/A	B	A	A + B
			3*	CKT B				
139	N/A	B	4.5	CKT A	N/A	A	B + D	A + B + D
			3 / 4.5	CKT D / CKT B				
Model RCA Sizes Designed for Dry Climate, Mountain Range								
025	N/A	A	2	CKT A	N/A	A	N/A	N/A
037	N/A	A	3	CKT A	N/A	A	N/A	N/A
Model RCA	**Model RDA**	**Cabinet Size**	**ARI Tonnage**	**Compressor Circuit ID**	**Staging Sequence (Refer to locations in FIGURE 14B.)**			
					RDA Staging Sequence (Y1) - ALWAYS CKT Dh	**1st Stage (Y2)**	**2nd Stage (Y3) - 1st Stage disabled**	**3rd Stage (Y2 + Y3)**

* Crankcase heater installed.

7. Electrical and Wiring (cont'd)

7.7 Compressors (cont'd)

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 located in positions A, B, and C and the compressor in position D on Sizes 139 and 164 have manual reset high pressure cutouts.

Optional Hot Gas Bypass

CAUTION: An operating bypass valve is very hot to the touch.

The hot gas bypass option provides expanded compressor modulation at low outside air temperatures. It is factory set; however, the factory adjustment should be checked at startup. To check the valve operation and/or make field adjustments, it is necessary to simulate a light load condition.

FIGURE 15 - Optional Hot Gas Bypass Valve

Adjustment Range	0-80 PSI
Factory Setting	75 PSI
PSI per Turn	7.5

Check Bypass Valve Setting - 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 75 psig. The valve has a range of 6 psig and will be fully open at 69 psig. When the valve begins to open, it will be hot to the touch. To adjust the pressure, remove the cap and turn the adjusting stem clockwise to increase the setting pressure and counterclockwise to decrease the setting pressure. 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. Controls

Reference NOTES:
For unit-mounted control location, refer to **FIGURE 20 or 21** on pages 32-33.

8.1 Digital Control Systems

All systems have a unit-mounted, factory-wired, 24-volt DDC controller that is specifically designed to control cooling (3 stages) and heating based on discharge air temperature, outdoor air temperature, dewpoint, and enthalpy.

The integrated display will show the current discharge air temperature, outdoor air temperature, dewpoint, and enthalpy; which outputs are enabled; and the mode of operation. The controller allows the user to change setpoints, change prop bands, and adjust the time clock (Option BHB1 with Option D12; standard with Option D12A). For instructions on changing or adjusting the controller, see the forms supplied in the literature envelope.

The digital controller monitors or provides the following: air proving switch, low limit protection, anti-cycle protection, minimum on/off times, gas valve modulation, and electric heat staging. Controllers may be equipped with optional cards for use with Johnson N2 (Option BHB2) or LON (Option BHB3) Building Automation System.

Summary of Control Features available on all MAPS II Models

FIGURE 16 - Programmable Controllers

FX05 Controller in Option D12

FX06 Controller in Option D12A

Both control options provide the functions listed below.

- Discharge air reset with heating/cooling setpoints
- Zone heating/cooling setpoints
- Reheat override options (disable reheat on call for cooling)
- Cooling lockouts (enthalpy)
- Discharge air reset based on outdoor dry bulb (linear reset)

In addition, Option D12A control system provides.

- Real time clock function built in with 8 event, 7-day schedule
- 9 menu selections for setpoint adjustments and unit status
- Optional remote display and remote space temperature setpoint adjustment

REFERENCE: For controller instructions, see either Form CP-MAPS D12 w/FX05 or CP-MAPS D12A w/FX06 in the literature envelope or download from www.RezSpec.com.

Optional Controls/ Sensors with Options D12 and D12A

If unsure which options are on the unit being installed, check the wiring diagram for the option codes.

Optional Control <u>used only with System Control Option D12 (FX05 Controller)</u>

Wall-Mounted Space (Zone) Temperature Sensor, Option CL53, P/N 207239 (or Option RT11 if factory mounted on an optional console, Paragraph 8.2)

Control works with either cooling or heating, providing zone temperature sensing, occupied setpoint boost (-3° cooling; 4° heating) and unoccupied override button, and LED fan and alarm status for cooling. Provides space temperature identification only (no space adjustment).

Depending on how it is ordered, the control is shipped separately for field installation or factory-mounted on a shipped-separate console. Follow the instructions supplied with the control and the wiring diagram on the unit.

Optional Controls <u>used only with System Control Option D12A (FX06 Controller)</u>

Wall-Mount Space Air Sensor, Option CL67, P/N 222052 (or Option RT14 if factory-mounted on an optional console, Paragraph 8.2)

The wall or console mounted sensor should be located on an interior wall (avoid direct placement in the sun) with the wall opening insulated to prevent cold drafts. Locate the sensor where it will sample representative space air.

The optional space sensor with setpoint adjust transfers the data back to the unit controller. The sensor requires 24VAC power and two wire communication. See the unit wiring diagram for wiring details.

Optional Remote Medium User Interface, Option RB2A, P/N 223125 (or Option RT15 if factory-mounted on an optional console, Paragraph 8.2)

The wall or console mounted user interface provides access to all controller setpoint and commands except test mode. Follow the instructions supplied with the control. Wire according to the wiring diagram on the unit.

Optional Controls <u>used with either System Control Option D12 (FX05) and D12A (FX06)</u>

Option DT5, Outside Air Relative Humidity Transmitter, P/N 206081

<u>Option DT5</u> - The sensor is factory-mounted in the outside air intake and sequences compressor operation based on outdoor dewpoint. It is recommended for humid and temperate climates. (NOTE: This control is standard on Models RDA, RDDA, REDA and other units with reheat Option AU25.)

Option CL47, Room Dehumidistat, P/N 177231 (or Option RT13 if factory-mounted on an optional console)

<u>Option CL47</u> - Uses standard control reheat sequences, except that the zone relative humidity input controls the reheat outputs. The relative humidity controller enables reheat upon a rise in relative humidity.

Control is shipped separately for field installation. Follow the instructions supplied with the control. Wire according to the wiring diagram on the unit.

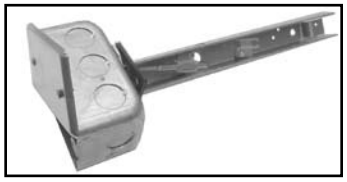
Option BNC1, Damper Changeover

<u>Option BNC1</u> - Control is unit mounted. Used in conjunction with a customer-supplied time clock, control overrides the outside air damper during unoccupied mode. Setup and setback setpoints are provided through the programmable control. Time clock contacts are closed during occupied mode.

Discharge Temperature Sensor

The discharge sensor element on cooling only or cooling with reheat systems (Models RCA/RDA) is attached to the discharge opening of the system. On systems with a heat section (Models RDCA/RDDA/RECA/REDA) or Models

FIGURE 17 - Discharge Air Sensor Assembly in heating systems (RDCA/RDDA/RECA/REDA) or cooling only systems with Option DU1



Discharge Temperature Sensor (cont'd)

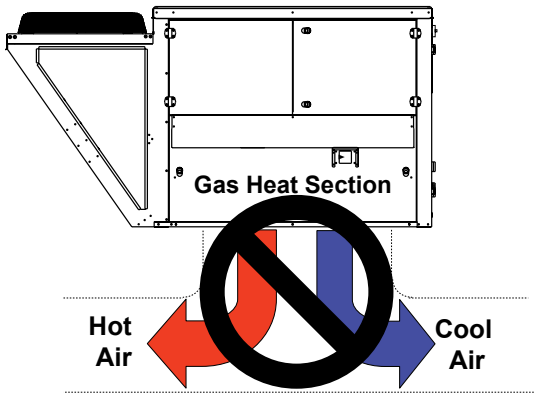
RCA and RDA with Option DU1, the sensor is temporarily installed for heater startup but must be relocated to the ductwork.

When installed in the ductwork the sensor must be housed in a mixing tube which is attached to a 2x4 electrical box. The assembled parts (See **FIGURE 17**) are shipped in the control compartment. Read the instructions below and follow carefully to relocate the discharge temperature sensor.

Discharge Temperature Sensor Relocation Instructions - Apply to all Models RDCA/RDDA/RECA/REDA and Models RCA/RDA with Option DU1

Placement of the discharge air sensor in the ductwork is critical to the correct operation of a MAPS system in both the cooling and heating modes. Due to the split burner and dual heat exchanger features of the MAPS gas heat section, it is extremely important in the heating mode when equipped with an optional gas heat section. The gas heat section of the MAPS unit is designed to conserve fuel by only firing that portion of the burner or one of the dual heat exchangers as required to supply the demand for heat. Improperly locating the sensor can result in poor control of discharge temperature; see **FIGURE 18**.

FIGURE 18 - On units with a gas heat section, avoid an immediate "T" in the discharge duct.



If the unit is installed in a system with immediate "T" configuration leaving the discharge, the 1/3 – 2/3 burner design may allow stratification of the air. The result is hot air only moving down one segment of the duct while cool air moves down the other segment. Avoid this application. If this application is not avoidable, provide air mixing devices or the necessary duct length before the "T" for mixing of the discharge air.

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 ductwork cross-sectional dimension is 24" x 12" (610mm x 305mm).**

   $5 \times \sqrt{\frac{4 \times 12 \times 24}{3.14}} = 96"$ $\quad 5 \times \sqrt{\frac{4 \times 305 \times 610}{3.14}} = 2435mm$

   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 ductwork 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 holder assembly.** The position of the sensor holder in the duct is also important. In horizontal ductwork, locate the sensor assembly in the top, middle of the duct with the sensor holder extending vertically down into the center of the airstream. In vertical ductwork, locate the sensor assembly in the middle of the side of the duct that corresponds with the top middle of the discharge outlet. The sensor holder will extend horizontally into the center of the airstream.

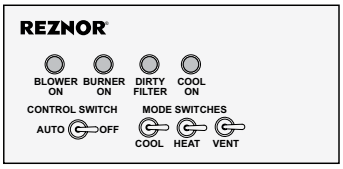
Push the sensing element into the clip attached to the inside of the sensor holder. Turn the metal holder so that the element will be shielded from direct airflow and will sense the temperature in the airstream as it flows through the holes in the sensor holder.
At the location selected, mark the diamond-shaped hole required for the sensor holder. Cut the hole no larger than required for the holder, approximately 1" x 1" (25mm x 25mm).
In the electrical box portion of the sensor holder, determine where the sensor wire should come through the box and remove the knockout at that location.

3. **Attach the sensor holder assembly.** Slide the sensor holder into the opening in the ductwork. Using four field-provided No. 6 sheetmetal screws, attach the box to the ductwork. Attach a field-supplied cable connector to the box, run the sensor wire out, and attach the cover to the box.
4. **Run the sensor wire to the unit.** Digital control inputs are low-current, resistance-based signals. The manufacturer recommends for optimum temperature control performance that the analog and digital inputs (zone sensors, discharge air sensors, etc.) that are connected to the FX05 or FX06 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 digital wires are to be run in the same field-supplied conduit as the 24 VAC control wiring, the digital wiring must be completed using shielded cable and bundled separately from 24 VAC control wiring. The shield must be drained at the unit and taped on the opposite end.

Wire Gauge	Maximum Sensor Wire Length (Digital Control)	
AWG	Feet	Meters
14	800	244
16	500	152
18	310	94
20	200	61
22	124	38

NOTE: If wire is supplied with the sensor, it is 22 AWG.

8.2 Remote Console



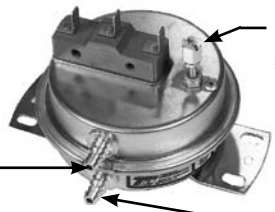
A selection of remote consoles is available with certain appropriate combinations of controls factory mounted. All consoles include indicator lights for blower and cooling operation and an auto/off control switch. NOTE: The auto/off switch must be closed (Auto) for the display on the programmable controller (**FIGURE 16**, page 28) to read "on" (Terminals TB-48 and TB-49). Burner indicator light, dirty filter light, and mode switches depend on option selection. If the unit is ordered with a damper control option that includes a potentiometer, the potentiometer may be mounted on the console.

Field Control Wiring Length/Gauge				
Total Wire Length		Distance from Unit to Control		Minimum Recommended Wire Gauge
ft	M	ft	M	
150	46	75	23	18
250	76	125	38	16
350	107	175	53	14

If any of the field-mounted optional cooling/heating or reheat controls are ordered, one may be mounted on the remote console. Console dimensions with mounting ring are length 15-3/4" (400mm) x height 7-5/8" (194mm) x depth 2-5/8" (67mm). If recessing the console (not using the mounting ring), subtract 7/8" (22mm) from the height and width.
Wire controls on the remote console according to the wiring diagram. Refer to the chart (left) for minimum control wire gauge by length.

FIGURE 19 - Dirty Filter Switch, P/N 105507

Dirty Filter Switch - If there is a dirty filter indicator light on the console, there is a dirty filter switch in the unit. For location, see **FIGURE 20 or 21**, page 33, Item 14. After the unit is started, before continuous operation, the dirty filter switch must be set.



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

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

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

Instructions for Setting Dirty Filter Switch - With clean filters in place; all doors closed (except electrical compartment); and the blower operating, increase the pressure setting by adjusting the setscrew on the switch clockwise until the filter light is energized or the screw is bottomed out. At that point, adjust the setscrew three full turns counterclockwise or until the screw is top-ended. At that setpoint, the filter light will be activated at approximately 50% filter blockage.

8. Controls (cont'd)

8.3 Control Locations

Except where indicated, the locations and number codes in the list (page 33) apply to both F**IGURE 20** and **FIGURE 21**.

FIGURE 20 - <u>Models RCA, RDA, RDCA, RDDA</u> - Locations of Standard and Optional Controls and Service Ports

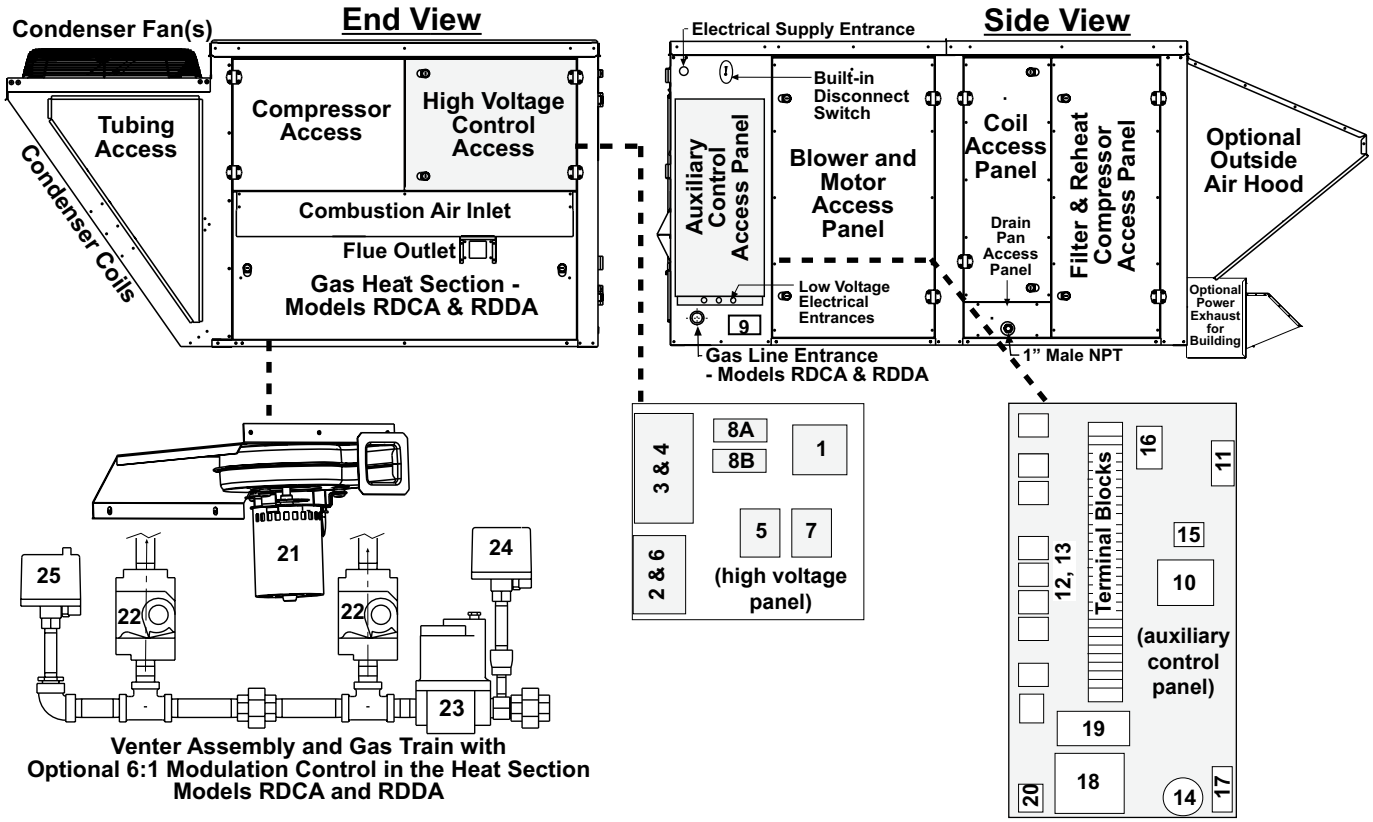
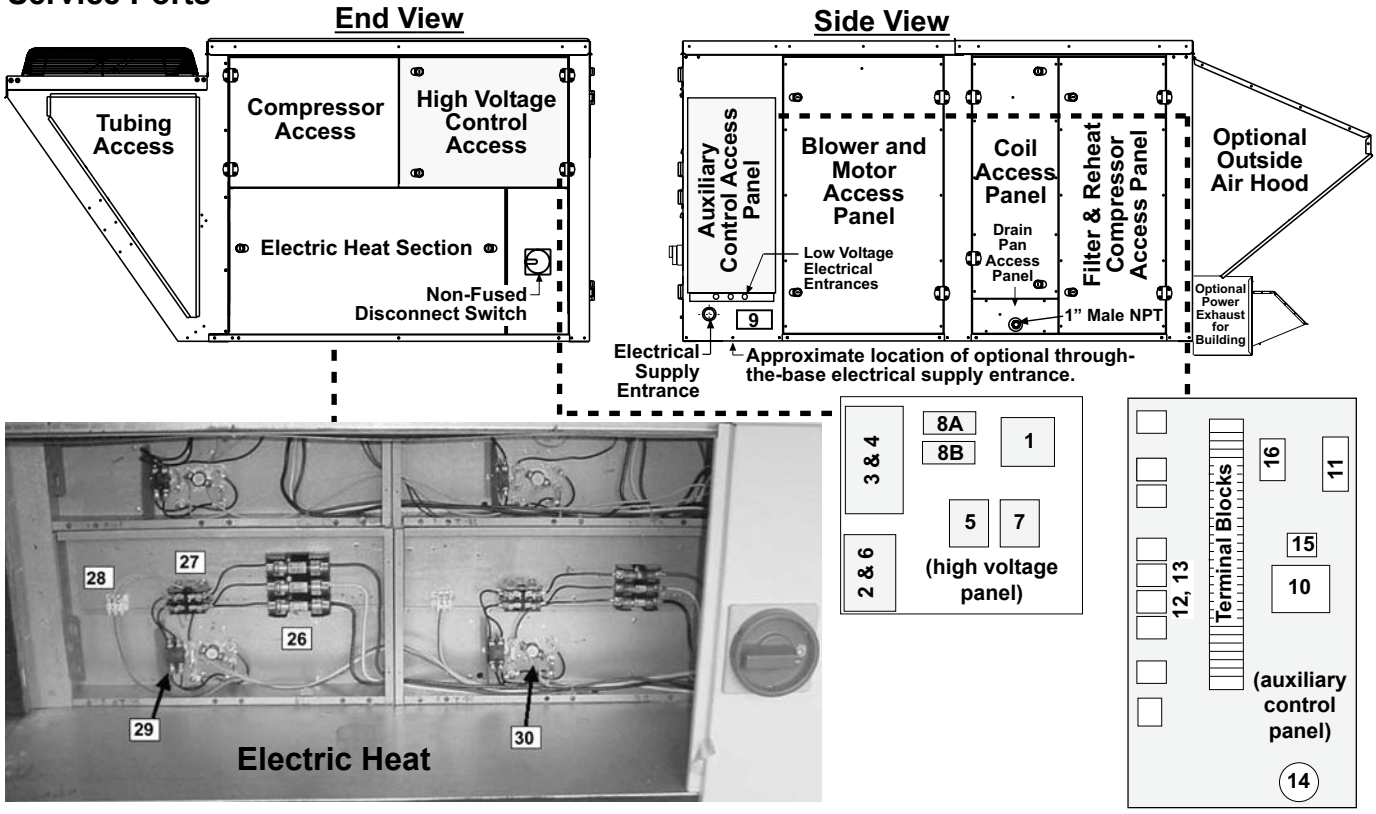


FIGURE 21 - <u>Models RECA and REDA</u> - Locations of Standard and Optional Controls and Service Ports



TUBING SECTION
- Low Refrigerant Pressure Cutouts
- High Refrigerant Pressure Cutouts
- Filter Driers
- Liquid Line Service Gauge Ports

COMPRESSOR SECTION
- Ckt A Compressor
- Ckt B Compressor
- Ckt C Compressor
- Discharge & Suction Service Ports
- Optional Hot Gas Bypass Valve(s)

HIGH VOLTAGE ELECTRICAL COMPARTMENT

1) Blower Motor Contactor or Starter
2) Control Transformers (as required)
3) Dehumidification Compressor Contactor (RDA,RDDA,REDA)
4) Condenser/Compressor Contactor
5) Optional Phase Loss/Phase Reversal Control (optional beginning 10/05; standard prior to 10/05)
6) Optional Damper Motor Transformer
7) Optional Over/Under Voltage Control
8A&B) Condenser Motor Capacitors
9) Optional Convenience Outlet (requires separate supply line)

AUXILIARY COMPARTMENT

10) Digital Controller (FX05 or FX06)
11) Air Proving Pressure Switch
12&13) Optional Control Relays
14) Optional Dirty Filter Switch
15) Optional Time Clock or BAS Card
16) Humidity Input Converter

Models RDCA & RDDA With Gas Heat Section (FIGURE 20 *only*):

17) Combustion Air Pressure Switch
18) Ignition Control
19) Optional Power Signal Converter
20) Venter Motor Capacitor (line voltage)

BLOWER SECTION
- Blower Motor

Models RDCA & RDDA With Gas Heat Section (FIGURE 20 *only*):
- Limit Control (capillary type)

COIL SECTION
- Evaporator Coils
- Thermal Expansion Valves
- Froststat (one per cooling circuit)
- Optional Subcooling Valves (RCA/RDCA/RECA)

FILTER AND INLET AIR SECTION
- Inlet Air, Humidity, & Override Sensors
- Outside Air Relative Humidity Transmitter (Std RDA/ RDDA/REDA; Optional RCA/RDCA/RECA)
- Ckt D or Dh Compressor
- Optional Damper Motor

Models RDCA & RDDA With Gas Heat Section (FIGURE 20 *only*):

21) Venter Assembly
22) Single-Stage Gas Valves
23) Optional Modulating Gas Valve
24) Optional Low Gas pressure Switch
25) Optional High Gas Pressure Switch

Models RECA & REDA With Electric Heat Section (FIGURE 21 *only*):

26) Fuse Block/Fuses
27) Contactor
28) Low Voltage Terminals
29) Manual Reset Limit
30) Auto Reset Limit

FIELD INSTALLED
- Discharge Air Sensor (supply duct)
- Optional Return Air Firestat (duct)
- Optional Discharge Air Firestat (duct)
- Optional Smoke Detector (duct)
- Optional wall-mounted controls in Paragraph 8.1

8.4 Miscellaneous Electrical and Control Options

Other electrical or control options that could have been ordered with the unit include phase loss monitor, over or under voltage protection, exhaust fan relay, photoelectric air duct smoke detector, an inlet or discharge firestat, or a 115V convenience outlet. See **FIGURES 22-26** to identify each control and its option code. Consult the system wiring diagram for option identification. For location of unit-mounted controls, see **FIGURE 20 or 21**.

FIGURE 22A - Opt BF15, Phase Loss Monitor, P/N 206105 (factory installed)

Auto Reset Phase Loss Device

With a phase loss monitor the cooling compressors or heat sections will not start or will shutdown if a phase loss or phase reversal situation is present. This is an auto reset device. If needed, interchange two wires on the 3-phase supply connections to the line side of the disconnect switch. DO NOT change load side wiring. All factory installed wiring is color-coded matched to assist in making certain the phase integrity is in tact and to assist in troubleshooting if necessary.

FIGURE 22B - Opt BF14, Over/Under Voltage Protection, P/N 176826 (factory installed)

Shuts unit down on high or low voltage condition. Resets automatically when power condition is corrected.

FIGURE 23 - Option BG3, Exhaust Fan Relay, P/N 211411 (factory installed)

DPDT relay for coordination with operation of building exhaust fan

Socket is **P/N 211415**..

FIGURE 24 - Option SA1, Smoke Detector, P/N 159553 (field installed)

Photoelectric smoke detector to be field-installed in ductwork. Follow instructions supplied with the control. Follow wiring diagram on the unit. Comply with local building codes.

FIGURE 25 - Option BD5, Firestat (200°F), P/N 42782

Firestat for field installation in either the return air or outlet air ductwork. Follow instructions supplied with the control. Follow wiring diagram on the unit. Comply with local building codes.

FIGURE 26 - Option BC2, 115V Convenience GFI Outlet (external weatherproof factory-installed outlet requires separate field-supplied power supply)

115V duplex weatherproof receptacle includes ground fault protection. Requires separate field-supplied 115 volt power supply (transformer not included).

9. Optional Equipment including Heat Sections

9.1 Inlet Air Control and Energy Recovery Options

The system may be equipped with a variety of air control options including 100% outside air, a variety of damper controls for 100% outside air or outside air and return air, economizers, and field-installed energy recovery modules. Air controls including economizers are identified as Option AR on the system wiring diagram. Energy recovery modules are identified as Option ER. Refer to the FIGURES and listings below to identify applications and components. Identify and inspect the inlet air control option on the unit.

9.1.1 Inlet Air Options - Dampers and Damper Controls

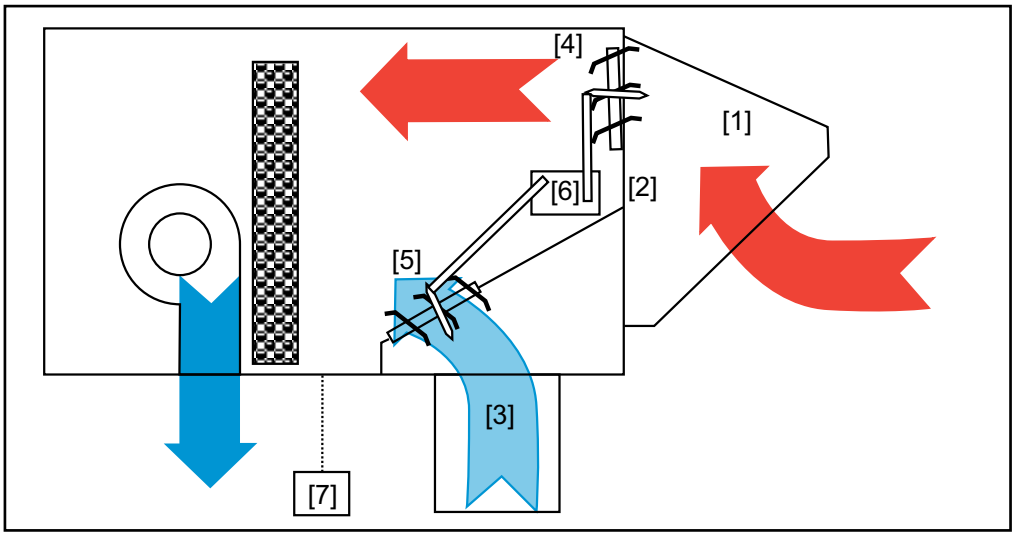


FIGURE 27 - Component Locations of Air Control Options AR1, AR8, AR11, AR17, AR18, AR23, and AR27

Option AR1 - Provides continuous intake air opening. Review Building Energy Codes for approval.
(1) Outside Air Intake Hood (Option AS16 or AS19) Required
(2) Horizontal Outside Air Inlet Opening

Option AR8 - Motorized outside air damper is opened 100% during system operation. If system is disabled, outside air damper is closed by spring return.
(1) Outside Air Intake Hood (Option AS16 or AS19) Required
(2) Horizontal Outside Air Intake Opening
(4) Outside Air Dampers
(6) 2-Position Damper Motor (open/closed)

Option AR11 - Provides manual adjustment of return and outside air dampers.
(1) Outside Air Intake Hood (Option AS16) Required
(2) Horizontal Outside Air Inlet Opening
(3) Bottom Return Air Opening
(4) Outside Air Dampers
(5) Return Air Dampers

Option AR17 - Motorized outside air dampers are driven 100% open and return air dampers are driven 100% closed when the system is enabled. If system is disabled, outside air dampers are closed (return air dampers opened) by spring return. Field-installed time clocks may provide for occupied and unoccupied control sequences.
(1) Outside Air Intake Hood (Option AS16) Required
(2) Horizontal Outside Air Inlet Opening
(3) Bottom Return Air Opening
(4) Outside Air Dampers
(5) Return Air Dampers
(6) 2-Position Damper Motor (either 100% outside air or 100% return air)

Option AR18 - Motorized outside air dampers and return air dampers. Damper positions are controlled by a potentiometer that is installed in the space.
(1) Outside Air Intake Hood (Option AS16) Required
(2) Horizontal Outside Air Inlet Opening
(3) Bottom Return Air Opening
(4) Outside Air Dampers
(5) Return Air Dampers
(6) Modulating Damper Motor
(7) Remote Potentiometer (shipped separately)

Option AR23 - Modulates return and outside air damper positions to maintain zone pressure (modulates from zero to 100%) by regulating return and outside air quantities (constant volume).
(1) Outside Air Intake Hood (Option AS16) Required
(2) Horizontal Outside Air Inlet Opening
(3) Bottom Return Air Opening
(4) Outside Air Dampers
(5) Return Air Dampers
(6) Modulating Damper Motor
(7) Remote Pressure Null Switch (0-100% outside air) (shipped separately)

Option AR27 - Modulates return and outside air damper positions to maintain zone pressure (modulates from zero to 100%) by regulating return and outside air quantities (constant volume airflow with minimum outside air damper position).
(1) Outside Air Intake Hood (Option AS16) Required
(2) Horizontal Outside Air Inlet Opening
(3) Bottom Return Air Opening
(4) Outside Air Dampers
(5) Return Air Dampers
(6) Modulating Damper Motor
(7) Remote Pressure Null Switch (minimum outside air damper position) (shipped separately)

Damper Linkage

Damper linkage provides limited air balance of return and outside air quantities. Return duct and outside air hood pressure drop differentials may require field-installed balancing devices.

NOTES: Damper linkage may not provide adequate air balance of return and outside air quantities. Compare return duct and outside air inlet hood pressure drops to determine balancing requirements. Damper operation is not integrated with the standard system controller. If equipped with Option BNC1 and a time clock, the controller will close the dampers.

Pressure Null Switch in Damper Options AR23 and AR27

The pressure null switch used in Option AR23 and AR27 is a Dwyer #1640-0 with a range of .01-.20" w.c. It is shipped separately for field installation. Refer to the following paragraphs and the manufacturer's installation instructions included with the switch.

Description and Application - The pressure null switch is a diaphragm operated differential pressure switch used in makeup air applications to control building pressure. It maintains a selected positive or negative pressure setpoint by changing the amount of outside air being introduced to the building through the modulating outside air dampers. As more pressure is required in the build-

9. Optional Equipment including Heat Sections (cont'd)

9.1 Inlet Air Control and Energy Recovery Options (cont'd)

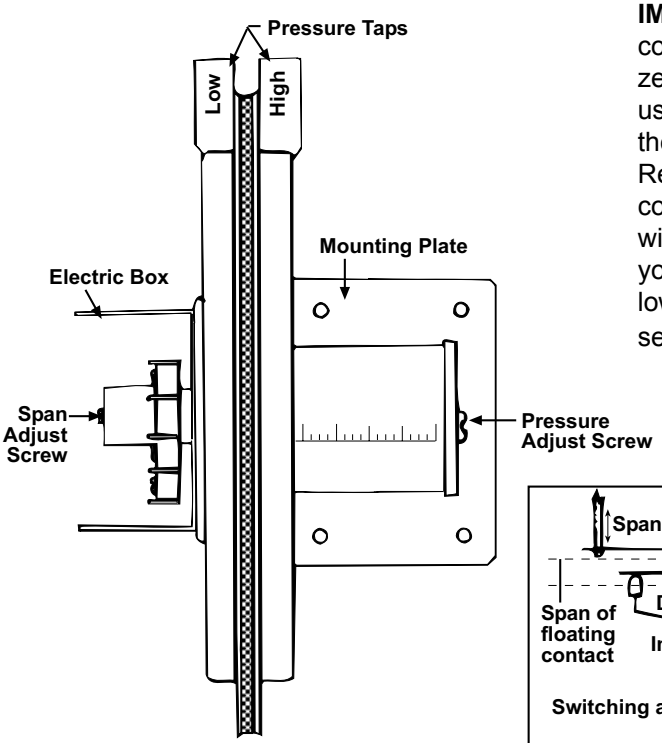
9.1.1 Inlet Air Options - Dampers and Damper Controls (cont'd)

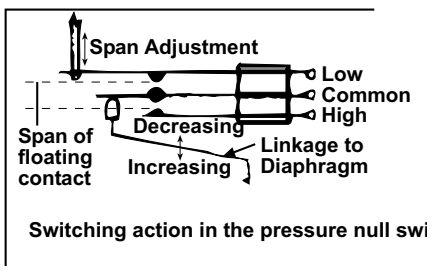
ing, the pressure null switch activates the damper motor driving the outside air damper towards the full open position and the recirculated air damper towards the closed position. Conversely, as less pressure is required, the switch drives the dampers in the opposite direction.

Installation Instructions for Pressure Null Switch

1. Select an indoor location free from excessive vibration where oil or water will not drip onto the switch and where ambient temperature will be within a range of -30°F (dry air) to 110°F.
2. **Mount the switch with the diaphragm in a vertical plane.** The switch is position sensitive and is calibrated to operate properly when the diaphragm is vertical. Mount switch securely.
3. Connect the pressure taps on the top of the switch to sources of air pressure differential. Metal tubing with 1/4" O.D. is recommended, but any tubing system which will not unduly restrict the air flow may be used. To maintain a positive building pressure, vent the low pressure tap to the outdoors and allow the high pressure tap to monitor building pressure. To maintain a negative building pressure, reverse the functions of the high and low pressure taps. In either case, be sure that the outdoor vent is protected from the wind and screened from insects.
4. **Adjustment of the Switch** - The "HIGH" actuation point of the null switch is indicated on a calibrated scale secured to the transparent range screw enclosure. Building pressure is set by turning the adjustment screw. The "Low" actuation point is set by adjusting the span of the null by turning the span adjustment screw. The span range is .01 to .03" w.c.
5. See the wiring diagram included with the furnace to make electrical connections.

FIGURE 28 - Pressure Null Switch (shipped separately for use with Options AR23 and AR27)



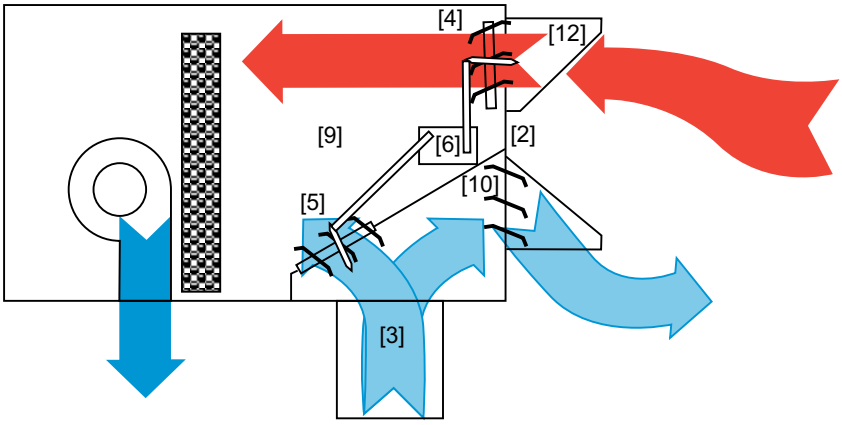


Switching action in the pressure null switch

IMPORTANT: To eliminate shipping damage to the switch contacts, the manufacturer reduced the span adjustment to zero before shipping. The span should be adjusted prior to using the switch. (If the switch has been installed, disconnect the vent tube so that the null switch is in a neutral position.) Remove the electrical box cover and while observing the contacts, turn the span adjustment screw slowly in a clockwise direction. Continue turning the adjustment screw until you are able to see gaps between the common and both the low and high contacts. A minimum gap provides the greatest sensitivity. The wider the gap the lower the sensitivity.

9.1.2 Economizer Options

FIGURE 29 - Component Locations of Economizer Air Control Options AR2E and AR2F



Legend (applies to Option AR2E and AR2F):

(**2**) Horizontal Air Intake and Exhaust Air Openings
(**3**) Bottom Return Air Opening
(**4**) Outside Air Intake Dampers
(**5**) Return Air Dampers
(**6**) Modulating Damper Motor
(**9**) Economizer Controls
Option AR2E - Reference Enthalpy Control provides free cooling with variable building loads for temperate climates.
Option AR2F - Dry Bulb Economizer Control provides free cooling for dry climates.
(**10**) Barometric Relief Dampers
(**12**) Outside Air Enthalpy Sensor, Option AR2E
Outside Air Dry Bulb Sensor, Option AR2F

NOTE: Damper linkage may not provide adequate air balance of return and outside air quantities. Compare return duct and outside air inlet hood pressure drops to determine balancing requirements.

FX05/FX06 Controller Setting Change

Display	New	Default
EN1	20	29
OC1	58°F	68°F

With the economizer and return air, the "mixed" air temperature sensed at the evaporator coil is raised. Lowering the EN1 and OC1 setpoints on the controller as shown in the table, will allow the enthalpy controller on the economizer to take over control of mechanical cooling. For instructions on setting the controller, refer to the control instruction sheet in the literature envelope.

Also, check the enthalpy setting on the economizer; it needs to be at the "D" setting. Adjust the minimum position potentiometer for the mixture of air required for the installation.

(NOTE: The EXH, DCV1, and CDV2 functions on the control are not used.)

Operating Sequence with Economizer Option AR2E

On a call for low stage cooling

1. The blower motor is energized.

2. With the outdoor enthalpy less than the return air enthalpy:
a) The "A" and "B" cool circuits are locked out.
b) Dampers are positioned by the economizer and mixed air sensor.

3. With outdoor air enthalpy higher than the return air enthalpy:
a) The "A" cool circuit is energized.
b) Dampers are positioned for minimum outside air.
c) On a call for high stage cooling, the "B" circuit is staged appropriately.

9.1.3 Energy Recovery Module Options

Energy recovery modules are shipped separately for field installation. Modules include an enthalpy wheel, a supply air blower, an exhaust blower, an intake hood, and an exhaust hood with a gravity damper. Energy recovery modules are identified as Option ER and are selected by CFM. The modules also have a variety of options. In addition to the Option ER energy recovery module, either air control Option AR2B or AR2A is required. See **FIGURE 30A** or **FIGURE 30B** for application and control components.

Follow the installation instructions shipped with the module.

9. Optional Equipment including Heat Sections (cont'd)

9.1 Inlet Air Control and Energy Recovery Options (cont'd)

9.1.3 Energy Recovery Module Options (cont'd)

FIGURE 30A - System with Optional Energy Recovery Module showing Component Locations of Energy Recovery Air Control Option AR2A

(**2**) Horizontal Air Intake & Exhaust Air Openings
(**3**) Bottom Return Air Opening
(**8**) Energy Recovery Module (Option ER) required
(**10**) Gravity Dampers
(11) *Optional - Motorized Two-Position Outside Air Intake Hood Dampers (Option ARD3)*

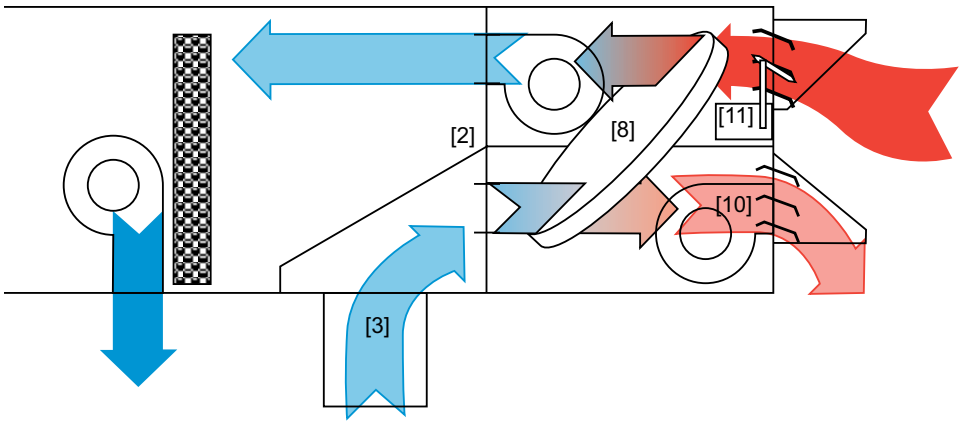
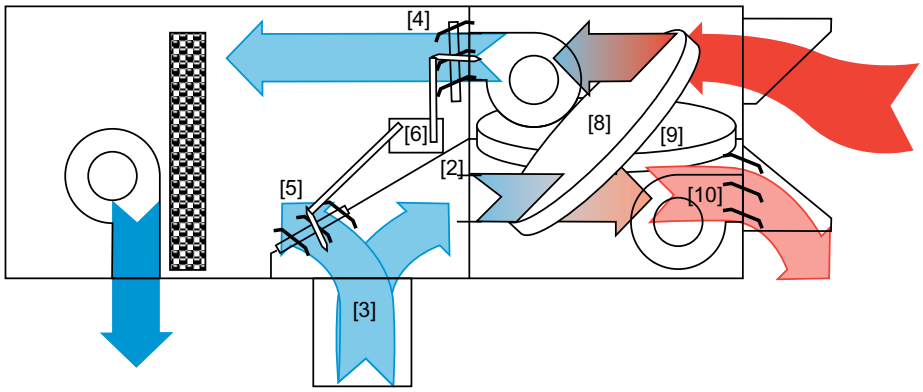


FIGURE 30B - System with Optional Energy Recovery Module showing Component Locations of Energy Recovery Air Control Option AR2B



(**2**) Horizontal Air Intake and Exhaust Air Openings
(**3**) Bottom Return Air Opening
(**4**) Outside Air Intake Dampers
(**5**) Return Air Dampers
(**6**) Modulating Damper Motor
(**8**) Energy Recovery Module (Option ER) required
(**9**) Energy Recovery Module Economizer Control (allows wheel to pivot out of air-streams when outside air does not need tempering)
(**10**) Gravity Dampers

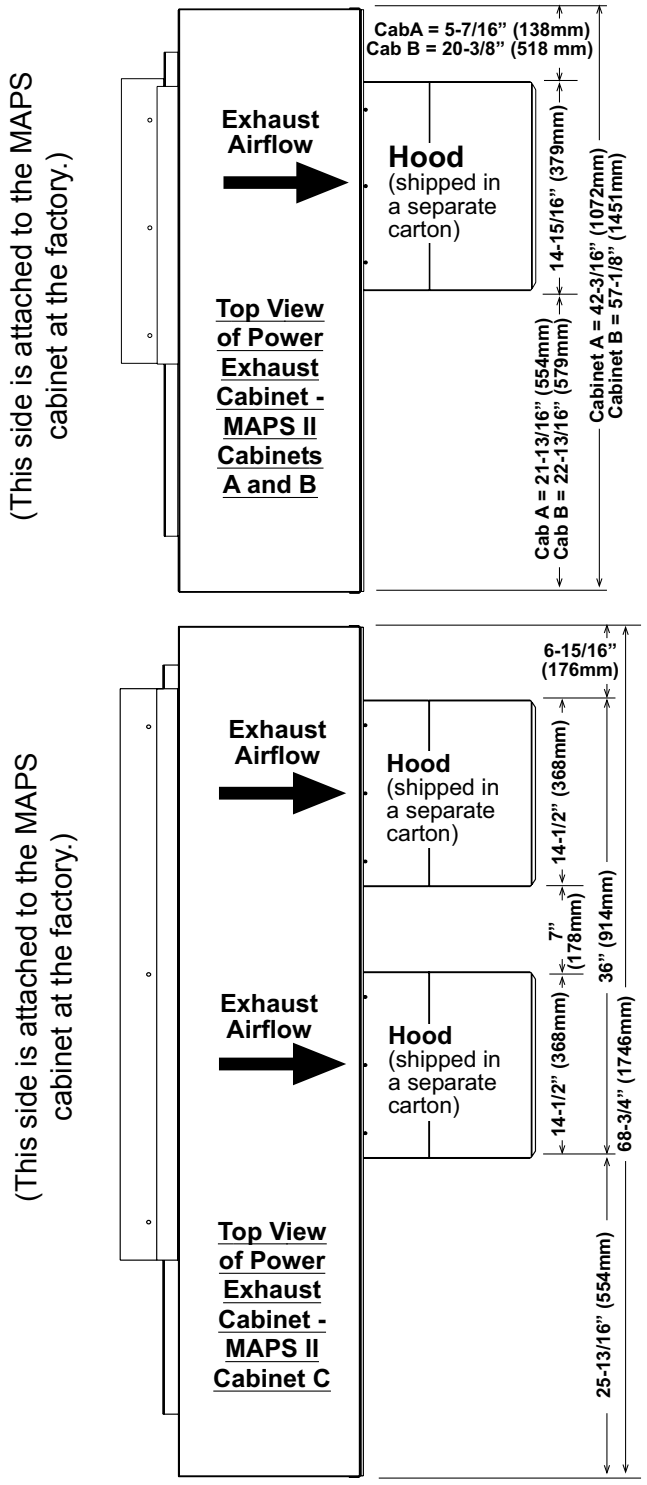
9.2 Power Exhaust (Building)

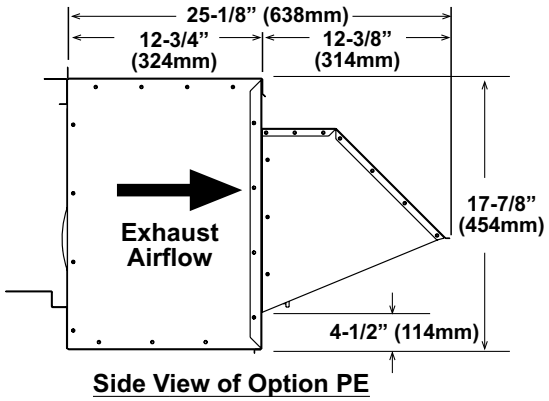
If ordered with Option PE, the system is factory equipped with a power exhaust for building air. The power exhaust blower, motor, and damper are assembled and attached to the cabinet below the outside air hood or inlet duct. (See location and dimensions in Paragraph 4.1 and **FIGURE 31**.) The power exhaust hood(s) is factory assembled and shipped in a separate carton to be installed at the site. To attach, slide the hood(s) over the flange and fasten with the sheetmetal screws provided. **NOTE:** Attach the power exhaust hood before installing the outside air hood or horizontal discharge ductwork.

Cabinet A and B sizes (see Cross Reference, page 58) have a 9x10 exhaust blower, gravity damper, and one shipped-separate hood. Cabinet C sizes have dual 9x10 blowers, gravity dampers, and two shipped-separate hoods. Check the rating plate for motor size (1/2 - 5 HP).

Standard control would turn the exhaust blower on when the unit blower runs. If optional return air dampers are ordered, the power exhaust is wired to coordinate with the appropriate damper position.

FIGURE 31 - Optional Power Exhaust Dimensions





Side View of Option PE Power Exhaust Cabinet and Hood - Applies to MAPS II Cabinet Sizes A, B, and C

NOTES:

1) Attach hood(s) with screws provided. Install hood(s) before attaching horizontal ductwork or outside air hood.

2) Cabinets A & B - the power exhaust cabinet extends 1-3/4" (44mm) below the MAPS cabinet.

RPM/HP Table - Power Exhaust Option PE1 on Cabinet A and Option PE2 on Cabinet B

CFM	External Static Pressure (ESP)				
	0.3	0.5	0.8	1.0	1.5
500	650/.50	--	--	--	--
1000	870/.50	1040/.50	1200/.50	1325/.50	1500/.75
1500	940/.50	1100/.50	1240/.75	1370/.75	1600/1.00
2000	1050/.75	1190/1.00	1310/1.00	1430/1.50	1640/1.50
2500	1190/1.50	1300/1.50	1410/1.50	1510/2.00	1710/2.00
3000	1350/2.00	1440/2.00	1535/3.00	1625/3.00	1800/3.00
3500	1520/3.00	1600/3.00	1680/5.00	1760/5.00	--
4000	1700/5.00	1760/5.00	1800/5.00	--	--

RPM/HP Table - Power Exhaust Option PE3 on Cabinet C

CFM	External Static Pressure (ESP)				
	0.3	0.5	0.8	1.0	1.5
1000	680/.50	--	--	--	--
1500	845/.50	1025/.50	1140/.50	--	--
2000	870/.50	1040/.75	1200/.75	1325/1.00	--
2500	900/.75	1070/.75	1220/1.00	1345/1.50	1575/1.50
3000	940/.75	1100/4.00	1240/1.50	1370/1.50	1600/2.00
3500	1000/1.00	1140/1.50	1275/1.50	1400/2.00	1620/3.00
4000	1050/1.50	1190/2.00	1310/2.00	1430/3.00	1640/3.00
4500	1120/2.00	1240/2.00	1360/3.00	1470/3.00	1675/5.00
5000	1190/3.00	1300/3.00	1410/3.00	1510/5.00	1710/5.00
5500	1270/3.00	1370/5.00	1470/5.00	1570/5.00	1750/5.00
6000	1350/5.00	1440/5.00	1535/5.00	1625/5.00	--
6500	1435/5.00	1520/5.00	--	--	--

9.3 Gas Heat Module - Models RDCA and RDDA

9.3.1 Gas Heat Module - General

A system with a gas heat section is equipped with a Reznor® TCORE^{2}® combustion system with 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, or 700 MBH input. The 83% thermal efficient furnace is power vented and has either a 3:1 turndown with sequenced gas valves or a 6:1 turndown modulating gas capacity control. A system with 3:1 turndown gas control could be for either natural or propane gas. A 6:1 turndown modulating system is natural gas only.

9. Optional Equipment including Heat Sections (cont'd)

9.3 Gas Heat Module - Models RDCA and RDDA (cont'd)

Temperature Guidelines for Gas Heat Section

Minimum Circulating Discharge Air Temperature (°F)	80	75	70	65	60
Minimum Design Ambient (°F)	-30 to - 21	-20 to - 11	-10 to -1	0 to 9	10 and above

9.3.2 Gas Heat Module - Mechanical

NOTE: If a Model JHUP-0250 duct furnace curb section is part of the installation, much of the information in this section applies to the duct furnace also; see Paragraph 9.4.

9.3.2.1 Gas Piping and Pressures

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. Gas supply piping installation should conform with good practice and with local codes.

WARNING: PRESSURE TESTING SUPPLY PIPING

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

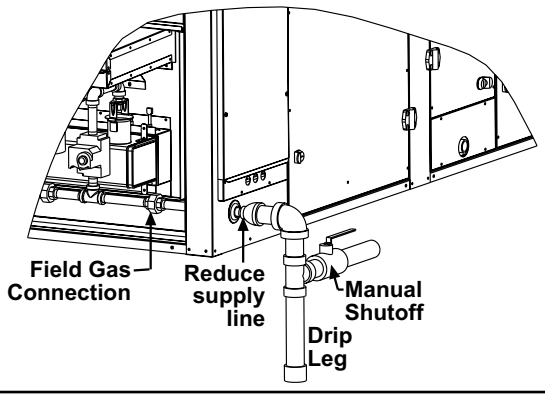
Test pressure EQUAL TO or BELOW 1/2 psi (3.5kPa): Before testing, close the manual valve at the heater.

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.

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: 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.

FIGURE 32 - Gas Connection



Gas Connection Size

Heat Section	Gas Connection
100 - 300	1/2"
350 - 400	3/4"
450 - 700	1"

Sizing Gas Supply Lines

CAPACITY OF PIPING - Cubic Feet per Hour based on 0.3" w.c. 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"		2-1/2"	
	Natural	Propane	Natural	Propane	Natural	Propane	Natural	Propane	Natural	Propane	Natural	Propane	Natural	Propane
20 ft	92	56	190	116	350	214	730	445	1100	671	2100	1281	3300	2013
30 ft	73	45	152	93	285	174	590	360	890	543	1650	1007	2700	1647
40 ft	63	38	130	79	245	149	500	305	760	464	1450	885	2300	1403
50 ft	56	34	115	70	215	131	440	268	670	409	1270	775	2000	1220
60 ft	50	31	105	64	195	119	400	244	610	372	1105	674	1850	1129
70 ft	46	28	96	59	180	110	370	226	560	342	1050	641	1700	1037
80 ft	43	26	90	55	170	104	350	214	530	323	990	604	1600	976
90 ft	40	24	84	51	160	98	320	195	490	299	930	567	1500	915
100 ft	38	23	79	48	150	92	305	186	460	281	870	531	1400	854
125 ft	34	21	72	44	130	79	275	168	410	250	780	476	1250	763
150 ft	31	19	64	39	120	73	250	153	380	232	710	433	1130	689
175 ft	28	17	59	36	110	67	225	137	350	214	650	397	1050	641
200 ft	26	16	55	34	100	61	210	128	320	195	610	372	980	598

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.

Supply Pressures - Before attempting to measure 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 pressure could cause excessive valve outlet gas pressure immediately or at some future time.

Natural gas inlet supply pressure for the 3-stage gas control system must be a minimum of 5.5" w.c. Minimum natural gas supply pressure for the modulating 6:1 gas control system is 6.0" w.c.

Maximum natural gas supply pressure is 14" w.c.

If natural gas 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.

Propane gas inlet supply pressure must be a minimum of 11" w.c. and a maximum of 14" w.c.

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

Gas Capacity Controls

The gas train is equipped with either 3:1 turndown gas capacity control (**FIGURE 33A or 35A**) or optional 6:1 turndown (**FIGURE 33B or 35B**). Both the 3:1 and 6:1 system have a split burner design (1/3 and 2/3) with two single-stage gas valves in heat section Sizes 100, 150, 200, 250, and 300. Heat section Sizes 350, 400, 350, 500, 550, 600, 650, and 700 have two section burners. One section is split 1/3 and 2/3 and the other is a "non-split" burner. Two single-stage gas valves feed the split burner and a third single-stage gas valve feeds the non-split burner.

The optional 6:1 turndown system includes a modulating/regulating valve and a power signal converter (**FIGURE 34**). Control is through the system cooling/heating controller (See Paragraph 8) based on heating air setpoint and inlet air temperature. **NOTE:** Propane gas systems are 3:1 turndown (6:1 is available with natural gas only).

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. See Hazard Levels, page 2.

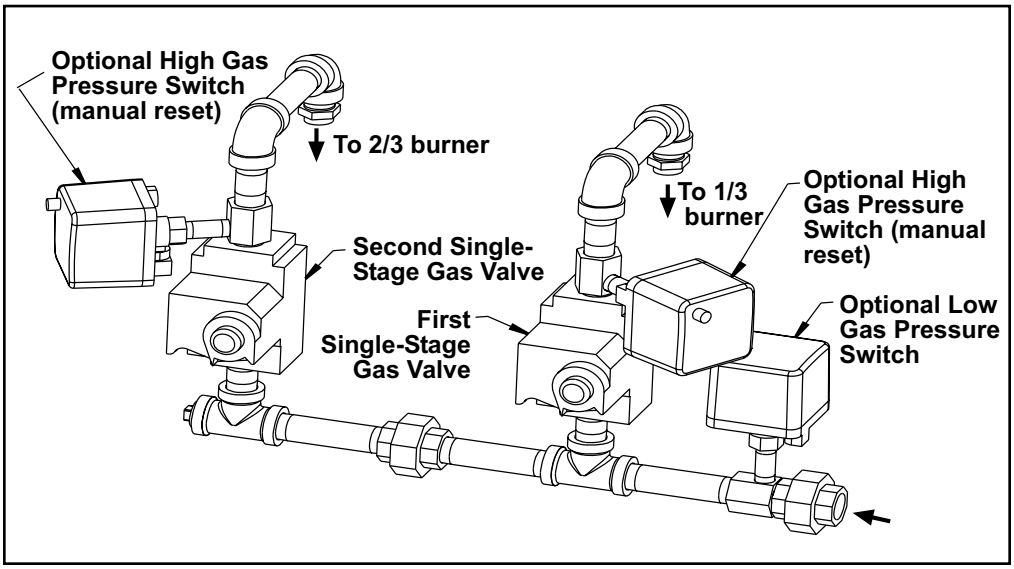


FIGURE 33A - Gas Train for Heat Section Sizes 100-400 showing Furnace with 3:1 Turndown (Option AG55) and both optional Low and High Gas Pressure Switches

FIGURE 33B - Gas Train for Heat Section Sizes 100-400 with Optional 6:1 Turndown (Option AG57, natural gas only) and both optional Low and High Gas Pressure Switches

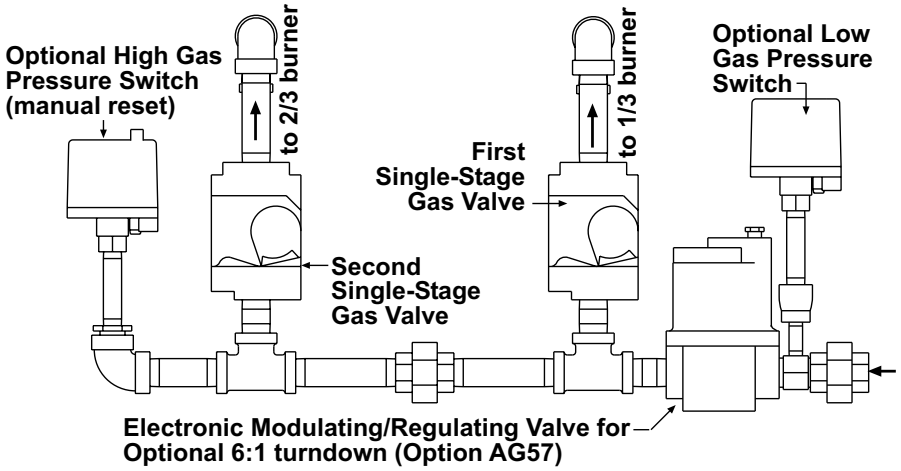


FIGURE 34 - Signal Conditioner, P/N 134170, used in Option AG57, Gas Controls with 6:1 Turndown

FIGURE 35A - Gas Train for Heat Section Sizes 450-700 with 3:1 Turndown (Option AG55)

Sequence of Operation:

The 1/3 burner valve and the 2/3 burner valve are energized. After 20 seconds the 1/3 burner valve is de-energized (this is Stage 1). For Stage 2, the full (non-split) burner valve and the 1/3 burner valve are energized, while the 2/3 burner valve is de-energized. Stage 3 brings the 2/3 burner valve back on so all valves are energized.

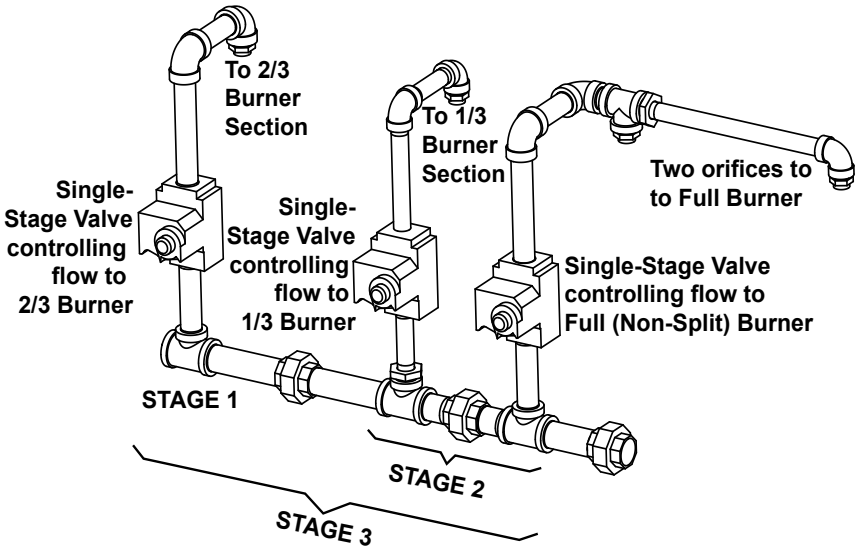
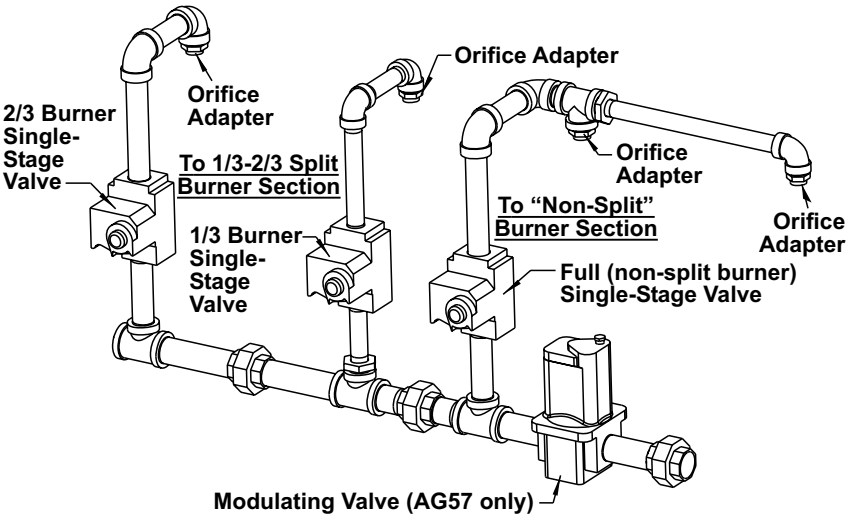


FIGURE 35B - Gas Train for Heat Section Sizes 450-700 with Optional 6:1 Turndown (Option AG57, natural gas only)

NOTE: See **FIGURE 34** for signal conditioner.



Manifold Pressure

WARNING: Manifold gas pressure must never exceed 3.5" w.c. for natural gas or 10" w.c. for propane gas.

The valves are set at the factory for the appropriate outlet pressure. Check the furnace rating plate for the manifold pressure setting.

Measuring manifold gas pressure cannot be done until the heater is in operation. It is included in the steps of the "Check-Test-Start" procedure in Paragraph 10. The following warnings and instructions apply.

All furnaces haves two or three single-stage gas valves. Follow the instructions to check the outlet pressure of all valves. If equipped with an optional modulating/regulating valve, unit must be operating at full rate.

Instructions for Checking Outlet Pressure of Valves (can only be done after heater is operating)

Measure the Full Fire Outlet Pressure of all Single-Stage Valves - Turn the manual valve in the gas line off. Locate the 1/8” output pressure tap on the first single-stage gas valve (See **FIGURE 36**). Connect a manometer to the 1/8" pipe outlet pressure tap in the valve. **NOTE:** A manometer (fluid-filled gauge) is recommended rather than a spring type gauge due to the difficulty of maintaining calibration of a spring type gauge.

Turn on the manual gas valve. Check the outlet pressure. (Reminder: If the unit has optional 6:1 modulating turndown, burner must be at full fire.) Manifold pressure for sea level operation should be 3.5" w.c. for natural gas or 10.0" w.c. for propane gas. If the unit was ordered for high altitude operation, check the high altitude plate or the Table below.

In most cases the outlet pressure will be correct, but in the rare instance that adjustment is required, refer to **FIGURE 36** and follow the instructions.

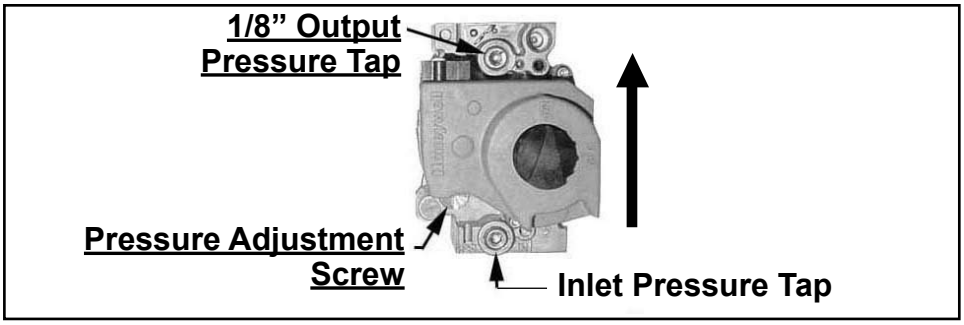


FIGURE 36 - View of Standard Single-Stage Valve (all units have two) showing Outlet Pressure Tap and Adjustment Locations

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

Altitude		Natural Gas	Propane
Feet	Meters	Outlet Pressure of Single Stage Valves at FULL RATE	
Manifold Pressure Settings by Altitude for the UNITED STATES			
0-2000	0-610	3.5" w.c.	10.0" w.c.
2001-3000	611-915	3.1" w.c.	8.8" w.c.
3001-4000	916-1220	3.0" w.c.	8.5" w.c.
4001-5000	1221-1525	2.8" w.c.	8.1" w.c.
5001-6000	1526-1830	2.7" w.c.	7.7" w.c.
6001-7000	1831-2135	2.6" w.c.	7.4" w.c.
7001-8000	2136-2440	2.5" w.c.	7.1" w.c.
8001-9000	2441-2745	2.4" w.c.	6.7" w.c.
9001-10000	2746-3045	2.3" w.c.	6.7" w.c.
Manifold Pressure Settings by Altitude for CANADA			
0-2000	0-610	3.5" w.c.	10.0" w.c.
2001-4500	611-1373	2.8" w.c.	8.1" w.c.

Adjustment to the valve outlet pressure setting is rarely necessary. If adjustment is necessary, remove the cap from the adjustment screw. Set pressure to correct setting by turning the regulator screw IN (clockwise) to increase pressure. Turn regulator screw OUT (counterclockwise) to decrease pressure. After an adjustment is made, cycle the burner. Re-check the outlet pressure. When outlet pressure is correct for the installation, remove the manometer and replace the cap. Check for leak at the pressure tap fitting.

9. Optional Equipment including Heat Sections (cont'd)

9.3 Gas Heat Module - Models RDCA and RDDA (cont'd)

9.3.2 Gas Heat Module - Mechanical (cont'd)

9.3.2.1 Gas Piping and Pressures (cont'd)

Turn the manual valve off. Connect the manometer to the second valve and repeat to check the outlet pressure of the other single-stage gas valves. High-fire outlet pressure should be the same for each valve.

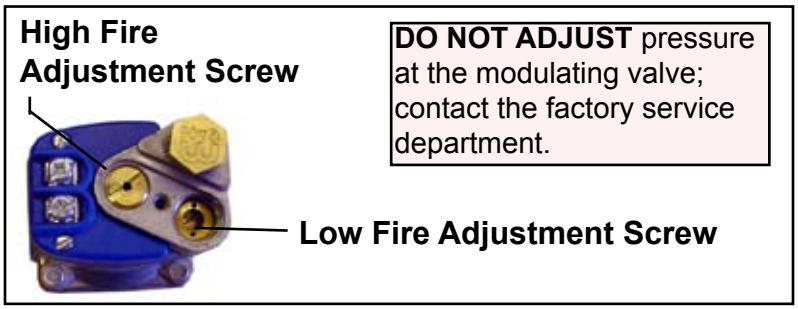
If equipped with Option AG57, the furnace has a modulating valve to provide 6:1 turndown. To measure the minimum fire outlet pressure, check the outlet pressure of the single-stage valve at the 2/3 burner (See **FIGURE 33B or 35B**). Connect the manometer at the same pressure tap as when measuring high fire outlet pressure. Disconnect one of the lead wires to the modulating valve. With the unit at full fire, measure the outlet gas pressure at the single-stage valve. Gas pressure should be as listed for "Full Rate Inlet Pressure" in the table below. (Modulating valve is a reverse acting valve; 0-6 is high fire and 15-24 is low fire.) If pressure is not correct, contact the factory. This setting is not field adjustable. After checking pressure, be sure to reconnect the wire to the modulating valve.

For reference purposes only, pressures by altitude are shown in the table below. **CONTACT THE FACTORY SERVICE DEPT IF PRESSURE IS INCORRECT. DO NOT ADJUST.**

Altitude		Natural Gas		
Feet	Meters	Minimum "Fire" OUTLET Gas Pressure for 2/3 Burner Section *	Full Rate INLET Gas Pressure at Single-Stage Valves with both Burner Sections Operating	Full Rate OUTLET Gas Pressure
Tolerance		(-.1 to +.2 " w.c.)	(-.15 to +.15 " w.c.)	(-.15 to +.15 " w.c.)
UNITED STATES				
0-2000	0-610	1.20" w.c.	4.5" w.c.	3.5" w.c.
2001-3000	611-915	1.05" w.c.	4.1" w.c.	3.1" w.c.
3001-4000	916-1220	1.00" w.c.	4.0" w.c.	3.0" w.c.
4001-5000	1221-1525	.95" w.c.	3.8" w.c.	2.8" w.c.
5001-6000	1526-1830	.90" w.c.	3.7" w.c.	2.7" w.c.
6001-7000	1831-2135	.86" w.c.	3.6" w.c.	2.6" w.c.
7001-8000	2136-2440	.84" w.c.	3.5" w.c.	2.5" w.c.
8001-9000	2441-2745	.80" w.c.	4.4" w.c.	2.4" w.c.
9001-10000	2746-3045	.78" w.c.	3.3" w.c.	2.3" w.c.
CANADA				
0-2000	0-610	1.20" w.c.	4.5" w.c.	3.5" w.c.
2001-4500	611-1373	2.80" w.c.	3.8" w.c.	2.8" w.c.

*The 1/3 burner outlet pressure will be slightly higher; it does not need to be set.

FIGURE 37 - Top View of Electronic Modulating/ Regulating Valve in Option AG57, 6:1 modulating turndown



High Altitude Capacity Changes

The input and/or the capacity of the gas heat section changes with altitude. The tables below list inputs and capacities at altitudes from sea level to 10,000 ft (3045M).

BTUH Inputs and Capacities by Altitude in the UNITED STATES for Gas Heat Section in Models RDCA and RDDA													
ALTITUDE		Normal Input	Thermal Output Capacity	Minimum Input	Normal Input	Thermal Output Capacity	Minimum Input	Normal Input	Thermal Output Capacity	Minimum Input	Normal Input	Thermal Output Capacity	Minimum Input
Feet	**Meters**	**Size 100**			**Size 150**			**Size 200**			**Size 250 & JHUP-0250**		
0-2000	0-610	100,000	83,000	70,000	150,000	124,500	105,000	200,000	166,000	140,000	250,000	207,500	175,000
2001-3000	611-915	94,000	78,020	65,800	141,000	117,030	98,700	188,000	156,040	131,600	235,000	195,050	164,500
3001-4000	916-1220	92,000	76,360	64,400	138,000	114,540	96,600	184,000	152,720	128,800	230,000	190,900	161,000
4001-5000	1221-1525	90,000	74,700	63,000	135,000	112,050	94,500	180,000	149,400	126,000	225,000	186,750	157,500
5001-6000	1526-1830	88,000	73,040	61,600	132,000	109,560	92,400	176,000	146,080	123,200	220,000	182,600	154,000
6001-7000	1831-2135	86,000	71,380	60,200	129,000	107,070	90,300	172,000	142,760	120,400	215,000	178,450	150,500
7001-8000	2136-2440	84,000	69,720	58,800	126,000	104,580	88,200	168,000	139,440	117,600	210,000	174,300	147,000
8001-9000	2441-2745	82,000	68,060	57,400	123,000	102,090	86,100	164,000	136,120	114,800	205,000	170,150	143,500
9001-10000	2746-3045	80,000	66,400	56,000	120,000	99,600	84,000	160,000	132,800	112,000	200,000	166,000	140,000
Feet	**Meters**	**Size 300**			**Size 350**			**Size 400**			**Size 450**		
0-2000	0-610	300,000	249,000	210,000	350,000	290,500	245,000	400,000	332,000	280,000	450,000	373,500	315,000
2001-3000	611-915	282,000	234,060	197,400	329,000	273,070	230,300	376,000	312,080	263,200	423,000	351,090	296,100
3001-4000	916-1220	276,000	229,080	193,200	322,000	267,260	225,400	368,000	305,440	257,600	414,000	343,620	289,800
4001-5000	1221-1525	270,000	224,100	189,000	315,000	261,450	220,500	360,000	298,800	252,000	405,000	336,150	283,500
5001-6000	1526-1830	264,000	219,120	184,800	308,000	255,640	215,600	352,000	292,160	246,400	396,000	328,680	277,200
6001-7000	1831-2135	258,000	214,140	180,600	301,000	249,830	210,700	344,000	285,520	240,800	387,000	321,210	270,900
7001-8000	2136-2440	252,000	209,160	176,400	294,000	244,020	205,800	336,000	278,880	235,200	378,000	313,740	264,600
8001-9000	2441-2745	246,000	204,180	172,200	287,000	238,210	200,900	328,000	272,240	229,600	369,000	306,270	258,300
9001-10000	2746-3045	240,000	199,200	168,000	280,000	232,400	196,000	320,000	265,600	224,000	360,000	298,800	252,000
Feet	**Meters**	**Size 500**			**Size 550**			**Size 600**			**Size 650**		
0-2000	0-610	500,000	415,000	350,000	550,000	456,500	385,000	600,000	498,000	420,000	650,000	539,500	455,000
2001-3000	611-915	470,000	390,100	329,000	517,000	429,110	361,900	564,000	468,120	394,800	611,000	507,130	427,700
3001-4000	916-1220	460,000	381,800	322,000	506,000	419,980	354,200	552,000	458,160	386,400	598,000	496,340	418,600
4001-5000	1221-1525	450,000	373,500	315,000	495,000	410,850	346,500	540,000	448,200	378,000	585,000	485,550	409,500
5001-6000	1526-1830	440,000	365,200	308,000	484,000	401,720	338,800	528,000	438,240	369,600	572,000	474,760	400,400
6001-7000	1831-2135	430,000	356,900	301,000	473,000	392,590	331,100	516,000	428,280	361,200	559,000	463,970	391,300
7001-8000	2136-2440	420,000	348,600	294,000	462,000	383,460	323,400	504,000	418,320	352,800	546,000	453,180	382,200
8001-9000	2441-2745	410,000	340,300	287,000	451,000	374,330	315,700	492,000	408,360	344,400	533,000	442,390	373,100
9001-10000	2746-3045	400,000	332,000	280,000	440,000	365,200	308,000	480,000	398,400	336,000	520,000	431,600	364,000
Feet	**Meters**	**Size 700**											
0-2000	0-610	700,000	581,000	490,000									
2001-3000	611-915	658,000	546,140	460,600									
3001-4000	916-1220	644,000	534,520	450,800									
4001-5000	1221-1525	630,000	522,900	441,000									
5001-6000	1526-1830	616,000	511,280	431,200									
6001-7000	1831-2135	602,000	499,660	421,400									
7001-8000	2136-2440	588,000	488,040	411,600									
8001-9000	2441-2745	574,000	476,420	401,800									
9001-10000	2746-3045	560,000	464,800	392,000									

BTUH Inputs and Capacities by Altitude in CANADA for Gas Heat Section in Models RDCA and RDDA													
ALTITUDE		Normal Input	Thermal Output Capacity	Minimum Input	Normal Input	Thermal Output Capacity	Minimum Input	Normal Input	Thermal Output Capacity	Minimum Input	Normal Input	Thermal Output Capacity	Minimum Input
Feet	**Meters**	**Size 100**			**Size 150**			**Size 200**			**Size 250 & JHUP-0250**		
0-2000	0-610	100,000	83,000	70,000	150,000	124,500	105,000	200,000	166,000	140,000	250,000	207,500	175,000
2001-4500	611-1373	90,000	74,700	63,000	135,000	113,400	94,500	180,000	151,200	126,000	225,000	189,000	157,500
Feet	**Meters**	**Size 300**			**Size 350**			**Size 400**			**Size 450**		
0-2000	0-610	300,000	249,000	210,000	350,000	290,500	245,000	400,000	332,000	280,000	450,000	373,500	315,000
2001-4500	611-1373	270,000	226,800	189,000	315,000	264,600	220,500	360,000	302,400	252,000	405,000	340,200	283,500
Feet	**Meters**	**Size 500**			**Size 550**			**Size 600**			**Size 650**		
0-2000	0-610	500,000	415,000	350,000	550,000	456,500	385,000	600,000	498,000	420,000	650,000	539,500	455,000
2001-4500	611-1373	450,000	378,000	315,000	495,000	415,800	346,500	540,000	453,600	378,000	585,000	491,400	409,500
Feet	**Meters**	**Size 700**											
0-2000	0-610	700,000	581,000	490,000									
2001-4500	611-1373	630,000	529,200	441,000									

9. Optional Equipment including Heat Sections (cont'd)

9.3 Gas Heat Module - Models RDCA and RDDA (cont'd)

9.3.2 Gas Heat Module - Mechanical (cont'd)

9.3.2.1 Gas Piping and Pressures (cont'd)

Optional Gas Pressure Safety Switches

(See **FIGURES 33A** and **33B**.)

If the manifold is equipped with optional high and/or low gas pressure switches, the switches protect against a malfunction that would cause an increase or decrease in the regulated gas pressure.

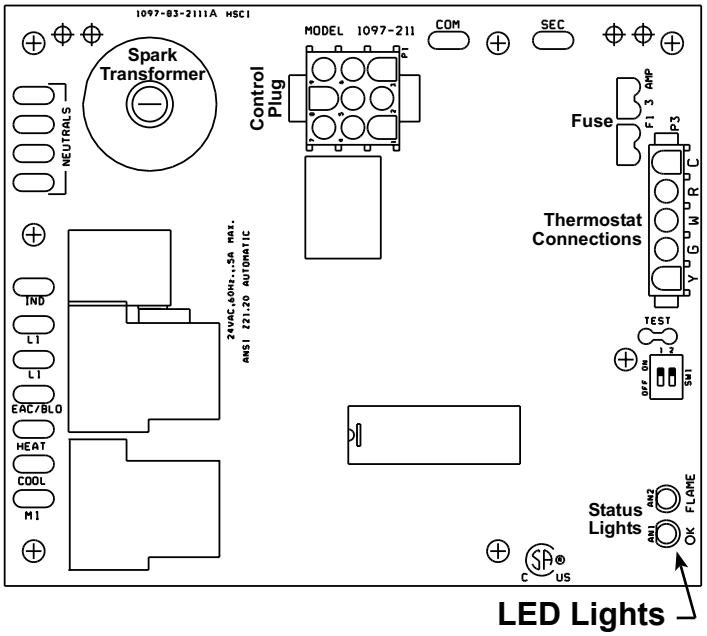
The low gas pressure switch is an automatic reset switch factory set to activate if the gas pressure is 50% of the minimum as stated on the unit rating plate.

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.

9.3.3 Ignition System

This furnace is equipped with a direct spark integrated control module (circuit board). The module monitors the safety devices and controls the operation of the venter motors and the gas valve between heat cycles.

FIGURE 387 – DSI Integrated Control Module (circuit board)



Control Status - Green LED Codes
Steady ON . Normal Operation, No call for heat
Fast Flash .. Normal Operation, Call for heat
1 Flash ..... System Lockout, Failed to detect or sustain flame
2 Flashes ... Pressure switch did not close within 30 seconds of venter motor
3 Flashes ... High limit switch open
4 Flashes ... Pressure switch is closed before venter motor is energized
Steady OFF Blown Fuse, No Power, or Defective Board

Flame Status - Yellow LED Codes
Steady ON . Flame is sensed
Slow Flash . Weak flame (current below 1.0 microamps ±50%)
Fast Flash .. Undesired Flame (valve open and no call for heat)

Normal Heat Cycle Operating Sequence

1) Call for Heat - The heating/cooling system controller calls for heat. The ignition system circuit board checks to see that the limit switch is closed and the pressure switch is open. If the limit switch is open, the circuit board responds as defined in the “Abnormal Heat Cycle, Limit Switch Operation”. If the pressure switch is closed, the circuit board will do four flashes on the green LED and wait indefinitely for the pressure switch to open. If the pressure switch is open, the circuit board proceeds to prepurge.

2) Prepurge - The circuit board energizes the venter motor and waits for the pressure switch to close. If the pressure switch does not close within 30 seconds of the venter motor energizing, the circuit board will do two flashes on the green LED. The circuit board will leave the venter motor energized indefinitely as long as the call for heat remains and the pressure switch is open.

When the pressure switch is proven closed, the circuit board begins the prepurge time. If flame is present any time while in prepurge, the prepurge time is restarted. If flame is present long enough to cause lockout, the circuit board responds as defined in “Fault Modes, Undesired Flame”.

The ignition system circuit board runs the venter motor for a 20 second pre-purge time, then proceeds to the ignition trial period.

3) Ignition Trial Period - The ignition system circuit board energizes the spark and main gas valve. The venter remains energized. If flame is sensed at the 1/3 burner section during the first 16 seconds, the spark is de-energized. If flame has not been sensed during the first 16 seconds, the control de-energizes the spark output and keeps the gas valve energized for an additional one second flame proving period. If flame is not present after the flame proving period, the control de-energizes the gas valve and proceeds with ignition re-tries as specified in “Abnormal Heat Cycle, Ignition Retry”. If flame is present, the circuit board proceeds to steady heat..

4) Steady Heat - Circuit board inputs are continuously monitored to ensure limit and pressure switches are closed, flame is established (sensor on both burner sections), and the system controller call for heat remains. When the call for heat is removed, the ignition system circuit board de-energizes the gas valve and begins postpurge timing.

5) Post Purge - The venter motor output remains on for a 45 second postpurge period after the system controller is satisfied.

Abnormal Heat Cycle Functions

Interrupted Call for Heat - If the system controller call for heat is removed before the flame is recognized, the circuit board will run the venter motor for the post purge period and de-energize all outputs.

If the call for heat is removed after successful ignition, the circuit board will de-energize the gas valve and run the venter motor through post purge.

Ignition Retry - If flame is not established on the 1st trial for ignition period, the ignition system circuit board de-energizes the gas valve, and the venter motor remains energized for an inter-purge period of 10 seconds. The spark and gas valve are then re-energized, and the circuit board initiates a 2nd trial for ignition.

If flame is not established on the 2nd trial for ignition, the circuit board de-energizes the gas valve and venter motor remains energized. The spark and gas valve are re-energized and the circuit board initiates a 3rd trial for ignition.

If flame is not established on the 3rd trial for ignition period, the circuit board de-energizes the gas valve, and the venter motor remains energized for an inter-purge period of 10 seconds. The circuit board then re-energizes the gas valve and spark and initiates a 4th trial for ignition.

If flame is not established on the 4th trial for ignition (initial try plus 3 re-tries), the circuit board de-energizes the gas valve and goes into lockout. The circuit board goes to one flash on the green LED to indicate ignition failure lockout.

Limit Switch Operation - The limit switch is ignored unless a call for heat is present. If the limit switch is open and a call for heat is present, the control de-energizes the gas valve and runs the venter motor.

When the switch re-closes or the call for heat is lost, the control runs the venter motor through post purge. The control will return to normal operation.

Pressure Switch - If the pressure switch opens before the trial for ignition period, the venter motor will run through the pressure switch recognition delay (2 seconds), the gas valve will be de-energized, and the venter motor will run through the postpurge time. The ignition system circuit board will re-start the heat cycle at the pressure switch proving state if the call for heat still exists.

Pressure switch opening for less than 2 seconds during the trial for ignition period shall not interrupt the heat cycle. (Gas valve will de-energize while the pressure switch is open.)

If the pressure switch opens after a successful ignition, the circuit board will de-energize the gas valve. If flame is lost before the end of the 2 second pres-

9.3 Gas Heat Module - Models RDCA and RDDA (cont'd)

9.3.3 Ignition System (cont'd)

Abnormal Heat Cycle Functions (cont'd)

sure switch recognition delay, the circuit board will respond to the loss of flame. If the pressure switch remains open for 2 seconds and the flame remains, the circuit board de-energizes the gas valve and the venter motor runs through postpurge

Ignition System Fault Modes

Undesired Flame - If flame is sensed longer than 20 seconds while the gas valve is de-energized, the circuit board shall energize the venter motor. When flame is no longer sensed, the venter motor will run through postpurge. The circuit board will do a soft lockout, but will still respond to open limit and flame. The FLAME (yellow) LED shall flash rapidly when lockout is due to undesired flame.

Gas Valve Relay Fault - If the circuit board senses the gas valve as energized for more than one second when the circuit board is not attempting to energize the gas valve, or the gas valve is sensed as not energized when it is supposed to be energized, then the circuit board will lockout with the green LED off. The control assumes either the contacts of the relay driving the gas valve have welded shut, or the sensing circuit has failed. The venter motor is forced off to open the pressure switch to stop gas flow unless flame is present.

If the gas valve was sensed as closed when it should be open, and has not de-energized after the venter motor was shutoff for 15 seconds, then the venter motor is re-energized to vent the unburned gas.

Soft Lockout - The circuit board shall not initiate a call for heat while in lockout. The circuit board will still respond to an open limit and undesired flame. Lockout shall automatically reset after one hour. Lockout may be manually reset by removing power from the circuit board for more than one second or removing the call for heat for more than one and less than 20 seconds.

Hard Lockout - If the circuit board detects a fault on the board, the status LED will be de-energized, and the circuit board will lockout as long as the fault remains. A hard lockout will automatically reset if the hardware fault clears.

Power Interruption - During a momentary power interruption or at voltage levels below the minimum operating voltage (line voltage or low voltage) the ignition system will self-recover without lockout when voltage returns to the operating range.

Power interruptions of less than 80mS shall not cause the circuit board to change operating states. Power interruptions greater than 80mS may cause the circuit board to interrupt the current operating cycle and re-start.

9.3.4 Venting and Combustion Air

Location of the Vent and Combustion Air Inlets

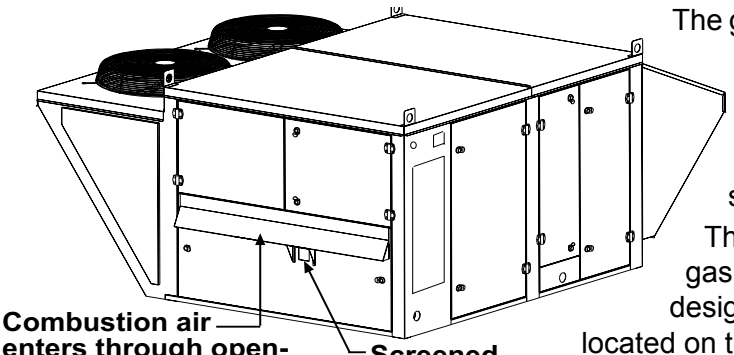


FIGURE 39 - Location of Flue Exhaust (vent) and Combustion Air Openings

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

The combustion air and flue gas openings are carefully designed screened openings located on the side of the unit.

Position the system so that the flue discharge is not directed at any fresh air inlet.

Vent Extension Field Kit

The gas-fired heat section vents combustion gas horizontally. A field-installed vent extension kit (**P/N 221120**) provides for attaching a vertical vent pipe that will allow the vent terminal to extend above the unit. For information, contact your distributor or see Form CP-MAPS-Vnt Ext on www.RezSpec.com.

Combustion Air Proving Switch

DANGER: Safe operation requires proper venting flow. Never bypass the combustion air proving switch or attempt to operate the unit without the venter running and proper flow in the vent system. Hazardous condition could result. See Hazard Levels, page 2.

The combustion air proving switch is a pressure switch that monitors air pressure to ensure that proper combustion airflow is available. The switch on a Size 100 furnace is designed to close when a negative pressure is sensed in the venter housing. The switch on Sizes 150-700 senses the differential pressure between the negative pressure in the venter housing and the pressure in the cabinet. For location of the combustion air proving switch, see **FIGURE 20**, page 33, Item 17.

On startup when the furnace is cold, the sensing pressure is at the most negative level, and as the furnace and the flue system warmup, the sensing pressure becomes less negative. After the system has reached equilibrium (approximately 20 minutes), the sensing pressure levels off. If a restriction causes the sensing pressure to become less than the switch setpoint, the pressure switch will function to shut off the burner. The burner will remain off until the system has cooled and/or the flue system resistance is reduced. The table below gives approximate water column negative pressure readings and switch setpoints for sea level operating conditions.

Sensing Type	Size	Startup (Cold)	Equilibrium (Hot)	Setpoint ON	Setpoint OFF	Label Color	Switch P/N
Single Negative Pressure	**100**	1.2±.2" w.c.	0.65±.1" w.c.	0.68±.1" w.c.	0.5" w.c.	Orange	196388
Differential Pressure	**150**	1.4±.2" w.c.	0.6±.1" w.c.	0.68±.1" w.c.	0.5" w.c.	Orange	196388
	200	1.4±.2" w.c.	0.6±.1" w.c.	0.73±.1" w.c.	0.5" w.c.	White	196362
	250	1.5±.2" w.c.	0.7±.1" w.c.	0.73±.1" w.c.	0.55" w.c.	White	196362
	300	1.5±.2" w.c.	0.7±.1" w.c.	0.73±.1" w.c.	0.55" w.c.	White	196362
	350	3.5±.2" w.c.	1.8±.2" w.c.	0.83±.1" w.c.	0.65"w.c.	Yellow	197028
	400	3.3±.2" w.c.	2.0±.2" w.c.	0.83±.1" w.c.	0.65"w.c.	Yellow	197028
	450	2.7±.2" w.c.	1.8±.2" w.c.	0.83±.1" w.c.	0.65"w.c.	Yellow	197028
	500	2.8±.2" w.c.	1.8±.2" w.c.	0.83±.1" w.c.	0.65"w.c.	Yellow	197028
	550	3.0±.2" w.c.	2.1±.2" w.c.	0.83±.1" w.c.	0.65"w.c.	Yellow	197028
	600	3.0±.2" w.c.	2.1±.2" w.c.	0.83±.1" w.c.	0.65"w.c.	Yellow	197028
	650	3.0±.2" w.c.	1.9±.2" w.c.	0.83±.1" w.c.	0.65"w.c.	Yellow	197028
	700	3.0±.2" w.c.	2.0±.2" w.c.	0.83±.1" w.c.	0.65"w.c.	Yellow	197028

9.3.5 High Temperature Limit Control

All furnaces are equipped with a temperature activated auto reset limit control. The control is factory set and is non-adjustable. If the setpoint is reached, the limit control will interrupt the electric supply to the gas valves. 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 with a capillary sensor that extends across the discharge opening. The switch is accessible in the blower compartment.

CAUTION: The auto reset limit control will continue to shut down the heater until the cause is corrected. Never bypass the limit control; hazardous conditions could result. See Hazard Intensity Levels, page 2.

9. Optional Equipment including Heat Sections (cont'd)

9.4 Optional Gas-Fired Duct Furnace Curb Section, Model JHUP-0250 (natural gas only)

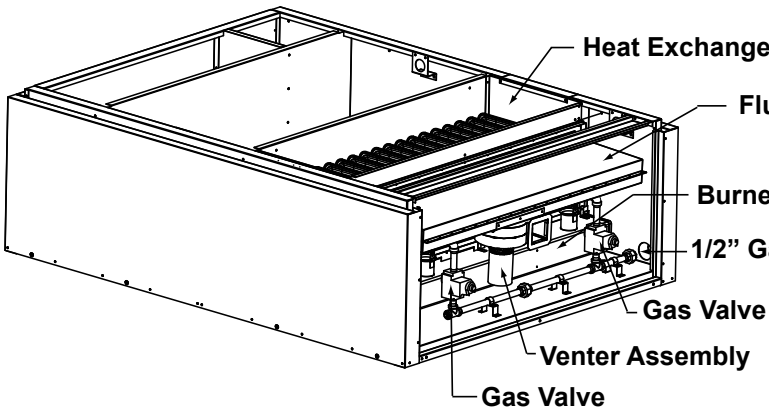
The Model JHUP-0250 duct furnace curb section includes a 250 BTUH gas-fired duct furnace. The curb section fits on a Cabinet B roof curb and mates to a Cabinet B Model RDCA or RDDA with a Size 250 heat section, placing a second heat exchanger in the discharge airstream. The Model JHUP-0250 duct furnace curb section adds 23-1/8" (587mm) to the height as shown in **FIGURE 40B**.

The duct furnace requires a separate gas line; gas connection is 1/2". See gas supply entrance location in **FIGURE 40B**. Refer to Paragraph 9.3.2.1 for gas supply piping and pressure requirements. Since the Size 250 duct furnace burner is the same as the burner on the unit and operates only at high fire, manifold pressure information is the same as for a Size 250 gas heat section at full fire.

The ignition system is the same as in Paragraph 9.3.3 and the vent/combustion air is the same as in Paragraph 9.3.4. The high temperature limit control shown in **FIGURE 40A** functions the same as in Paragraph 9.3.5.

Field wiring is required. Check the wiring diagram for field-wiring requirements. Follow the wiring diagram to connect the field-supplied wiring.

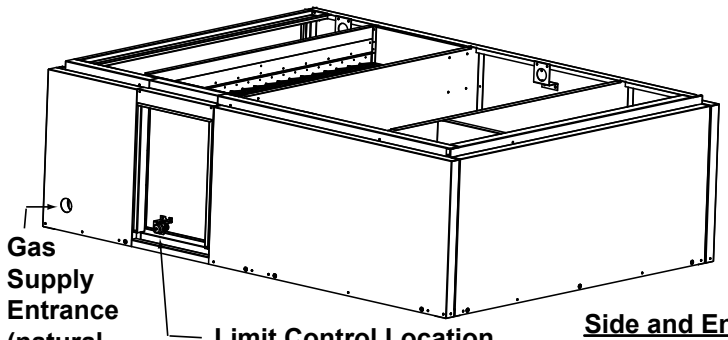
FIGURE 40A - Duct Furnace Curb Heater Gas Train and Limit Control Location



Front View of JHUP Duct Furnace with Access Panel Removed

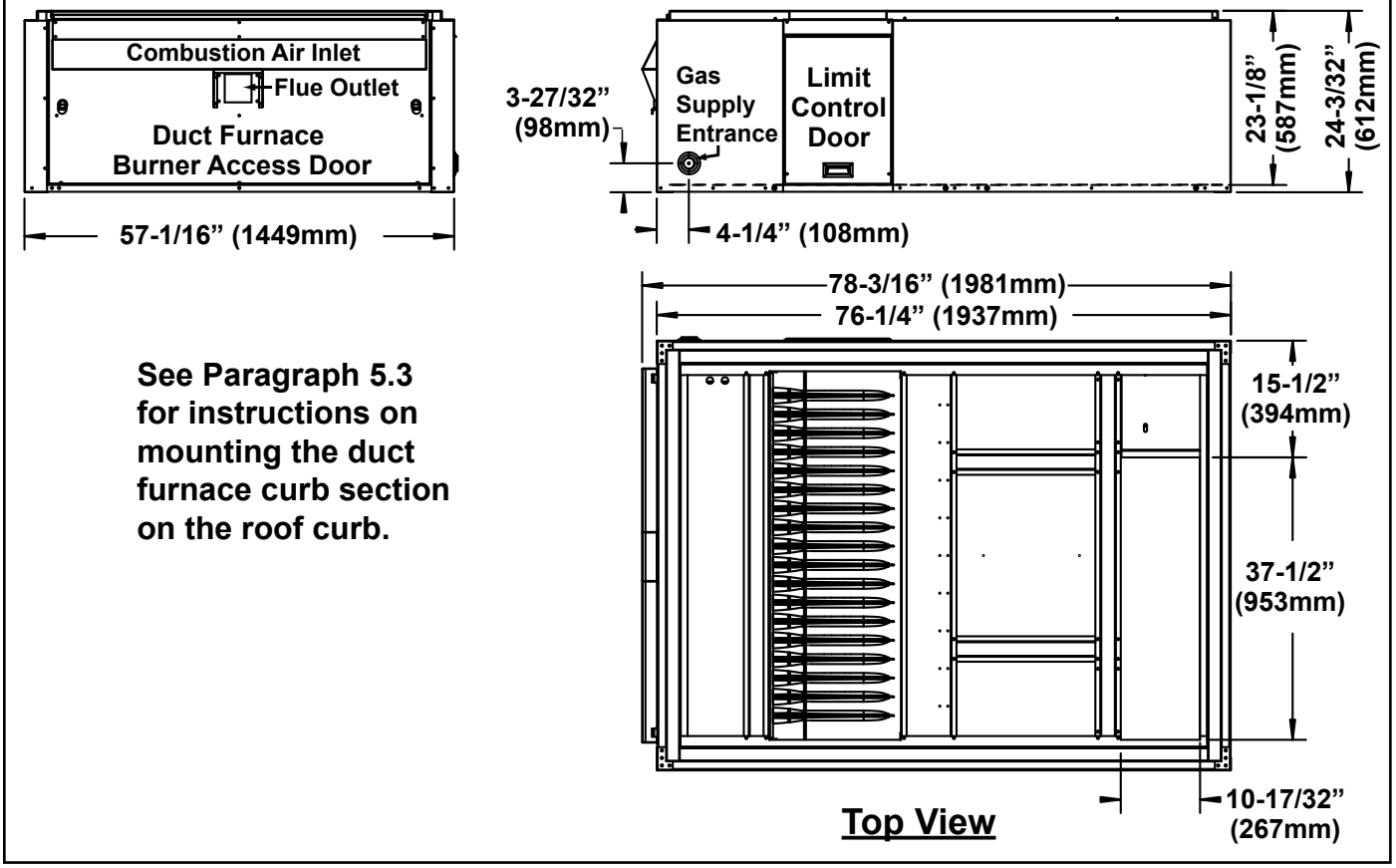
Duct Furnace Sequence of Operation:

The JHUP Series duct furnace can only be energized after the main unit DSI control has enabled operation of the integral heat section and the remote temperature controller’s sensor initiates a call for heat. When both of these conditions are met, the JHUP duct furnace will be energized to operate at full fire only.



Side and End Views of the Duct Furnace Curb Section showing Limit Control Location and Entrance for Natural Gas

FIGURE 40B - Dimensions of a Model JHUP-0250 Duct Furnace Curb Section



See Paragraph 5.3 for instructions on mounting the duct furnace curb section on the roof curb.

9.5 Electric Heat Section - Model RECA and Model REDA

A system with an electric heat section is equipped to provide from 5 to 88 kw of electric heat. Depending on the size, electric heat sections provide one or three stages of heating operation. Call for heat and staging occur in response to system controls (See Paragraph 8).

Electric Heat Capacity and Sequence of Operation

Electric Heat Capacity Table						
Size	240/480/600V		208V		230/460/575V	
	KW	MBH	KW	MBH	KW	MBH
05S	5	17.1	3.8	12.8	4.6	15.7
10S	10	34.1	7.5	25.6	9.2	31.4
15S	15	51.2	11.3	38.4	13.8	47.1
20S	20	68.3	15.0	51.2	18.4	62.8
24S	24	82.0	18.0	61.5	22.1	75.4
15	15	51.2	11.3	38.4	13.8	47.1
20	20	68.3	15.0	51.2	18.4	62.8
25	25	85.4	18.8	64.0	23.0	78.5
30	30	102.5	22.5	76.8	27.6	94.3
35	35	119.5	26.3	89.6	32.2	110.0
39	39	133.2	29.3	99.9	35.9	122.5
60	60	204.9	45.0	153.7	55.2	188.5
75	75	256.1	56.3	192.1	69.0	235.6
88	88	300.5	66.0	225.4	81.0	276.5

NOTE: 575V and 600V apply to Model RECA only.

Size (kW)	Size	Cabinet	Electric Heaters Sequence of Operation		
			Stage 1	Stage 2	Stage 3
5	05S	A	5	-	-
10	10S	A	10	-	-
15	15S	A	15	-	-
20	20S	A	20	-	-
24	24S	A	24	-	-
15	15	A or B	5	10	5 + 10
20	20	A or B	5	15	5 + 15
25	25	A or B	10	15	10 + 15
30	30	A or B	10	20	10 + 20
35	35	A or B	15	20	15 + 20
39	39	A, B, or C	15	24	15 + 24
50	50	B or C	15	15+15	15+15+10+10
60	60	B or C	10+10	20+20	10+10+20+20
75	75	B or C	20	20+15+20	20+15+20+20
88	88	B or C	24	20+24+20	20+24+20+24

10. Commissioning and Startup

10.1 General

NOTE: Redo cooling startup procedures when the cooling season begins.

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. See Hazard Levels, page 2.

10.2 Checklist Prior to Startup

NOTE: If unit is equipped with a phase loss/phase reversal control and does not start, check the phase rotation of the electrical supply. See Paragraph 7 and **FIGURE 22**, page 34.

10.2.1 All Systems Checklist Prior to Startup:

- ☐ Check clearances. All clearances must be as illustrated in Paragraph 4.3.
- ☐ Verify the electrical supply matches voltage rating of the unit. (Refer to the rating plate.) Check for voltage imbalance; see Paragraph 7.2.
- ☐ Check the wiring for loose connections or damaged wire. Tighten connections. Replace damaged wiring. (See Paragraph 7 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 be compliance with the National Electric Code and local regulations.
- ☐ Be certain that the electrical entrances are sealed against the weather.
- ☐ Check that fuses or circuit breakers are in place and sized correctly.
- ☐ Be certain optional manual reset controls (firestat and high gas pressure switch) are reset.
- ☐ If any changes are required to factory settings, be sure they have been made. (Refer to control instructions shipped with the unit.)
- ☐ **IMPORTANT - Before applying power, check blower pulley, blower wheel, and motor pulley to be sure they are secure to the shafts.**
  Setscrew torque for pulley (sheave) is 110 in-lb minimum to 130 in-lb maximum.
  Setscrew torque for bearing hub with 1-3/8 to 1-3/4" shaft is 165 in-lbs.
  Socket setscrew size is 5/16".
  Check blower and pulleys for free movement. Check belt tension and alignment. See Paragraph 6.4.
- ☐ Check free rotation of condenser fans.
- ☐ Remove compressor tiedowns and all other shipping supports and restraints.
- ☐ Verify that condensate drain is properly trapped and open. See Paragraph 6.2.
- ☐ If compressors have crankcase heaters, they must be allowed to warm up for at least 24 hours prior to startup. The primary cooling compressor on Models 059, 077, 109, and 139 is equipped with a bellyband type crankcase heaters. If actual startup of these models is scheduled in 24 hours, unlock the disconnect switch and turn on the electric.

10.2.2 Gas Heat Checklist Prior to Startup:

- ☐ Check gas piping for leaks and proper gas pressure. See Paragraph 9.2.2.1. Bleed gas lines of trapped air.
  a) Turn manual shutoff valve to off position.
  b) Turn gas supply on.

c) Observe gas meter for movement, or

d) Attach pressure gauge readable to 0.1" w.c. and after turning gas on for ten seconds, turn gas supply off. No change in pressure should occur over a three-minute period.

e) If either c) or d) above indicate a leak, locate leak by brushing a soapy solution on all fittings. Bubbles will appear at the leak. Repair and repeat tests.

☐ Check to make sure that the combustion air inlet and flue discharge openings are free of obstructions.

When all checks are completed satisfactorily, close and secure all doors.

10.3 Checklist - Startup

10.3.1 Startup Checklist for ALL Systems

Assumptions: All prior to startup checks have been completed satisfactorily. Compressors with crankcase heaters have been allowed to warm up for at least 24 hours.

Reference: See one-page Startup Form in Paragaph 10.5, page 57. Form is also available on line at www.RezSpec.com.

Startup Cooling Sequence when ambient temperature is ABOVE 68°F/20°C

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

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

Sequence of Cooling Operation <u>when ambient temperature is ABOVE 68°F/20°C</u> (all Models):

NOTE: Outdoor ambient lockouts may prevent mechanical cooling or reheat. Temporarily override lockouts by lowering the oC1 programmable control setting to 58°F. To enable unit reheat functions, temporarily lower the DP1 setting to 50°F. When testing is complete, reset oC1 or DP1 as required by the application. (For instructions on changing settings on the programmable control, refer to the instruction sheet for the control system shipped either in the Literature Bag or with the Wiring Diagram.)

1.Set control switch at Auto position (closed).

A) Energizing the blower motor and, if equipped, the damper motor.

B) Air proving switch closes, allowing for heating, cooling, or reheat mode.

1) On temperature rise above outside air setting for cooling

a) Energizing the re-heat pump circuit after minimum time delay (RDA, RDDA, REDA).

b) Cooling rate is controlled by discharge air sensor.

c) On call for cooling, the corresponding compressors and con denser motors are energized.

d) On low humidity or abnormal temperature, the re-heat heat pump is de-energized (RDA, RDDA, REDA).

e) On abnormal temperature, the corresponding cooling circuit is de-energized.

2) On temperature drop below changeover setting, the cooling circuit is de-energized

2.For shutdown, set control switch at OFF position (open).

10.3.1 Startup Checklist for ALL Systems (cont'd)

SPECIAL Startup Cooling Sequence when ambient temperature is BELOW 68°F/20°C

Sequence of Cooling Operation <u>when ambient temperature is BELOW 68°F/20°C</u> (all Models):

NOTE: Outdoor ambient lockouts may prevent mechanical cooling or reheat. Temporarily override lockouts by lowering the oC1 programmable control setting to 58°F. To enable unit reheat functions, temporarily lower the DP1 setting to 50°F. If ambient conditions (below 58°F) still prevent mechanical cooling operation, the outside air sensor can be warmed by hand or replaced with a 14 watt, 1000 to 1200 Ohm resistor. When testing is complete, reset oC1 or DP1 as required by the application. (For instructions on changing settings on the programmable control, refer to the instruction sheet for the control system shipped either in the Literature Bag or with the Wiring Diagram.)

1. Set control switch at Auto position (closed).
   - A) Energizing the blower motor, and if equipped, the damper motor.
   - B) Air proving switch closes, allowing for heating, cooling, or reheat mode.
     - 1) On temperature rise above outside air changeover setting,
       - a) Energizing the re-heat heat pump circuit after minimum time delay (RDA, RDDA, REDA).
       - b) Cooling rate controlled by discharge air sensor.
       - c) On call for cooling, the corresponding compressors and con denser motors are energized.
       - d) On low humidity or abnormal temperature, the re-heat heat pump is de-energized (RDA, RDDA, REDA only).
       - e) On abnormal temperature, the corresponding cooling circuit is de-energized.
     - 2) On temperature drop below changeover setting, the cooling circuit is de-energized.
2. For shutdown, set control switch at OFF position (open).

IMPORTANT: All refrigeration checks must be made by a qualified refrigeration technician.

☐ Verify that the blower and all condenser fans are rotating in the proper direction. If blower rotation is incorrect, change phase at the field line voltage connection. Compressor rotation is phase sensitive.

☐ Check the superheat and subcooling.

Superheat is the verification that the evaporator coil is properly using the refrigerant supplied. Too much superheat indicates that the coil is undercharged. Too little superheat indicates that the coil is overcharged and potentially flooding liquid refrigerant to the compressor.

Subcooling is the measurement of liquid refrigerant stored in the condenser coil. Too much subcooling indicates a system overcharge. Too little indicates a system undercharge and may not provide the thermal expansion valve with a full column of liquid refrigerant for proper operation.

<u>Two important requirements before checking superheat and subcooling</u>:

1) This unit has fully intertwined refrigerant circuits and each circuit **MUST be isolated** before measuring its temperature. Another active circuit will influence the reading and make it impossible to determine accurate superheat and subcooling.

2) If the circuit is equipped with an optional hot gas bypass valve, the valve must be disabled before measuring superheat and subcooling. Disable the hot gas bypass valve by removing the cover and adjusting the spring

tension counterclockwise until the spring tension is relieved. **Count and record the number of turns** required so that you can return the bypass valve to its original setting.

Instructions for Checking and Adjusting the Superheat of an Isolated Circuit:

Step 1) Measure and record the temperature (insulate probe from surrounding air temperature) and the pressure of the suction line at the compressor.

Step 2) From the Temperature/Pressure Conversion Chart in the **APPENDIX** on page 58, convert the pressure measured in **Step 1** to temperature.

Step 3) Subtract measured temperature in **Step 1** from the temperature taken from the Conversion Chart in **Step 2**. The answer is the degrees of superheat. **Recommended superheat range is 8-12°F (4.5-6.7°C).**

Step 4) Superheat is adjusted at the thermal expansion valve. To **reduce** superheat, turn the adjusting stem **counterclockwise**. To **increase** the superheat, turn the adjusting stem **clockwise**. Adjust and check until superheat is within the recommended range.

Step 5) Repeat **Steps 1-4** for each refrigeration circuit.

Instructions for Checking and Adjusting the Subcooling of an Isolated Circuit:

Step 1) Measure and record the temperature (insulate probe from surrounding air temperature) and the pressure of the liquid line at the condenser coil outlet.

Step 2) From the Temperature/Pressure Conversion Chart in the **APPENDIX** on page 58, convert the pressure measured in **Step 1** to temperature.

Step 3) Subtract measured temperature in **Step 1** from the temperature taken from the Conversion Chart in **Step 2**. The answer is the degrees of subcooling. **Recommended subcooling range is 18-22°F (10.1-12.3°C).**

Step 4) Subcooling is adjusted by the amount of refrigerant charge. To reduce subcooling, remove refrigerant. To increase subcooling, add refrigerant. Adjust refrigerant and check until subcooling is within the recommended range.

Step 5) Repeat **Steps 1-4** for each refrigeration circuit.

- ☐ Check the compressor suction and discharge pressures and compare them to the values in **FIGURE 4 or 5** graphs in the Operation/Maintenance/Service Manual, Form O-MAPS II, found in the owner's envelope.
- ☐ **RDA/RDDA/REDA only** - Check the re-heat heat pump circuit refrigerant subcooling and superheat. (Refer to the instructions above for checking superheat and subcooling.) Acceptable subcooling readings range from 18° to 25°F (10.1 to 14°C). Superheat should be in the 8° to 12°F (4.5 to 6.7°C) range.
- ☐ If the system is equipped with an optional hot gas bypass, check the valve. Follow the instructions in Paragraph 7.7, page 28.
- ☐ If the system is equipped with an optional dirty filter switch, set the switch. Follow the instructions in Paragraph 8.2, page 31.

10.3.2 Startup Checklist for Systems with Gas Heat Module

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

Sequence of Gas Heat Operation:

NOTE: Outdoor ambient lockouts will prevent mechanical gas heating. Temporarily override lockouts by raising the oC1 programmable control setting to 95°F and the heating setpoint (HSP) to 95°F. When testing is complete, reset oC1 and HSP as required by the application. (For instructions on changing

10. Commissioning and Startup (cont'd)

10.3 Checklist Startup (cont'd)

10.3.2 Startup Checklist for Systems with Gas Heat Module (cont'd)

settings on the programmable control, refer to the instruction sheet in the Literature Bag or with the Wiring Diagram.)

1. Set the discharge temperature heating control at its lowest 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.C. to N.O. contacts, firing 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).

☐ Turn the unit off and on, pausing two minutes between each cycle. Observe for smooth ignition. (**NOTE**: Spark ignition occurs at 1/3 burner section only.)

Manipulate discharge temperature setpoint up and down to see if furnace is sequencing 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, <u>complete combustion</u>. However, <u>if the installation</u> does not permit the burner to receive the proper supply of combustion air, complete combustion may not occur. The result is <u>incomplete combustion</u> which produces carbon monoxide, a poisonous gas that can cause death. NEVER RESTRICT OR OTHERWISE ALTER THE SUPPLY OF COMBUSTION AIR TO ANY HEATER.

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

10.4 Checklist After Startup:

Assumptions: All checks have been successfully performed and system is operating properly. All panels and doors are secure. The area has been cleared of any excess supplies, scraps, and debris.

☐ Place "Literature Bag" containing Limited Warranty information, this booklet, the operation/maintenance/service manual (Form O-MAPS), control instructions, and any information on optional controls in an accessible location. Comply with the instructions on the bag.

☐ **IMPORTANT - After at least 8 hours but no longer than a week of operation, recheck the blower wheel including all setscrews, the blower pulley, the motor pulley, and belt tension. Make any required adjustments.**

Setscrew torque for pulley (sheave) is 110 in-lb minimum to 130 in-lb maximum.

Setscrew torque for bearing hub with 1-3/8 to 1-3/4" shaft is 165 in-lbs.

Socket set screw size is 5/16".

10.5 Startup Form (To fill out this form on line and print or to print a blank copy, go to www.RezSpec.com.)

REZNOR®

STARTUP FORM

Reset Form | Print Form

Applies to: **MAPS II Model Series RCA, RDA, RDCA, RDDA, RECA, and REDA Modular Air Processing Systems**

Job Name _____ **Contractor** _____

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

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

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

Startup Checklist - General Checks (Reference)

- ☐ Inspect unit for damage. (I-MAPS II, Sec. 3.1)
- ☐ Verify shipping brackets are removed.
- ☐ Check clearances (I-MAPS II, Sec. 4.3)
- ☐ Seal electrical entrances.
- ☐ Check all fans for free movement.
- ☐ Inspect dampers.
- ☐ Check outside air hood and filters. (I-MAPS II, Sec. 6.3)
- ☐ Verify air filters are installed. (O-MAPS II, Sec. 3)
- ☐ Check condensate connections. (I-MAPS II, Sec. 6.2)
- ☐ Verify all copper tubing is isolated and does not rub.
- ☐ Check discharge and space sensors.
- ☐ Check and tighten all electrical terminals.
- ☐ Check fuses/breakers for correct sizing (Check unit rating plate for electrical requirements.)
- ☐ Check for voltage imbalance. (I-MAPS II, Sec. 7.2)
- ☐ Check for manual resets (firestat, high gas pressure switch)

Blower Assembly

- ☐ Alignment
- ☐ Belt tension
- ☐ Rotation

Motor HP _____ **Nameplate Amps** _____

RPM _____ **CFM.** _____ **E.S.P.** _____

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

- ☐ Tighten all screws on pulleys, bearings, and fans (I-MAPS II, Sec. 6.4; O-MAPS II, Sec 4)
- ☐ Check optional dirty filter switch. (I-MAPS II, Sec. 8.2)

Condenser Fans

Nameplate HP _____ **Volts** _____ **RLA** _____

	Voltage			Amperage		
	L1 - L2	L2 - L3	L3 - L1	RLA-1	RLA-2	RLA-3
Fan 1						
Fan 2						
Fan 3						

Compressor Data

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

Circuit	Voltage			Amperage			Nameplate RLA	Head Press PSIG	Suct Press PSIG	Superheat	Subcooling	DAT
	L1 - L2	L2 - L3	L3 - L1	RLA-1	RLA-2	RLA-3						
Compressor A												
Compressor B												
Compressor C												
D or Reheat DH												

- ☐ Check optional hot gas bypass valve. (I-MAPS II, Sec. 7.7)

Gas Heat Section

◯ Natural Gas ◯ LP

- ☐ Leak test gas piping
- ☐ Purge air from lines

Inlet Gas Pressure _____

Operational Inlet Gas Pressure _____

Maximum Inlet Gas Pressure: 14" for both natural gas & LP

Minimum Inlet Gas Pressure: 5.5"w.c. for 3-stage naturalgas (AG55); 6.0"w.c. for 6:1 modulation natural gas (AG57);11"w.c. for 3-stage LP (AG55)

Check Manifold Pressure (Desired outlet pressure of single stage valve from 0-2000 ft (0-610M) at full fire is 3.5" w.c. for natural gas or 10" w.c. for LP.

Operational Manifold Gas Pressure:

1/3 or Single Burner _____ 2/3 Burner _____

Full Burner (Sizes 450-700) _____

Electric Heat Section

	Voltage			Amperage		
	L1 - L2	L2 - L3	L3 - L1	RLA-1	RLA-2	RLA-3
1						
2						
3						
4						

Option ERV Exhaust Assy

☐ Alignment ☐ Belt tension ☐ Air balance

Intake Motor HP _____ Nameplate Amps _____

Exhaust Mtr HP _____ Nameplate Amps _____

Motor	Voltage			Amperage		
	L1 - L2	L2 - L3	L3 - L1	RLA-1	RLA-2	RLA-3
Intake						
Exhaust						

Comments

Thomas&Betts

APPENDIX

Cross-Reference by Model/Size and Cabinet Size A, B, or C

Model RCA and Model RDA

Model RCA	Cabinet Size
025	A
037	
059	
060	
077	
078	
090	
108	
109	
120	
139	B
164	A
166	B
176	C
184	B
198	
226	C
292	
374	

Model RDA	Cabinet Size
102	A
114	
126	
144	
188	B
220	
234	
230	C
280	
346	
428	
446	

Model RDCA and Model RDDA by Gas Heat Section Size

Model RDCA	Gas Heat Section Size												
	-100	-150	-200	-250	-300	-350	-400	-450	-500	-550	-600	-650	-700
025	A	A	A	--	--	--	--	--	--	--	--	--	--
037	A	A	A	--	--	--	--	--	--	--	--	--	--
059	A	A	A	--	--	--	--	--	--	--	--	--	--
060	A	A	A	--	--	--	--	--	--	--	--	--	--
077	A	A	A	--	--	--	--	--	--	--	--	--	--
078	A	A	A	B	B	--	--	--	--	--	--	--	--
090	A	A	A	B	B	--	--	--	--	--	--	--	--
108	A	A	A	B	B	--	--	--	--	--	--	--	--
109	--	A	A	--	--	--	--	--	--	--	--	--	--
120	A	A	A	B	B	--	--	--	--	--	--	--	--
139	--	--	--	B	B	--	--	--	--	--	--	--	--
164	--	A	A	--	--	--	--	--	--	--	--	--	--
166	--	--	--	B	B	--	--	--	--	--	--	--	--
176	--	--	--	--	--	C	C	C	C	C	C	C	C
184	--	--	--	B	B	--	--	--	--	--	--	--	--
198	--	--	--	B	B	--	--	--	--	--	--	--	--
226	--	--	--	--	--	C	C	C	C	C	C	C	C
292	--	--	--	--	--	C	C	C	C	C	C	C	C
374	--	--	--	--	--	C	C	C	C	C	C	C	C

Model RDDA	Gas Heat Section Size												
	-100	-150	-200	-250	-300	-350	-400	-450	-500	-550	-600	-650	-700
102	A	A	A	B	B	--	--	--	--	--	--	--	--
114	A	A	A	B	B	--	--	--	--	--	--	--	--
126	A	A	A	B	B	--	--	--	--	--	--	--	--
144	--	A	A	B	B	--	--	--	--	--	--	--	--
188	--	--	--	B	B	--	--	--	--	--	--	--	--
220	--	--	--	B	B	--	--	--	--	--	--	--	--
230	--	--	--	--	--	C	C	C	C	C	C	C	C
234	--	--	--	B	B	--	--	--	--	--	--	--	--
280	--	--	--	--	--	C	C	C	C	C	C	C	C
346	--	--	--	--	--	C	C	C	C	C	C	C	C
428	--	--	--	--	--	C	C	C	C	C	C	C	C
446	--	--	--	--	--	C	C	C	C	C	C	C	C

Model RECA and Model REDA by Electric Heat Module

Model RECA	Electric Heat Module														
	-05S	-10S	-15S	-20S	-24S	-15	-20	-25	-30	-35	-39	-50	-60	-75	-88
025	--	--	--	--	--	A	A	A	A	A	A	--	--	--	--
037	--	--	--	--	--	A	A	A	A	A	A	--	--	--	--
059	--	--	--	--	--	A	A	A	A	A	A	--	--	--	--
060	A	A	A	A	A	A	A	A	A	A	A	--	--	--	--
077	--	--	--	--	--	A	A	A	A	A	A	--	--	--	--
078	--	A	A	A	A	A	B	A	A	B	A	B	B	B	--
090	--	A	A	A	A	A	B	A	A	B	A	B	B	B	B
108	--	A	A	A	A	A	B	A	A	B	A	B	B	B	B
109	--	--	--	--	--	--	A	A	A	A	A	--	--	--	--
120	--	A	A	A	A	A	B	A	A	B	A	B	B	B	B
139	--	--	--	--	--	--	B	B	B	B	B	B	B	B	B
164	--	--	A	A	A	A	A	A	A	A	A	--	--	--	--
166	--	--	--	--	--	B	B	B	B	B	B	B	B	B	B
176	--	--	--	--	--	--	--	--	--	--	C	C	C	C	C
184	--	--	--	--	--	B	B	B	B	B	B	B	B	B	B
198	--	--	--	--	--	--	B	B	B	B	B	B	B	B	B
226	--	--	--	--	--	--	--	--	--	--	C	C	C	C	C
292	--	--	--	--	--	--	--	--	--	--	C	C	C	C	C
374	--	--	--	--	--	--	--	--	--	--	C	C	C	C	C

Model REDA	Electric Heat Module													
	-10S	-15S	-20S	-24S	-15	-20	-25	-30	-35	-39	-50	-60	-75	-88
102	A	A	A	A	A	B	A	A	B	A	B	B	B	--
114	A	A	A	A	A	B	A	A	B	A	B	B	B	B
126	--	A	A	A	A	B	A	A	B	A	B	B	B	B
144	--	A	A	A	A	B	A	A	B	A	B	B	B	B
188	--	--	--	--	B	B	B	B	B	B	B	B	B	B
220	--	--	--	--	--	B	B	B	B	B	B	B	B	B
230	--	--	--	--	--	--	--	--	--	C	C	C	C	C
234	--	--	--	--	--	B	B	B	B	B	B	B	B	B
280	--	--	--	--	--	--	--	--	--	C	C	C	C	C
346	--	--	--	--	--	--	--	--	--	C	C	C	C	C
428	--	--	--	--	--	--	--	--	--	C	C	C	C	C
446	--	--	--	--	--	--	--	--	--	C	C	C	C	C

Technical Data - Applies to Makeup Air Cooling System in Models RCA, RDCA, and RECA

Cabinet Size	Model Size	Capacity Stages	Compressors		Condensers					Evaporator Coil			Condensate Drain Size
			Nominal Tons	Qty	Coils		Fans			Face Area	Rows	FPI	
					Face Area	Rows	Qty	CFM	HP	(Ckt A/B)	(A/B)	(A/B)	
A	060	40/60/100	2.0/3.0	2	5.75	3	1	3490	3/4	5.2	3	14	1" MPT
A&B*	078	30/70/100	2.0/4.5	2	9.6	3	1	3992	3/4	7.3	3	13	1" MPT
A&B*	090	40/60/100	3.0/4.5	2	9.6	3	1	4496	3/4	7.3	3	14	1" MPT
A&B*	108	33/66/100	3.0/6.0	2	11.5	3	1	5000	3/4	7.3	4	13	1" MPT
A&B*	120	42/58/100	4.5/6.0	2	13.4	3	2	7479	3/4	7.3	4	13	1" MPT
A	164	33/66/100	4.5/3.0/6.0	3	17.25	3	2	8487	3/4	7.3 / 7.3	1 / 4	11 / 13	1" MPT
B	166	33/66/100	4.5/3.0/6.0	3	17.25	3	2	8487	3/4	7.3	6	13	1" MPT
C***	176	31/69/100	4.5/10.0	2	23	3	2	10000	1	18.3	3	13	1" MPT
B	184	30/70/100	4.5/4.5/6.0	3	19.1	3	2	8991	3/4	10.9	4	13	1" MPT
B	198	36/64/100	4.5/6.0/6.0	3	21.0	3	2	9475	3/4	10.9	6	13	1" MPT
C***	226	33/66/100	6.2t/6.2t/6.2	3	23	3	2	10000	1	18.3	4	13	1" MPT
C***	292	25/50/100	6.2t/6.2t/12	3	26.7	3	3	13500	1	18.3	5	13	1" MPT
C***	374	33/66/100	10/10/10	3	38.7	3	3	15000	1	18.3	6	13	1" MPT
Sizes (with odd Model number) below are specifically designed for a DRY CLIMATE.													
Cabinet Size	Model Size	Capacity Stages	Compressors		Condensers					Evaporator Coil			Condensate Drain Size
			Nominal Tons	Qty	Coils		Fans			Face Area	Rows	FPI	
					Face Area	Rows	Qty	CFM	HP	(Ckt A/B)	(A/B)	(A/B)	
A	025	100	2.0	1	5.75	3	1	3490	3/4	5.2	2	7	1" MPT
A	037	100	3.0	1	5.75	3	1	3490	3/4	5.2	2	10	1" MPT
A	059**	40/60/100	2.0/3.0	2	9.6	3	1	4496	3/4	5.2 / 5.2	2 / 2	6 / 6	1" MPT
A	077**	30/70/100	2.0/4.5	2	11.5	3	1	5000	3/4	5.2 / 5.2	2 / 2	7 / 9	1" MPT
A	109**	33/66/100	3.0/6.0	2	17.25	3	2	8487	3/4	5.2 / 5.2	2 / 2	9 / 10	1" MPT
B	139**	37/63/100	4.5/3.0/4.5	3	21.0	3	2	9475	3/4	7.3 / 7.3	2 / 2	12 / 11	1" MPT

* These sizes in cooling only or with an electric heat section are always Cabinet A. With gas heat, cabinet size depends on heating capacity. ** Models 059, 077, 109, and 139 are rated for up to 125°F 100% outside air.

*** Due to the larger size, do not attempt to move a "C" cabinet system with a fork lift; use the lifting lugs.

Technical Data - Applies to Makeup Air Cooling System and Re-Heat Pump Reheat Cycle in Models RDA, RDDA, and REDA

Cabinet Size	Model Size	Cooling Capacity Stages	Cooling Compressors		Cooling Condensers			Drain Size	Re-Heat Pump					
									Compressor(s)		Coil		Condenser	
			Nominal Tons	Qty	Fans				Nominal Tons	Qty	Face Area	Rows	Face Area	Rows
					Qty	CFM	HP							
A&B*	102	30/70/100	2.0/4.5	2	1	4300	3/4	1" MPT	2	1	7.3	1	7.5	1
A&B*	114	40/60/100	3.0/4.5	2	1	4300	3/4	1" MPT	2	1	7.3	1	7.5	1
A&B*	126	33/66/100	3.0/6.0	2	1	5000	3/4	1" MPT	2	1	7.3	1	7.5	1
A&B*	144	42/58/100	4.5/6.0	2	2	6400	3/4	1" MPT	2	1	7.3	1	7.5	1
B	188	33/66/100	4.5/3.0/6.0	3	2	8200	3/4	1" MPT	2	1	7.3	1	7.5	1
B	220	30/70/100	4.5/4.5/6.0	3	2	9300	3/4	1" MPT	3	1	10.9	1	11.3	1
B	234	36/64/100	4.5/6.0/6/0	3	2	9700	3/4	1" MPT	3	1	10.9	1	11.3	1
C***	230	31/69/100	4.5/10.0	3	2	10000	1	1" MPT	4.5	1	18.3	1	16.9	1
C***	280	33/66/100	6.2t/6.2t/6.2	3	2	10000	1	1" MPT	4.5	1	18.3	1	16.9	1
C***	346	25/50/100	6.2t/6.2t/12	3	3	13500	1	1" MPT	4.5	1	18.3	1	16.9	1
C***	428	33/66/100	10/10/10	3	3	15000	1	1" MPT	4.5	1	18.3	1	16.9	1
C***	446	33/66/100	10/10/10	3	3	15000	1	1" MPT	6.2	1	18.3	1	16.9	1

* These sizes in cooling and reheat only or with electric heat are always Cabinet A. With gas heat, cabinet size depends on heating capacity. *** Due to the larger size, do not move a "C" cabinet system with a fork lift; use the lifting lugs.

APPENDIX (cont'd)

Wiring Diagram Option Identification

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

Option Code	Brief Description	Installed
AG55	3:1 Turndown Gas Control	Factory
AG57	6:1 Electronic Modulating Gas Control	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
AN2	Motor Contactor	Factory
AN10	Motor Starter	Factory
AR2A or B	Requires Energy Recovery module (field-installed)	Factory
AR2E or F	OA/RA Dampers with Economizer Controls	Factory
AR8	Horizontal Damper with two-Position (open/closed)	Factory
AR17	OA/RA Dampers with two-position motor (outside/return)	Factory
AR18	OA/RA Modulating Dampers with Potentiometer	Factory
AR23	OA/RA Modulating Dampers wtih Pressure Null Switch	Factory & Field
AR25	Modulating OA/RA Dampers w/customer supplied digital control	Factory & Field
AR27	Modulating OA/RA Dampers w/Pressure Null Switch	Factory & Field
AU25	Supplemental Reheat	Factory
AUC1	Hot Gas Bypass - 1st stage	Factory
AUC2	Hot Gas Bypass - 1st and 2nd stage	Factory
BA6	Unit flush mounted disconnect on/off switch	Factory
BC2	Convenience Outlet (requires separate power supply)	Factory & Field
BD5	Firestat, 200°F (field installed)	Field
BE9	Monitors Temperature from Main Evaporator Coil	Factory
BF14	Phase Loss and Voltage Under/Over Protection	Factory
BF15	Phase Loss Protection	Factory
BG9	Exhaust Fan Relay	Factory & Field
BHB1	Time Clock Card	Factory
BHB2	N2 Communication Plug-in Module	Factory
BHB3	Lon Communication Plug-in Module	Factory
CL47	Wall-Mounted Dehumidistat	Field
CL53	Wall-Mounted Temperature Sensor/Override	Field
CL67	Wall-Mounted Temperature Sensor/Setpoint	Field
CP__	Disconnect Switch	Field
D12	Space Temperature Control with D/A Reset using FX05	Factory & Field
D12A	Space Temperature or Neutral Air Control using FX06	Factory & Field
DR2	Adjustable Motor Sheave, Linked Belt(s)	Factory
DR4	Adjustable Motor Sheave, Solid V-Belt(s)	Factory
DT5	Outside Air Relative Humidity Transmitter	Field
ER__	Energy Recovery Module	Factory & Field
PE 1, 2, 3	Power Exhaust	Factory & Field
RB2A	Remote Module with Display, Controls, and Alarm Light	Field
RC__	Remote Console	Field
SA1	Duct Photoelectric Smoke Detector	Factory & Field

Pressure/ Temperature Chart for Checking Superheat and Subcooling

Saturation Temperature		Pressure (psig)	
(ºF)	(ºC)	R-22	R-407C
0	-17.8	24	19.5
5	-15.0	28.2	23.6
10	-12.2	32.7	28.0
15	-9.4	37.7	32.7
20	-6.7	43	37.9
25	-3.9	48.7	43.6
30	-1.1	54.9	49.6
35	1.7	61.4	56.2
40	4.4	68.5	63.2
45	7.2	76	70.7
50	10.0	84	78.8
55	12.8	92.5	87.5
60	15.6	101.6	96.8
65	18.3	111	106.7
70	21.1	121.4	117.2
75	23.9	132	128.4
80	26.7	144	140.4
85	29.4	156	153.1
90	32.2	168.4	166.5
95	35.0	182	180.8
100	37.8	196	195.8
105	40.6	211	211.8
110	43.3	226.4	228.7
115	46.1	243	246.5
120	48.9	260	265.3
125	51.7	278.4	285.2
130	54.4	296.8	306.1
135	57.2	317	328.2
140	60.0	337.3	351.4
145	62.8	359	375.9

Index

References (Catalogs and instruction manuals are available for download at www.RezSpec.com.)

Pressure Drops, Airflow Ranges, Pressure Drops	See Sales/Technical Catalog C-PC
Blower Charts (RPM/HP)	See Sales/Technical Catalog C-PC
Controller Instructions for Option D12A w/FX06	See Form CP-MAPS II-D12A for FX06
Controller Instructions for Option D12 w/FX05	See Form CP-MAPS II-D12 for FX05
Maintenance	See Form O-MAPS II
Service	See Form O-MAPS II
Wiring Diagram	On the Unit

NOTES:

INSTALLER MUST COMPLETE THE FOLLOWING:

Installer:

Name _____

Company _____

Address _____

_____

_____

Phone _____

Distributor (company from which the unit was purchased):

Contact _____

Company _____

Address _____

_____

_____

Phone _____

Model No. _____ Serial No._____Date of Installation _____

SPECIFIC INSTALLATION NOTES: (i.e. Location, CFM, HP, Static Pressure, Amps, Temperature, Voltage, Adjustments, Options, Warranty, etc.)

_____

_____

_____

BUILDING OWNER OR MAINTENANCE PERSONNEL:

For service or repair

- Contact the installer listed above.
- If you need additional assistance, contact the Reznor Distributor listed above.
- For more information, contact your Reznor Representative by calling 1-800-695-1901.

Reznor/Thomas & Betts Corp.
150 McKinley Avenue
Mercer, PA 16137

www.RezSpec.com
(800) 695-1901

10/08 Form I-MAPS II (Version B.6)