REZNOR®

MAPS® MAPS® dH™

Installation

Applies to: **All MAPS®III&IV (Cabinets A, B, C, and D) Model Series RCB, RDB, RCC, & RDC Packaged Makeup Air Cooling; Models RDCB, RDDB, RDCC, & RDDC Packaged Makeup Air Cooling with a Gas-Fired Heat Section; and Models RECB, REDB, RECC, & REDC Packaged Makeup Air Cooling with an Electric Heat Section; and Model JHUP Gas-Fired Curb Duct Furnaces**

R-410A Refrigerant

MAPS®III&IV Cabinets "A", "B", and "C"

MAPS®III Cabinet "D"

DANGER:

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

⚠ WARNING:

FIRE OR EXPLOSION HAZARD

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

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

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

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

— **WHAT TO DO IF YOU SMELL GAS**

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

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

Table of Contents

1.0 General

1.1 Cautions and Warnings

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

Definitions of Hazard Intensity Levels used in this Manual

HAZARD INTENSITY LEVELS

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

Warnings for MAPS® Units with a Gas Heat Section

WARNING

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

WARNING

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

WARNING

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

1.2 General Information

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

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

Handling of the R-410A 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® models:

Models	Description
RCB, RCC	Makeup Air Cooling Packaged System, 1000-13000 CFM
RDCB, RDCC	Makeup Air Cooling Packaged System, 1000-13000 CFM, with Gas Heat Section (400-1600 MBH)
RECB, RECC	Makeup Air Cooling Packaged System, 1000-13000 CFM, with Electric Heat Section (10 - 180 kw)
RDB, RDC	Makeup Air Cooling and Re-heat Pump Reheat Cycle Packaged System, 1000-13000 CFM
RDDB, RDDC	Makeup Air Cooling and Re-heat Pump Reheat Cycle Packaged System, 1000-13000 CFM, with a Gas Heat Section (100-1600 MBH)
REDB, REDC	Makeup Air Cooling and Re-heat Pump Reheat Cycle Packaged System, 1000-13000 CFM, with Electric Heat Section (10 - 180 kw)
JHUP	Optional Curb Section with a 250 or 300 MBH Gas-Fired Duct Furnace installed with a MAPS® unit with a Size 250 or 700 Heat Section to provide 500 or 1000 MBH of heat

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.

1.0 General (cont'd)

1.4 Installation Codes

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

Approval and Installation Codes

Models RDCB, RDDB, RDCC, and RDDC include a single or double gas heat section. The gas-fired, power-vented duct furnace uses the Reznor® TCORE^{2}® combustion system. The heat section is available in nine sizes from 400 to 1600 MBH for use with natural gas. The furnace is certified by ETL to the latest editions of both ANSI Z83.8 and CSA 2.6 for use in the United States and Canada. The ETL label, type of gas, and the firing rate are shown on the heat section rating plate.

California Warning Label

If a gas-fired heat section is included and the system is being installed in the state of California, the installer MUST attach the 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.

2.0 Location and Moving

<u>IMPORTANT NOTE</u>: A Cabinet Size C or D unit MUST be loaded and unloaded using ALL lifting points and spreader bars. DO NOT attempt to move a MAPS® Cabinet Size C or D with a fork lift.

This outdoor unit is designed to be set on a slab, on a roof curb, or on rails (D Cabinet) and must be level for proper operation. When selecting the location, check the following:

- ☐ Installation location must comply with local codes.
- ☐ Location on a roof depends on building structure. Refer to the weights in Paragraph 5.1.
- ☐ Comply with required clearances in Paragraph 4.1.
- ☐ Position the unit so that the outside air inlet will not be facing into the prevailing wind.
- ☐ Before moving unit, refer to Paragraph 5.6 for rigging information. See **NOTE** on left.

3.0 Receiving and Storage

3.1 Receiving

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

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

On the inside of the door of the control compartment, locate the system rating plate (See **FIGURE 1A**.). Check the specifications and the electrical characteristics and verify compatibility with the electric supply at the installation site.

If installing a MAPS® unit with a heat section, check the rating plate (See **FIGURE 1B**.) 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.

Shipped-Separate Accessories and Shipped-Loose Parts

Check for shipped-separate accessories and shipped-loose parts. All systems will have a shipped-loose discharge air sensor. The roof curb is shipped separately (See Paragraph 5.2), and in most cases, in advance of the unit. The outside air hood is shipped in a separate carton for field assembly and installation. (**NOTE**: Install the hood after the unit is in place.) An optional energy recovery module is shipped as a separate component to be mated to the unit at the installation site.

If ordered, other items that would be shipped separately include a disconnect switch, various types of space-mounted sensors and controls, a duct smoke detector, a VFD, a firestat, extra belts, and extra filters.

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

REZNOR®

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

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 A	**[H]**	**[I]**	**[J]**
COMPRESSOR B	**[K]**	**[L]**	**[M]**
COMPRESSOR C	**[N]**	**[O]**	**[P]**
COMPRESSOR D	**[Q]**	**[R]**	**[S]**
COMPRESSOR E	**[GG]**	**[HH]**	**[II]**

CIRCUITS **A B C D E**

REFRIGERANT - R-410a CHARGE - LBS [V] [W] [X] [Y] [JJ]

TEST PRESSURES HIGH **600** PSIG LOW **45** 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]**

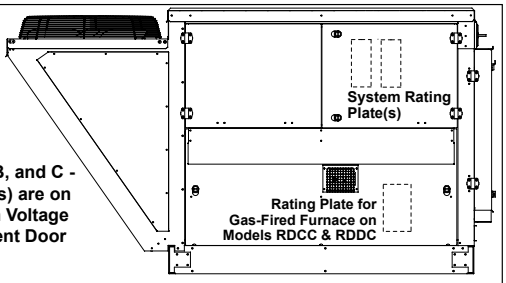
REFER TO RATING PLATE IN THE FURNACE SECTION (WHEN USED) FOR ADDITIONAL INFORMATION.

*HACR TYPE REQUIRED PER NEC

System Rating Plate Key:

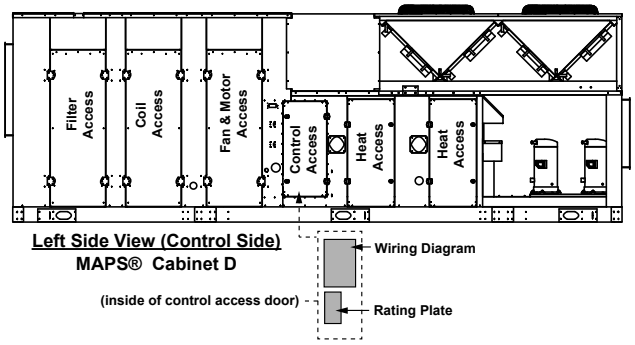
A = Model
B = Manufacturing Date (Month/Year)
C = Blower Motor HP
D = Volts/Phase/Hertz
E = Full Load Amps of Blower Motor
F = Minimum Circuit Ampacity
G = Maximum Fuse Size
H = Quantity - Compressor A
I = Rated Load Amps of Compressor A
J = Locked Rotor Amps of Compressor A
K = Quantity - Compressor 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
GG = Quantity - Compressor E
HH = Rated Load Amps of Compressor E
II = Locked Rotor Amps of Compressor E
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
JJ = Refrigerant Charge (lbs) - Circuit E
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.

Rating Plate Location - Cabinets A, B, and C



MAPS® Cabinets A, B, and C - System Rating Plate(s) are on the inside of the High Voltage Electrical Compartment Door

Rating Plate Location - Cabinet D



Left Side View (Control Side)
MAPS® Cabinet D

FIGURE 1B - Sample of a Gas Heat Section Rating Plate

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 Z83.8 **[AA] - [A]**

CSA 2.6 **[AA1] - [A1]** DUCT FURNACE/GÉNÉRATEUR D'AIR CHAUD À GAINE

MODEL/MODÈLE [C] **[P]**

SERIAL NO. / #DE SÉRIE: [ ]

VOLTAGE **[D]**

TYPE OF GAS/TYPE DE GAZ: [E]

ALTITUDE **[Q]** FEET/PIEDS, **[R]** MÈTRES

BURNER ORIFICE SIZE [F] DRILL HAS BEEN FACTORY ADJUSTED

BRULEUR DIMENSION DE L'ORIFICE [F] FORET

NORMAL INPUT/ENTRÉE NORMALE (TOTAL) [H] BTU/HR

THERMAL OUTPUT / RENDEMENT THERMIQUE (TOTAL) [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

Gas Heat Section Rating Plate Key:

AA/A = ANSI Standard Date
AA1/A1 = CSA Standard Date
C = Model No.
D = Voltages
E = Type of Gas (natural)
F = Orifice Size
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

3.0 Receiving and Storage (cont'd)

3.2 Storage

If this system is going to be stored, take precautions to prevent condensate formation inside the electrical compartments and motors. To prevent damage to the unit, do not store sitting on the ground.
Battery backup for controls will maintain for approximately one year. If backup expires, controls will need to be reprogrammed.

4.0 Clearances and Dimensions

4.1 Clearances

Provide minimum clearances as shown in **FIGURE 2A or 2B**. Minimum clearances are required to ensure proper operation and access for service. If a heat section is included, clearance to combustibles is 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 (50°C) above the surrounding ambient temperature is not exceeded.

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

FIGURE 2A - MAPS® A, B, & C Cabinet Clearances
For cross-reference of cabinet size to model size, see APPENDIX, pages 71-72.

Top Clearance: All Models - 60" (1524mm)

Bottom Clearance: All Models - 0" (0mm)

Additional Gas Heat Section Clearance Information -
If installing a unit with a gas heat section, the 4 ft 7 inch (1.4M) 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.

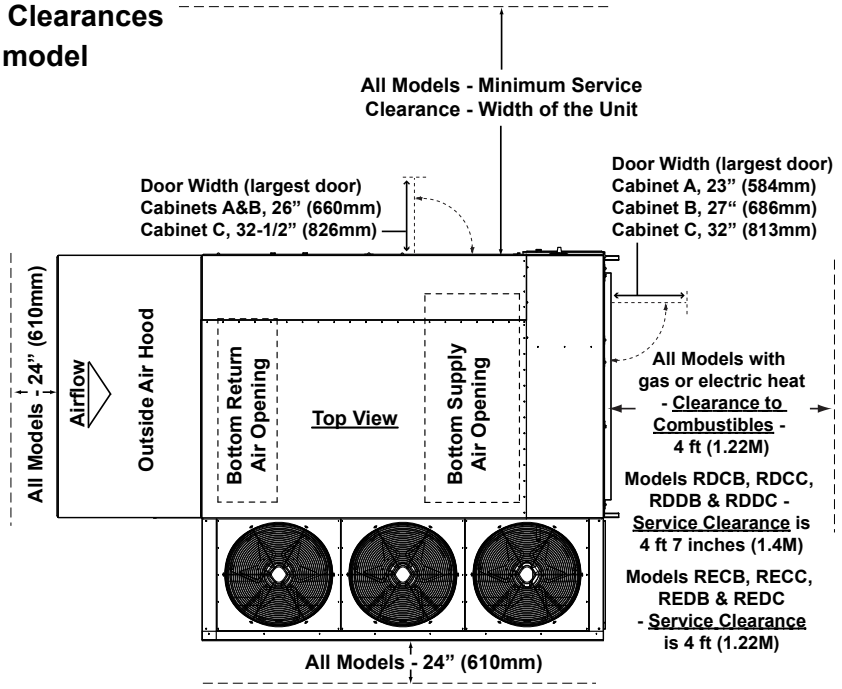
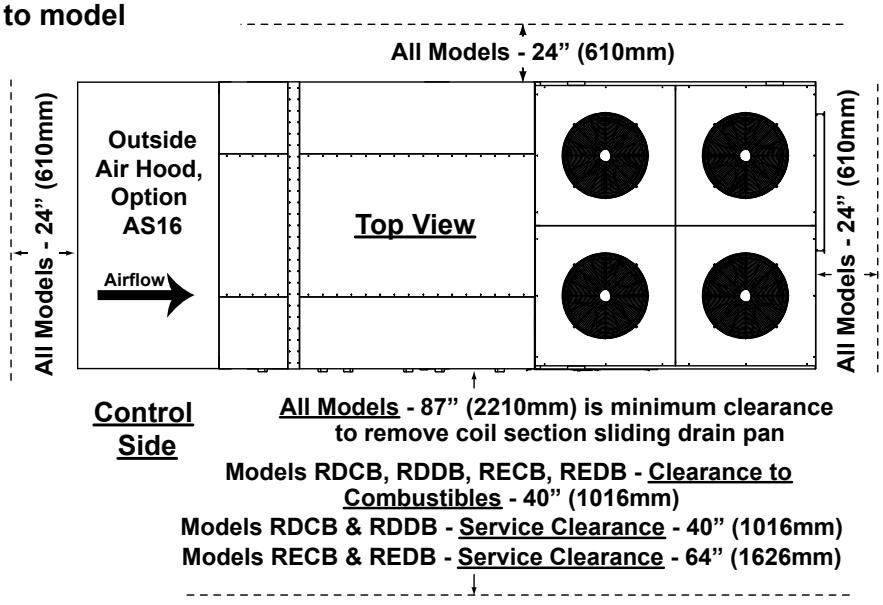


FIGURE 2B - MAPS®III D Cabinet Clearances
For cross-reference of cabinet size to model size, see APPENDIX, pages 71-72.

Top Clearance: All Models - 60" (1524mm)

Bottom Clearance: All Models - 0" (0mm)

Additional Gas Heat Section Clearance Information
If installing a unit with a gas heat section, the 40" (1016mm) 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.



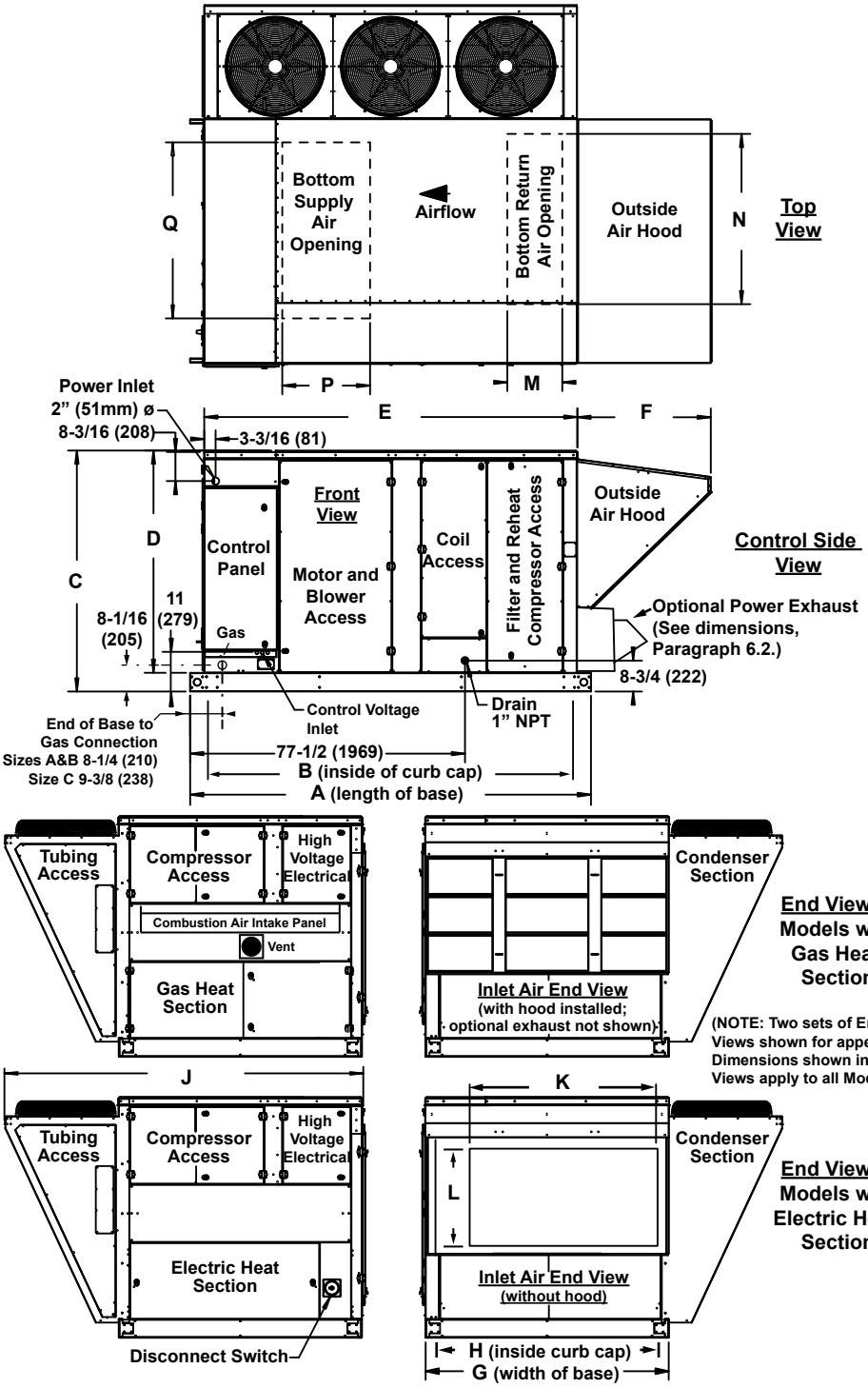
4.2 Dimensions

4.2.1 Dimensions - Cabinet Sizes A, B, and C

FIGURE 3A - General Arrangement and Dimensions (inches/mm) - Cabinets A, B, and C

Cabinet	A	B	C	D	E	F	G	H	J	K	L	M*	N*	P*
Dimensions - inches														
A	84	73-7/8	49	43-7/8	76-1/4	26-3/4 (Opt AS16); 44 (Opt AS19)*	41-7/8	39-1/2	72-5/8	24-1/4	20-1/4	12-1/2	27	17-1/2
B	84	73-7/8	49	43-7/8	76-1/4		56-7/8	54-1/2	87-5/16	36-1/4	20-1/4	12-1/2	39	17-1/2
C	113	102-1/2	67-3/4	62-5/8	105-3/16	37-5/8 (Opt AS16&AS19)	68-1/2	66	101-3/16	49-7/8	25-7/8	15-1/2	48	24-3/4
Dimensions - mm														
A	2134	1870	1245	1114	1937	679 (Opt AS16); 1118 (Opt AS19)*	1064	1003	1837	616	514	318	686	445
B	2134	1870	1245	1114	1937		1445	1384	2218	921	514	318	991	445
C	2870	2604	1721	1591	2672	986 (Opt AS16&AS19)	1740	1677	2570	1267	657	394	1219	629

*Outside air hood Option AS19 is required with power exhaust or energy recovery module option.



Cabinet & Heat Size		Q*
Dimensions - inches		
A	No Heat	26-1/2
	Electric Heat	26-1/2
	100 MBH (gas)	19
	150 MBH (gas)	26-1/2
	200 MBH (gas)	34
B	No Heat	49
	Electric Heat	49
	250 MBH (gas)	41-1/2
	300 MBH (gas)	49
C	No Heat	32-5/8**
		49-5/8***
	Electric Heat	49-5/8
	400 MBH (gas)	32-5/8
	500 MBH (gas)	44-5/8
	600 MBH (gas)	49-5/8
	700 MBH (gas)	54-5/8
Dimensions - mm		
A	No Heat	673
	Electric Heat	673
	100 MBH (gas)	483
	150 MBH (gas)	673
	200 MBH (gas)	864
B	No Heat	1245
	Electric Heat	1245
	250 MBH (gas)	1054
	300 MBH (gas)	1245
C	No Heat	829**
		1260***
	Electric Heat	1260
	400 MBH (gas)	829
	500 MBH (gas)	1133
	600 MBH (gas)	1260
	700 MBH (gas)	1387

NOTES:

*M, N, P, & Q are opening sizes in the bottom of the cabinet. Duct flanges are in the roof curb; see Form I-OPT-C for duct connection dimensions.

**Applies to Model RCB 190, 216; RCC 190; RDB 248, 262, 272, 288; RDC 248, 262

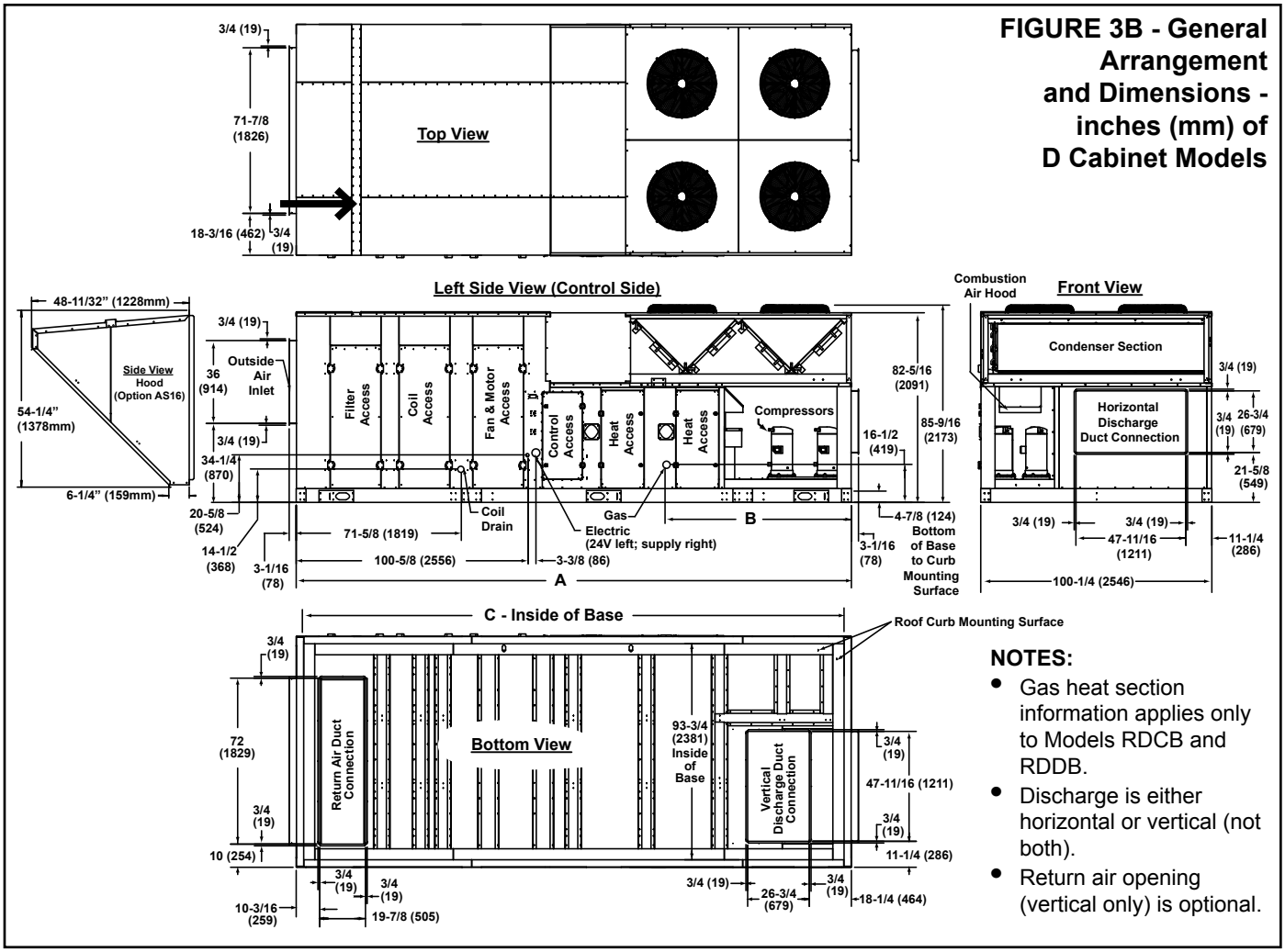
*** Applies to Models RCB & RCC 298, 410; RDB & RDC 354, 370, 468, 482

For cross-reference of cabinet size to model size, see APPENDIX, pages 71-72.

4.2 Dimensions (cont'd)

4.2.2 Dimensions of Cabinet D Size Models and Cabinet D Door Hinges

FIGURE 3B - General Arrangement and Dimensions - inches (mm) of D Cabinet Models



NOTES:

- Gas heat section information applies only to Models RDCB and RDDB.
- Discharge is either horizontal or vertical (not both).
- Return air opening (vertical only) is optional.

Model and Cooling Size	with Gas Heat Section Size	CODES (FIGURE 3B)		
		A	B	C
Dimensions - inches (±1/16)				
RCB, RECB 360, 480, 600, 720	**N/A**	208-3/8	--	201-15/16
RDCB 360, 480, 600, 720	**500, 600, 700, 800**	208-3/8	80-3/16	201-15/16
	1000, 1200, 1400, 1600	240-3/4	80-13/16	234-5/16
RDB, REDB 418, 444, 602, 722, 842	**N/A**	208-3/8	--	201-15/16
RDDB 418, 444, 602, 722, 842	**500, 600, 700, 800**	208-3/8	80-3/16	201-15/16
	1000, 1200, 1400, 1600	240-3/4	80-13/16	234-5/16
Dimensions - mm (±2)				
RCB, RECB 360, 480, 600, 720	**N/A**	5293	--	5129
RDCB 360, 480, 600, 720	**500, 600, 700, 800**	5293	2037	5129
	1000, 1200, 1400, 1600	6115	2053	5952
RDB, REDB 418, 444, 602, 722, 842	**N/A**	5293	--	5129
RDDB 418, 444, 602, 722, 842	**500, 600, 700, 800**	5293	2037	5129
	1000, 1200, 1400, 1600	6115	2053	5952

Model RDCB & RDDB NOTES:

- Heat Sizes 500, 600, 700, 800 have one heat module.
- Heat Sizes 1000, 1200, 1400, 1600 have two heat modules (illustrated).

Cabinet D Door Hinges / Handles

The filter, coil, and fan/motor cabinet doors can be opened from the left or right. On the side of the door to be opened, unlock the two hinges with an allen key. Pull out unlocked "fronts" of the hinges to 90 degrees to expose handles needed to open the door.

Re-lock hinges when doors are closed.

FIGURE 4 - D Cabinet Door Hinges

<u>Door Hinges</u> - Use an allen key to unlock hinges to open D Cabinet doors from left or right.

5.0 Mounting

5.1 Approximate Weights

The weights listed here are approximate and are not corner weights. If corner weights are needed, refer to www.RezSpec.com or call 1-800-695-1901.

5.1.1 Accessory Weights

Add the accessory weight to the base weight below.

Cabinet Size	A		B		C		D	
Optional Accessory	**lbs**	**(kg)**	**lbs**	**(kg)**	**lbs**	**(kg)**	**lbs**	**(kg)**
Outside Air Hood (Option AS16 or AS19)	35	16	45	(20)	80	(36)	147	(67)
Model JHUP-25 Curb Duct Furnace (Option JH25)	■		530	(240)	■		■	
Model JHUP-30 Curb Duct Furnace (Option JH30)	■		■		830	(376)	■	
Energy Recovery Module (Option ER1A, ER1B, ER1C))	767	(348)	1006	(456)	1334	(605)	■	
Downflow Roof Curb (Option CJ3)	■		■		■		770	(349)
Downflow Roof Curb (Option CJ31)	93	(42)	105	(48)	235	(107)	■	
Downflow Roof Curb for unit with Energy Recovery Module (Option CJ34)	254	(115)	292	(292)	365	(166)	■	
32" (813mm) High Horizontal Flow Roof Curb (Option CJ50)	353	(160)	434	(197)	■		■	
32" (813mm) High Horizontal Flow Roof Curb for unit with ER (Option CJ54)	675	(306)	785	(356)	■		■	
36" (914mm) High Horizontal Flow Roof Curb (Option CJ49)	■		■		654	(297)	■	
36" (914mm) High Horizontal Flow Roof Curb for unit with ER (Option CJ53)	■		■		1087	(493)	■	

5.1.2 Approximate Weights - Models RCB, RDB, RCC, & RDC Base

Models RCB and RCC (cooling only) and Models RDB and RDC (cooling with reheat) Weight (lbs)

Model RCB or RCC Cooling Only	Size	060	078	090	118	120	136	160	186	200	190	216	298	410	360	480	600	720
	Cabinet	A	A	A	A	A	A	B	B	B	C	C	C	C	D	D	D	D
	Lbs	775	904	915	916	916	1019	1280	1348	1416	1416	1891	1891	2276	6100	6296	6436	6458

Model RDB or RDC Cooling w/ Reheat	Size	084	102	114	142	144	162	184	196	210	222	224	236	257	248	262	272	288	354	370	468	482	418	444	484	538	564	602	658	684	722	804	842
	Cabinet	A	A	A	A	A	A	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D
	Lbs	982	982	993	972	972	1097	1372	1440	1440	1440	1508	1508	1508	2018	2018	2018	2018	2403	2403	2727	2756	6235	6235	6235	6431	6431	6431	6582	6582	6582	6593	6593

Model RCB and RCC (cooling only) and Models RDB and RDC (cooling with reheat) Weight (kg)

Model RCB or RCC Cooling Only	Size	060	078	090	118	120	136	160	186	200	190	216	298	410	360	480	600	720
	Cabinet	A	A	A	A	A	A	B	B	B	C	C	C	C	D	D	D	D
	kg	352	410	415	415	415	462	581	611	642	642	858	858	1032	2767	2856	2919	2929

Model RDB or RDC Cooling w/ Reheat	Size	084	102	114	142	144	162	184	196	210	222	224	236	257	248	262	272	288	354	370	468	482	418	444	484	538	564	602	658	684	722	804	842
	Cabinet	A	A	A	A	A	A	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D
	kg	445	445	450	498	498	498	622	653	653	653	684	684	684	915	915	915	915	1090	1090	1237	1250	2828	2828	2828	2917	2917	2917	2986	2986	2986	2991	2991

5.1.3 Approximate Weights - Models RDCB, RDDB, RDCC, & RDDC Base

Weight (lbs) - Cabinets A & B, Models RDCB, RDDB, RDCC, & RDDC

Size	DX Cooling and Gas Heat Section					
	Cabinet A			Cabinet B		
	-100	-150	-200	-250	-300	-500
060	885	1000	1025	■	■	■
078	1014	1129	1154	1157	1157	*
090	1026	1140	1165	1168	1168	*
118	1004	1119	1144	1147	1147	*
136	1129	1244	1269	1272	1272	*
160	■	■	■	1533	1533	*
186	■	■	■	1601	1601	*
200	■	■	■	1669	1669	*
Size	**DX Cooling with Reheat & Gas Heat Section**					
	Cabinet A			**Cabinet B**		
	-100	**-150**	**-200**	**-250**	**-300**	**-500**
084	1092	1207	1232	■	■	■
102	1092	1207	1232	1235	1235	*
114	1103	1218	1243	1246	1246	*
142	1082	1197	1222	1225	1225	*
162	■	1322	1347	1350	1350	*
184	■	■	■	1625	1625	*
210	■	■	■	1693	1693	*
222	■	■	■	1693	1693	*
224	■	■	■	1761	1761	*
236	■	■	■	1761	1761	*

Weight (kg) - Cabinets A & B, Models RDCB, RDDB, RDCC, & RDDC

Size	DX Cooling and Gas Heat Section					
	Cabinet A			Cabinet B		
	-100	-150	-200	-250	-300	-500
060	401	454	465	■	■	■
078	460	512	523	525	525	*
090	465	517	528	530	530	*
108	455	508	519	520	520	*
139	512	564	575	577	577	*
164	■	■	■	695	695	*
166	■	■	■	726	726	*
198	■	■	■	575	575	*
Size	**DX Cooling w/ Reheat & Gas Heat Section**					
	Cabinet A			**Cabinet B**		
	-100	**-150**	**-200**	**-250**	**-300**	**-500**
084	495	547	559	■	■	■
102	495	547	559	560	560	*
114	500	552	564	565	565	*
142	491	543	555	556	556	*
126	■	600	611	612	612	*
188	■	■	■	737	737	*
220	■	■	■	768	768	*
230	■	■	■	768	768	*
234	■	■	■	799	799	*
280	■	■	■	799	799	*

*Weight of a B Cabinet Size 500 is a Size 250 plus JH250 from the Accessory Table above.

**Weight of a C Cabinet Size 1000 is a Size 700 plus JH300 from the Accessory Table above.

Weight (lbs) - Cabinet C, Models RDCB, RDDB, RDCC, & RDDC and Cabinet D, Models RDCB & RDDB

RDCB or RDCC	Cabinet	Gas Heat Section Size								
		-400	-500	-600	-700	-800	-1000	-1200	-1400	-1600
190	C	2190	2253	2397	2400	■	**	■	■	■
216	C	2190	2253	2397	2400	■	**	■	■	■
298	C	2575	2638	2782	2785	■	**	■	■	■
410	C	2900	2963	3107	3110	■	**	■	■	■
360	D	■	6362	6412	6462	6512	6630	6728	6826	6924
480	D	■	6558	6608	6658	6708	6826	6924	7022	7120
600	D	■	6709	6759	6809	6859	6977	7075	7173	7271
720	D	■	6720	6770	6820	6870	6988	7086	7184	7282
RDDB or RDDC	**Cabinet**	**Gas Heat Section Size**								
		-400	**-500**	**-600**	**-700**	**-800**	**-1000**	**-1200**	**-1400**	**-1600**
248	C	2317	2380	2524	2527	■	**	■	■	■
262	C	2317	2380	2524	2527	■	**	■	■	■
272	C	2317	2380	2524	2527	■	**	■	■	■
288	C	2317	2380	2524	2527	■	**	■	■	■
354	C	2702	2765	2909	2912	■	**	■	■	■
370	C	2702	2765	2909	2912	■	**	■	■	■
468	C	3026	3089	3233	3236	■	**	■	■	■
482	C	3055	3118	3233	3235	■	**	■	■	■
418	D	■	6497	6547	6597	6647	6765	6863	6961	7059
444	D	■	6497	6547	6597	6647	6765	6863	6961	7059
484	D	■	6497	6547	6597	6647	6765	6863	6961	7059
538	D	■	6693	6743	6793	6843	6961	7059	7157	7255
564	D	■	6693	6743	6793	6843	6961	7059	7157	7255
602	D	■	6693	6743	6793	6843	6961	7059	7157	7255
658	D	■	6844	6894	6944	6994	7112	7210	7308	7406
684	D	■	6844	6894	6944	6994	7112	7210	7308	7406
722	D	■	6844	6894	6944	6994	7112	7210	7308	7406
804	D	■	6855	6905	6955	7005	7123	7221	7319	7417
842	D	■	6855	6905	6955	7005	7123	7221	7319	7417

Weight (kg) - Cabinet C, Models RDCB, RDDB, RDCC, & RDDC and Cabinet D, Models RDCB & RDDB

RDCB or RDCC	Cabinet	Gas Heat Section Size								
		-400	-500	-600	-700	-800	-1000	-1200	-1400	-1600
190	C	993	1022	1087	1089	■	**	■	■	■
216	C	993	1022	1087	1089	■	**	■	■	■
298	C	1168	1197	1262	1263	■	**	■	■	■
410	C	1315	1344	1409	1411	■	**	■	■	■
360	D	■	2886	2908	2931	2954	3007	3076	3096	3141
480	D	■	2975	2997	3020	3043	3096	3141	3185	3230
600	D	■	3043	3066	3086	3111	3165	3209	3254	3298
720	D	■	3048	3071	3094	3116	3170	3214	3259	3303
RDDB or RDDC	**Cabinet**	**Gas Heat Section Size**								
		-400	**-500**	**-600**	**-700**	**-800**	**-1000**	**-1200**	**-1400**	**-1600**
248	C	1051	1080	1145	1146	■	**	■	■	■
262	C	1051	1080	1145	1146	■	**	■	■	■
272	C	1051	1080	1145	1146	■	**	■	■	■
288	C	1051	1080	1145	1146	■	**	■	■	■
354	C	1226	1254	1320	1321	■	**	■	■	■
370	C	1226	1254	1320	1321	■	**	■	■	■
468	C	1373	1401	1466	1468	■	**	■	■	■
482	C	1386	1414	1466	1468	■	**	■	■	■
418	D	■	2947	2970	2992	3015	3069	3113	3157	3202
444	D	■	2947	2970	2992	3015	3069	3113	3157	3202
484	D	■	2947	2970	2992	3015	3069	3113	3157	3202
538	D	■	3035	3059	3081	3104	3157	3202	3246	3291
564	D	■	3035	3059	3081	3104	3157	3202	3246	3291
602	D	■	3035	3059	3081	3104	3157	3202	3246	3291
658	D	■	3104	3127	3150	3172	3226	3270	3315	3359
684	D	■	3104	3127	3150	3172	3226	3270	3315	3359
722	D	■	3104	3127	3150	3172	3226	3270	3315	3359
804	D	■	3109	3132	3155	3177	3231	3275	3320	3364
842	D	■	3109	3132	3155	3177	3231	3275	3320	3364

5.1.4 Approximate Weights - Models RECB, REDB, RECC, & REDC Base

NOTE: Weights listed are for the largest kw size available in the model size.

Weight (lbs) - Models RECB & RECC (cooling and electric heat) and Models REDB & REDC (cooling, electric heat, and dehumidification)

Model RECB or RECC Cooling Only	Size	060	078	090	118	120	136	160	186	200	190	216	298	410	360	480	600	720
	Cabinet	A	A&B	A&B	A&B	A&B	A&B	B	B	B	C	C	C	C	D	D	D	D
	Lbs	815	944	995	974	974	1099	1360	1428	1496	1971	1971	2356	2681	6100	6296	6436	6458

Model REDB or REDC Cooling w/Reheat	Size	084	102	114	142	144	162	184	196	210	222	224	236	257	248	262	272	288	354	370	468	482	418	444	484	538	564	602	658	684	722	804	842
	Cabinet	A	A&B	A&B	A&B	A&B	A&B	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D
	Lbs	1022	1022	1073	1052	1052	1177	1452	1440	1520	1520	1588	1588	1588	2098	2098	2098	2098	2483	2483	2807	2836	6235	6235	6235	6431	6431	6431	6582	6582	6582	6593	6593

Weight (kg) - Models RECB & RECC (cooling and electric heat) and Models REDB & REDC (cooling, electric heat, and dehumidification)

Model RECB or RECC Cooling Only	Size	060	078	090	118	120	136	160	186	200	190	216	298	410	360	480	600	720
	Cabinet	A	A&B	A&B	A&B	A&B	A&B	B	B	B	C	C	C	C	D	D	D	D
	kg	361	428	451	442	442	499	617	648	679	858	858	1032	1180	2767	2856	2919	2929

Model REDB or REDC Cooling w/Reheat	Size	084	102	114	142	144	162	184	196	210	222	224	236	257	248	262	272	288	354	370	468	482	418	444	484	538	564	602	658	684	722	804	842
	Cabinet	A	A&B	A&B	A&B	A&B	A&B	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D
	kg	463	463	487	477	477	534	659	653	689	689	720	720	720	952	952	952	952	1126	1126	1273	1286	2828	2828	2828	2917	2917	2917	2986	2986	2986	2991	2991

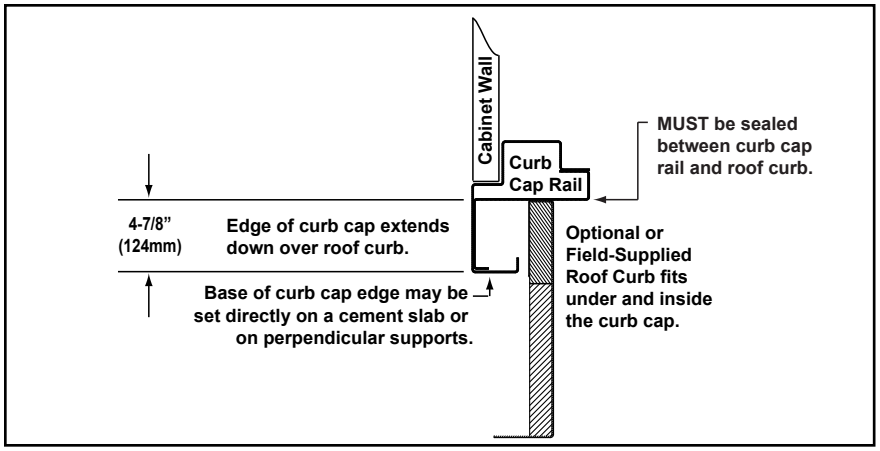
5.0 Mounting (cont'd)

5.2 Curb Cap Base and Mounting

MAPS® packaged heating/cooling systems have a curb cap base designed for use with a full perimeter curb. When on a roof, either a manufacturer-designed roof curb, a field-supplied roof curb, or other field-supplied support is required. **NOTE:** A Reznor® roof curb is required with a vertical discharge and/or bottom return air to provide a weatherproof installation.

A MAPS®III Cabinet D size system which has an optional horizontal discharge may be set directly on a concrete slab or cross supports (See Paragraph 5.3 below).

FIGURE 5 - Cross Section View of Curb Cap Base

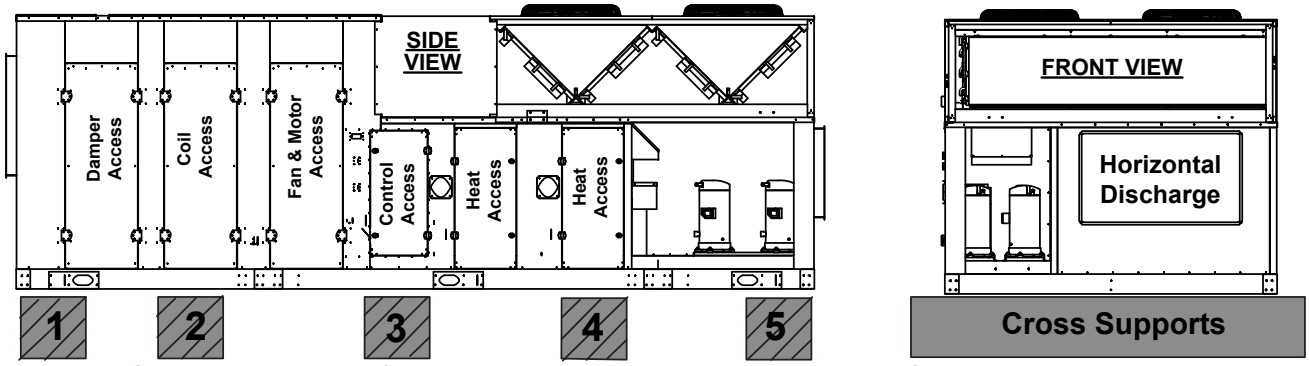


5.3 Mounting a Horizontal Discharge System on Cross Supports (no roof curb) - D Cabinet only

Prior to installation, be sure that the method of support is in agreement with all local building codes and is suited to the climate. If considering an installation without a roof curb in snow areas, the support under the system should be at least 12" (305mm) higher than the roof surface. **IMPORTANT NOTE:** If setting cross supports on the roof surface and not decking, be sure to have sufficient tread material under the supports to adequately spread the load and prevent "sinking" into the roofing material.

The field supplied, weather resistant, cross-support structure must be secure and adequate for the weight of the system (Refer to weights in Paragraph 5.1). See width dimensions in Paragraph 4.2.

FIGURE 6 - Cross Support Requirements (no roof curb) - Cabinet D



There MUST be no less than five cross supports. A cross support MUST be in the approximate locations shown in the Side View. ALL cross supports MUST extend the full width of the unit as shown in the Front View. Cross supports must be weather resistant and must be able to support the unit weight. Supports should be a minimum height of 12" (305mm) in snow areas.

5.4 Mounting on a Roof Curb

Curbs available with the system are fully enclosed and insulated. Other characteristics by cabinet size and option are listed below.

MAPS® Cabinet Size*	Roof Curb		
	Discharge	Option	Height
A, B, & C	Down with Duct Connections in the Curb	CJ31	14" (356mm)
A, B, & C w/Energy Recovery Module		CJ34	
D		CJ3	16" (406mm)
A & B	Horizontal Duct Connections in the Curb (at the inlet air side of the unit)	CJ50	32" (813mm)
C		CJ49	36" (914mm)
A & B w/Energy Recovery Module		CJ54	32" (813mm)
C with Energy Recovery Module		CJ53	36" (914mm)
D - horizontal discharge connection on unit (no return air)		CJ3	16" (406mm)

*For cross-reference of cabinet size to Model Size, see Appendix, pages 71-72.

If the application is sound sensitive, consider installing a field-supplied vibration isolation curb or specialty sound attenuation curb.

Whether using an optional roof curb available with the system or a field-supplied curb, the curb must be secure, square, and level. When the unit is being placed on a roof, location depends on the roof structure and is the responsibility of the installer. For condensate drainage and proper operation, it is important that the installation be level.

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

Always comply with the unit clearances in Paragraph 4.1.

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

5.4.1 Downflow Roof Curbs for MAPS® Cabinets A, B, and C

Both Option CJ31 and CJ34 (for MAPS® with an Energy Recovery Module) are 14" (356mm) high insulated, downflow roof curbs. The curbs include integral duct connections for supply air and optional return air as illustrated in **FIGURE 7A and 8A**. See curb dimensions in **FIGURES 7C and 8C,** and assembly instructions beginning on pages 12 and 17.

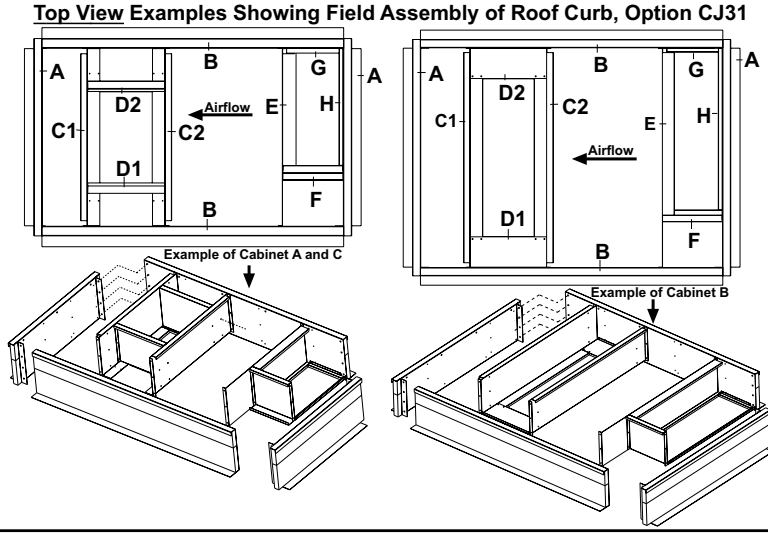
5.4.1.1 Curb for Vertical (Down) Airflow (Option CJ31) - MAPS® units without energy recovery

Layout and Components

FIGURE 7A - Roof Curb Components and Layout for MAPS® Cabinets A, B, C

- Curbs in **FIGURE 7A** do not apply to a MAPS® unit with an optional energy recovery module. For Option CJ34 with an energy recovery module (Option ER1), go to Paragraph 5.4.1.2, page 14.
- All curbs include corner hardware as listed below and screws for attaching duct pieces.
- Integral ducts are designed so that ductwork may be either inserted down from the top or attached from the bottom.
- Seal tops of supply air "dividers" (C & D) that mate with the blower or heat exchanger opening.
- Seal tops of return air "dividers" (E, F, G, & H).
- Seal tops of curb rails. Curb must be level.

Top View Examples Showing Field Assembly of Roof Curb, Option CJ31



Roof Curb P/N by Model/Size		See Model Size / Cabinet Size Cross Reference on pages 71-72.	Cabinet A			Cabinet B		Cabinet C			
Models RCB/RDB/RCC/RDC			-	All Cabinet A	-	-	All Cabinet B	190, 216, 248, 262, 272, 288	-	298, 410, 354, 370, 468, 482	-
Models RDCB/RDDB/RDCC/RDDC			100	150	200	250/500*	300	400	500	600	700/1000*
Models RECB/REDB/RECC/REDC			-	All Cabinet A	-	-	All Cabinet B	-	-	All Cabinet C	-
Roof Curb (Option CJ31) Package P/N			205660	205661	205662	205663	205664	208854	208855	208856	208857
Codes - FIG 1A	Description:	Qty	Component P/N's								
A	Curb End Assembly	2	204486			204487		208799			
B	Curb Side Assembly	2	204485					208798			
C1	Supply Air Duct End	1	204431			204432		207961	207960	207959	207958
C2	Supply Air Duct End	1	204431			204432		207965	207964	207963	207962
D1	Supply Air Duct Side	1	204433	204434	204436	204435	204437	207967			
D2	Supply Air Duct Side	1	204433	204434	204436	204435	204437	207967			207971
E*	Return Duct End	1	204438			204439		207966			
F*	Return Duct Side	1	204440			204441		207974			
G*	Return Duct Side Angle	1	204444					207973			
H*	Return Duct Rear Angle	1	204442			204443		207972			

*If the system does not include optional return air, these pieces may be installed but are not required and will serve no function.

* B Cabinet Size 500 and C Cabinet Size 1000 require optional duct furnace curb section.

Option CJ31 Roof Curb Corner Hardware (See FIGURE 7B.)		Hardware to Assemble and Attach Dividers to make Duct Connections and Sealant Tape for Top of Rails
For **Top** Two "Holes"	(8) 5/16" x 1" Lag Screws, **P/N 16243;** (8) 5/16" Lockwasher, **P/N 1333**	
For **Bottom** Two "Holes"	(8) 5/16" x 3/4" Hex Head Cap Screw, **P/N 16247;** (8) 5/16" Lockwasher, **P/N 1333;** (8) 5/16-18 Hex Nut, **P/N 1035**	(64) #10 Sheetmetal Screws, **P/N 11813**
		(1) 1/4" x 1-1/4" x 50' Foam Sealant Tape, **P/N 66302**

5.0 Mounting (cont'd)

5.4 Mounting on a Roof Curb (cont'd)

5.4.1 Downflow Roof Curbs for MAPS® Cabinets A, B, C (cont'd)

5.4.1.1 Curb for Vertical (Down) Airflow (Option CJ31) (cont'd)

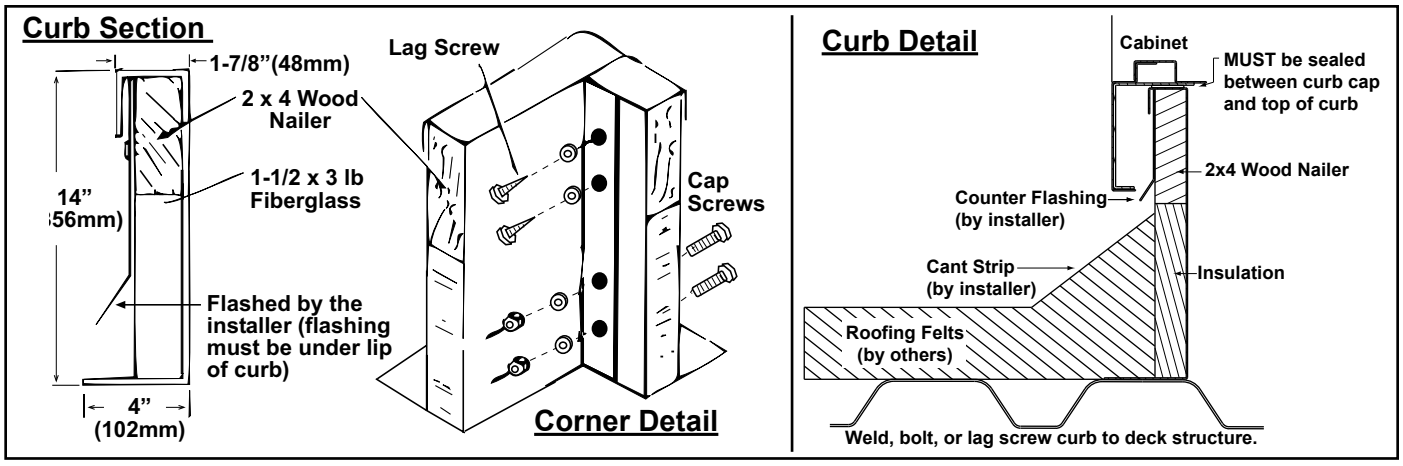
Installation Instructions for Down Discharge Roof Curb, Option CJ31, for MAPS® Cabinet Sizes A, B, and C

NOTE: For A, B, or C with energy recovery Option ER1, see page 14.

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

1. Position the roof curb ends (**Code A**) and sides (**Code B**) as shown in the drawing in **FIGURE 7A**. Fasten with bolts and lag screws as illustrated in the corner detail (**FIGURE 7B**).
2. Install bottom opening ductwork. Use the sheetmetal screws to attach the dividers (**Codes C1, C2, D1, D2, E, & F** in **FIGURE 7A**). Attach the return air duct angles (**Codes G & H**) to the attached end and side and to the roof curb. **NOTE:** If the system does not have a return air opening, Codes F, G, & H may be installed in the curb but are 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 unit curb cap and the roof curb, the roof 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 7B**).

FIGURE 7B - Option CJ31 Downflow Roof Curb Cross Section and Corner Detail



5. Install field-supplied flashing.
6. **Before** placing the MAPS® unit or optional duct furnace (Option JH25 or JH30) on the curb:

☐ If ductwork is being installed from the top, slide the ductwork down into the discharge and return air openings. Ductwork should be sized slightly smaller with a minimum 3/4" duct flange that will rest on and be attached to all sides of the duct connection. See duct connection requirements in Paragraph 6.4.

☐ 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 integral dividers, being sure to make good butt joints at all corners. The sealant tape must be applied to prevent water leakage into the curb area due to blown rain and capillary action.

☐ If installing an optional duct furnace curb section (Option JH), place it on the roof curb before the unit. See Paragraph 5.4.3.

☐ When it is time to lift the MAPS® unit or optional duct furnace onto the prepared curb (See Rigging and Lifting in Paragraph 5.5.), be sure that all of the above preparations have been made. **IMPORTANT:** Verify that the unit will be placed in the correct airflow orientation to mate properly with the discharge and return air openings.

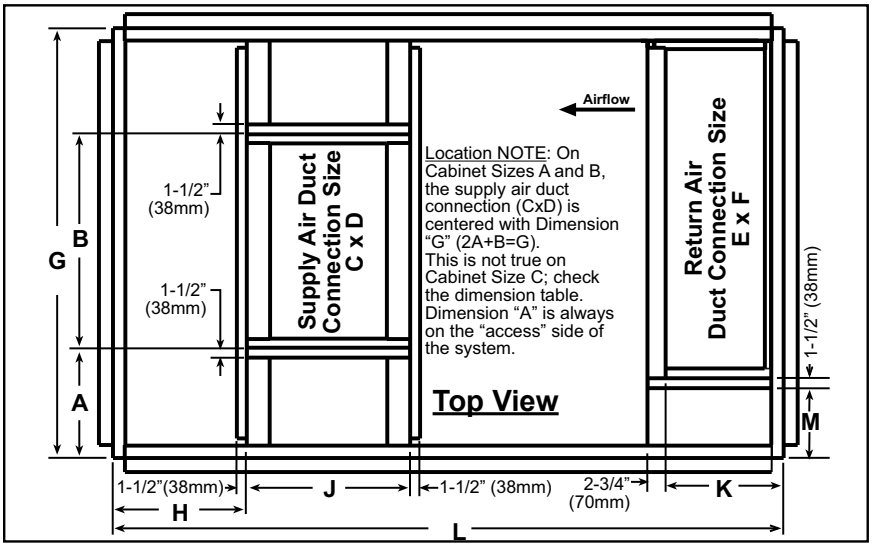
Weights by Cabinet Size* - Downflow Roof Curb Option CJ31

Option CJ31 Roof Curb Weight	Cabinet Size *	A	B	C
	lbs	93	105	235
	kg	42	48	107

* See chart on pages 71-72 for cross-reference by Model Size or Model and Heat Size to Cabinet Size.

Dimensions - Downflow Roof Curb Option CJ31 for MAPS® III & IV Cabinet Sizes A, B, and C

FIGURE 7C - Roof Curb and Duct Opening Dimensions



NOTE: See pages 71-72 for cross-reference by Model Size and Cabinet Size.

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"x69" (884x1753mm); Cabinet B - 49-13/16"x69" (1265x1753mm); Cabinet C - 61-5/16"x97-7/8" (1557x2486mm).

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

Cabinet Size	RCB or RCC Model Size	RDB or RDC Model Size	Illustration Codes - FIGURE 7C											
			A	B	C	D	E	F	G	H	J	K	L	M
Curb Dimensions for Cooling Only Model RCB, RCC, RDB, RDC by Cabinet Size, Model Size - inches (±1/8)														
A	060, 078, 090, 118, 120, 136	084, 102, 114, 142, 144, 162	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
B	160, 186, 200	184, 196, 210, 222, 224, 236, 257	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	190, 216	248, 262, 272, 288	19-3/8	32-3/8	30	18	45	15	65-1/8	20-1/4	24-3/4	17-7/8	101-5/8	13-1/4
	298, 410	354, 370, 468, 482	10-3/4	49-1/2	47	18	45	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 RCB, RCC, RDB, RDC by Cabinet Size and Model Size - mm (±3)														
A	060, 078, 090, 118, 120, 136	084, 102, 114, 142, 144, 162	156	673	610	305	610	305	981	337	445	327	1848	311
B	160, 186, 200	184, 196, 210, 222, 224, 236, 257	N/A	N/A	914	305	914	305	1362	337	445	327	1848	311
C	190, 216	248, 262, 272, 288	492	822	762	457	1143	381	1654	514	629	454	2581	337
	298, 410	354, 370, 468, 482	273	1257	1194	457	1143	381	1654	514	629	454	2581	337

Cabinet Size	RDCB or RDCC Model Size	RDDB or RDDC Model Size	Gas Heat Size *	Illustration Codes - FIGURE 7C											
				A	B	C	D	E	F	G	H	J	K	L	M
Curb Dimensions for Cooling/Gas Heat Makeup Air Model RDCB, RDCC, RDDB, RDDC by Cabinet Size & Model Size - inches (±1/8)															
A	060, 078, 090, 118, 120, 136	084, 102, 114, 142, 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
		084, 102, 114, 142, 144, 162	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, 118, 136, 160, 186, 200	102, 114, 142, 162, 184, 196, 210, 222, 224, 236, 257	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	190, 216, 298, 410	248, 262, 272, 284, 354, 370, 468, 482	400	19-3/8	32-3/8	30	18	45	15	65-1/8	20-1/4	24-3/4	17-7/8	101-5/8	13-1/4
			500	13-1/4	44-1/2	42	18	45	15	65-1/8	20-1/4	24-3/4	17-7/8	101-5/8	13-1/4
			600	10-3/4	49-1/2	47	18	45	15	65-1/8	20-1/4	24-3/4	17-7/8	101-5/8	13-1/4
			700	8-1/4	55	52	18	45	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 RDCB, RDCC, RDDB,RDDC by Cabinet Size and Model Size - mm (±3)															
A	060, 078, 090, 118, 120, 136	084, 102, 114, 142, 144	100	251	483	457	305	610	305	981	337	445	327	1848	311
		084, 102, 114, 142, 144, 162	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, 118, 136, 160, 186, 200	102, 114, 142, 162, 184, 196, 210, 222, 224, 236, 257	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	190, 216, 298, 410	248, 262, 272, 284, 354, 370, 468, 482	400	492	822	762	457	1143	381	1654	514	629	454	2581	337
			500	337	1130	1067	457	1143	381	1654	514	629	454	2581	337
			600	273	1257	1194	457	1143	381	1654	514	629	454	2581	337
			700	210	1397	1321	457	1143	381	1654	514	629	454	2581	337

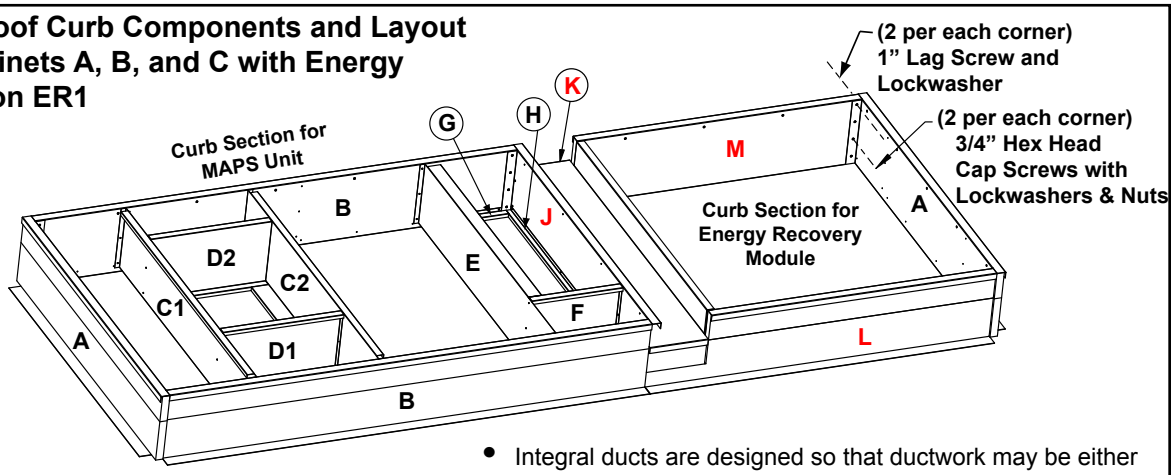
Cabinet Size*	RECB, RECC Model Size *	REDB, REDC Model Size *	* Electric Heat Size	Illustration Codes - FIGURE 7C											
				A	B	C	D	E	F	G	H	J	K	L	M
Curb Dimensions for Cooling/Electric Heat Makeup Air Model RECB, RECC, REDB, REDC by Cabinet Size and Model Size - inches (±1/8)															
A	060, 078, 090, 118, 120, 136	084, 102, 114, 142, 144, 162	All available	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, 118, 120, 136, 160, 186, 200	084, 102, 114, 142, 144, 162, 184, 196, 210, 222, 224, 236, 257		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	190, 216, 298, 410	248, 262, 272, 288, 354, 370, 468, 482		10-3/4	49-1/2	47	18	45	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 RECB, RECC, REDB, REDC by Cabinet Size and Model Size - mm (±3)															
A	060, 078, 090, 118, 120, 136	084, 102, 114, 142, 144, 162	All available	N/A	N/A	610	305	610	305	981	337	445	327	1848	311
B	078, 090, 118, 120, 136, 160, 186, 200	084, 102, 114, 142, 144, 162, 184, 196, 210, 222, 224, 236, 257		N/A	N/A	914	305	914	305	1362	337	445	327	1848	311
C	190, 216, 298, 410	248, 262, 272, 288, 354, 370, 468, 482		273	1257	1194	457	1143	381	1654	514	629	454	2581	337

5.4.1.2 Roof Curb for MAPS® III&IV A, B, and C Cabinet with Vertical (Down) Airflow WITH an Optional Energy Recovery Module, Option ER1A, ER1B, ER1C (Roof Curb Option CJ34)

Roof Curb P/N by Model/Size	See Model Size / Cabinet Size Cross Reference on pages 71-72.	Cabinet A			Cabinet B		Cabinet C			
RCB/RCC/RDB/RDC w/Option ER1		-	All Cabinet A	-	-	All Cabinet B	190, 216, 248, 262, 272, 288	-	298, 410, 354, 370, 468, 482	-
RDCB/RDCC/RDDB/RDDC w/Opt ER1		100	150	200	250	300	400	500	600	700
RECB/REDB/RECC/REDC w/Opt ER1		-	All Cabinet A	-	-	All Cabinet B	-	-	All Cabinet C	-
Roof Curb (Option CJ34) Package P/N		262478	262479	262480	262481	262482	262483	262484	262485	262486

Code (FIGURE 8A)	Component Description:	Qty	Component P/N's								
A	Curb Ends (unit & ER end)	2	204486			204487		208799			
B	Curb Sides (under unit)	2	204485					208798			
C1	Supply Air Duct End	1	204431			204432		207961	207960	207959	207958
C2	Supply Air Duct End	1	204431			204432		207965	207964	207963	207962
D1	Supply Air Duct Side	1	204433	204434	204436	204435	204437	207967			
D2	Supply Air Duct Side	1	204433	204434	204436	204435	204437	207967			207971
E	Return Duct End	1	204438			204439		207966			
F	Return Duct Side	1	204440			204441		207974			
G	Return Duct Side Angle	1	204444					207973			
H	Return Duct Rear Angle	1	204442			204443		207972			
J	Curb End (unit end in center)	1	261995			261996		260855			
K	Tunnel (between unit & ER)	1	261993			261994		260856			
L	Right Curb Side (under ER)	1	262411					262418			
M	Left Curb Side (under ER)	1	262412					262419			

FIGURE 8A - Roof Curb Components and Layout for MAPS® Cabinets A, B, and C with Energy Recovery Option ER1



NOTES:

- Curb in **FIGURE 8A** applies to a MAPS® unit with an optional energy recovery module. For downflow curb without an energy recovery module (Option CJ31), go to Paragraph 5.4.1.1 page 11.
- All curbs include corner hardware as listed below and screws for attaching duct pieces.
- Integral ducts are designed so that ductwork may be either inserted down from the top or attached from the bottom.
- Apply sealant tape to tops of supply air "dividers" (C & D) that mate with the blower or heat exchanger opening.
- Apply sealant tape to tops of return air "dividers" (E, F, G, H).
- Apply sealant tape to tops of all curb rails.
- Curb MUST be level.

Installation Instructions for Down Discharge Roof Curb, Option CJ34, for MAPS® Cabinet Sizes A, B, and C WITH Energy Recovery Module, Option ER1

1. Assemble the MAPS® Unit Curb Section

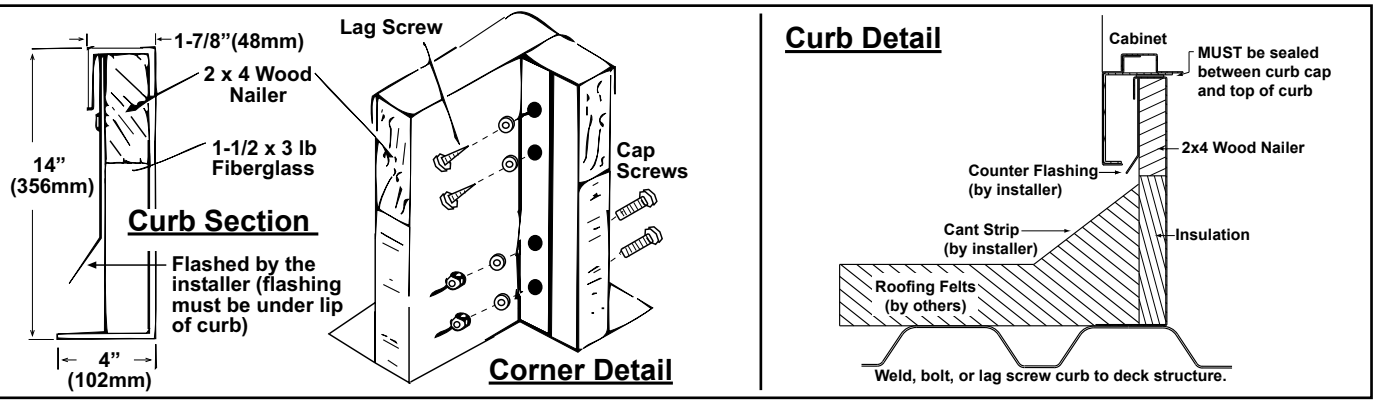
a) Position the ends and sides (**Codes B, B, A, and J**) of the MAPS® unit section of the curb as shown in the drawing in **FIGURE 8A**. Fasten with bolts and lag screws as illustrated in the corner detail (**FIGURE 8B**).

Option CJ34 Roof Curb Corner Hardware (See FIGURE 8B)	
For **Top** Two "Holes"	(16) 5/16" x 1" Lag Screws, **P/N 16243;** (16) 5/16" Lockwasher, **P/N 1333**
For **Bottom** Two "Holes"	(16) 5/16" x 3/4" Hex Head Cap Screw, **P/N 16247;** (16) 5/16" Lockwasher, **P/N 1333;** (16) 5/16-18 Hex Nut, **P/N 1035**
Hardware to Assemble and Attach Dividers to make Duct Connections and Sealant Tape for Top of Rails: (75) #10 Sheetmetal Screws, **P/N 11813; (1)** 1/4" x 1-1/4" x 50' Foam Sealant Tape, **P/N 66302**	

b) Install bottom opening ductwork. Use the sheetmetal screws to attach the dividers (**Codes C1, C2, D1, D2, E, & F**). Attach the return air duct angles (**Codes G & H**) to the attached end and side and to the roof curb. **NOTE:** If the system does not have a return air opening, Codes F, G, & H may be installed in the curb but are not required.

2. **Assemble the Energy Recovery Curb Section**
   a) Position the sides (**Codes L and M**) as shown in the drawing in **FIGURE 8A**. Attach the sides to the assembled curb section with sheetmetal screws.
   b) Attach the curb end (**Code A**). Fasten with bolts and lag screws as illustrated in the corner detail (**FIGURE 8B**) .
   c) Position the tunnel (**Code K**) over the opening in the center. Attach with sheetmetal screws.
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 unit curb cap and the roof curb, the roof 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 8B**).
5. Install field-supplied flashing.

FIGURE 8B - Option CJ34 Downflow Roof Curb Cross Section and Corner Detail



6. **Before placing the MAPS® unit or energy recovery module on the curb:**

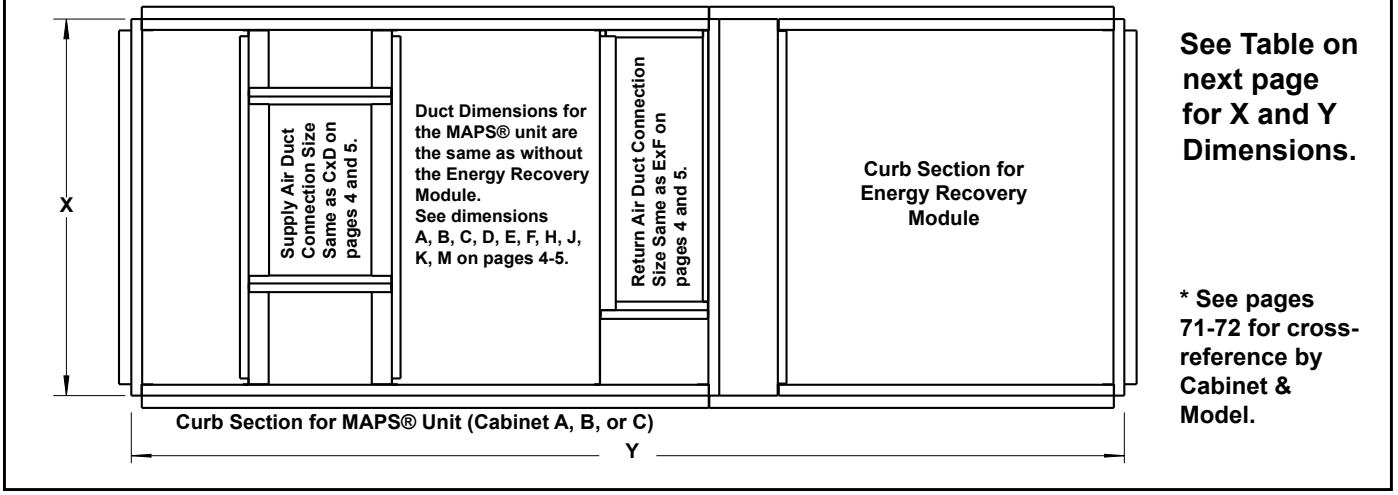
☐If ductwork is being installed from the top, slide the ductwork down into the discharge and return air openings. Ductwork should be sized slightly smaller with a minimum 3/4" duct flange that will rest on and be attached to all sides of the duct connection. See Paragraph 6.4 for ductwork requirements.

☐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 integral dividers, being sure to make good butt joints at all corners. The sealant tape must be applied to prevent water leakage into the curb area due to blown rain and capillary action.

7. Lift the MAPS® unit on to the prepared curb (See Rigging and Lifting in Paragraph 5.5). **IMPORTANT:** Verify that the unit will be placed in the correct airflow orientation to mate properly with the discharge and return air openings.
8. After the MAPS® unit is in place, follow the instructions shipped with the energy recovery module (Form I-MAPSIII&IV-ER) to lift and mate the energy recovery module to the MAPS® unit.

Dimensions and Weights

FIGURE 8C - Curb Dimensions of Option CJ34 for a MAPS® unit with Option ER1



5.4.1.2 Roof Curb Option CJ34 for MAPS® III&IV, Cabinets A, B, & C with ER Module (cont'd)

Cabinet Size	RCB/RCC Model Size	RDB/RDC Model Size	Codes - FIG 8C X	Codes - FIG 8C Y
Outside Curb Dimensions for Cooling Models RCB/RCC/RDB/RDC with Energy Recovery Module by Cabinet Size, Model Size - inches (±1/8)				
A	060, 078, 090, 118, 120, 136	084, 102, 114, 142, 144, 162	38-5/8	136-3/4
B	160, 186, 200	184, 196, 210, 222, 224, 236, 257	53-5/8	136-3/4
C	190, 216	248, 262, 272, 288	65-1/8	171-5/8
	298, 410	354, 370, 468, 482	65-1/8	171-5/8
Outside Curb Dimensions for Cooling Models RCB/RCC/RDB/RDC with Energy Recovery Module by Cabinet Size, Model Size - mm (±3)				
A	060, 078, 090, 118, 120, 136	084, 102, 114, 142, 144, 162	981	3473
B	160, 186, 200	184, 196, 210, 222, 224, 236, 257	1362	3473
C	190, 216	248, 262, 272, 288	1654	4359
	298, 410	354, 370, 468, 482	1654	4359

Cabinet Size *	RDCB/RDCC Model Size*	RDDB/RDDC Model Size*	Gas Heat Size *	Codes - FIG 8C X	Codes - FIG 8C Y
Curb Dimensions for Cooling/Gas Heat Makeup Air Model RDCB, RDCC, RDDB, RDDC with Energy Recovery Module by Cabinet Size and Model Size - inches (±1/8)					
A	060, 078, 090, 118, 120, 136	084, 102, 114, 142	100	38-5/8	136-3/4
		084, 102, 114, 142, 144, 162	150	38-5/8	136-3/4
			200	38-5/8	136-3/4
B	078, 090, 118, 120, 136, 160, 186, 200	102, 114, 142, 144, 162, 184, 196, 210, 222, 224, 236, 257	250	53-5/8	136-3/4
			300	53-5/8	136-3/4
C	190, 216, 298, 410	248, 262, 272, 284, 354, 370, 468, 482	400	65-1/8	171-5/8
			500	65-1/8	171-5/8
			600	65-1/8	171-5/8
			700	65-1/8	171-5/8
Curb Dimensions for Cooling/Gas Heat Makeup Air Model RDCB, RDCC, RDDB, RDDC with Energy Recovery Module by Cabinet Size and Model Size - mm (±3)					
A	060, 078, 090, 118, 120, 136	084, 102, 114, 142	100	981	3473
		084, 102, 114, 142, 144, 162	150	981	3473
			200	981	3473
B	078, 090, 118, 120, 136, 160, 186, 200	102, 114, 142, 144, 162, 184, 196, 210, 222, 224, 236, 257	250	1362	3473
			300	1362	3473
C	190, 216, 298, 410	248, 262, 272, 284, 354, 370, 468, 482	400	1654	4359
			500	1654	4359
			600	1654	4359
			700	1654	4359

Cabinet Size*	RECB/RECC Model Size *	REDB/REDC Model Size *	* Electric Heat Size	Codes - FIGURE 8C X	Codes - FIGURE 8C Y
Curb Dimensions for Cooling/Electric Heat Makeup Air Model RECB, RECC, REDB, REDC by Cabinet Size and Model Size - inches (±1/8)					
A	060, 078, 090, 118, 120, 136	084, 102, 114, 142, 144, 162	All available	38-5/8	136-3/4
B	078, 090, 118, 120, 136, 160, 186, 200	084, 102, 114, 142, 144, 162, 184, 196, 210, 222, 224, 236, 257		53-5/8	136-3/4
C	190, 216, 298, 410	248, 262, 272, 288, 354, 370, 468, 482		65-1/8	171-5/8
Curb Dimensions for Cooling/Electric Heat Makeup Air Model RECB, RECC, REDB, REDC by Cabinet Size and Model Size - mm (±3)					
A	060, 078, 090, 118, 120, 136	084, 102, 114, 142, 144, 162	All available	981	3473
B	078, 090, 118, 120, 136, 160, 186, 200	084, 102, 114, 142, 144, 162, 184, 196, 210, 222, 224, 236, 257		1362	3473
C	190, 216, 298, 410	248, 262, 272, 288, 354, 370, 468, 482		1654	4359

If area inside curb is open, roof opening dimensions MUST be no greater than:

Cabinet A - 34-13/16"x133" (884x3378mm);

Cabinet B - 49-13/16"x133" (1265x3378mm);

Cabinet C - 61-5/16"x167-7/8" (1557x4264mm).

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

Approximate Weights of Roof Curb Option CJ34 by Cabinet Size *		Cabinet A	Cabinet B	Cabinet C
	lbs	254	292	365
	kg	115	132	166

*See Model Size / Cabinet Size Cross Reference on pages 71-72.

5.4.2 Roof Curbs for Horizontal Airflow (Options CJ49, CJ50, CJ53, and CJ54) - Cabinets A, B, and C

Option CJ50 is a 32" (813mm) high horizontal airflow curb for MAPS®III&IV, Cabinet Sizes A and B. Option CJ49 is a 36" (914mm) high horizontal airflow curb for MAPS®III &IV, Cabinet Size C.

Option CJ54 is a 32" (813mm) high horizontal airflow curb for MAPS®III&IV, Cabinet Sizes A and B with an energy recovery module. Option CJ53 is a 36" (914mm) high horizontal airflow curb for MAPS®III&IV, Size C with an energy recovery module.

Verify all the components and be sure that the curb is correct for the system being installed.

5.4.2.1 Horizontal Airflow Roof Curb Option CJ49 for MAPS®III&IV Cabinets A, & B and Option CJ50 for Cabinet C

NOTE: Horizontal flow curbs in this section do not apply to a MAPS® unit with an optional energy recovery module. For a horizontal airflow curb for a MAPS® unit with an energy recovery module (Option ER1), go to Paragraph 5.4.2.2 page 19.

Components and Application

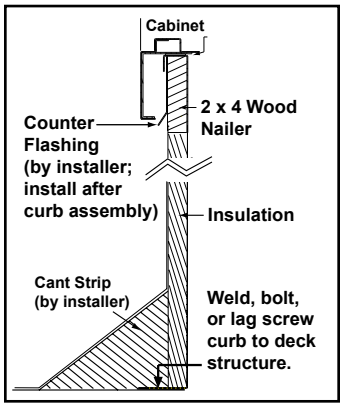
Roof Curb P/N's by Model & Cabinet Size *			Cabinet A	Cabinet B	Cabinet C
Models RCB/RCC/RDB/RDC			*All Sizes	*All Sizes	*All Sizes
Models RDCB/RDCC/RDDB/RDDC with Cabinet & Gas Heat Size Combination			With Gas Heat Sizes 100/150/200	With Gas Heat Sizes 250/300	With Gas Heat Sizes 400/500/600/700/1000
Models RECB/RECC/REDB/REDC			*All Sizes	*All Sizes	*All Sizes
ID on Part	Roof Curb Package P/N (Option)		261699 (CJ50)	261700 (CJ50)	261701 (CJ49)
	Component Descriptions	Qty	Component P/N's		
A	Curb End Assembly (solid)	1	261653	261654	261670
B	Curb Side Assembly (insulated)	2	261655		261671
3 C's	Curb End Assembly (insulated)	1	261656	261657	261672
	Duct Flanges (4pcs in one bundle)	4	261386	261387	261414
	Return Air Cap (not used with return air)	1	261388	261389	261415
D	Supply Duct End (solid insulated partition)	1	261658	261659	261673
E	Supply Duct Bottom (insulated) (**2 pcs)	**1	261660	261661	** 261674 & 261428
F	Supply Air Duct Bottom Liner (**2 pcs)	**1	261394	261395	** 261418 & 261429
G	Air Baffle ("curve" in the supply duct)	1	268604	268605	268606
H	Supply Air Duct Center Divider	1	261396	261397	261419
J	Return Air Duct Partition	1	261662	261663	261675
K	Vertical Divider (lower part) between Supply and Return Air Ducts	1	261666		261677

CAUTION: Before installation, recheck to be sure that the curb selected matches the unit ordered. Verify the dimensions of the curb received with the dimensions on page 19.

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

Assy Hardware Bag, P/N 262438:		
P/N	Description	Qty
1035	Nut 5/16" Hex-18 Thread	16
1333	Lockwasher 5/16 In.	20
16243	Hex Hd Lag Bolt 5/16" x 1-1/4"	4
16247	Cap Screw 5/16 X 3/4"	16
11813	S/M Screw #10-16x1/2 Ab Stalgd	125
66302	1-1/4x1/4 x 50 ft Sealant Tape	

FIGURE 9B - Curb Detail

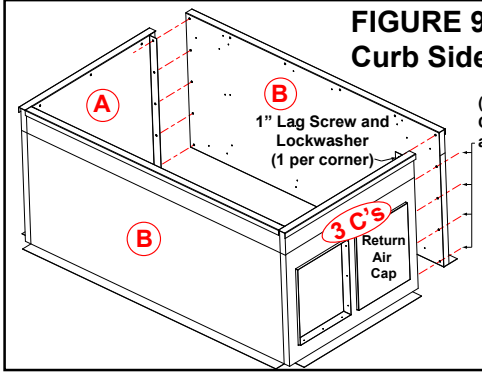


ID	Description (cont'd)	Qty	Component P/N's (cont'd)		
L	Divider (upper part) between Supply and Return Air Ducts	1	261667	261668	261678
M	Duct Divider Top Liner	1	261408	261409	261426
N	Duct Divider Bottom Liner	1	261405		261424
P	Supply Air Duct Large Top (insulated)	1	261664	261665	261676
Q	Supply Air Duct Small Top (insulated)	1	261669		261679
	Hardware Bag	1	262438 (see content list, left below)		

* See Model Size / Cabinet Size Cross Reference on page 2. ** Curb bottom in Cabinet C is 2-piece.

1. Follow the Steps and refer to the curb assembly drawings
2. Position curb ends (**Codes A & "large" C**) and curb side rails (**Codes B & B**) as shown in **FIGURE 9A**. Join the corners as illustrated.
   Locate the 4-pc bundle labeled (**C**). Using sheetmetal screws from the hardware package, attach the duct flange pieces to both the inlet and return air openings. If not using return air in the installation, position the return air cap (**C**) over the opening and attach. If a return air duct will be used, the cap is not needed.

FIGURE 9A - Assemble Curb Ends (A&C) and Curb Sides (B&B)

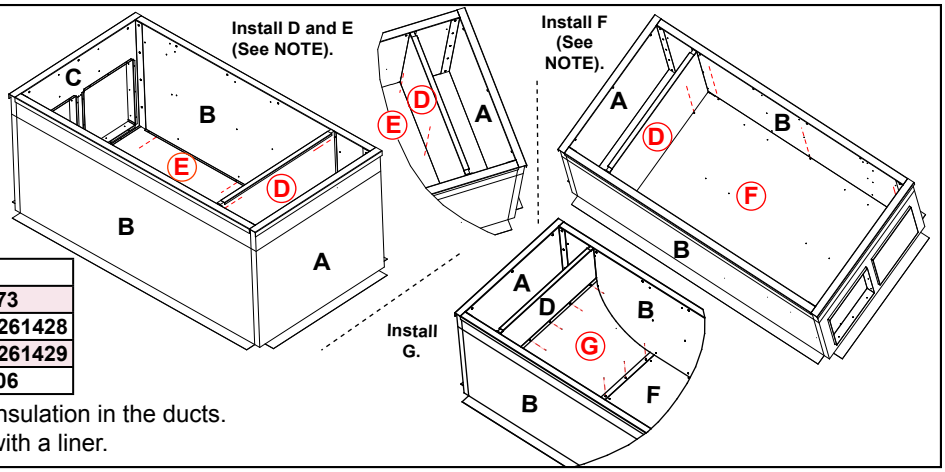


ID	P/N by Cabinet Size		
A	A-261653	B-261654	C-261670
B	A&B-261655		C-261671
C	A-261656	B-261657	C-261672
	A-261386	B-261387	C-261414
	A-261388	B-261389	C-261415

3. Check the assembly 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 unit curb cap and the roof curb, the roof curb must be leveled in both directions with no twist end to end. Shim as required and secure curb to roof deck. (**NOTE**: Install internal ducts **before** flashing; see Step 5.)
5. Install solid partition (**Code D**), duct bottom (**Codes E & F**), and air baffle (**Code G**) using sheetmetal screws (See **FIGURE 9C**).
   a) Position the solid partition (**Code D**) with insulation side toward the solid end of the curb. Align the holes (push the insulation out of the way) and attach partition to curb sides (**B & B**).
   b) Position insulated duct bottom (**Code E**) with insulation side up in the bottom of curb. Align the holes (push the insulation out of the way) and attach partition to curb sides (**B & B**). Attach the bottom to partition (**D**).
   c) Position the bottom liner (**Code F**) over the insulation in the bottom of the curb. Align the holes and attach around the perimeter.
   d) Position the air baffle (**Code G**) against the partition (**D**). Align the holes and attach. Align the air baffle with the holes in the bottom liner (**F**) and attach.

FIGURE 9C - Install Supply Duct Partition (D), Bottom (E), Bottom Liner (F), and Air Baffle (G)

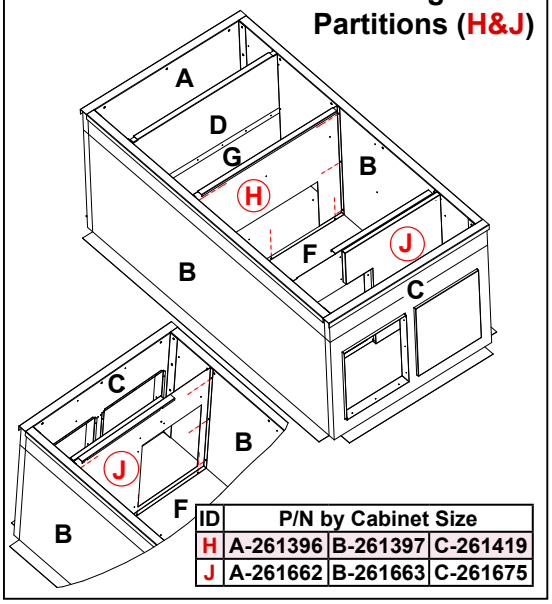
NOTE: Cabinet C - Insulated bottom (Code E) and Bottom Liner (Code F) are two piece.



ID	P/N by Cabinet Size		
D	A-261658	B-261659	C-261673
E	A-261660	B-261661	C-261674 & 261428
F	A-261394	B-261395	C-261418 & 261429
G	A-268604	B-268605	C-268606

Insulation NOTE: There is no exposed insulation in the ducts. All insulation in airflow paths is covered with a liner.

FIGURE 9D - Install the Large Duct Partitions (H&J)



ID	P/N by Cabinet Size		
H	A-261396	B-261397	C-261419
J	A-261662	B-261663	C-261675

6. Install supply air duct partition (**Code H**) and return air duct partition (**Code J**) using sheetmetal screws. (See **FIGURE 9D**).
   - **a)** Position partition (**Code H**) in the orientation illustrated. Align the holes and attach the partition to curb sides (**B & B**) and bottom liner (**F**).
   - **b)** Position partition (**Code J**) in the orientation illustrated. Align the holes and attach the partition to curb sides (**B & B**) and bottom liner (**F**).
7. Install supply air and return duct dividers (**Code K**) and (**Code L**); divider liners (**Code M**) and (**Code N**); and duct tops (**Code P**) and (**Code Q**) using sheetmetal screws. (See **FIGURE 9E**).
   - **a)** Position and attach duct dividers (**Codes K & L**) as illustrated. Cover the insulation with liners (**Codes M & N**) and attach with screws.
   - **b)** Position tops (**Codes P & Q**) with insulation side up. Align the holes (push the insulation out of the way) and attach the perimeter.
8. Install field-supplied flashing (**FIGURE 9B**, page 17).

FIGURE 9E - Install Smaller Duct Partitions and Liners (K, L, M, N) and Duct Tops (P&Q)

ID	P/N by Cabinet Size		
K	A&B-261666		C-261677
L	A-261667	B-261668	C-261678
M	A-261408	B-261409	C-261426
N	A&B-261405		C-261424
P	A-261664	B-261665	C-261676
Q	A&B-261669		C-261679

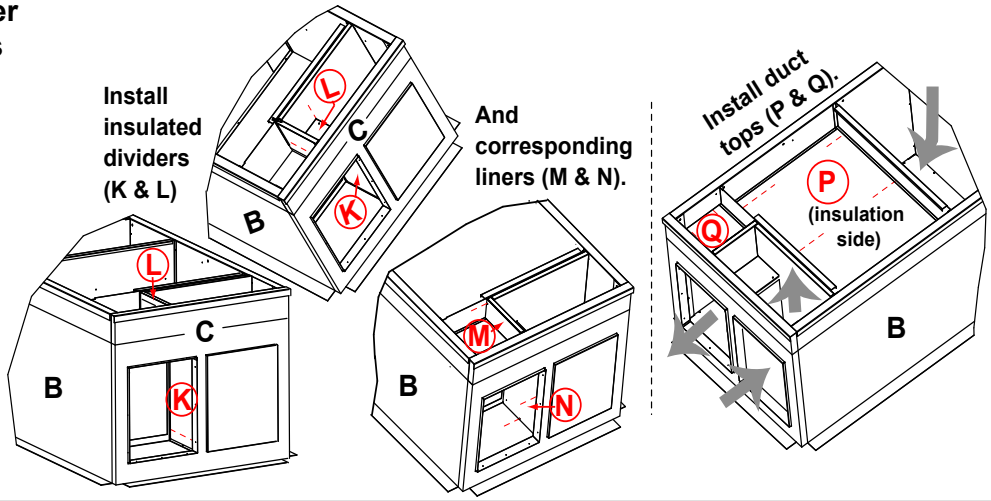
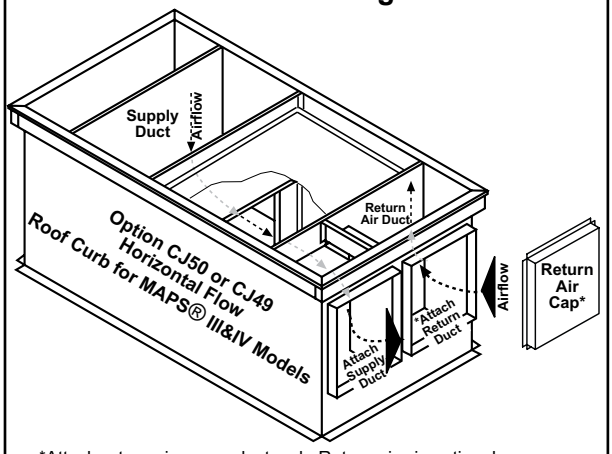


FIGURE 9F - Airflow through the Curb



*Attach return air cap or ductwork. Return air r is optional.

9. **Before placing the MAPS® unit or optional duct furnace on the curb:**

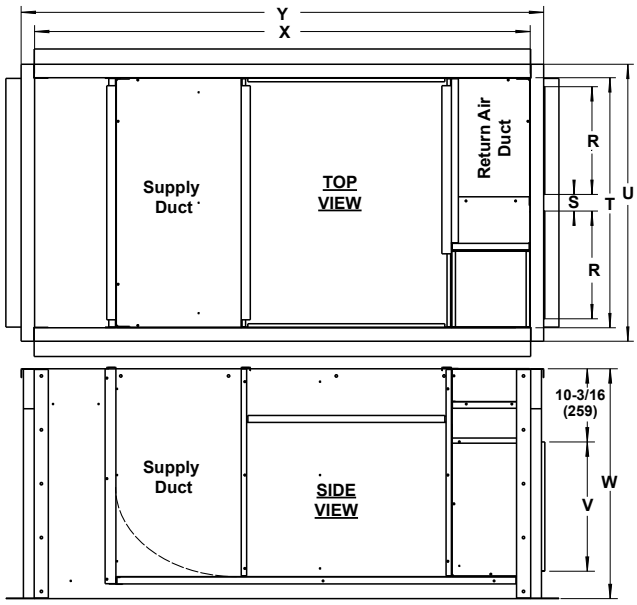
- ☐ Apply 1/4" x 1-1/4" foam sealant tape to both the top surface of the curb rails and the top surface of the perimeter of the duct dividers, being sure to make good butt joints at all corners.
- ☐ If installing an optional duct furnace curb section (Option JH), place it on the curb before the unit. See Paragraph 5.4.3.
- ☐ **When it is time to lift the MAPS® unit or optional duct furnace onto the prepared curb** (See Rigging and Lifting, Paragraph 5.5.), be sure that all of the above preparations have been made. **MPORTANT:** Verify that the unit will be placed in the correct airflow orientation to mate properly with the discharge and return air openings. **Remember that the INLET AIR END OF THE UNIT is at the DISCHARGE (duct connection) END OF THE CURB.**

FIGURE 9G - Dimensions and Weights - Options CJ49 and CJ50 for MAPS® Cabinets A, B, and C without an Energy Recovery Module

Dimensions and Weight

Cabinet		R	S	T	U	V	W	X	Y	Wt
A*	inches	15	2-5/16	34-13/16	38-5/8	18	32	69	72-3/4	353 lbs
	mm	381	59	884	981	457	813	1753	1848	160 kg
B*	inches	22-1/2	2-5/16	49-13/16	53-5/8	18	32	69	72-3/4	434 lbs
	mm	572	59	1265	1362	457	813	1753	1848	197 kg
C*	inches	28-1/4	2-5/8	61-5/16	65-1/8	22	36	97-7/8	101-5/8	654 lbs
	mm	718	67	1557	1654	559	914	2486	2581	297 kg

*See Model Size / Cabinet Size Cross Reference on pages 71-72.



5.4.2.2 Roof Curbs for Horizontal Airflow (Options CJ54 and CJ53) for MAPS® III&IV Cabinets A, B, and C WITH an Energy Recovery Module

NOTE: Curbs in this section do not apply to a MAPS® unit without an optional energy recovery module. For a horizontal airflow curb for a MAPS® unit without an energy recovery module), go to Paragraph 5.4.2.1, page 16.

*See Model Size / Cabinet Size Cross Reference on pages 71-72.

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 on page 22.

Components and Application

Roof Curb P/N's by Model & Cabinet Size *			Cabinet A	Cabinet B	Cabinet C
Models RCB/RCC/RDB/RDC			*All Sizes	*All Sizes	*All Sizes
Models RDCB/RDCC/RDDB/RDDC with Cabinet & Gas Heat Size Combination			With Gas Heat Sizes 100/150/200	With Gas Heat Sizes 250/300	With Gas Heat Sizes 400/500/600/700/1000
Models RECB/RECC/REDB/REDC			*All Sizes	*All Sizes	*All Sizes
ID on Part	Roof Curb Package P/N (Option)		262533 (CJ54)	262534 (CJ54)	262535 (CJ53)
	Component Description:	Qty	Component P/N's		
A	Curb End Assembly (solid w/insulation)	1	261653	261654	261670
B	Curb Side Assembly (insulated)	2	261655		261671
C	Supply Duct End (solid insulated partition)	1	261658	261659	261673
D	Supply Duct Bottom (insulated) (** 2 pcs)	**1	261660	261661	** 261674 & 261428
E	Supply Air Duct Bottom Liner (** 2 pcs)	**1	261394	261395	** 261418 & 261429
F	Air Baffle ("curve" in the supply duct)	1	268604	268605	268606
G1	Supply Air Duct Center Divider	1	261396	261663	261419
G2	Return Air Duct Partition Assembly	1	261662	261663	261675
H	Vertical Divider (lower part) between Supply and Return Air Ducts	1	261666		261677
J	Divider (upper part) between Supply and Return Air Ducts	1	261667	261668	261678
K	Duct Divider Top Liner	1	261408	261409	261426
L	Duct Divider Bottom Liner	1	261405		261424
M	Supply Air Duct Large Top (insulated)	1	261664	261665	261676
N	Supply Air Duct Small Top (insulated)	1	261669		261679
P	Horizontal Curb End Connector to ER	1	261384		262425
Q	Liner Support	2	262538	262547	262428
R	Right Curb Side Assy (under ER Module)	1	262537		262427
S	Left Curb Side Assy (under ER Module)	1	262536		262426
T	Duct Bottom Assembly (insulated) (under ER Module) (** 2 pieces)	**1	262539	** 262548 & 262553	** 261674 & 262429
U	Curb Tunnel (between unit & ER)	1	261993	261994	260856
V	Bottom Duct Liner (under ER) (** 2 pcs)	**1	262541	262550	** 261418 & 262430
W	Vertical Duct Divider (insulated)	1	262543		262431
X	Vertical Return Air Duct Liner	1	262544		262432
3 Y's	Curb End Assembly (insulated)	1	261656	261657	261672
	Duct Flanges (4pcs in one bundle)	4	261386	261387	261414
	Return Air Cap (not used with return air)	1	261388	261389	261415
Z	Duct Top Assembly (insulated)	1	262545	** 262552 & 262556	** 261676 & 262435
	Hardware Bag	1	(see content list, page 11)		

*See Model Size / Cabinet Size Cross Reference on page 2. ** Curb part is two-piece; one of each P/N is required.

Assembly and Installation Instructions for Option CJ54 and CJ53, Curbs with Energy Recovery Module

1. Follow the Steps and refer to the curb assembly drawings
2. Position curb end (**Code A**) and curb side rails (**Codes B & B**) as shown in **FIGURE 10A**. Join the two corners as illustrated.

5.0 Mounting (cont'd)

5.4.2 Roof Curbs for Horizontal Airflow - Cabinets A, B, C (cont'd)

Hardware Bag includes:		
P/N	Description	Qty
1035	Nut 5/16" Hex-18 Thread	48
1333	Lockwasher 5/16 In.	60
16243	Hex Hd Lag Bolt 5/16" x 1-1/4"	12
16247	Cap Screw 5/16 x 3/4"	48
11813	S/M Screw #10-16x1/2 Ab Stalgd	210
66302	1-1/4 x 1/4 x 50 ft Sealant Tape	

5.4.2.2 Roof Curbs for Horizontal Airflow (Options CJ54 & CJ53) for Cabinets A, B, and C WITH an Energy Recovery Module (cont'd)

Assembly and Installation Instructions for Option CJ54 & CJ53, Curbs with Energy Recovery Module (cont'd)

3. Install supply duct end (**Code C**) and bottom (**Codes D & E**).

a) Position the solid partition (**Code C**) with insulation side toward the solid end of the curb. Align the holes (push the insulation out of the way) and attach partition to curb sides (**B & B**).

b) Position the duct bottom (**Code D**) in the curb with insulation side up. Align the holes (push the insulation out of the way) and attach partition to curb sides (**B & B**). Attach the bottom (**Code D**) to the partition (**C**).

c) Position the bottom liner (**Code E**) over the insulation in the bottom of the curb. Align the holes and attach around the perimeter.

d) Position the air baffle (**Code F**) against the partition (**C**). Align the holes and attach. Align the air baffle with the holes in the bottom liner (**E**) and attach.

FIGURE 10A - Assemble Curb End (A), Curb Sides (B&B), Supply Duct End (C), Insulated Bottom (D) Bottom Liner (E) and Baffle (F)

Insulation NOTE: There is no exposed insulation in the ducts. All insulation in airflow paths is covered with a liner.

ID	P/N by Cabinet Size		
A	A-261653	B-261654	C-261670
B	A&B-261655		C-261671
C	A-261658	B-261659	C-261673
D	A-261660	B-261661	C-261674 & 261428
E	A-261394	B-261395	C-261418 & 261429
F	A-268604	B-268605	C-268606

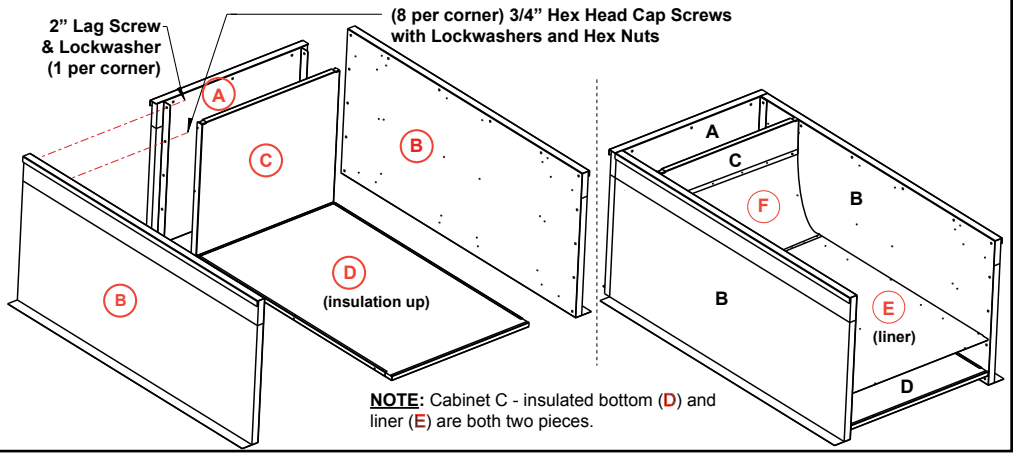
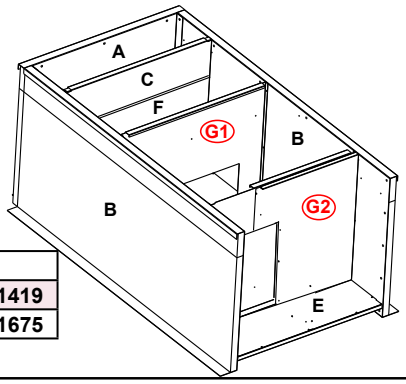


FIGURE 10B - Install Duct Partitions G1 and G2

ID	P/N by Cabinet Size		
G1	A-261396	B-261663	C-261419
G2	A-261662	B-261663	C-261675



4. Install supply air duct partition (**Code G1**) and return air duct partition (**Code G2**) with sheet-metal screws (**FIGURE 10B**).

a) Position partition (**Code G1**) in the orientation illustrated. Align the holes and attach the partition to curb sides (**B & B**) and bottom liner (**E**).

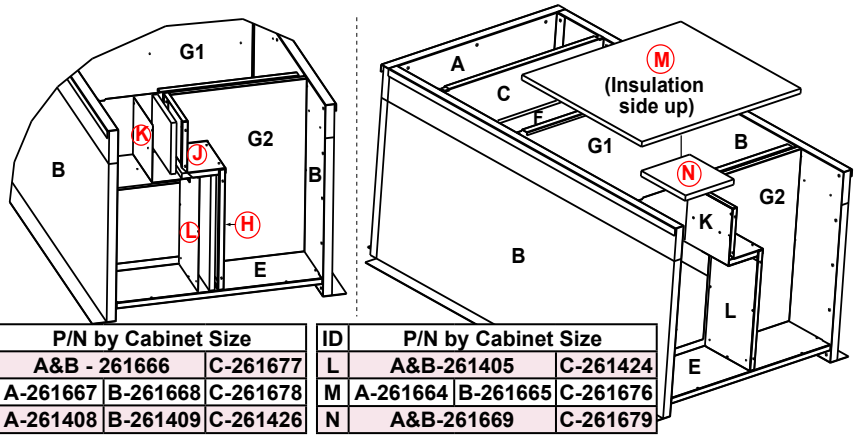
b) Position partition (**Code G2**) in the orientation illustrated. Align the holes and attach the partition to curb sides (**B & B**) and bottom liner (**E**).

5. Install supply air and return air insulated duct dividers (**Codes H & J**) ; divider liners (**Codes K & L**); and duct tops (**Codes M & N**) using sheetmetal screws (**FIGURE 10C**).

a) Position and attach duct dividers (**Codes H & J**) as illustrated. Cover the insulation with liners (**Codes K & L**) and attach with screws.

b) Position tops (**Codes M & N**) with insulation side up. Align the holes (push the insulation out of the way) and attach the perimeter.

FIGURE 10C - Install Smaller Duct Partitions, Liners, and Tops

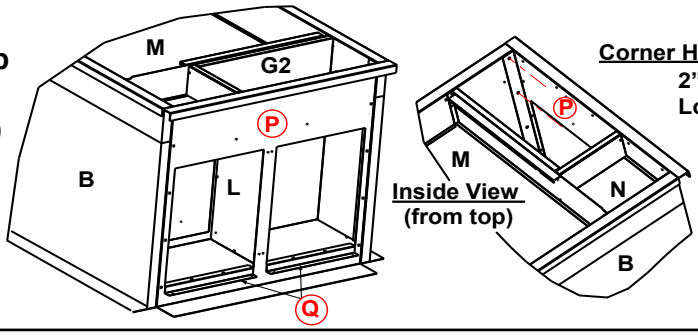


ID	P/N by Cabinet Size		
H	A&B - 261666		C-261677
J	A-261667	B-261668	C-261678
K	A-261408	B-261409	C-261426

ID	P/N by Cabinet Size		
L	A&B-261405		C-261424
M	A-261664	B-261665	C-261676
N	A&B-261669		C-261679

6. Install end connector (Code **P**) and two liner supports (Code **Q**) (**FIGURE 10D**).
   a) Position end connector (Code **P**) as illustrated. Attach at both corners with hardware listed. Attach the "front" with sheetmetal screws.
   b) Position liner supports (Code **Q**) in the openings and attach with sheetmetal screws.

FIGURE 10D - IInstall Unit Curb End (P) & Liner Supports (2 Q's) for the curb section under the Energy Recovery Module

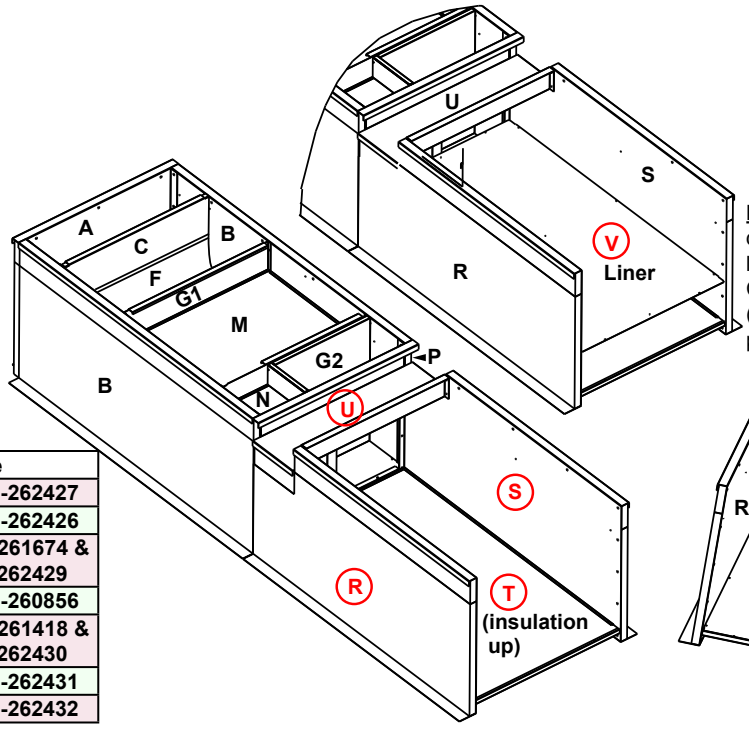


Corner Hardware for attaching "P":
2" Lag Screw and Lockwasher (2 per corner)
3/4" Hex Head Cap Screws with Lockwashers and Hex Nuts (8 per corner)

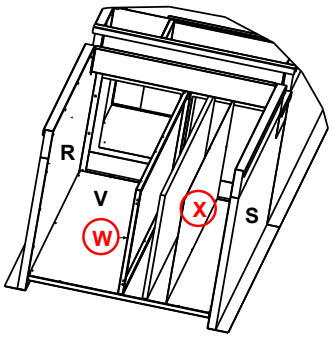
ID	P/N by Cabinet Size		
P	A&B-261384		C-262425
(2) Q	A-262538	B- 262547	C-262428

7. Install energy recovery curb section sides, duct bottom and divider, and "tunnel" cover.
   a) Position curb sides (**Codes R & S**) and attach to sides (**B & B**) with sheetmetal screws.
   b) Position the duct bottom (**Code T**) in the curb with insulation side up. Align the holes (push the insulation out of the way) and attach partition to curb sides (**R & S**). Attach the bottom (**Code T**) to the connector end (**P**).
   c) Position the bottom liner (**Code V**). Align the holes and attach with sheetmetal screws.
   d) Position the tunnel (**Code U**) over the gap between the unit and energy recovery curb sections. Attach with sheetmetal screws.
   e) Position the vertical, insulated duct divider (**Code W**); attach it to the bottom liner and the tunnel (**Code U**). Position the liner (**Code X**) over the insulation and attach.

FIGURE 10E - Install Curb Sides for supporting ER Module, Duct Bottom, Tunnel between the unit curb and the ER curb, Duct Liner, and Duct Divider



NOTE: Cabinet B - Insulated duct bottom (T) is two-piece; liner (V) is one piece. Cabinet C - Insulated bottom (T) and liner (V) are both two pieces.

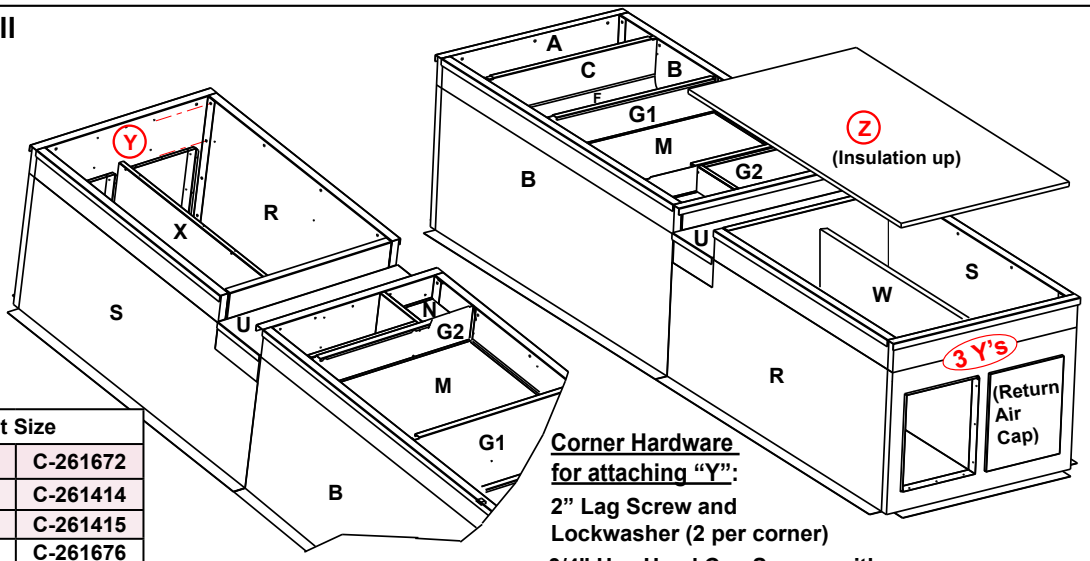


ID	P/N by Cabinet Size		
R	A&B-262537		C-262427
S	A&B-262536		C-262426
T	A-262539	B-262548 & 262553	C-261674 & 262429
U	A-261993	B-261994	C-260856
V	A-262541	B-262550	C-261418 & 262430
W	A&B-262543		C-262431
X	A&B-262544		C-262432

8. Install the end with duct connections and the duct top (**FIGURE 10F, page 22**)
   a) Using sheetmetal screws in the hardware package, attach the duct flange pieces (**"bundle" Code Y**) to the openings in the end panel (**"large" Code Y**). Position the end panel with flanges and attach to the curb sides with corner hardware as shown.
   If not using return air in the installation, position the return air cap (**Y**) over the opening and attach. If a return air duct will be used, the cap is not needed.
   b) Position duct top (**Code Z**) with insulation side up. Align holes and attach with sheetmetal screws.

FIGURE 10F - Install the Curb End with Duct Connections (3 Y'S) and the Energy Recovery Section Duct Top (Z)

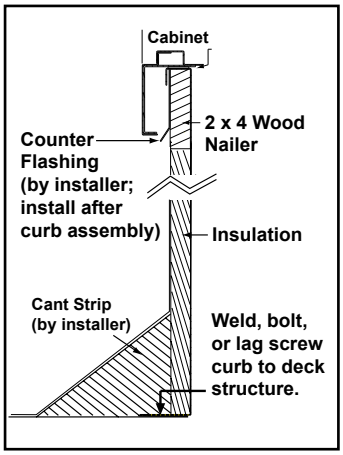
NOTE: Cabinet Sizes B and C - Insulated Duct Top (Code Z) is two piece.



ID	P/N by Cabinet Size		
Y	A-261656	B-261657	C-261672
	A-261386	B-261387	C-261414
	A-261388	B-261389	C-261415
Z	A-262545	B-262552 &262556	C-261676 &262435

Corner Hardware for attaching "Y":
2" Lag Screw and Lockwasher (2 per corner)
3/4" Hex Head Cap Screws with Lockwashers and Hex Nuts (8 per corner)

FIGURE 10G - Curb Detail



9. Complete field installation of the roof curb
- **a)** Check the assembly for squareness. The curb must be adjusted so that the diagonal measurements are equal within a tolerance of ±1/8" (±3mm).
- **b)** Level the roof curb. To ensure a good weatherproof seal between the unit curb cap and the roof curb, the roof curb must be leveled in both directions with no twist end to end. Shim as required and secure curb to roof deck.
- **c)** Install field-supplied flashing (**FIGURE 10G**).
- **d)** 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 dividers, being sure to make good butt joints at all corners.

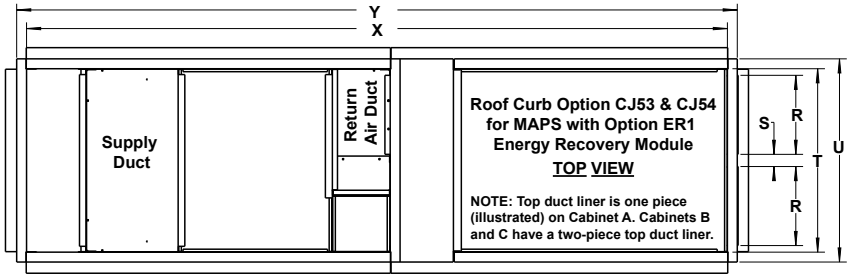
10. Lift the MAPS® unit on to the prepared curb (See Rigging and Lifting, Paragraph 5.5). **IMPORTANT:** Verify that the unit will be placed in **the correct airflow orientation to mate properly with the discharge and return air openings**. Remember that the energy recovery module is at the discharge end of the curb.

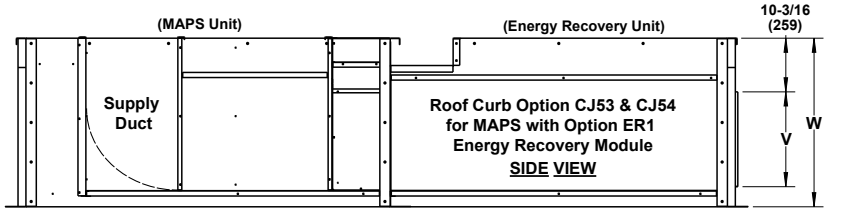
11. After the MAPS® unit is in place, follow the instructions shipped with the energy recovery module (Form I-MAPSIII&IV-ER) to lift and mate the energy recovery module to the MAPS® unit.

Weights and Dimensions of Options CJ54 & CJ53 for MAPS® unit with Energy Recovery Module

FIGURE 10H - Dimensions (inches/mm)

Cabinet		R	S	T	U	V	W	X	Y
A*	inches	15	2-5/16	34-13/16	38-5/8	18	32	133	136-3/4
	mm	381	59	884	981	457	813	3378	3473
B*	inches	22-1/2	2-5/16	49-13/16	53-5/8	18	32	133	136-3/4
	mm	572	59	1265	1362	457	813	3378	3473
C*	inches	28-1/4	2-5/8	61-5/16	65-1/8	22	36	167-7/8	171-5/8
	mm	718	67	1557	1654	559	914	4264	4359





Roof Curb Weight

Cabinet Size *	A	B	C
	Opt CJ54	Opt CJ4	Opt CJ53
lbs	675	785	1087
kg	306	356	493

*See Model Size / Cabinet Size Cross Reference, pages 71-72.

5.4.3 Duct Furnace Curb Sections, Option JH30 for Cabinet C and Option JH25 for Cabinet B

NOTE: Curb duct furnaces may be used only with roof curbs CJ31, CJ49 or CJ50. Duct furnace curb sections cannot be installed with an optional energy recovery module.

If installing a MAPS® gas heat Model RDCB, RDCC, RDDB or RDDC that includes a curb section with a duct furnace, the curb section with the duct furnace must be set on the roof curb BEFORE placing the MAPS® unit. Option JH30 and JH25 will work with downflow roof curb Option CJ31 and horizontal flow roof curb Options CJ49, and CJ50.

Verify the following before placing the duct furnace curb section on the installed roof curb:

☐ If ductwork is being installed from the top (Roof Curb Option CJ31), slide the duct-work down into the discharge and return air openings. See **FIGURE 7C**, page 13, for duct connection sizes. Ductwork should be sized slightly smaller with a minimum 3/4" duct flange that will rest on all sides of the duct connection. See Paragraph 6.4 for duct connection requirements.

☐ 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 prevent water leakage into the curb area due to blown rain and capillary action.

☐ When it is time to lift the duct furnace, be sure that the required preparations have been made. **IMPORTANT:** Before lifting, verify that the duct furnace will be placed in the correct orientation to mate properly with the discharge air opening.

FIGURE 11A - Set an Optional Duct Furnace Curb Section directly on the Roof Curb (either CJ31, CJ49, or CJ50)

Using all four lifting points (either the lifting lugs or the corner holes in the base) and being sure the orientation is correct, set the duct furnace on the prepared roof curb. Follow safe lifting procedures.

Approximate Weights				
JHUP 250 - 530lbs (240kg)				
JHUP 300 - 830lbs (376kg)				
Corner Weights				
JHUP	**250**		**300**	
Corner	**lbs**	**kg**	**lbs**	**kg**
"W"	158	72	228	103
"X"	158	72	231	105
"Y"	107	49	185	84
"Z"	107	49	186	84

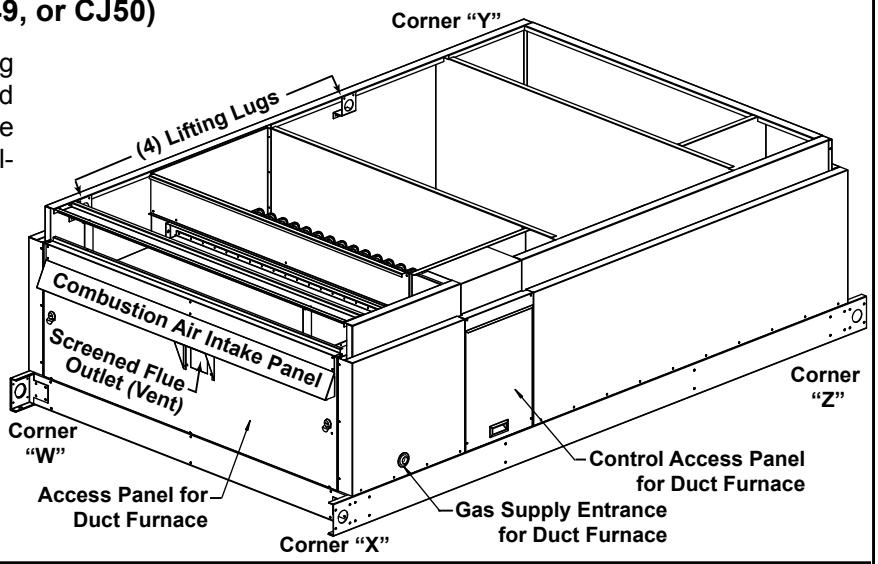
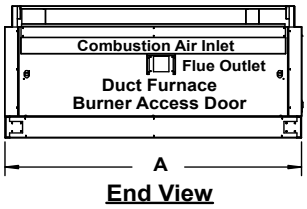
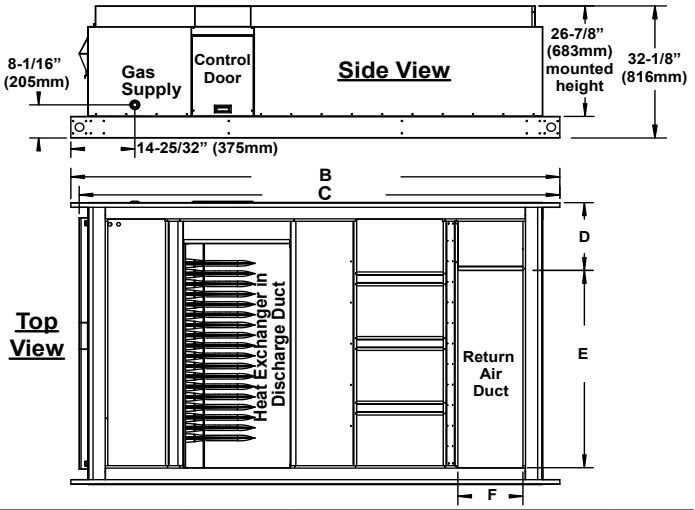


FIGURE 11B - Dimensions of an Optional Duct Furnace Curb Section





NOTE: Duct furnace curb section adds 23-1/8 (587mm) to the overall height of the installation.

Dimensions (inches/mm) - Option JHUP25 and JHUP30 Curb Section Duct Furnaces

Duct Furnace	A		B		C		D		E		F	
	inches	(mm)	inches	(mm)	inches	(mm)	inches	(mm)	inches	(mm)	inches	(mm)
JHUP 250	57-1/16	(1449)	78-3/19	(1981)	76-1/2	(1937)	15-1/2	(394)	37-1/2	(953)	16-17/32	(267)
JHUP300	66-17/32	(1741)	113	(2870)	111-1/16	(2821)	16-1/2	(419)	48	(1219)	15-1/32	(382)

Option JH30 Duct Furnace Installation

The duct furnace requires a separate gas line; gas connection is 1/2". See gas supply entrance location in **the illustrations**. Refer to Paragraph 9.2.1.2 for gas supply piping and pressure requirements. The Size 300 duct furnace burner operates only at high fire. Manifold pressure is 3.5" w.c.; see Paragraph 9.2. The high temperature limit control functions the same as described in Paragraph 9.2.4.

Field wiring is required. Check the wiring diagram for requirements. Follow the wiring diagram in **FIGURE 11C** to connect the field-supplied wiring.

Duct Furnace Operation

The 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 duct furnace will be energized to operate at full fire only.

FIGURE 11C - Wiring Connections for Optional Curb Duct Furnace

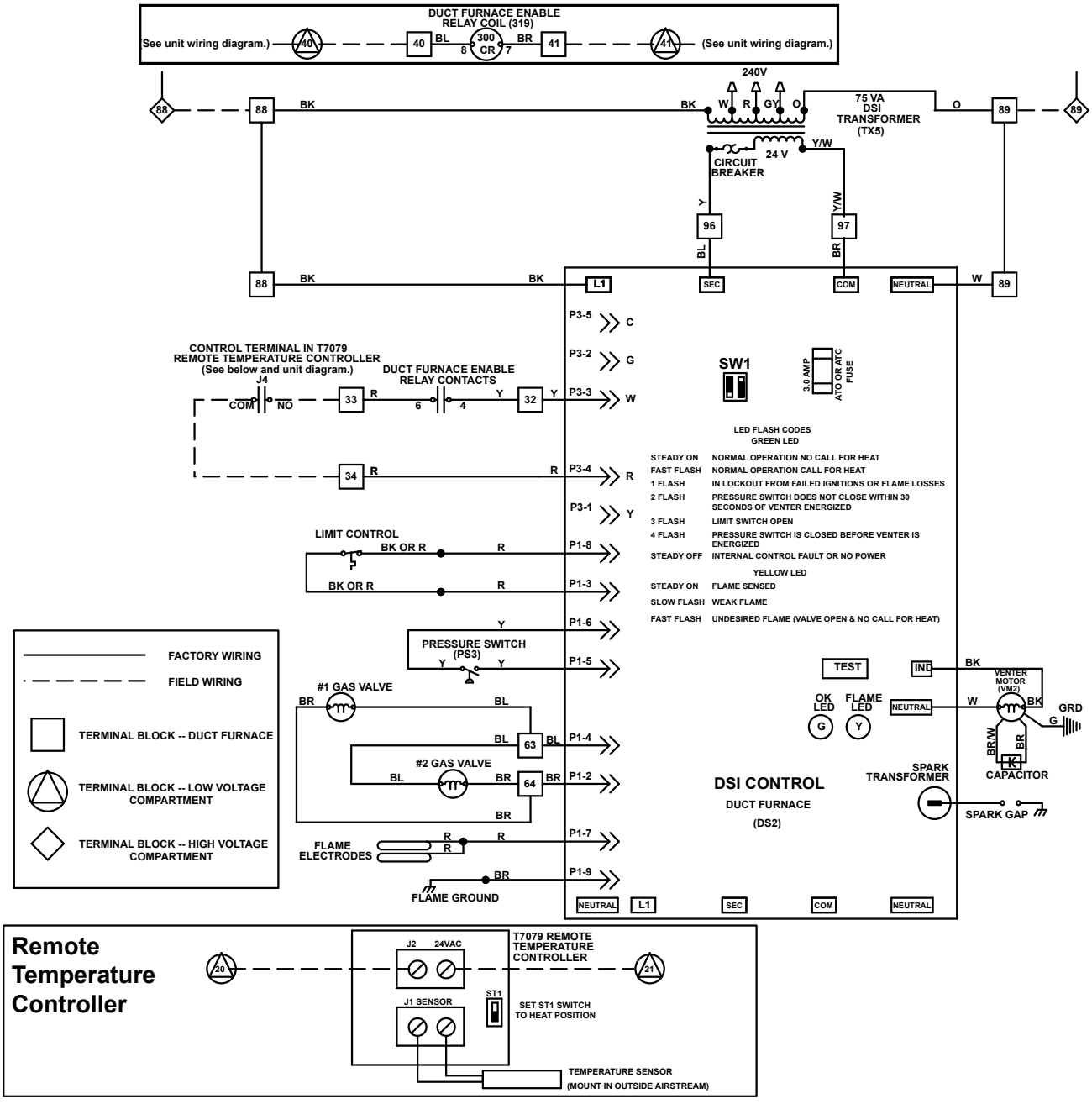
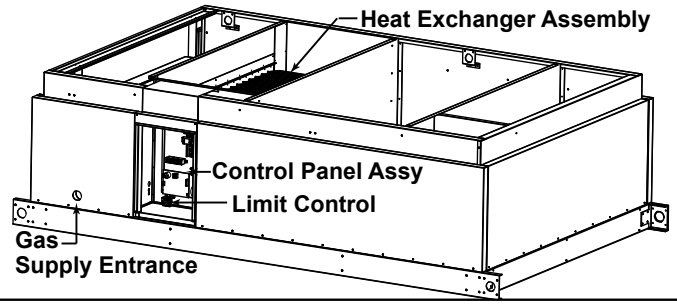
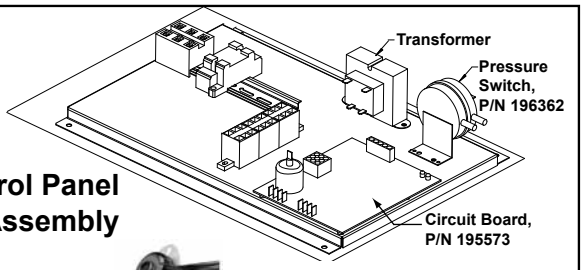


FIGURE 11D - Duct Furnace Curb Heater Operation

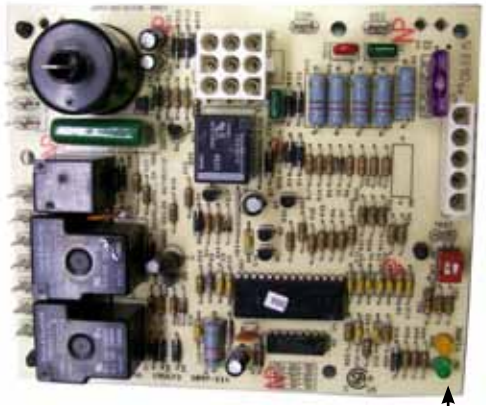




Control Panel Assembly

Limit Control, P/N 148588

FIGURE 11E - Circuit Board LED Codes



Control Status - Green LED	
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 in Open Position
3 Flashes	High Limit Switch Open
4 Flashes	Pressure Switch is closed before venter is energized
Steady Off	Internal Failure - Replace the ignition control module
Flame Status - Yellow LED	
Steady On	Flame is sensed
Slow Flash	Weak Flame
Fast Flash	Undesired Flame

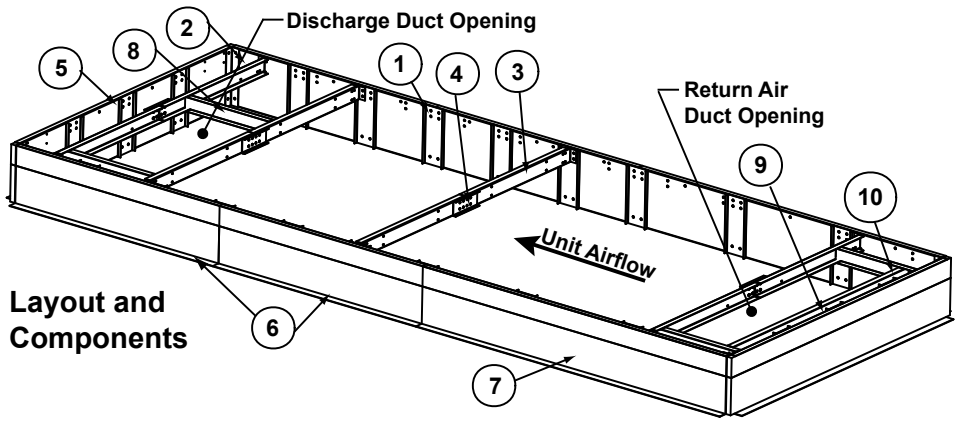
Fan Delay to OFF Switch (DIP Switch Settings - selected prior to call for heat)	SW1	SW2	Fan Delay To OFF (seconds)
	OFF	OFF	120
	OFF	ON	90
	ON	OFF	160 (Factory Preset)
	ON	ON	45

5.4.4 Roof Curbs - MAPS®III Models RCB, RDB, RDCB, RDDB, RECB, REDB Cabinet Size D

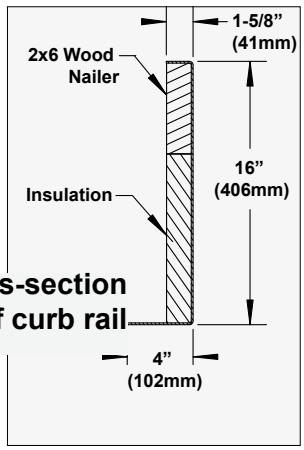
Components

There are two sizes of curbs for MAPS® D Cabinet units. Verify that the curb package received matches the unit. Check components against the applicable list.

FIGURE 12A - Option CJ3 Roof Curb Components and Layout



Layout and Components



Cross-section of curb rail

Option CJ3 Roof Curb Packages for MAPS®III for D Cabinet Sizes	Code	Component Description	**Pkg P/N 223041 - All RCB, RDB, RECB & REDB and RDCB & RDDB w/ Heat Sctn 500, 600, 700, 800**	Qty	P/N	**Pkg P/N 223042 - RDCB & RDDB w/Heat Section 1000, 1200, 1400, 1600**	Qty	P/N
	1	Rail Side Support Channel		4	222068		4	222068
	2	Curb Corner Support Angle		4	222069		4	222069
	3	Curb Cross Support		8	222072		8	222072
	4	Cross Support Splicing Brckt		4	222073		4	222073
	5	Curb Rail End		2	222899		2	222899
	6	Curb Side Rail Section		6	222900		4	222900
	7	Curb Side Rail Section		--	N/A		2	222901
	8	Discharge Duct Side Support		2	255637		2	255637
	9	Return Air Duct End Support		1	255638		1	255638
	10	Return Air Duct Side Support		2	255639		2	255639

5.0 Mounting (cont'd)

Assembly and Installation Instructions for MAPS®III Cabinet Size D Roof Curb

Note: If the installation has horizontal inlet only or horizontal discharge, it is not necessary to install the unused duct supports. **Cross supports must always be installed.**

5.4 Mounting on a Roof Curb (cont'd)

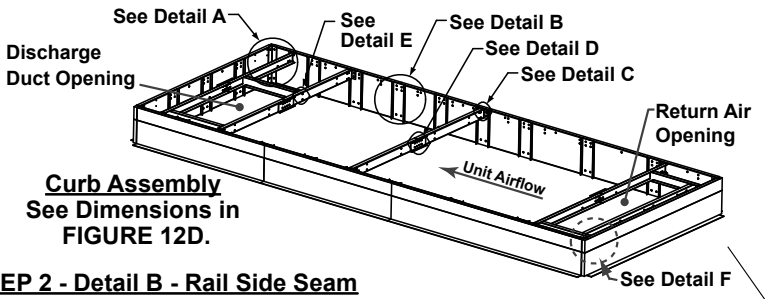
5.4.4.Roof Curbs for MAPS®III Models RCB, RDB, RDCB, RDDB, RECB, REDB Cabinet Size D (cont'd)

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. Roof curb installation is the responsibility of the installer.

Assembly Hardware and Tape shipped with curb:	
(24) **P/N 163334**, Cap Screw, 7/16-14 x 2-1/2" long	(16) **P/N 7328**, Hex Nut 1/4-20 Keps
(40) **P/N 163335**, Cap Screw, 7/16-14 x 3/4" long	(4) **P/N 114485** 1/4-28 x 2-1/2 Bolt
(64) **P/N 15119,** Lockwasher, 7/16-14	(4) **P/N 114486**, Hex Nut 1/4-28
(64) **P/N 15117**, Hex Nut, 7/16-14	(4) **P/N 96854**, 1/4" Ext Tooth Lockwasher
(16) **P/N 47252**, 1/4-20 x 5/8 Bolt	**66302** 1-1/4 x 1/4 x 50 ft Sealant Tape

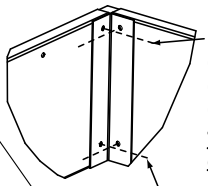
1. **Curb Rails** - Position the roof curb rails as shown in **FIGURES 12A and 12D**. When installing a curb for a unit with heat section size 1000, 1200, 1400 or 1600, be sure to **place the longer curb side pieces at the return air end**. Assemble the corners and sides as shown in STEPS 1 and 2 in **FIGURE 12B**.
2. **Cross Supports** - Position the four two-piece roof curb cross supports and splice brackets in the locations shown in **FIGURE 12D**. **Be certain to turn supports so that the splice brackets will not be in the duct openings.** Assemble as shown in STEPS 3 and 4 in **FIGURE 12B.**

FIGURE 12B - Option CJ3 Roof Curb Assembly for MAPS®III Cabinet D



Curb Assembly
See Dimensions in FIGURE 12D.

STEP 1 - Detail A - Curb Corner
Position rails as illustrated. If installing Pkg P/N 220342, be sure to put the two longer rail side pieces at the return air end. Position the angle support in the corner and attach with hardware as illustrated.

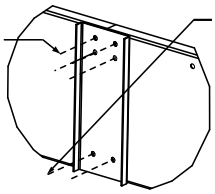


Hardware used for 4 Corner Tops:
(8) 2-1/2" Cap Screws, P/N 163334
(8) Lock Washers, P/N 15119
(8) Hex Nuts, P/N 15117
TOP - Cap screw heads should be on the wood side of the rail.

Hardware used for 4 Corner Bottoms:
(8) 3/4" Cap Screws, P/N 163335
(8) Lock Washers, P/N 15119
(8) Hex Nuts, P/N 15117
BOTTOM - Cap screw heads should be on the insulation side of the rail.

STEP 2 - Detail B - Rail Side Seam
Connect rail side pieces with the support channels and hardware as illustrated.

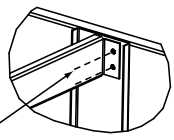
Hardware used for 4 Seams (Top):
(16) 2-1/2" Cap Screws, P/N 163334
(16) Lock Washers, P/N 15119
(16) Hex Nuts, P/N 15117
TOP - Cap screw heads should be on the wood side of the rail.



Hardware used for 4 Seams (Bottom):
(8) 3/4" Cap Screws, P/N 163335
(8) Lock Washers, P/N 15119
(8) Hex Nuts, P/N 15117
BOTTOM - Cap screw heads should be on the insulation side of the rail.

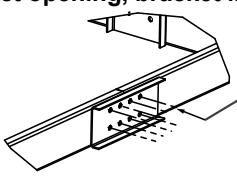
STEP 3 - Detail C - Attaching 8 Cross Support Pieces to the Side Rails (See FIGURE 12D for locations.)

Determine locations of the four cross supports; dimensions are in FIGURE 12D.
Follow the instructions to attach the ends of all 8 center cross support pieces (4 cross supports; each with two pieces)



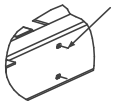
1) Remove the two screws at the top of the curb rail.
2) Position the cross support at the top of the curb as illustrated.
3) Re-insert screws attaching the cross support.

STEP 4 - Detail D - Attaching Splicing Bracket to Connect Centers of the Four Cross Supports (NOTE: If splice is in a duct opening, bracket MUST NOT BE INSIDE the opening.)



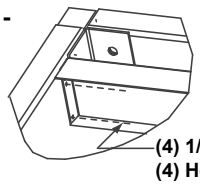
Hardware for attaching the four Splicing Brackets:
(32) 3/4" Cap Screws, P/N 163335
(32) Lock Washers, P/N 15119
(32) Hex Nuts, P/N 15117

STEP 5 - Detail E - Attaching the Two Discharge Air Duct Side Supports to Curb Cross Supports



See FIGURE 12D; position and attach the two discharge duct side supports "inside" the curb cross supports.
(8) 1/4-20 x 5/8 Bolts, P/N 47252
(8) 1/4-20 Hex Nuts, P/N 7328

STEP 6 - Detail F - Attaching Two Return Air Duct Side Supports to Curb Rail (one end of each support)



(4) 1/4-28 x 2-1/2 Bolt, P/N 114485
(4) Hex Nut 1/4-28, P/N 114486
(4) Lock Washers, P/N 96854

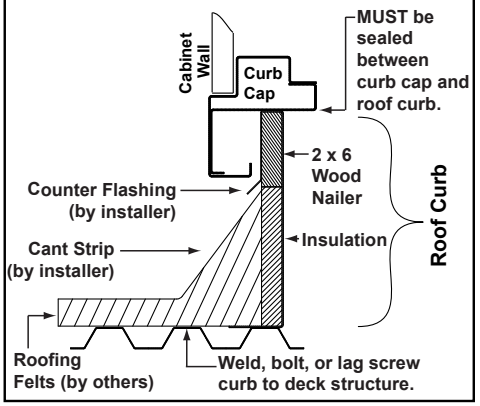
STEP 7 - Repeat Detail E (STEP 5) to attach the opposite ends of the return air duct side supports (attached in STEP 6) to the cross support.

Repeat Detail E (STEP 5) again to complete the return air duct support by attaching each end of the return air duct end support to the installed side supports.

(8) 1/4-20 x 5/8 Bolts, P/N 47252; (8) 1/4-20 Hex Nuts, P/N 7328

3. **Discharge Duct Supports** - Position the two discharge duct side supports as shown in **FIGURES 12A and 12D**, and attach to cross supports as shown in STEP 12 in **FIGURE 12B**.
4. **Return Air Duct Supports** - Position the two return air side supports and the end support as shown in **FIGURES 12A and 12D.** Follow STEP 7 in **FIGURE 12B** to attach.
5. 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).
6. Level the roof curb. To ensure a good weatherproof seal between the cabinet curb cap and the roof curb, the curb must be leveled in both directions with no twist end to end. Shim as required and secure curb to the roof deck before installing flashing.
7. Install field-supplied flashing. See **FIGURE 12C**.
8. If the unit has return air and/or down discharge, insert ductwork into the duct openings. See ductwork sizes in **FIGURE 12E**.

FIGURE 12C - Cross Section of Roof Curb Installation



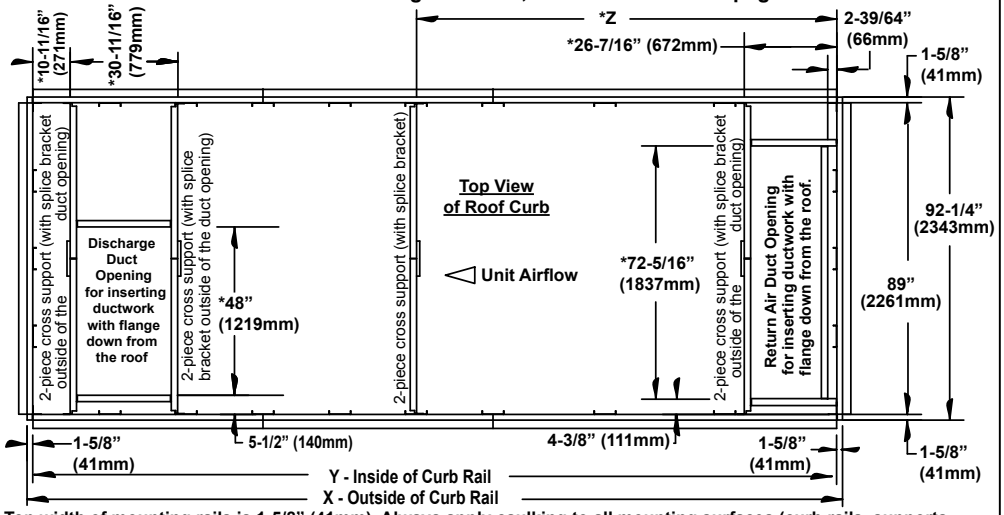
9. Before placing the unit on the curb:

☐ If ductwork is being installed from the top, slide the ductwork down into the discharge and return air openings. See dimensions in **FIGURE 12E**. Ductwork should be sized slightly smaller with a minimum 3/4" duct flange that can be attached on all sides of the duct connection. See the system installation manual for ductwork requirements

☐ 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 dividers, being sure to make good butt joints at all corners. The sealant tape must be applied to prevent water leakage into the curb area due to blown rain and capillary action.

FIGURE 12D - Dimensions - MAP®SIII Cabinet D, Option CJ3 Roof Curb (Curb height is 16" / 406mm.)

***Use these dimensions for assembling the roof curb; follow the instructions on pages 26-27.**
DO NOT USE these dimensions for sizing ductwork; see FIGURE 12E on page 28.



Top width of mounting rails is 1-5/8" (41mm). Always apply caulking to all mounting surfaces (curb rails, supports, and duct dividers) before placing unit.

Roof Curb Dimensions and Weight by Model and Size

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.

Cabinet D MAPS®III Models and Cooling Sizes	with Gas Heat Section	with Electric Heat Section	Illustration Codes - FIGURE 12D			Approx Curb Wt
			X	Y	Z	
Dimensions - inches						**lbs**
RCB 360, 480, 600, 720	None	None	200-7/16	197-3/16	87-9/16	710
RECB 360, 480, 600, 720		120, 180	200-7/16	197-3/16	87-9/16	710
RDCB 360, 480, 600, 720	500, 600, 700, 800	None	200-7/16	197-3/16	87-9/16	710
	1000, 1200, 1400, 1600		232-7/8	229-5/8	120	740
RDB 418, 444, 538, 564, 602, 658, 684, 722, 804, 842	None	None	200-7/16	197-3/16	87-9/16	710
REDB 418, 444, 538, 564, 602, 658, 684, 722, 804, 842		120, 180	200-7/16	197-3/16	87-9/16	710
RDDB 418, 444, 538, 564, 602, 658, 684, 722, 804, 842	500, 600, 700, 800	None	200-7/16	197-3/16	87-9/16	710
	1000, 1200, 1400, 1600		232-7/8	229-5/8	120	740
Dimensions - mm						**kg**
RCB 360, 480, 600, 720	None	None	5091	5009	2224	322
RECB 360, 480, 600, 720		120, 180	5091	5009	2224	322
RDCB 360, 480, 600, 720	500, 600, 700, 800	None	5091	5009	2224	322
	1000, 1200, 1400, 1600		5915	5833	3048	322
RDB 418, 444, 538, 564, 602, 658, 684, 722, 804, 842	None	None	5091	5009	2224	322
REDB 418, 444, 538, 564, 602, 658, 684, 722, 804, 842		120, 180	5091	5009	2224	322
RDDB 418, 444, 538, 564, 602, 658, 684, 722, 804, 842	500, 600, 700, 800	None	5091	5009	2224	322
	1000, 1200, 1400, 1600		5915	5833	3048	336

5.0 Mounting (cont'd)

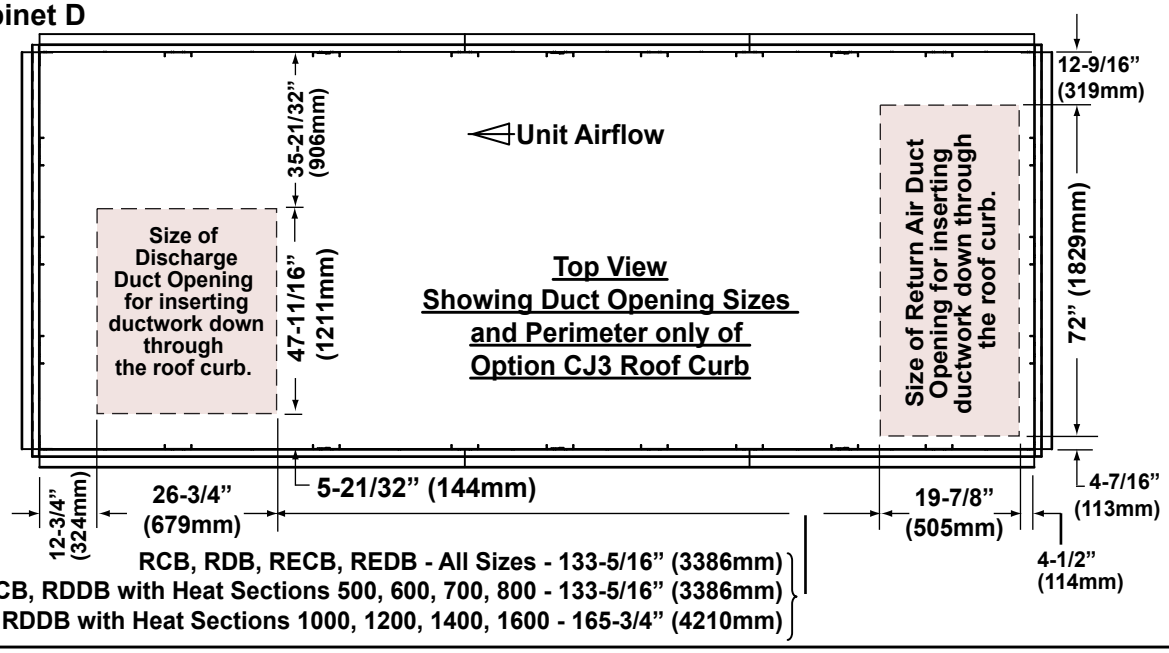
5.4 Mounting on a Roof Curb (cont'd)

5.4.4.Roof Curbs for MAPS® Models RCB, RDB, RDCB, RDDB, RECB, REDB Cabinet Size D (cont'd)

Installing Ductwork with Option CJ3 MAPS®III Cabinet D Roof Curb

The roof curb designed for the MAPS®D Cabinet includes return air and discharge duct supports that allow the ductwork to be inserted down through the roof. The sizes of the duct openings are shown in **FIGURE 12E.** Ductwork should be sized slightly smaller with a minimum 3/4" duct flange that can be attached to all sides of the duct connection. The duct opening is positioned to mate with the heater inlet or discharge. After installing the ductwork, before placing the system on the curb, apply sealant tape to the top surface of the duct opening sides making good butt joints at the corners. (Sealing tape must also be applied to the curb rails.)

FIGURE 12E - Duct Opening Dimensions and Locations inside Option CJ3 Roof Curb for MAPS®III Cabinet D



5.5 Rigging and Lifting the MAPS® Units

DANGER

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

See approximate net weights in Paragraph 5.1. If corner weights are required, refer to Sales/Technical Catalog Form C-PC (available at www.RezSpec.com). **IMPORTANT NOTE:** ALL MAPS® Cabinet C and D systems MUST be loaded and unloaded by lifting. Due to size, DO NOT attempt to move any MAPS® C or D Cabinet with a fork lift.

Holes for attaching rigging are provided in the base. Cabinets A, B, and C have four lifting holes -- one on each corner; see **FIGURE 14A**. Cabinet D has six lifting holes for rigging; see **FIGURE 14B**. **ALL lifting points MUST always be used.** Spreader bars **MUST** be used to prevent cabinet damage.

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.

The unit MUST be rigged with spreader bars that will allow the unit to be lifted straight up with vertical force only on the lifting points. Using ALL lifting points is mandatory.

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

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

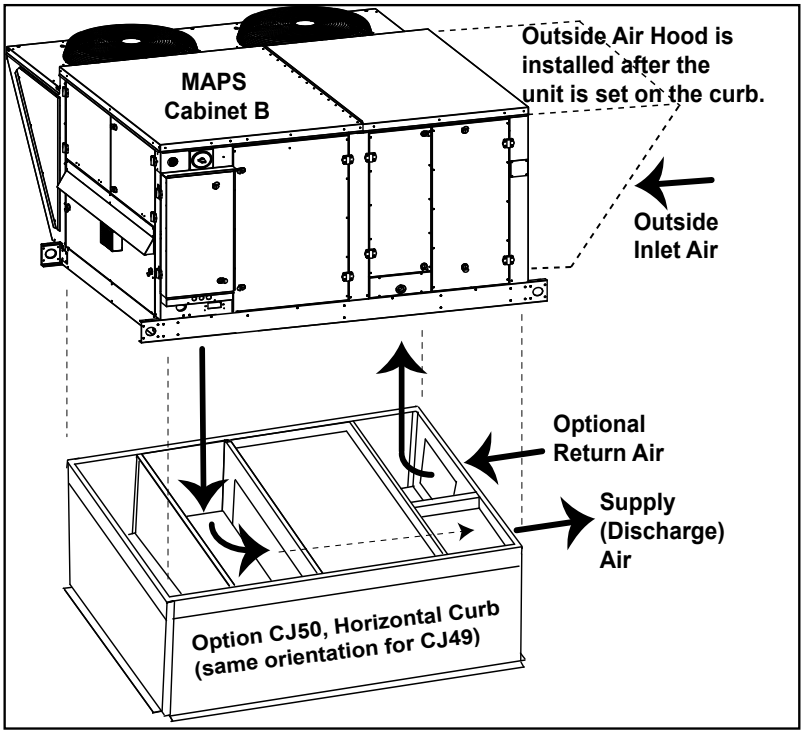
☐ If installing an Option JH duct furnace curb section, verify that sealant tape has been applied to all top surfaces of the curb. Verify the orientation so that the openings match. Set the duct furnace section on the roof curb before the unit.

☐ If setting on the roof curb or a duct furnace curb section, verify that sealant tape is applied to all top surfaces.

☐ IMPORTANT: Verify that the lift operator knows the correct placement of the unit so that the airflow orientation will be correct. When placing a unit on a horizontal flow curb, be sure the unit is being positioned as illustrated in **FIGURE 13**.

FIGURE 13 - Correct Orientation when Lifting to a Horizontal Curb is with the Inlet End of the MAPS® Unit at the Duct Connection End of the Roof Curb

NOTE: If the installation includes an energy recovery module, install the unit first, placing it in this same orientation on the end of the curb without the duct connections.

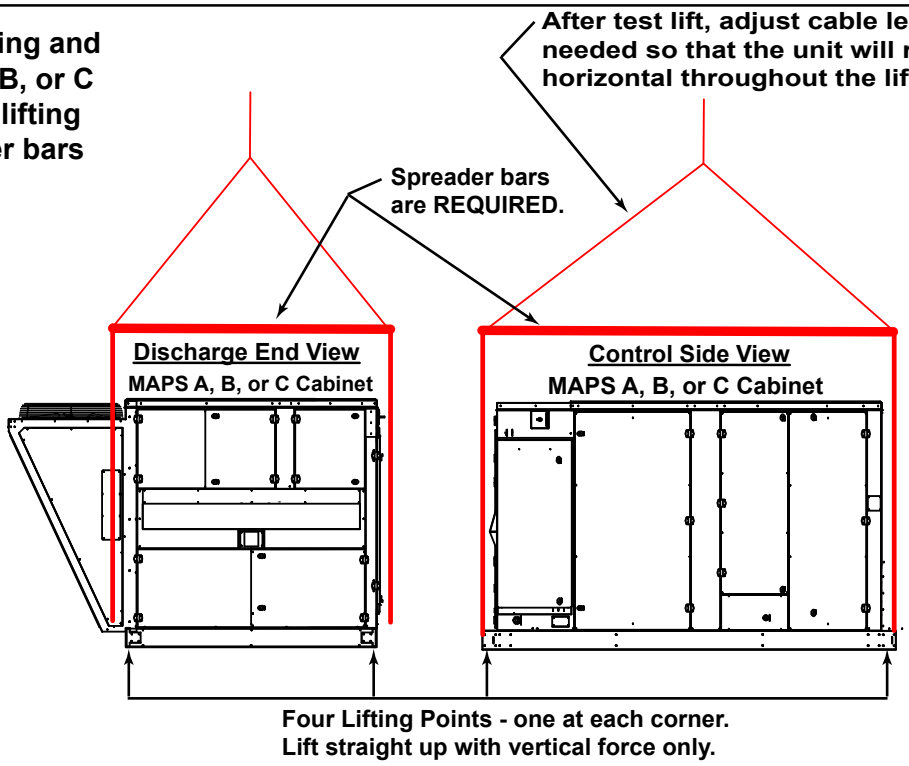


DANGER

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

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

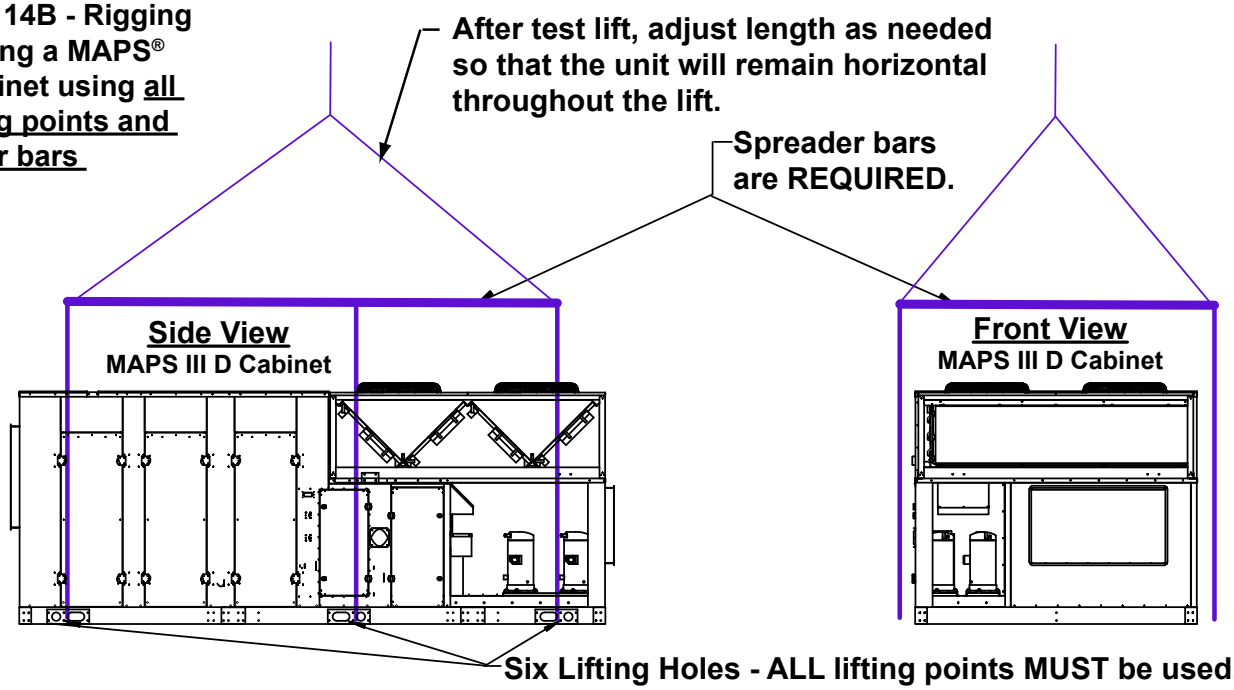
FIGURE 14A - Rigging and Lifting a MAPS® A, B, or C Cabinet using four lifting points and spreader bars



5.0 Mounting (cont'd)

5.5 Rigging and Lifting the MAPS® Units (cont'd)

FIGURE 14B - Rigging and Lifting a MAPS® "D" Cabinet using all six lifting points and spreader bars



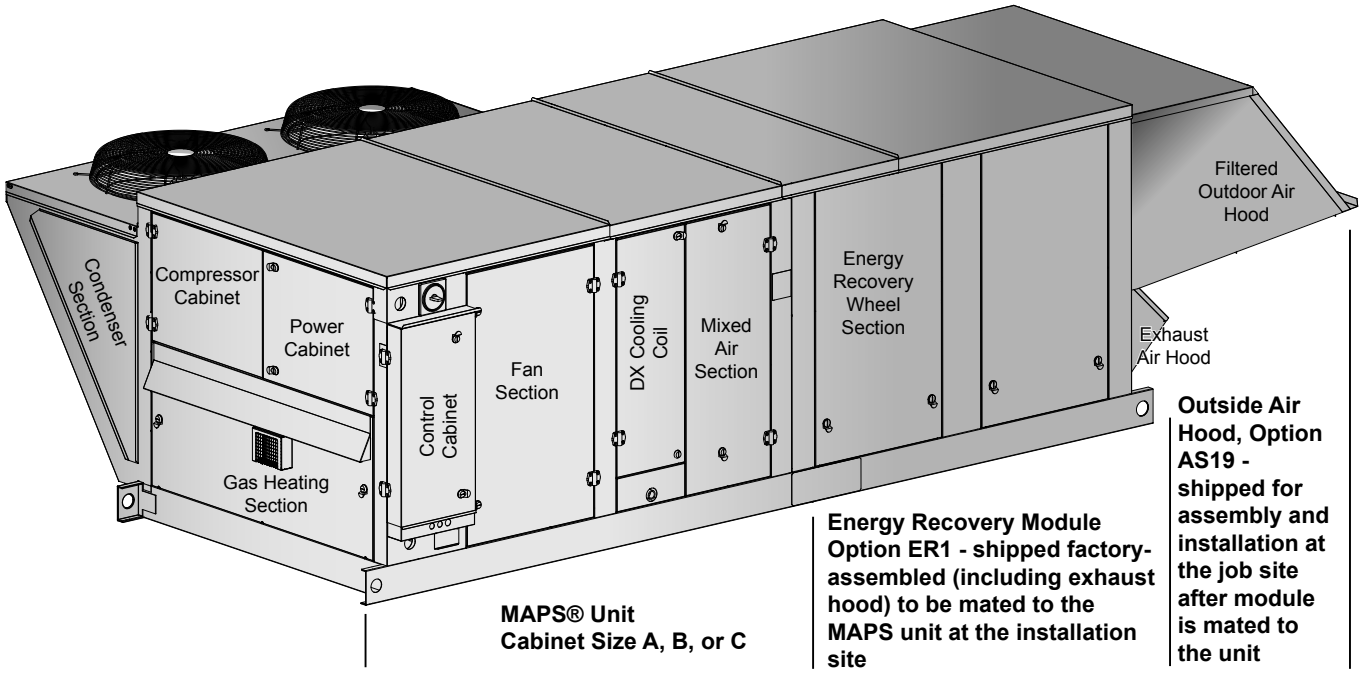
6.0 Mechanical

6.1 Energy Recovery Module (Option ER1) - A, B, and C

If ordered with an energy recovery module, the module is shipped separately and must be lifted separately and mated to the inlet side of the already mounted MAPS® unit. **Follow the lifting and mating instructions in the manual supplied with the energy recovery module (Form I-MAPS III&IV-ER)**.

NOTE: Control information is in Form CP-MAPS-D15/16 that was shipped with this manual.

FIGURE 15 - MAPS® Unit with Energy Recovery Module and Outside Air Hood Installed



6.2 Optional Power Exhaust or Gravity Exhaust Hood on MAPS® Cabinets A, B, C (without an energy recovery module)

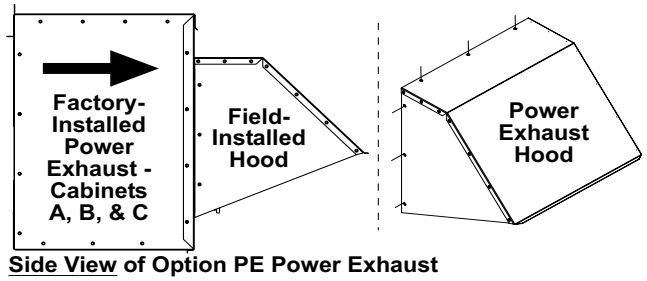
If ordered with Option PE, the system is factory equipped with a power exhaust for building air. The power exhaust blower, motor, and damper are assembled and at the factory. The power exhaust hood(s) is factory assembled and shipped in a separate carton to be installed at the site. To attach, slide 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, pages 71-72) 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 16A - Attaching Optional Exhaust Hood(s)

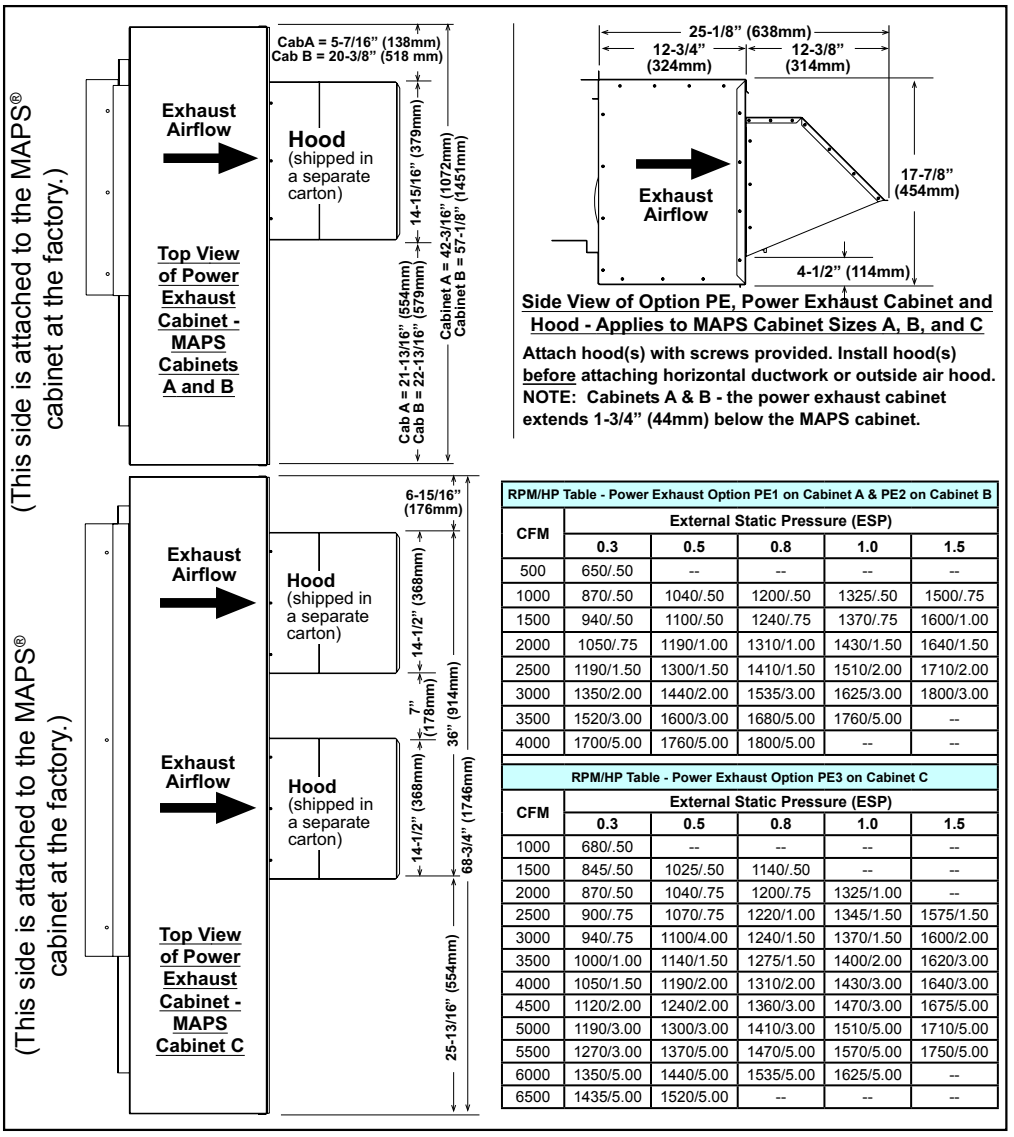
NOTE: Power exhaust hood is illustrated. Follow same procedure for gravity exhaust hood.



Side View of Option PE Power Exhaust Cabinet and field attached Hood

Depending on the size of the unit, one or two hoods with sheetmetal screws are shipped in separate cartons.
Slide the hood over the flange and attach across the top and on each side.
Attach the hood(s) BEFORE installing an outside airhood or horizontal ductwork.

FIGURE 16B - Optional Power Exhaust Dimensions



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

Attach hood(s) with screws provided. Install hood(s) before attaching horizontal ductwork or outside air hood.
NOTE: 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 & 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	--	--	--

6. Mechanical (cont'd)

NOTE: Other inlet air options may also require field installation. See Paragraph 9.1 for information on other optional inlet air accessories.

6.3 Outside Air Hoods

All inlet air hoods (Option AS16 or AS19) require field installation. Hood instructions differ for Cabinets A, B, C, and D. Follow the illustrated instructions that apply.

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 (either the MAPS® unit or an optional energy recovery module).

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.

6.3.1 Option AS16 or AS19, Inlet Air Hood for MAPS®III A, B, and C Cabinets

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.

NOTE: If equipped with a power exhaust option (Option PE), attach the power exhaust hoods **BEFORE** installing the inlet hood for outside air.

Refer to the illustration that applies:

Refer to FIGURE	Hood Option	MAPS® Size *	May be used with optional equipment::	
			Power Exhaust (PE)	Energy Recovery (ER1)
17A	AS16	A, B	no	no
17B	AS19	A	yes	yes
17C	AS19	B	yes	yes
17D	AS16	C	no	no
	AS19		yes	yes
* See Model Size/Cabinet Size cross-reference on pages 71-72.)				

Instructions (apply to all FIGURES 17A-D except where noted):

NOTE: 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.

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. **FIGURE 17C - 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.
   FIGURES 17A & 17D - Attach to the cabinet using the required number of **self-drilling screws**. Attach to both side panels with sheetmetal screws.
   FIGURES 17B & 17C - Attach to both side panels with sheetmetal screws.
6. **Install the Filter Assembly**
   FIGURE 17A, Cabinet Sizes A and B without a power exhaust option -
   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 17B & 17C, Cabinet Size A or B with a power exhaust option -
   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.

FIGURE 17A - 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, pages 71-72.)

Filter Sizes

Cabinet A - (4) 1x16x20

Cabinet B - (4) 1x16x25

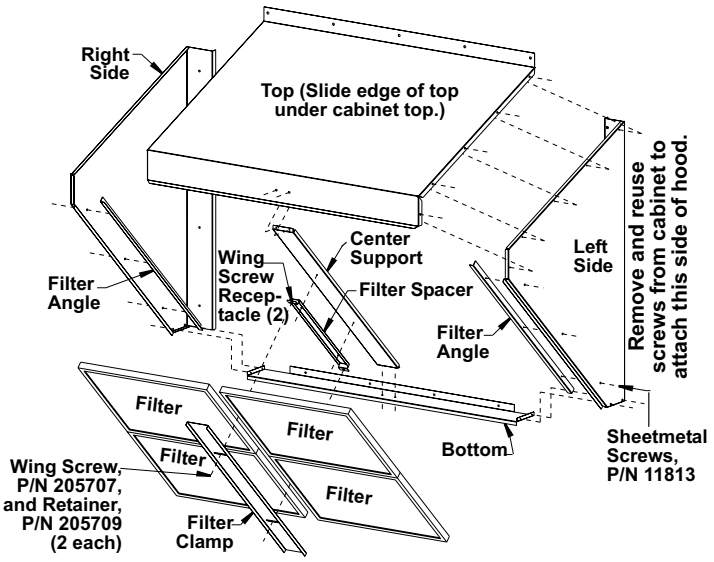


FIGURE 17B - Installation of Outside Air Hood, Option AS19, on Cabinet Size A with an optional power exhaust (Option PE1) (For a cross-reference of cabinet size and model size, refer to the Appendix, pages 71-72.)

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

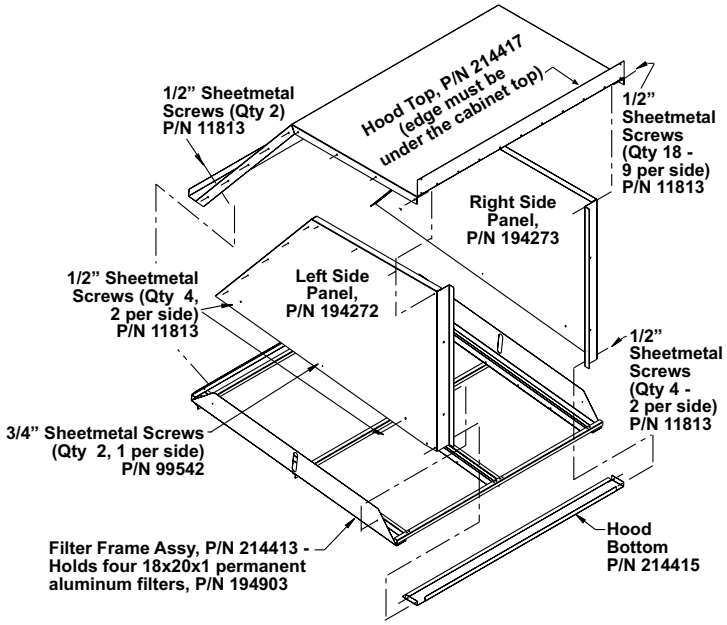
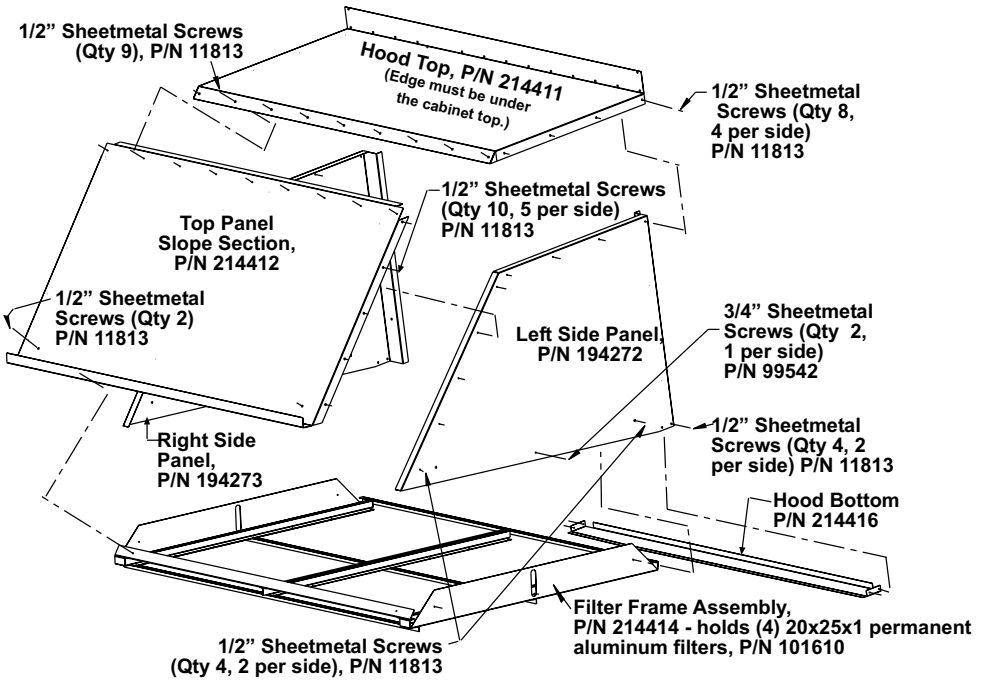


FIGURE 17C - Installation of Outside Air Hood, Option AS19, on Cabinet Size B with an optional power exhaust (Option PE2) (For a cross-reference of cabinet size and model size, refer to the Appendix, pages 71-72.)



6. Mechanical (cont'd)

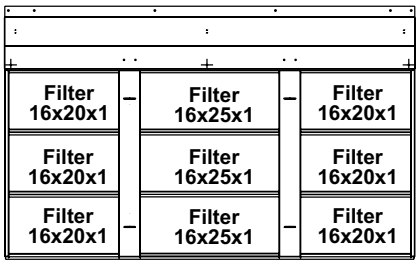
6.3 Outside Air Hood (cont'd)

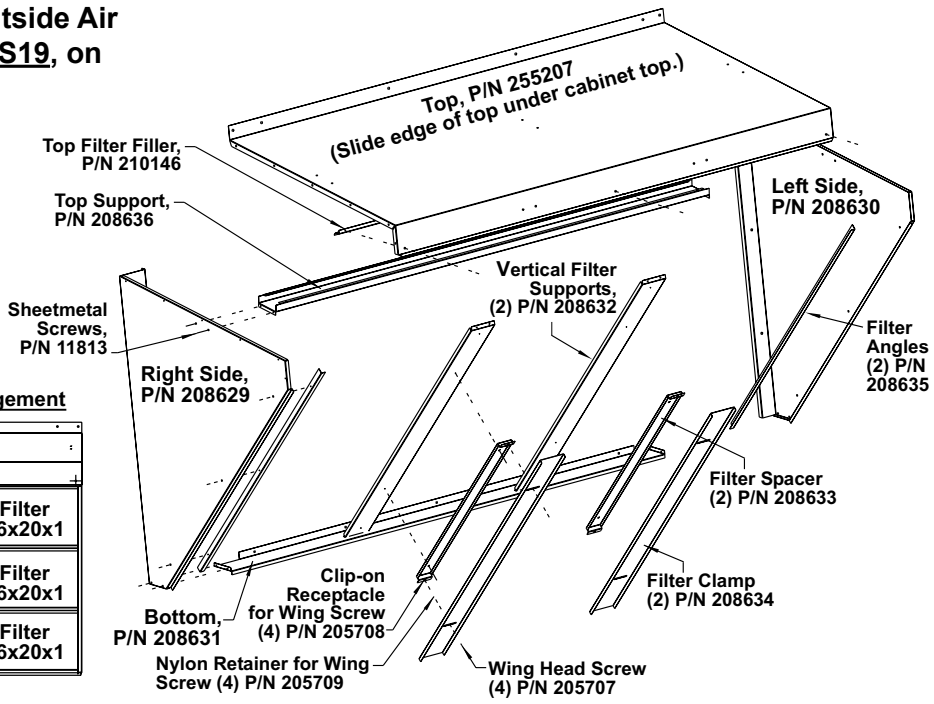
6.3.1 Air Hoods for MAPS®III A, B, & C Cabinets (cont'd)

FIGURE 17D - <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 17D - Installation of Outside Air Hood, <u>Option AS16 or Option AS19</u>, on MAPS®III Cabinet C Models

For a cross-reference of cabinet size and model size, refer to the Appendix, pages 71-72.)



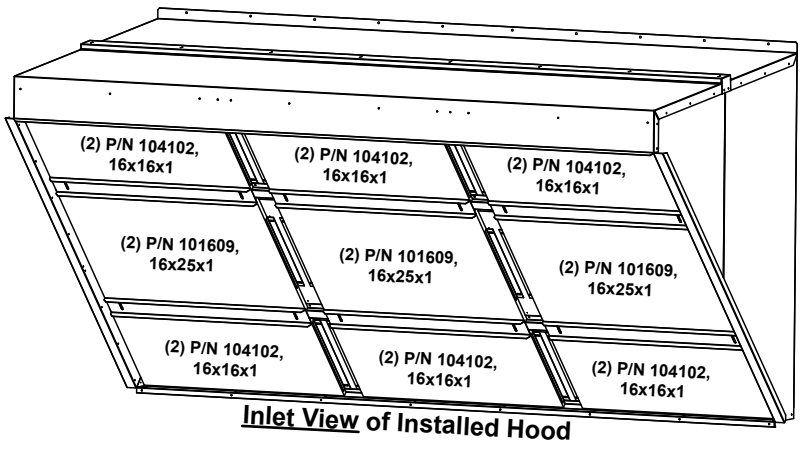


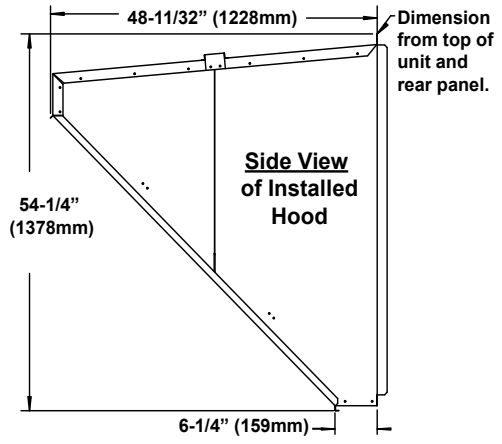
6.3.2 Option AS16, Inlet Air Hood for MAPS®III "D" Cabinet

Installation Instructions for Inlet Air Hood Option AS16 for D Cabinet Models

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. Due to the size, assembly and installation requires two persons.

FIGURE 18A - Assembled Inlet Air Hood, <u>Option AS16</u> for MAPS®III D Cabinet



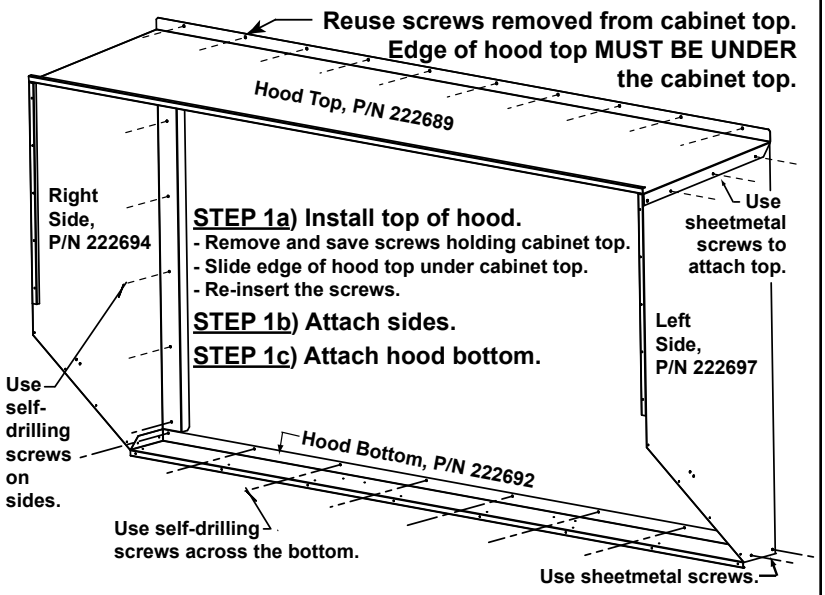


<u>Installation NOTES</u>:

- 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 matching holes are not provided.
- Follow STEPS in order.

Components by STEP (FIGURES 18A - 18D)			
Used in	Qty	Description	P/N
STEP 1a, FIGURE 18A	1	Top (Section 1)	222689
	6	Sheetmetal Screws	11813
STEP 1b, FIGURE 18A	1	Left Side (Section 1)	222697
	1	Right Side (Sctn 1)	222694
	12	Self-Drilling Screws	37661
STEP 1c, FIGURE 18A	1	Bottom	222692
	8	Self-Drilling Screws	37661
	4	Sheetmetal Screws	18113
STEP 2a, FIGURE 18B	1	Left Side (Section 2)	222696
	1	Right Side (Sctn 2)	222693
	10	Sheetmetal Screws	11813
		Silicone	53335
STEP 2b, FIGURE 18B	1	Top (Section 2)	222690
	10	Sheetmetal Screws	11813
STEP 2c, FIGURE 18B	1	Top Seal	222691
	20	Sheetmetal Screws	11813
		Silicone	53335
STEP 3a, FIGURE 18C	1	Top Filter Support	222701
	1	Top Filter Clip	222702
	16	Sheetmetal Screws	11813
STEP 3b, FIGURE 18C	1	Btm Filter Support	222703
	1	Bottom Filter Clip	222704
	16	Sheetmetal Screws	11813
STEP 3c, FIGURE 18C	1	Left Side Gutter	222698
	1	Right Side Gutter	222695
	18	Sheetmetal Screws	11813
STEP 3d, FIGURE 18C	2	Vertical Supports	222700
	8	Sheetmetal Screws	11813
STEP 3e, FIGURE 18C	2	Horizontal Supports	222699
	24	Sheetmetal Screws	11813
	12	Clip-on Receptacles	205708
STEP 4a, FIGURE 18D	12	Filter Stops	222705
	24	Sheetmetal Screws	11813
STEP 4b, FIGURE 18D	12	Filters, 16x16x1	104102
	6	Filters, 16x25x1	101609
	6	Filter Retainers	222706
	12	Wing Head Screws	205707
	12	Nylon Retainers	205709

FIGURE 18B - STEP 1, Install First Section



All screw ends (except some across the bottom) should be inside the air hood. The top and sides are in two sections; starting at the inlet air opening, follow the illustrated instructions.

1. Install First Section (FIGURE 18B)

a) Top Panel - Above the air inlet opening, remove and save the factory-installed screws attaching the system top. Slide the edge of 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.

b) Install First Section Side Panels - Position the hood side panel under and to the **inside** of the hood top panel. Attach the side panel to the system cabinet and to the hood top. Use the type of screws shown. (See note in **FIGURE 18A** about selection.) Screw ends should be inside the hood.

Repeat to install the other side of the hood.

c) Install Hood Bottom (FIGURE 18B) - Position and attach the bottom as illustrated. Use the type of screws shown.

2. Install the Second Section (FIGURE 18C)

a) Install Side Panels - Position one of the small side panels against the already installed side panel as illustrated. Remove the small panel and apply a bead of silicone **along the mating surface of the already installed** panel. Attach the second panel piece with sheetmetal screws.

Repeat to attach the other small side panel piece.

b) Install Top Panel - Position the hood top piece over the newly installed side panels. Attach to the side panels with sheetmetal screws.

c) Install Top Seal - Position the top seal over the seam in the top of the hood. Lift the seal and silicone along both sides of the seam so that the flanges of the top seal will be on the silicone. Attach the seal with sheetmetal screws.

3. Install the Filter Supports & Hood Gutters (FIGURE 18D)

a) Install Top Horizontal Filter Support and Clip - Position the top horizontal filter support inside the top edge of the hood. Line up the holes and attach with sheetmetal screws.

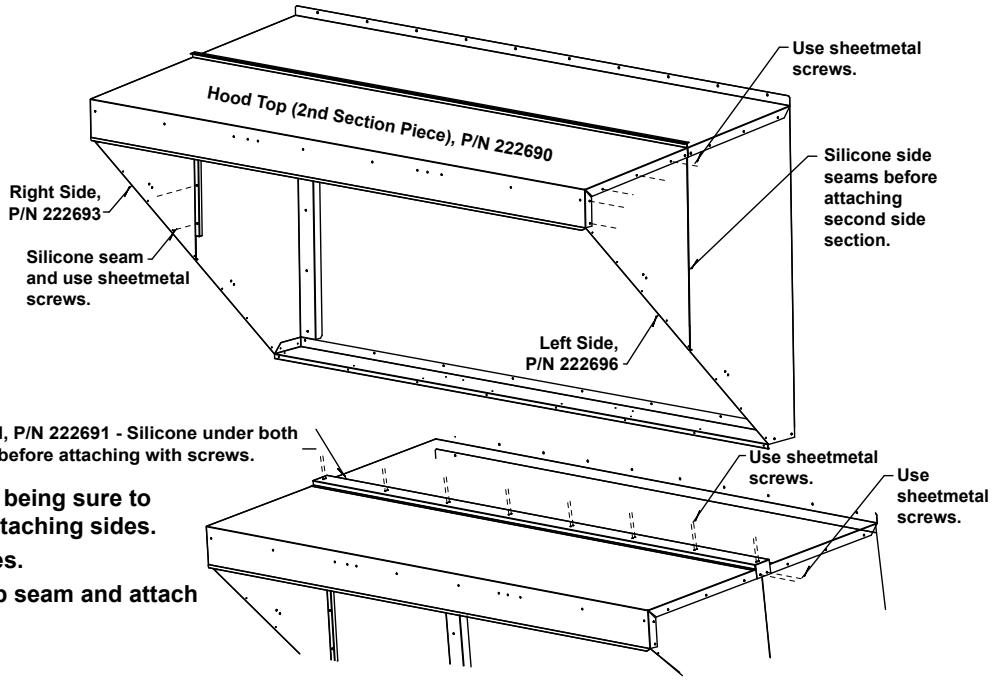
With the open side down, position the filter clip to the inside of the filter support. Line up the holes with the support and attach with sheetmetal screws.

b) Install Bottom Horizontal Filter Support and Clip - Position the bottom horizontal filter support on the bottom of the hood. Attach with sheetmetal screws

Position the filter clip on the filter support and attach with sheetmetal screws.

Installation Instructions for Inlet Air Hood Option AS16 for D Cabinet Models (cont'd)

FIGURE 18C - STEP 2, Install Second Section

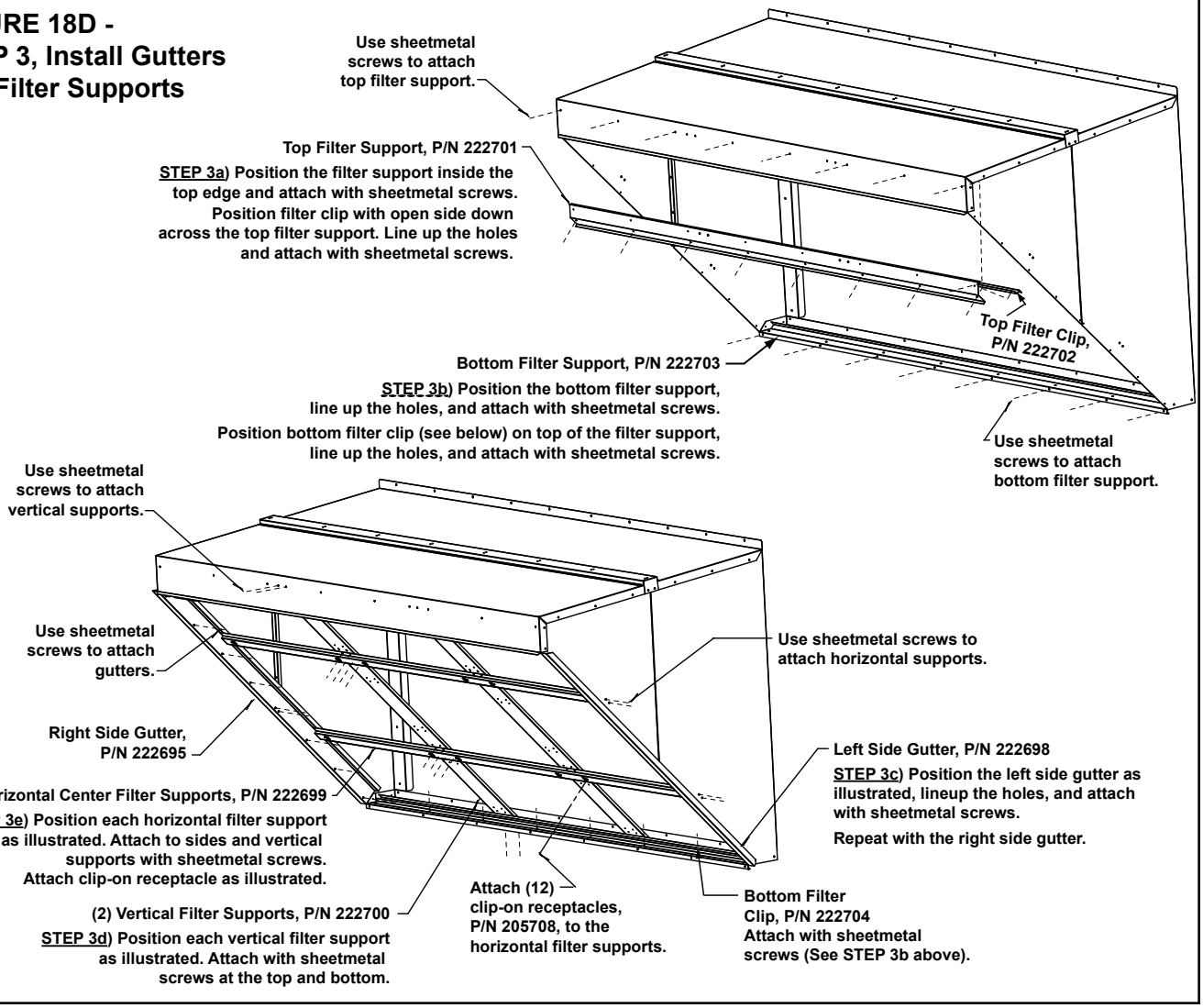


STEP 2a) Install both sides being sure to silicone before attaching sides.

STEP 2b) Attach top to sides.

STEP 2c) Silicone along top seam and attach top seal.

FIGURE 18D - STEP 3, Install Gutters and Filter Supports



c) Install Side Gutters - Position the left side gutter on the left side of the cabinet. Line up the holes and attach with sheetmetal screws. Repeat with the right side gutter.

d) Install Two Vertical Filter Supports - Position a vertical support as illustrated so that it is lined up with two holes in the top edge and two in the bottom. Attach with sheetmetal screws. Repeat with the second support.

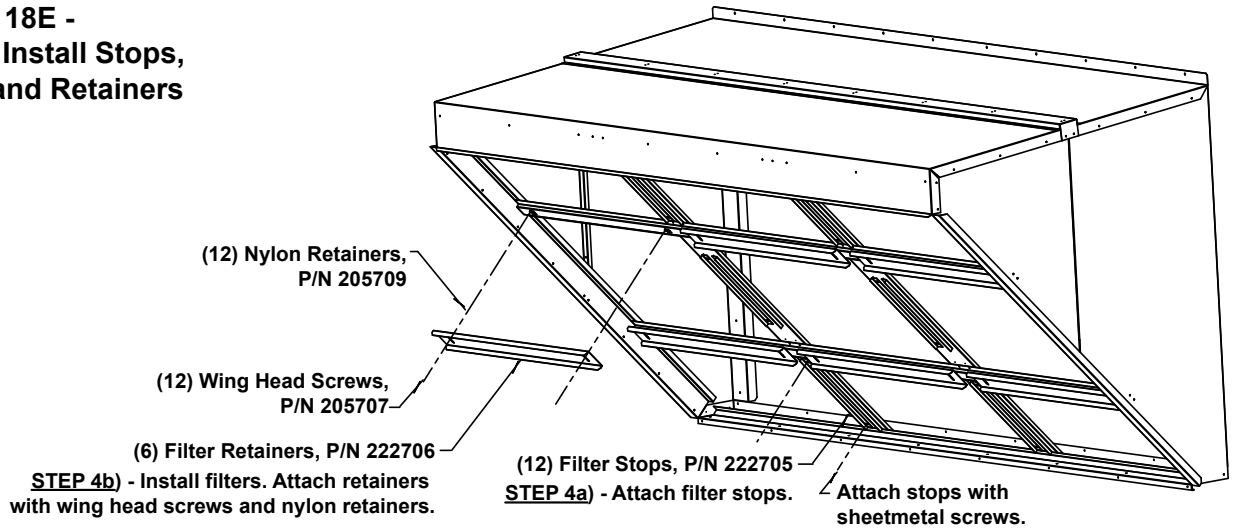
e) Install Two Horizontal Filter Supports - Position a horizontal support as illustrated so that it is lined up with two holes on each side. Attach to the sides and the gutters with sheetmetal screws. Where the horizontal support crosses the vertical supports, attach with sheetmetal screws. Repeat with the second horizontal filter support.

4. Install Filter Stops, Filters (not illustrated here; see FIGURE 18A), and Filter Retainers (FIGURE 18E)

a) Install 12 Filter Stops - Position the filter stops on the vertical supports. Attach filter stops with sheetmetal screws but do not tighten.

b) Install the 18 Filters and six Filter Retainers - Starting with either the bottom or the top row, position two filters in an opening, adjust stop, remove filters, tighten stop, and return filters to position. Holding filters in place, use nylon retainers, wing head screws, and the clip-on retainers installed in **STEP 3E** to secure the filter retainer. Install the other filters in that row. Install the other two rows of filters and their retainers.

FIGURE 18E - STEP 4, Install Stops, Filters, and Retainers



6.4 Duct Connections and Ductwork

NOTE: If installing MAPS® unit with electric heat (Model RECB, REDB, RECC, or REDC), see Paragraph 8.1.1 about placement of discharge air sensor.

Requirements and Suggestions for Installing Ducts

Duct connections for MAPS® units are in the roof curb designed for the unit, See Paragraph 5.4 for duct connection sizes. Downflow roof curbs are designed for installing ductwork from the top before setting the unit on the curb.

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.

- **Type of Ductwork** - The type of duct installation to be used depends in part on the 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.

6.0 Mechanical (cont'd)

6.4 Duct Connections and Ductwork (cont'd)

- **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.

6.5 Condensate Drains

NOTE: Do not reduce the diameter of the condensate drain piping.

All systems require a condensate drain on the cooling section and all "D" cabinet models with gas heat require a drain on the heat section.

ALL Models - A slide-out, removable drain pan with a 1 or 1-1/2" male NPT condensate drain connection is located below the coil cabinet. 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.

D Cabinet Models RDDB and RDCB - Below the gas heat section that is closest to the blower, there is 1/2" male NPT connection for a condensate drain line.

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

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

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

Condensate Drain Trap

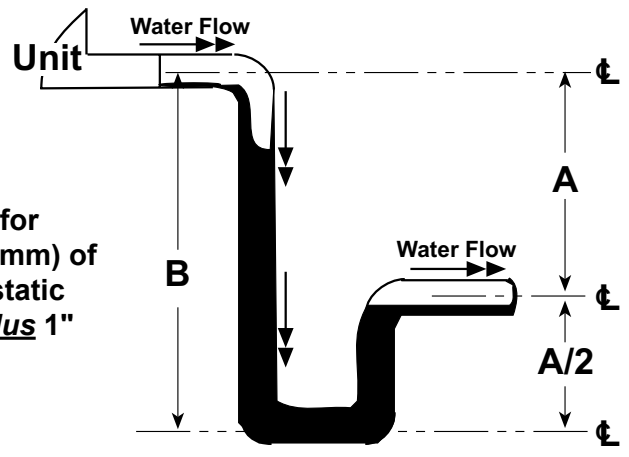
The design of the drain trap is important. Since the condensate drain pan is on the blower inlet side, there is a negative pressure at the drain relative to the ambient. The trap height must account for this static pressure difference. Maximum negative static can be determined by reading the negative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

If dimension "B" in **FIGURE 19A** 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 19A** illustrates the appropriate dimensions for trapping a negative pressure system.

FIGURE 19A - Condensate Drain Trap Dimensions

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

B = A + A/2



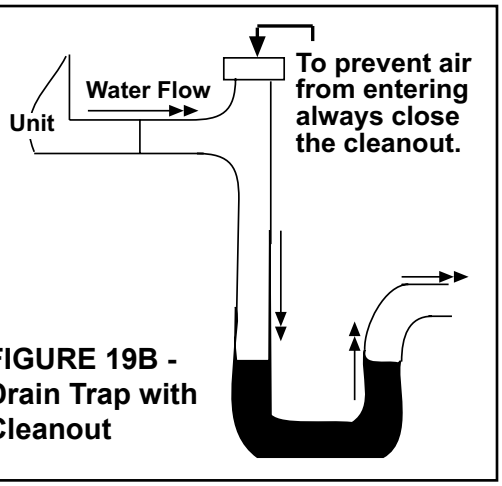


FIGURE 19B - Drain Trap with Cleanout

Improper trap design accounts for some condensate drainage system failures, but incorrect use and maintenance of condensate drain trap 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 trap. The trap must be cleaned regularly to avoid blockage that can slow or stop water flow, resulting in backup into the system.

If drain has a cleanout opening (**FIGURE 19B**), 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 contaminants. Inspect condensate drain pan, trap, and piping; fill trap 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 trap and drain to prevent freeze damage. If local building codes permit, trap 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).

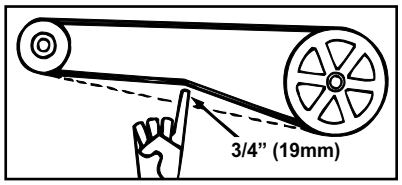
Year Round Usage - Climates or applications with cooling requirements year round require more frequent inspections of the cooling coil cabinet and condensate drains. Depending on climate, freeze protection of the trap may be required during non-cooling days.

6.6 Blowers, Belts, and Drives

6.6.1 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.

FIGURE 20 - Belt Tension



NOTE: The information in Paragraph 6.6 also applies to an optional power exhaust blower.

Linked Belts - 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. (**NOTE**: After "24-hour run" tension adjustment, required maintenance adjustment may be by removing links or turning the adjusting screw on the motor base as required to achieve proper tension. Replace worn links or belts.)

Solid Belts - Adjust the belt tension by turning the adjusting screw on the motor base until the belt can be depressed 3/4" (19mm). (See **FIGURE 20**.) After correct tension is achieved, re-tighten the locknut on the adjustment screw. Be sure that the belt is aligned in the pulleys.

WARNING

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

Pulley/Shaft Setscrews - Wrench torque 110 in-lb minimum to 130 in-lb maximum.
Bearing Hub - Socket size 5/16"; Torque 165 in-lbs.

6.6.2 Adjusting Blower Speed

The blower speed may be adjusted to achieve the desired air volume, as long as the adjustment is within the temperature rise and the static pressure limits shown on the rating plate for both heating and cooling. 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 an excess air volume, which can cause 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.

At final adjustment, amperes should not exceed motor nameplate amp rating. With a gas heat section, the installation must be adjusted to obtain a temperature rise within the range specified on the furnace rating plate. Maximum temperature rise for this unit is 100°F.

6.6 Blowers, Belts, and Drives (cont'd)

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

The belt drive on these units is equipped with an adjustable pulley which permits adjustment of the 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 following the appropriate instructions in Paragraph 6.6.1. 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.

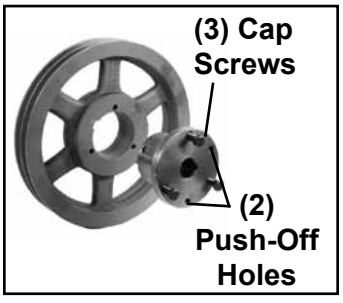
For units with 5 HP and larger motor, follow these instructions for adjusting RPM:

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 20**.) 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. 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 21 - Split Taper Bushing



6.6.3 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 21**.)

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.

6.6.4 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® Cabinet ABC or O-MAPS® Cabinet D for maintenance instructions.

6.6.5 Blower Rotation - Cabinets A, B, C

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.

6.6.6 Optional Variable Frequency Drive and Controls

When an optional variable frequency drive is ordered, the motor will operate on varying speeds as determined by the electrical frequency. The drive requires remote field installation. The minimum ambient temperature for installing a VFD is 18°F (-8°C). Maximum distance of the VFD from the unit is 50 ft (15M). Follow the manufacturer's instructions included with the package and the system wiring diagram. (**NOTE:** If specific wiring for desired VFD operation was not requested on the order, the VFD wiring on the system wiring diagram is for two speed.)

Depending on which control (Option VFC) was selected, the variable frequency drive is controlled by a wall-mounted two or three speed control, by duct or building static pressure, or by a space CO2 monitor. See control information in Paragraph 8.2.

Generally, high speed is used for cooling and low speed for heating. Minimum high speed is 60 Hertz. Maximum speed for low speed heating is the frequency that will provide the maximum temperature rise of the heater. Maximum allowable temperature rise for a MAPS® gas heat section is 100°F.

Follow the variable frequency controller manufacturer's instructions to program the variable frequency drive settings.

The formula for motor speed is N = 120 x f/p where N is speed; f is frequency; and p is number of poles (3600 RPM motor has 2 poles; an 1800 RPM motor has 4 poles).

Example: 1800 RPM motor on 60Hz; N = 120 x 60/4 = 1800
1800 is synchronous speed; assume 2% slip. Motor will run between 1750 and 1790 RPM at full load depending on design. Run the same motor at 45Hz (120 x 45/4 = 1350). 1350 RPM less 2% slip equals about 1300 RPM.

7.0 Electrical and Wiring

7.1 General

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.

7.2 Supply Wiring

Check the rating plate for the supply voltage and current requirements. Run a separate line voltage supply directly from the main electrical panel, making connection at the disconnect switch.

7.2.1 Disconnect Switch

The system may be factory equipped with a built-in non-fusible, lockable disconnect switch. The built-in disconnect switch (Option BA6) requires copper wiring with ampacity based on 75°C maximum temperature rating at the line side terminals.

If the system does not have a built-in disconnect switch, a field-provided or optional shipped-separate, wall-mounted disconnect switch is required. It is recommended that there is at least four feet (1.2M) of service room between the switch and system access panels. All external wiring must be within approved conduit and have a minimum temperature rise rating of 60°C. Run conduit so that it does not interfere with the system access panels. See **FIGURE 3A or 3B** on pages 7-8, for location of supply wiring entrance. When providing or replacing fuses in a fusible disconnect, use dual element time delay fuses and size according to the rating plate.

WARNING

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

7.0 Electrical and Wiring (cont'd)

7.2 Supply Wiring (cont'd)

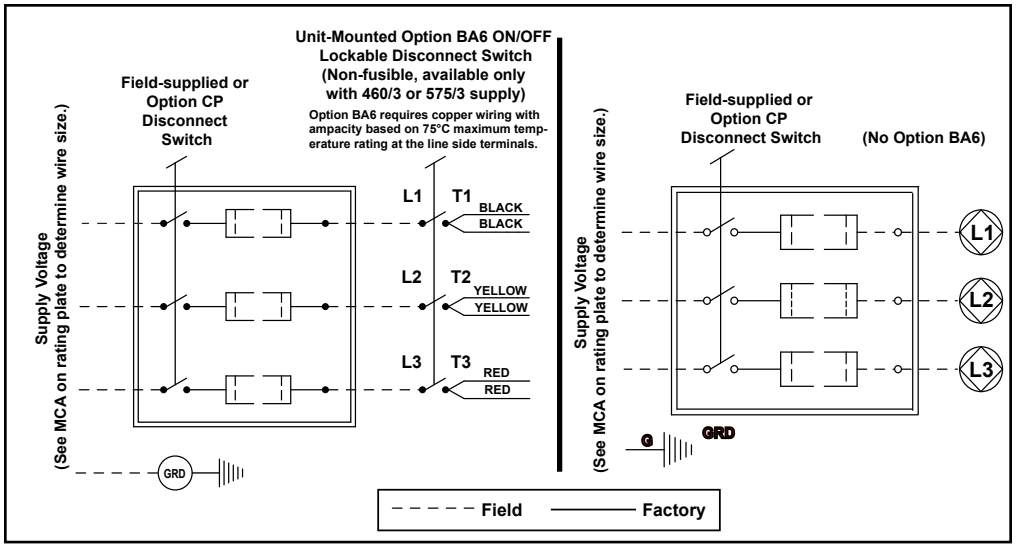


FIGURE 22 - Disconnect Wiring Connections

WARNING

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

7.2.2 Supply Voltage

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

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

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

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

Follow instructions below to check.

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

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

NOTE: If the unit is equipped with Option PL4, an over/under voltage protection device, the unit will shut down on an over or under voltage supply condition and also if there is a phase loss. This is an auto reset device and will reset when the power condition is corrected.

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

Optional Voltage Protection, Option PL4 - If the system was ordered with Option PL4 (identified on the wiring diagram), it will have a factory-installed redundant phase loss/reversal and over/under voltage monitor. The monitor will cause the controller to shut down the unit until the power condition is corrected. It is an automatic reset device.

7.2.3 3-Phase Wiring Check

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

Before initial startup, connect refrigerant pressure gauges to the compressor suction and discharge lines. At startup, observe the gauges. **If the suction pressure rises and discharge pressure drops, the compressor is operating in reverse and should be shut down.** (After several minutes of operation in reverse, the compressor's internal protector will trip. If compressors are repeatedly allowed to restart and run in reverse, the compressors will be permanently damaged.) **Turn off the power. At the incoming power connection, switch the 3-phase line voltage wiring connections before restarting the unit. Recheck the pressure gauges.**

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

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

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

Keep the wiring diagram and all manuals for future reference

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

Optional Convenience Outlet, Option BC2 - If the system was ordered with this option, it will have an external weatherproof, factory-installed 115V outlet with ground fault protection. This outlet requires a separate 115 volt power supply.

7.4 Control Wiring

The unit is equipped with a low voltage (24V) control circuit. 24V wires enter the cabinet near the line voltage entrance and must be routed over to the low voltage compartment. Connections are made at the low voltage terminal blocks.

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

Refer to the wiring diagram for wiring connections. Refer to the chart for control wire gauge and length requirements.

Digital Control Wiring

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 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 digital control 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.

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

Refer to the wiring diagram for making wiring connections.

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.

7.0 Electrical and Wiring (cont'd)

7.6 Condenser Fan Motors and Fans

All condenser fan motors are direct-drive, statically and dynamically balanced, and permanently lubricated. Condenser fan motors are open dripproof motors with external sling protection against water penetration and have auto reset thermal overload protection.

Area above the fans should always be unrestricted and open.

Condenser Fan Control

1. The unit has a maximum of four condenser fans.
2. The condenser fans are electrically tied to the compressors.
3. The condenser fans on "D" Cabinet systems are grouped into two banks.

7.7 Compressors

All of the compressors are high efficiency hermetic scroll type designed for use with R-410A refrigerant. Circuit A, B, C, and D cooling compressors are in the Compressor Section. Circuit E or Dh compressor (reheat) is located in the cabinet filter section.

Compressor Amps/ Voltage

Compressor Model	ARI Tonnage	208 V		230 V		460 V		575 V	
		RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA
ZP24K5E	2	9.6	58.0	9.6	58.0	5.1	28.0	3.3	23.7
ZP36K5E	3	13.5	88.0	13.5	88.0	6.0	44.0	4.9	34.0
ZP54K5E	4.5	15.6	110	15.6	110	7.8	52	5.8	38.9
ZP57K3E	5	20.5	155	20.5	155	9.6	75	7.6	54
ZP61KCE	5	19.0	123	19.0	123	9.7	62	7.4	50
ZPD61KCE	5	20.4	156	20.4	156	9.7	62	7.4	50
ZP72KCE	6	23.2	164	23.2	164	11.2	75	7.9	54
ZP83KCE	7	25.0	164	25.0	164	12.2	100	9.0	78
ZPD83KCE	7	24.0	187	24.0	187	12.6	100	9.9	78
ZP120KCE	10	33.3	239	33.3	239	17.9	125	12.8	80
ZP137KCE	11	48.1	245	48.1	245	18.6	125	14.7	100
ZPD137KCE	11.4	48.1	245	48.1	245	18.6	125	14.7	100
ZPT144KCE	12T	23.2	164	23.2	164	11.2	75	7.9	54
ZP154KCE	12	51.3	300	51.3	300	23.1	150	19.9	109
ZPDT14MCE	12	46.4	164	46.4	164	22.4	75	15.8	54
ZP182KCE	15	55.8	340	55.8	340	26.9	173	23.7	132

(For additional information, refer to the Operation/ Maintenance/Service Manual, either Form O-MAPS Cabinets A/B/C or Form O-MAPS Cabinet D)

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

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

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

Compressor Staging (RCB, RDB, RDCB, RDDB, RECB. REDB) - Each system leaves the factory with the compressor staging sequence set. The compressor will start based upon a call for cooling to maintain the discharge air temperature setpoint. There is a minimum 240 second ON and OFF time for each stage (not compressor).

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

For additional information about compressor operation, see the Operation/Maintenance/Service Manual.

Optional Hot Gas Bypass

If ordered with Option AUC9, the bypass valve will provide expanded compressor modulation at low outside air temperatures by allowing some of the gas from the suction line to be re-routed directly to the evaporator coil. With Option AUC9, at least one circuit per stage has a hot gas bypass valve.

Hot gas bypass valves are factory set. However, the factory setting should be checked at startup. To check the valve operation and/or make field adjustments, it is necessary to simulate a light load condition as described below.

FIGURE 23 - Optional Hot Gas Bypass Valve

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

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

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

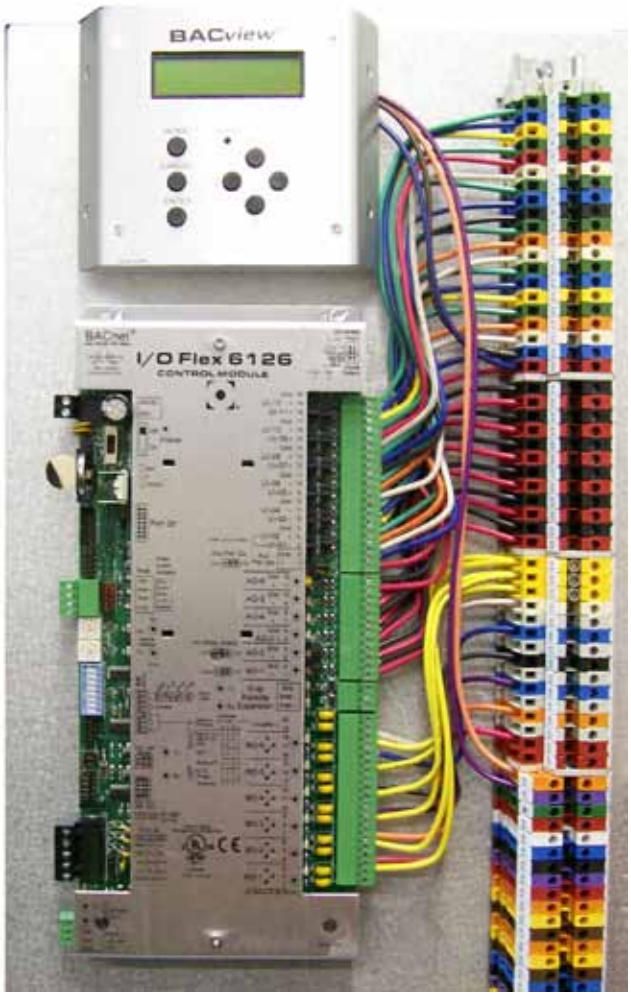
Modulating Reheat, Option AUR1

With modulating reheat, a sensor monitors the air temperature as it leaves the reheat coil. Based on a potentiometer setpoint and the sensor signal, the board will open or close a refrigerant bypass valve. Changing the amount of refrigerant hot gas being added to the refrigerant liquid before it enters the pre-cool coil will “modulate” the function of the pre-cool and reheat coils to provide the desired leaving air temperature.

8.0 Controls

8.1 Cooling/Dehumidification/Heating Control

FIGURE 24 - Controller and BacView Display in Electrical Compartment



NOTE: See control details and instructions in Form CP-MAPS-D15/D16 included with the unit and available at www.RezSpec.com.

All systems have a unit-mounted, IQ controller that is programmed to control cooling, dehumidification, and/or heating based on discharge air temperature, outdoor air temperature, dewpoint, and/or enthalpy depending on which Model and options were ordered. The system control option is identified as either Option D15, programmed for neutral air/discharge air control, or Option D16, programmed for space control with discharge air reset.

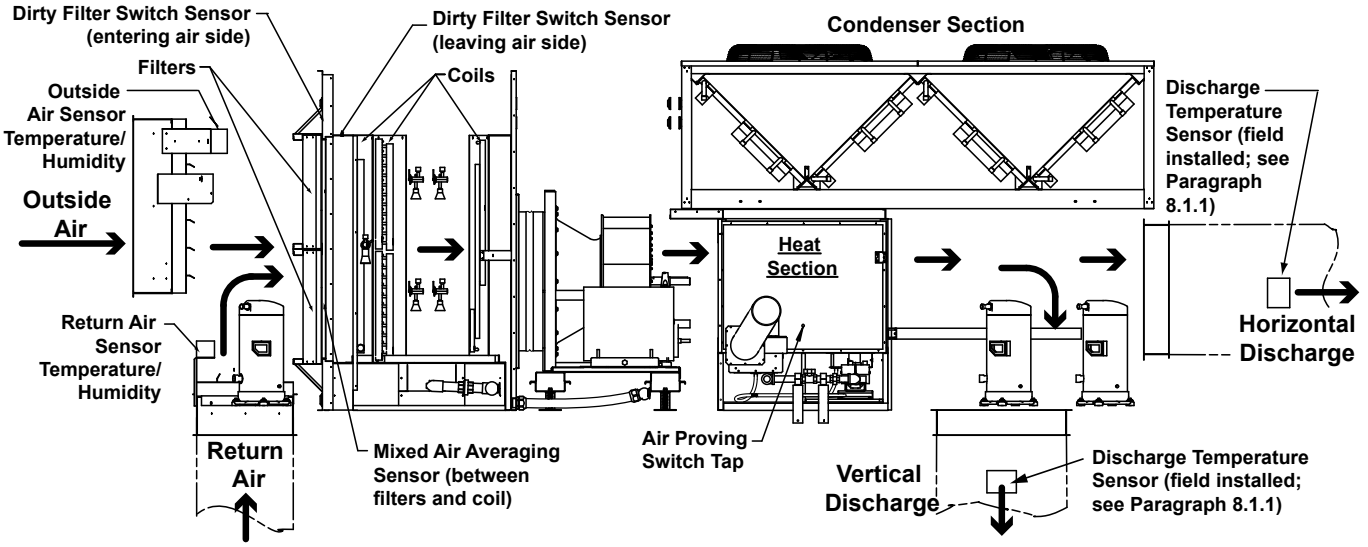
The integrated LCD display (*BACview) will show the current discharge air temperature, outdoor air temperature, dewpoint, and enthalpy; which outputs are enabled; and the mode of operation. The control allows the user to change setpoints, change prop bands, and adjust the time clock.

Control Option D16 will also have a wall temperature sensor. If ordered as Option CL77 with Option D15, it will also have a wall temperature sensor. Or, if ordered with Option RB4, there is a handheld display/control module with most of the same functions as the unit-mounted display.

A brief description of control functions follows in this section. For additional information and to make adjustments, see the more detailed control instructions in Form CP-MAPS D15/D16.

The IQ controller has an integral time clock for occupied/unoccupied modes and supports BACnet (over MSTP or ARCnet) and LonWorks protocols. The control also provides or monitors the air proving switch, low limit protection, anti-cycle protection, minimum on/off times, phase loss protection, optional dirty filter sensor, gas valve modulation on systems with a gas heat section, and electric staging on systems with electric heat.

FIGURE 25 - Airflow and Sensor (std & some optional) Locations - D Cabinet illustrated



8.1.1 Instructions for Installing Discharge Air Sensor in the Ductwork

FIGURE 26 - Discharge Air Temperature Sensor Probe and Weatherproof Box, P/N 222753

The discharge air temperature sensor (See **FIGURE 26.**) is shipped with every unit and must be field installed in the ductwork. The location and position of the sensor are important. Follow the instructions below.

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.** The position of the sensor in the duct is also important. In horizontal ductwork, locate the sensor assembly in the top, middle of the duct with the sensor probe extending vertically down into the center of the airstream.

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

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

4. **Run the sensor wire to the unit.** Use field-supplied 2 to 3 pair of 16 to 22 ga wire. Digital control inputs are low-current, resistance-based signals. For optimum temperature control performance, it is recommended that the sensor inputs (zone

Maximum Sensor Wire Length for less than 1°F Signal Error		
Wire Gauge	Maximum Sensor Wire Length	
AWG	Feet	Meters
16	500	152
18	310	94
20	200	61
22	124	38

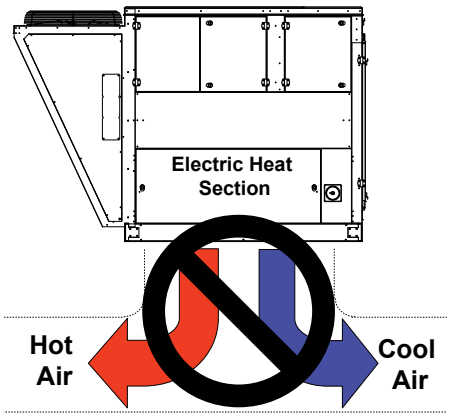
sensors, discharge air sensors, etc.) that are connected to the controller be routed to the unit in one of the following manners:

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

FIGURE 27 - Sensor Location for Units with an Electric Heat Section with Stage Control

Specific requirements for locating discharge air sensor on electric heat models:

If a Model RECB, REDB, RECC, with multi-stage control is installed in a system with immediate "T" configuration ductwork leaving the discharge, heat staging 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.



8.1.2 Optional Unit Monitoring Sensors

In addition to the standard sensors, the unit may be equipped with the following optional unit monitoring sensors: Most are factory installed but some require field installation. Follow the sensor wiring requirements above for wiring field-installed sensors.

Senses	Option	Components	Installation and Function
Evaporator Coil Temperature	**BE9**	Sensor, P/N 223111	Factory installed sensor to monitor and control the temperature of the air as it exits from passing through the evaporator coil.
Mixed Air Temperature	**BE10**	Sensor, P/N 223111	Factory installed sensor between the filters and the evaporator coil to monitor the temperature of the "mixed air" entering from both outside and through the return air opening.
Duct Static Pressure	**BE11**	Transducer, P/N 234818; sensor port, P/N 234821	Factory installed transducer to monitor duct pressure. Requires field installation of pickup and tubing in the supply duct. See instructions below.
Building Static Pressure	**BE12**	Transducer, P/N 234819	Factory installed transducer to monitor building pressure. Requires field installation of field-supplied pickup(s) and tubing. See instructions below.
Return Air Temperature	**BE13**	Sensor, P/N 222753	Field installed in the return air duct to monitor the temperature of return air entering the unit.
Return Air Humidity	**BE14**	Sensor, P/N 234907	Field installed to monitor the humidity of return air entering the unit.
Space CO_2, Range 0 TO 2000 ppm	**BE15**	Sensor, P/N 234820,	Field installed in the building to monitor the carbon dioxide level. See instructions below and in the sensor manufacturer's form.
Filter Pressure	**BE16**	Sensor, P/N 255784	Factory installed photohelic pressure sensor monitors pressure through the filters and send a signal to the IQ Controller.
Duct Smoke Detector	**BE17**	Smoke Detector, P/N 159553	Field installed photohelic smoke detector in the supply ductwork. See instructions below and in the manufacturer's installation form.
Filter Pressure	**BE16**	Pressure Switch, P/N 105507	Factory installed pressure switch monitors pressure drop through the filters and sends signal to I/Q Controller.

Instructions for Field-Installed Sensors in Table above

Option BE11, Duct Static Pressure Sensor

The differential pressure transducer (**P/N 234818**) used in Option BE11 is mounted in the low voltage compartment. A data sensor port is shipped loose to be attached to the side of the ductwork. To install the duct sensor port, locate a position about 2/3 the distance of the duct run (minimum of 10 duct lengths). Drill a hole in the side of the duct, insert the sensor tube and attach with four sheetmetal screws. The transducer has a high and a low tubing port. The low tubing port will remain open to measure atmospheric pressure. Connect 1/4" field-supplied tubing to the high pressure port and to the field-installed sensor port. The transducer has a range of 0 to 2.5" w.c. and was calibrated at the factory; it should not need field adjustment. Refer to the manufacturer's instructions in the owner's envelope for additional information.

8.0 Controls (cont'd)

8.1 Cooling/ Dehumidification/Heating Control (cont'd)

FIGURE 28A - Tubing Ports on the Transducer in Option BE11 and Ductwork Sensor Port

High Pressure Port - Attach tubing.

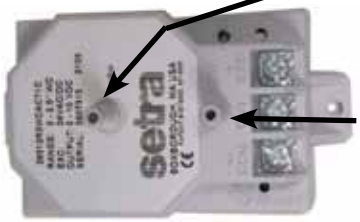
Low Pressure Port - Leave open. or attach tubing.

High Pressure Data Sensor Port - Attach to ductwork. Slide tubing on barb.

Option BE12, Building Static Pressure Sensor

The differential pressure transducer (**P/N 234819**) used in Option BE12 is mounted in the low voltage compartment. The transducer has a high and a low tubing port. Depending on the application, attach tubing to both ports or leave one open to atmospheric pressure. Connect 1/4" field-supplied tubing to the port(s) and run it to the pressure reference point(s). Cut the end of the tubing at a 45° angle to minimize the affect of air movement and attach it to a wall or in a ceiling. The transducer has a range of -0.5 to .5" w.c. and was calibrated at the factory; it should not need field adjustment. Refer to the manufacturer's instructions in the owner's envelope for additional information.

FIGURE 28B - Tubing Ports on Option BE12, Building Static Pressure Sensor



High Pressure Port - Connect to the high pressure reference point.

Low Pressure Port - Connect to the low pressure reference point.

FIGURE 28C - Return Air Temperature Sensor, P/N 222753

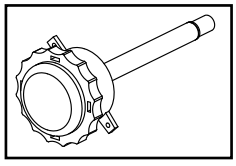
Option BE13, Return Air Temperature Sensor

The return air temperature sensor (**P/N 222753**) is shipped loose for field installation in the return air ductwork. The position of the sensor is important. In a horizontal return air ductwork, locate the sensor assembly in the top, middle of the duct with the sensor probe extending vertically down into the center of the airstream. In vertical return air ductwork, locate the sensor assembly in the middle of the side of the duct that corresponds with the middle of the discharge outlet.

Mark the location and drill a 7/16" hole. Insert the probe in the hole. With the probe centered in the hole, attach with two #8 sheetmetal screws. Be sure the hole is sealed.

Refer to Paragraph 8.1.1 and follow the same guidelines for the sensor wire. Wires will attach to the sensor and to the controller expansion board. Refer to the unit wiring diagram.

FIGURE 28D - Return Air Humidity Sensor, P/N 234907



Option BE14, Return Air Humidity Sensor

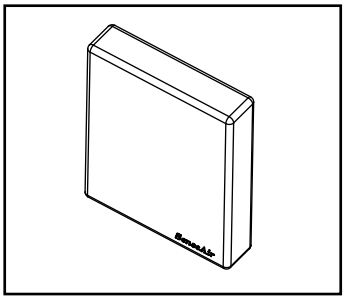
The return air humidity sensor (**P/N 234907**) is shipped loose for field installation in the return air ductwork. The sensor must be located away from areas of excessive moisture, corrosive fumes, vibration, or extremely high temperature.

To install, mark the selected location and drill a 3/4" hole. Insert the stainless steel probe into the hole until the foam is in direct contact with the duct. Attach the RH transmitter using two #8 x 3/4" self-tapping screws.

Follow the requirements in Paragraph 8.1.1 to run the sensor wire. To connect the wire to the sensor, remove the cover and install conduit connectors.

Wires will connect to the controller expansion board. Refer to the unit wiring diagram.

FIGURE 28E - CO2 Sensor, P/N 234820



Option BE15, Building CO_2 Sensor

The sensor (**P/N 234820**) used in Option BE15 must be field mounted in the building and electrically connected to the I/Q controller expansion board (Option BHB6). Follow the manufacturer's instructions to mount the sensor. Connect the wires as instructed below. Power supply must be connected to +~ and ⏚

Sensor Terminal	Function	Electrical Data	Remarks / Standard Settings
+~	Power (+)	24 VAC/DC+ (±10%), 2W	System voltage reference
⏚	Power ground (-)	24 VAC/DC -	
OUT 1	Analogue output 1 (+)	0-10 VDC	0-2000 ppm CO2
		2.0-10.0 VDC or 4.0-20.0 mA	0-2000 ppm CO2
OUT 2	Analogue output 2 (+)	0.9 - 1.6 VDC or 1.5-2.5mA	Status = ERROR
		0 VDC or 0 mA	Status = NOT READY

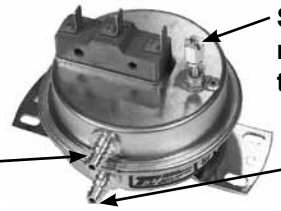
CAUTION: The same ground reference has to be used for the CO_2 sensor and for the control system.

Option BE18, Dirty Filter Switch

All "C" Cabinet systems have either 2" or 4" pleated disposable or permanent filters. D Cabinet systems have 4" pleated disposable or permanent filters. If dirty filter indicator Option BE18 was ordered, a dirty filter switch is in the electrical compartment with tubing sensors placed on either side of the filters as shown in **FIGURE 25**.

The pressure switch is in the low voltage electrical compartment. Follow the instructions in **FIGURE 28F** to set the dirty filter switch.

FIGURE 28F - Dirty Filter Switch, P/N 105507



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

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

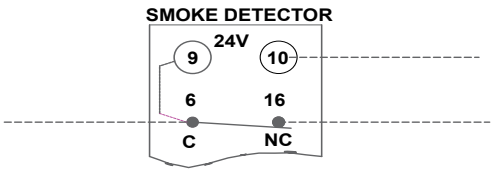
Negative pressure connection is toward the "front or top" of the switch (senses blower side of filters)

Instructions for Setting Dirty Filter Switch - With clean filters in place; all doors closed (except electrical compartment); and the blower operating, 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.

Option BE17, Photoelectric Duct Smoke Detector

The photoelectric smoke detector (**P/N 159553**) used in Option BE17 is field mounted on the ductwork. A field-supplied duct air sampling tube is required. Follow the manufacturer's installation instructions. Comply with the requirements in Paragraph 8.1.1 when running the sensor wire. Wires will connect to the controller expansion board. Refer to the unit wiring diagram.

FIGURE 28G - Wiring Connections for Option BE17 Photoelectric Duct Smoke Detector



8.2 Supply Fan (blower) Start/ Stop Control

The I/Q control can be programmed to operate the unit in two modes: Occupied and Unoccupied

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

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

The control could be programmed with an optional optimum start sequence, which allows the supply fan to operate and bring the space temperature to its setpoint value just before the unit is scheduled to be in occupied mode.

If the unit is in the unoccupied mode, the supply fan is turned OFF and will only run intermittently to maintain night setback/setup space conditions. During the unoccupied mode, if the override push button on the user wall interface is pressed, the unit will switch to occupied mode for 60 minutes.

Adjustable Control Parameters from Local Display (in the control compartment) and Remote Display (if equipped)

Control Mode (Default = Stand alone): Stand alone or BAS

Push Button Override Timer (Default=60 minutes): Range=15 minutes to 240 minutes

Hardwire Occupancy Input (Default = Disabled): Enabled or Disabled

Optimum Start/Stop (Default=Enabled): Enabled or Disabled

NOTE: The hardwired occupancy input will override the local or remote schedule. If this point is active, the software schedules do not function.

Optional Supply Fan Controls: Optional variable frequency drive (Option VFD) can be controlled by a number of optional sensors.

Sensors for Optional Variable Frequency Drive

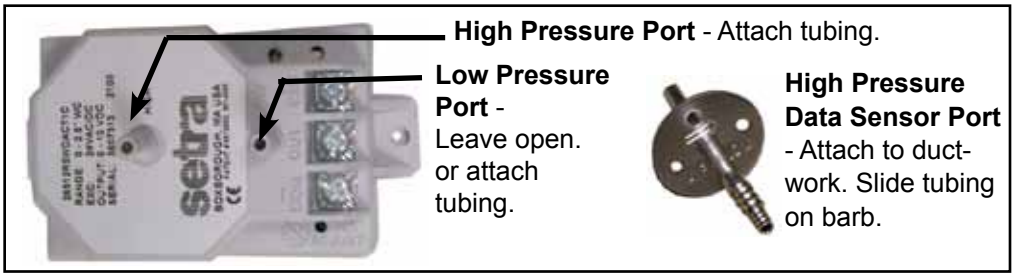
Senses	Option	Components	Installation and Function
External DDC Controller, 0-5V	**VFC2**		Requires a field supplied input source.
Duct Static Pressure (0 to 2.5" w.c.)	**VFC3**	Transducer, P/N 234818; Probe P/N 234821	Factory installed to monitor duct pressure. Requires field installation of sensor in the supply duct. See instructions below and in the sensor manufacturer's installation form.
Building Static Pressure (-0.5 to 0.5" w.c.)	**VFC4**	Transducer, P/N 234819	Field installed sensor to monitor building pressure. Requires field installation of tubing and sensor. See instructions below and in the sensor manufacturer's installation form.
CO2 Sensor (0-2000 ppm)	**VFC5**	P/N 234820	Field installed in the building to monitor the carbon dioxide level. See instructions below and in the sensor manufacturer's instructions.
Wall Stat for Low/Medium/High Speed Control	**VFC7**	**Requires CL77 wall sensor.**	Wall temperature sensor, P/N 222756, must be installed. See the wiring connections below and on the unit wiring diagram.
Four speed fan control	**VFC8**		Factory installed relay. Two hardware inputs and four setpoints provide 4-speed control through IQ controller.
Adjustable Constant Volume Control	**VFC9**		Adjustable constant speed controlled by the IQ controller through an adjustable setpoint.

Field-installed Sensors for VFC Options.

Option VFC3, Duct Static Pressure Sensor

The differential pressure transducer (**P/N 234818**) is mounted in the low voltage compartment. A data sensor pickup is shipped loose to be attached to the side of the ductwork. To install the duct sensor port, locate a position about 2/3 the distance of the duct run (minimum of 10 duct lengths). Drill a hole in the side of the duct, insert the sensor tube and attach with sheetmetal screws. The transducer has a high and a low tubing port. In most installations, the low tubing port will be sensing atmospheric pressure so it can be left open. If a different reference point is needed, attach 1/4" tubing and extend to that location. Connect 1/4" field-supplied tubing to the high pressure port and to the field-installed sensor port. The transducer has a range of 0 to 2.5" w.c. and was calibrated at the factory; it should not need field adjustment. Refer to the manufacturer's instructions in the owner's envelope for additional information.

FIGURE 29A - Tubing Ports on the Transducer in Option VFC3 and Ductwork Sensor Port



Option VFC4, Building Static Pressure Sensor

The differential pressure transducer (**P/N 234819**) used in Option VFC4 is mounted in the low voltage compartment. The transducer has a high and a low tubing port. Depending on the application, attach tubing to both ports or leave one open to atmospheric pressure. Connect 1/4" field-supplied tubing to the port(s) and run it to the pressure reference point(s). Cut the end of the tubing at a 45° angle to minimize the affect of air movement and attach it to a wall or in a ceiling. The transducer has a range of -0.5 to .5" w.c. and was calibrated at the factory; it should not need field adjustment. Refer to the manufacturer's instructions in the owner's envelope for additional information.

FIGURE 29B - Electrical Connections and Tubing Ports on Option VFC4, Building Static Pressure Sensor

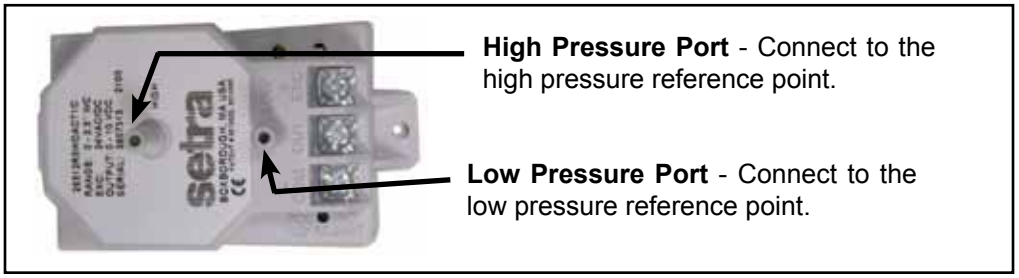
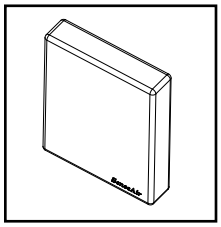


FIGURE 29C - CO2 Sensor, P/N 234820



CAUTION: The same ground reference has to be used for the CO_2 sensor and for the control system.

Option VFC5, Building CO_2 Sensor

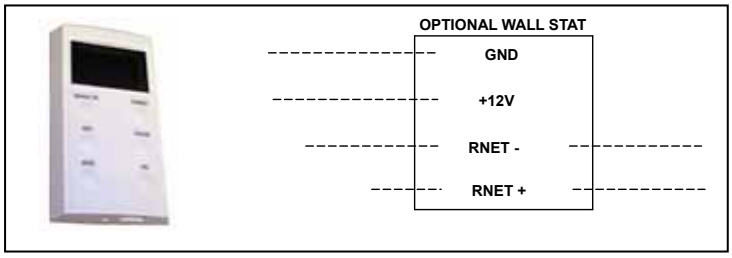
The sensor (**P/N 234820**) used in Option VFC5 must be field mounted in the building and electrically connected to the I/Q controller expansion board (Option BHB6). Follow the manufacturer's instructions to mount the sensor. Connect the wires as instructed below. Power supply must be connected to +~ and ⏚

Sensor Terminal	Function	Electrical Data	Remarks /Standard Settings
+~	Power (+)	24 VAC/DC+ (±10%), 2W	
⏚	Power ground (-)	24 VAC/DC -	System voltage reference
OUT 1	Analogue output 1 (+)	0-10 VDC	0-2000 ppm CO2
		2.0-10.0 VDC or 4.0-20.0 mA	0-2000 ppm CO2
OUT 2	Analogue output 2 (+)	0.9 - 1.6 VDC or 1.5-2.5mA	Status = ERROR
		0 VDC or 0 mA	Status = NOT READY

Option VFC7, Wall Stat for Low/Medium/High Fan Control

A field-installed thermostat, **P/N 222756**, is used for blower override. Follow the manufacturer's instructions for mounting the wall stat. See wiring information below and on the unit wiring diagram. Thermostat is 24V.

FIGURE 29D - Wall Stat, P/N 222756, used with Option VFC7



8.3 Control Options

(See Form CP-MAPS D15/16 for additional information on Option D15 and Option D16.)

Neutral Air Control System (Option D15)

In the Occupied Mode, startup is determined by the outside air temperature (OAT). If the outside air temperature is above 68°F, the system starts in the cooling mode. If the outside air temperature is below 68°F, a MAPS® unit with a heat section starts in the heating mode. The heating/cooling mode is then set by the controlling temperature requirements. A unit with cooling and heating operates to maintain the user selected discharge air temperature setpoint for either cooling or heating mode. Upon proof of fan status, mechanical heating and cooling systems operate to maintain the setpoint if the ambient conditions permit the function. There is a 120 second delay (Mode Changeover Timer) between a change of heating and cooling equipment and mode.

In the Unoccupied Mode, the unit is off.

Space Temperature Control System (Option D16)

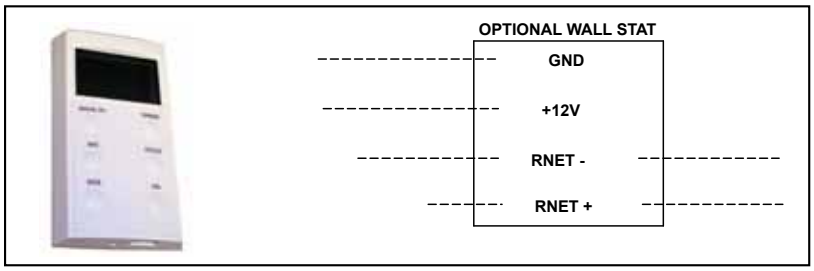
In the Occupied Mode, startup is determined by the outside air temperature (OAT). If the outside air temperature is above 68°F the system starts in the cooling mode. If the outside air temperature is below 68°F, a MAPS® unit with a heat section starts in the heating mode.

The heating/cooling mode is then set by the controlling temperature requirements. If the space temperature is 2°F above the space cooling setpoint, and the OAT is above the mechanical cooling lockout, the unit will switch to space cooling mode. If the space temperature is 2°F below the space heating setpoint and the OAT is below the mechanical heating lockout, a system with a heat section will switch to space heating mode. There is a 120 second delay (Mode Changeover Timer) between a change of heating and cooling equipment and mode.

On proof of fan status, the unit maintains the space temperature setpoint according to the mode sequence. In the Unoccupied Mode, the unit will run intermittently to maintain night setup/setback temperatures.

8.3 Control Options (cont'd)

FIGURE 30 - Wall Mounted Temperature Sensor, P/N 222756, is Std in D16; Option CL77 if ordered with Control Option D15

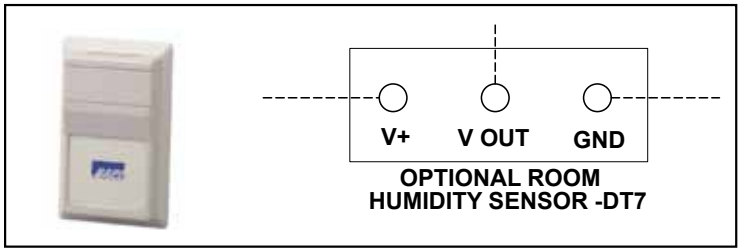


Wall-mounted Setpoint Interface (Override) - The wall temperature sensor is standard with D16 and allows the occupant to change the space temperature setpoints for cooling and heating. In addition, the user has optional high-medium-low fan speed control or heat-cool-auto-off control. Other functionality includes occupied override timer and display of unit alarm codes and key temperature values. It also displays the outside air temperature and humidity, discharge air temperature, and fan status. See below and unit wiring diagram for electrical connections.

Wall-Mounted Space Humidity Sensor

The room humidity sensor allows for space control of humidity with dehumidification Models RDB, RDDB, REDB, RDC, RDDC, REDC. See below and the unit wiring diagram for electrical connections.

FIGURE 31 - Room Humidity Sensor, Option DT7, P/N 234822, and Field Wiring Connections



Optional Control Modules

Both the wall-mounted control module, Option RB3, and the hand-held module, Option RB4, include alarm lights and access to menus. See Form CP-MAPS D15/D16 for information.

The wall-mounted control module requires field installation. Follow the manufacturer's recommendations when selecting a location and mounting the control. Refer to the control manual, Form CP-MAPS 15/16, for installation instructions and to the wiring diagram for field wiring connections.

FIGURE 32A - Wall-Mounted Control Module, Option RB3, P/N 222189, and Field Wiring

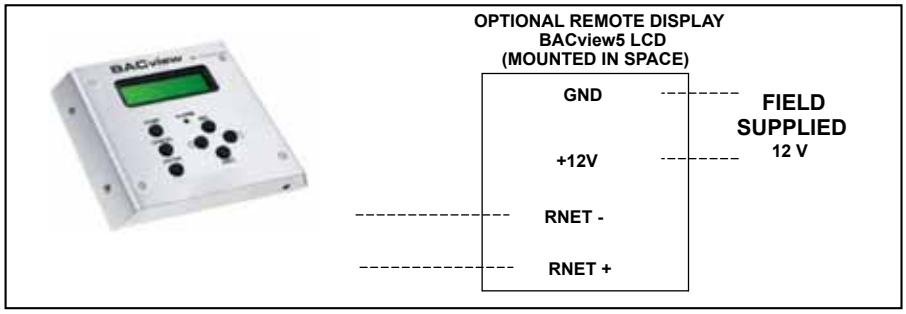
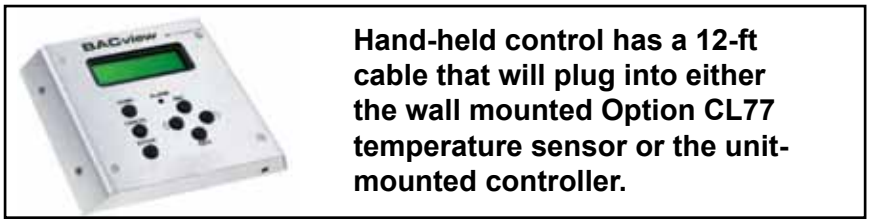


FIGURE 32B - Hand-Held Control Module, Option RB4, P/N 258452



Hand-held control has a 12-ft cable that will plug into either the wall mounted Option CL77 temperature sensor or the unit-mounted controller.

Optional Firestat

Firestat is 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.

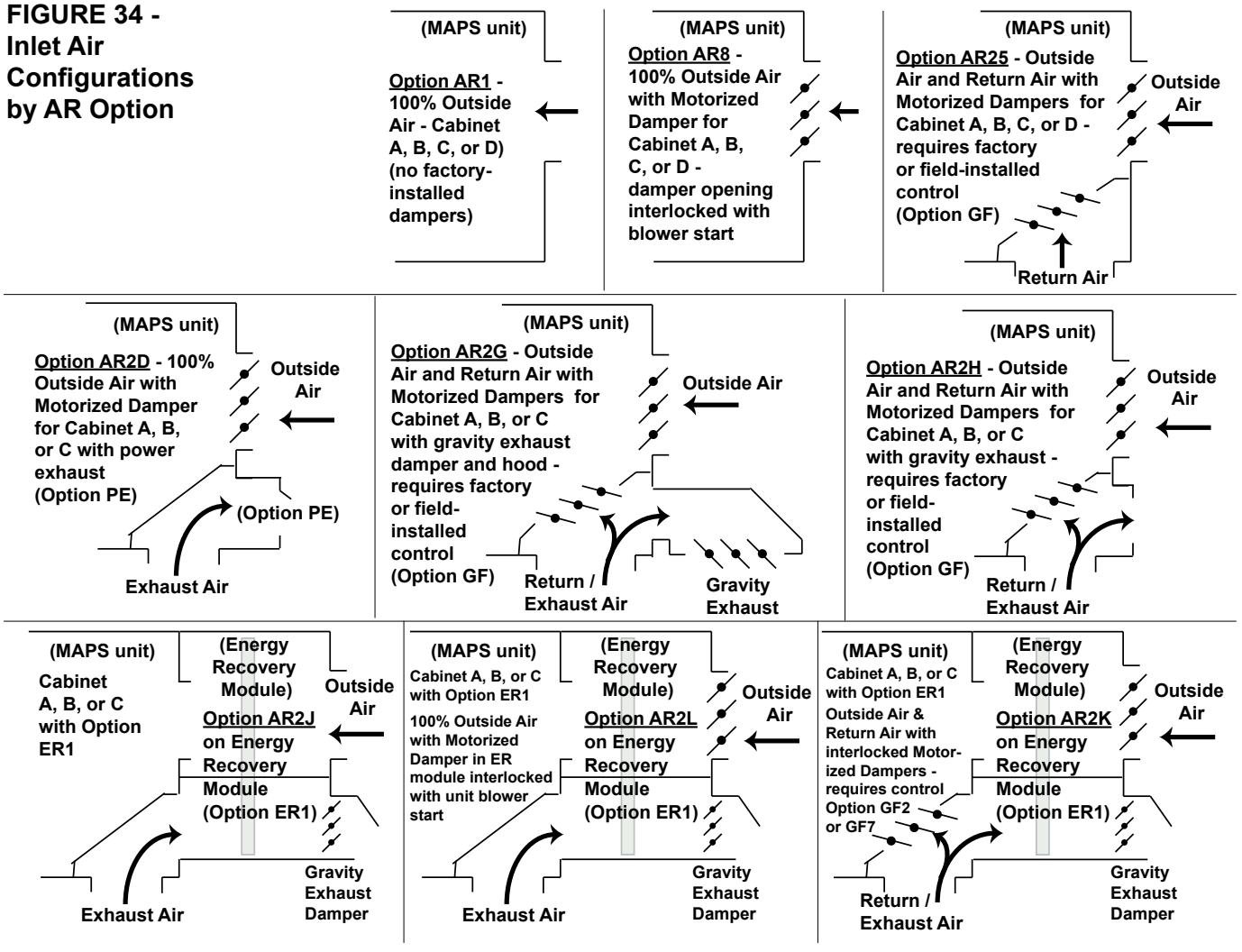
FIGURE 33 - Option BD5, Firestat (200°F), P/N 42782

9.0 Optional Equipment including Heat Sections

9.1 Inlet Air Options

The system may be equipped with a variety of configurations and air control options including 100% outside air, outside and return air, a variety of damper controls, and the field-installed energy recovery module in Paragraph 6.1. Inlet air configurations with and without dampers are identified as Option AR and may apply to the MAPS® unit only or to a MAPS® unit with an energy recovery module. Some inlet air options require additional Option GF controls. Option AR2D is for use with Option PE power exhaust. Refer to the **FIGURE 34** to identify the appearance of each inlet air configuration.

FIGURE 34 - Inlet Air Configurations by AR Option



Inlet Air Dampers and Controls

Outside Air Only Dampers, Option AR8 or AR2L -The damper motor is electrically interlocked with the blower (supply fan) motor such that a command to start the fan opens the damper first and then allows the fan to run. When the fan is called to be OFF, the damper closes.

9.0 Optional Equipment (cont'd)

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

9.1 Inlet Air Options (cont'd)

Outside Air & Return Air Dampers, Option AR25, AR2G, AR2H, or AR2K - If outside and return air motorized dampers were ordered, there are a variety of damper control options (Option GF). Some require field installation. If the damper control sensing option requires field installation of components, the components are shipped with the unit and include the manufacturer's instructions. Install according to the instructions and connect the wires according to the unit diagram. Follow the same wiring recommendations as in Paragraph 8.1.1 for the discharge air temperature sensor.

Damper Linkage

When a system has both an outside air and a return air damper, both dampers are closed for shipping. The linkage of the return air damper must be adjusted prior to use. Follow instructions to adjust damper linkage.

1. Open the damper access door.
2. Loosen the setscrew on the return air damper rod at the damper arm.
3. Manually open the return air dampers. While the dampers are opening, the damper rod and arm will automatically move to its correct position.
4. Tighten the setscrew.
5. Close the door.

Damper Control Options

Senses	Option	Parts	Installation and Function
Remote Damper Control, DDC	**GF1 (requires BHB6 Board)**		Damper position is adjusted by the IQ controller in response to a field-supplied remote 0-5V input signal. The I/Q controller limits the drive speed between 25% to 100%.
Two Position Damper Control (open/closed), DDC	**GF2**		Sends message to open or close dampers as required. Damper opens to a fixed setpoint during occupied mode and closes during unoccupied mode.
Four-Position Damper Control	**GF4 (requires BHB6 Board)**		Factory installed to provide four damper settings from two switches. Each input represents a position. As the input changes, the I/Q controller changes the damper position
Building Static Pressure	**GF5 (requires BHB6 Board)**	Sensor, P/N 234819	Factory installed to monitor building pressure for damper operation. Requires field-installation of sensor. See instructions below.
Mixed Air Controlled by CO2 level	**GF6 (requires BHB6 Board)**	Sensor, P/N 234820	Field installed in the building to monitor the carbon dioxide level. See instructions below and in the sensor manufacturer's installation form
Outside Air Damper, 2-Position Enthalpy Control	**GF7**		Factory installed to monitor the humidity of outside air entering the unit.
Mixed Air Dampers, Dual Reference Enthalpy Control	**GF8 (requires BHB6 Board**	P/N 234907	Factory installed to measure enthalpy and provide information for control of outside and return dampers.
Dry Bulb Mixed Air Economizer	**GF9**	P/N 222753 and 223111	Factory installed to measure dry bulb temperature and provide information for control of outside and return dampers.

Instructions for Field-Installed Sensors in Table Above

Option GF5, Building Static Pressure Sensor

The differential pressure transducer (**P/N 234819**) used in Option GF5 is mounted in the low voltage compartment. The transducer has a high and a low tubing port. The low tubing port will remain open to measure atmospheric pressure. Connect 1/4" field-supplied tubing to the high pressure port and run it to a common area in the building. Cut the end of the tubing at a 45° angle to minimize the affect of air movement and attach it to a wall or in a ceiling. The transducer has a range of 0 to .5" w.c. and was calibrated at the factory; it should not need field adjustment.

Refer to the manufacturer's instructions in the owner's envelope for additional information.

FIGURE 35A - Electrical Connections and Tubing Ports on Option GF5, Building Static Pressure Sensor

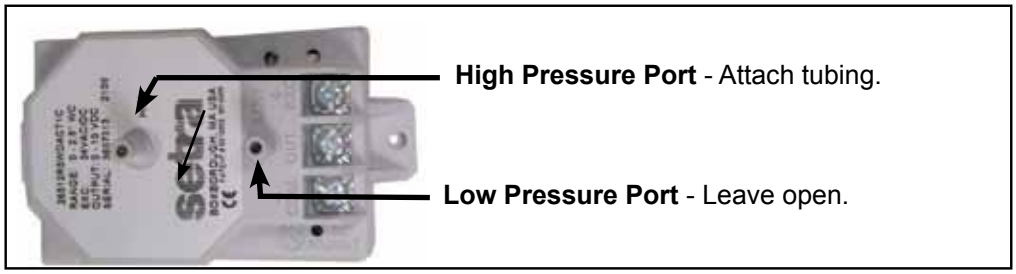
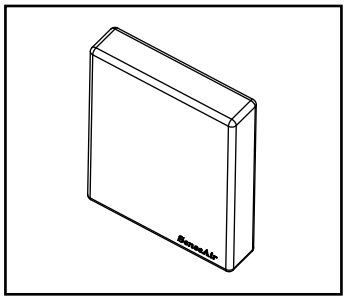


FIGURE 35B - CO2 Sensor, P/N 234820



Option GF6, Building CO_2 Sensor

The sensor (**P/N 234820**) used in Option GF6 must be field mounted in the building and electrically connected to the I/Q controller expansion board (Option BHB6). Follow the manufacturer's instructions to mount the sensor. Connect the wires as instructed. Power supply must be connected to +~ and ⏚

CAUTION: The same ground reference has to be used for the CO_2 sensor and for the control system.

Sensor Terminal	Function	Electrical Data	Remarks /Standard Settings
+~	Power (+)	24 VAC/DC+ (±10%), 2W	
⏚	Power ground (-)	24 VAC/DC -	System voltage reference
OUT 1	Analogue output 1 (+)	0-10 VDC	0-2000 ppm CO2
		2.0-10.0 VDC or 4.0-20.0 mA	0-2000 ppm CO2
OUT 2	Analogue output 2 (+)	0.9 - 1.6 VDC or 1.5-2.5mA	Status = ERROR
		0 VDC or 0 mA	Status = NOT READY

9.2 Gas Heat - Models RDCB, RDDB, RDCC, RDDC

A system with a gas heat section is equipped with a Reznor®TCORE$^{2®}$combustion system from 100 to 1,600 MBH input. The 80% thermal efficient furnace is power vented and has either a staged gas control or depending on size either a 8:1 or 16:1 turndown modulating gas capacity control.

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

9.2.1 Gas Heat Module - Mechanical

9.2.1.1 Screened Vent Cover - MAPS® III "D" Cabinet

The vent cover is shipped with the unit for field installation. Each package includes the assembled vent cover, **P/N 222614**, and four sheetmetal screws, **P/N 11813**.

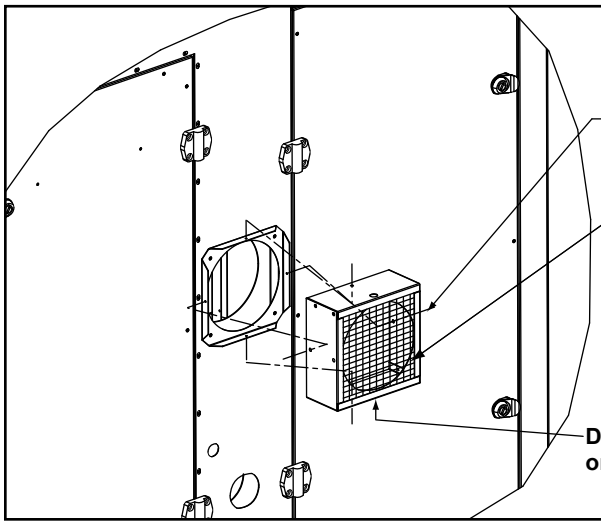


FIGURE 36 - Install a Vent Cover on Each Gas Furnace - D Cabinet Sizes

Instructions

1. Position the cover over the vent being sure that the drain hole in the box is toward the bottom.
2. Attach the vent cover with the four screws as illustrated.
3. On heat sections with two furnaces (Cabinet D Sizes 1000, 1200, 1400, and 1600), install a vent cover on each furnace.

9.2.1.2 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.

9.2.1.2 Gas Piping and Pressures (cont'd)

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

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.

WARNING

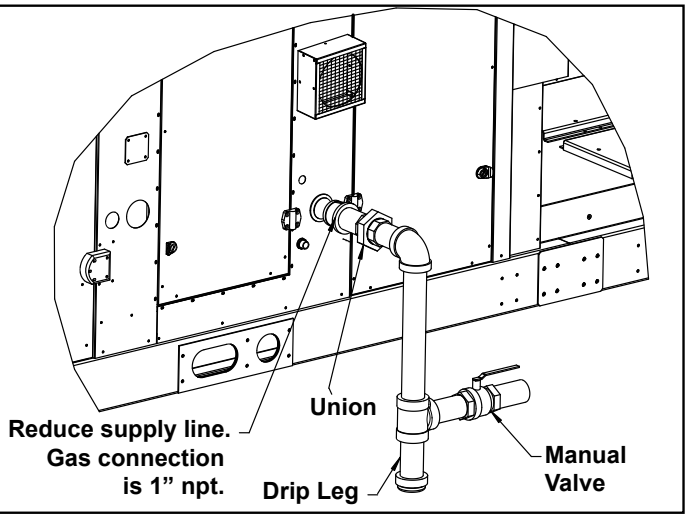
All components of a gas supply system must be leak tested prior to placing equipment in service. NEVER TEST FOR LEAKS WITH AN OPEN FLAME. Failure to comply could result in personal injury, property damage or death.

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

FIGURE 37 - Gas Connection (D Cabinet illustrated)

Cabinet Size	Heat Section	Gas Connection	
		Natural Gas	Propane
A	100, 150, 200	1/2”	1/2”
B	250, 300	3/4”	3/4”
C	400, 500, 600, 700	1”	--
D	500, 600, 700, 800, 100, 1200, 1400, 1600	1”	--



Supply Pressures

Before attempting to measure valve outlet and manifold 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 all gas control systems must be a minimum of 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. The regulator should not allow greater than 1/2 psig (14" w.c.) to the factory installed valves, even in the off cycle.

If natural gas supply pressure is too low, contact your gas supplier.

Gas Capacity Controls

The modulating control system (Option AG70) on single heat section Sizes 100 through 700 is approximately 8:1 turndown and 16:1 turndown on dual heat section Sizes 800, 1200, 1400 and 1600. All deep modulating, single furnace gas trains include a safety shutoff, single-stage or dual single-stage valve, and a modulating ball valve. All two-furnace gas trains (D Cabinet only) include a safety shutoff, dual single-stage valve and a modulating ball valve on one furnace and a safety shutoff, dual single-stage valve on the other furnace. See Cabinet A gas train in **FIGURE 38A,** Cabinet B in **FIGURE 38B,** Cabinet C in **FIGURE 38C,** and D Cabinet gas train in **FIGURE 39**. **FIGURE 40** illustrates the ball valve and actuator used in all manifolds.

A call for heat is determined by the cooling/heating main controller (See Paragraph 8) based on heating air setpoint and inlet air temperature.

FIGURE 38A - Gas Train in A Cabinet Gas Heat Section Sizes 100, 150, 200

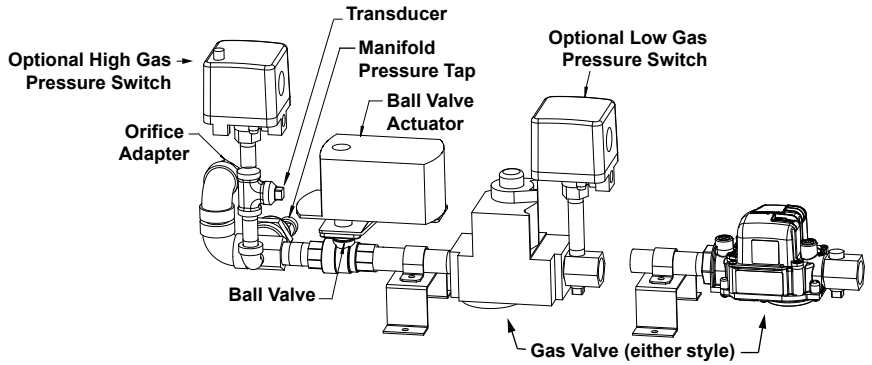


FIGURE 38B - Gas Train in B Cabinet Gas Heat Section Sizes 250 and 300

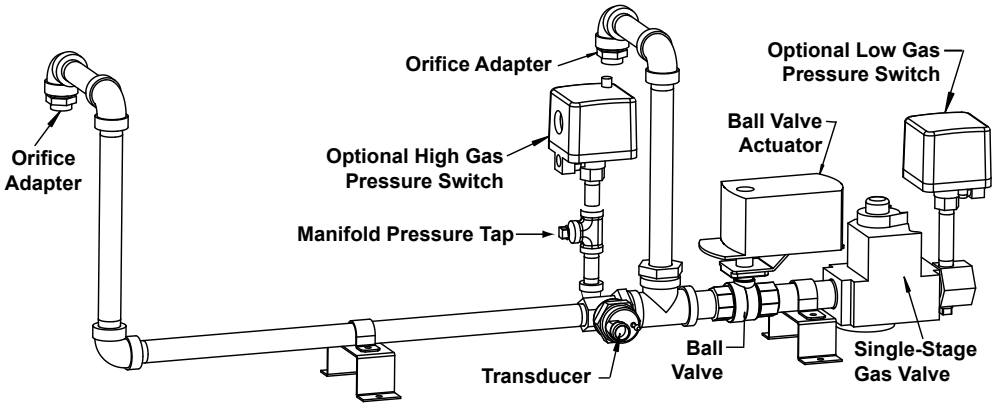


FIGURE 38C - Gas Train in C Cabinet Gas Heat Section Sizes 400, 500, 600, and 700

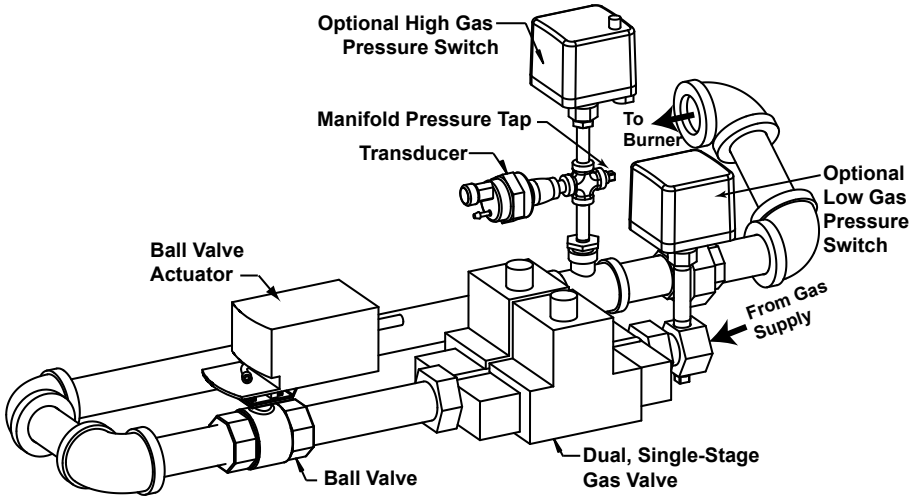
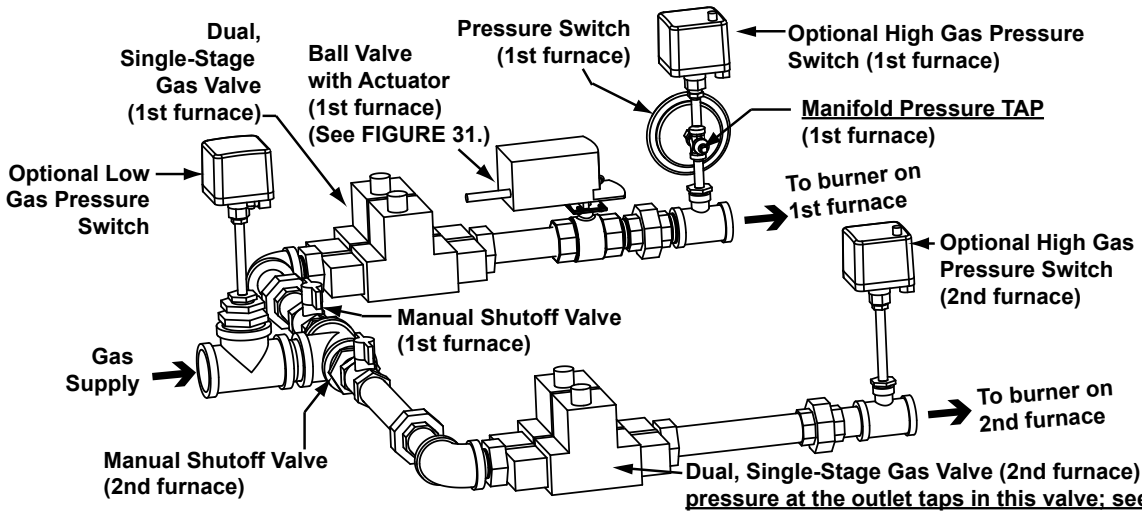


FIGURE 39 - Modulating Gas Control Manifold showing Two Furnaces - D Cabinet Sizes 1000, 1200, 1400, 1600 (See NOTE below.)

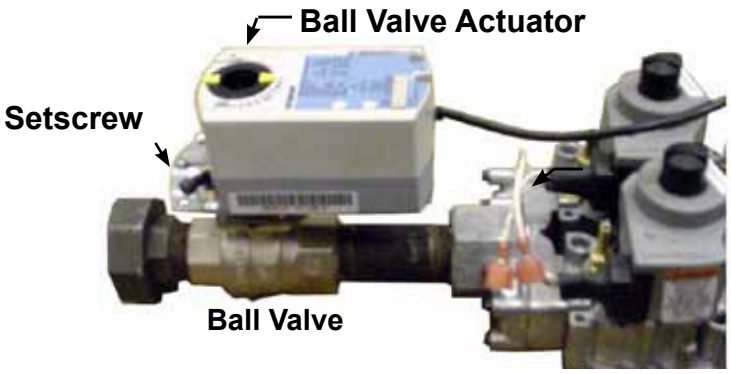


NOTE: "D" Cabinets with Heat section Sizes 500, 600, 700, and 800 with one furnace have the manifold for "1st furnace" only. "D" Cabinets with two furnaces (Heat Section Sizes 1000, 1200, 1400, and 1600) have two manifolds as shown in FIGURE 39.

FIGURE 40 - Actuator and Ball Valve in Modulating Gas Control Option AG70

Single-Stage or Dual Single-Stage Valve

If manifold pressure adjustment is required, outlet pressure of the single-stage gas valve (either regular or dual) must be adjusted. See **FIGURE 41A or 41B** and follow instructions for adjusting the single stage valve**.**



Manifold Pressure Measuring and Adjustment

WARNING

Manifold gas pressure must never exceed 3.5" w.c. for natural gas.

The valves are normally set at the factory to provide 3.5" w.c. manifold pressure on a demand for high fire.

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

NOTE: Manifold pressure is checked at high fire. If the heat section has two furnaces, measure manifold pressure of both furnaces at the same time.

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.

Instructions for Measuring High Fire Manifold Pressure (can only be done after the heater is operating)

1) Turn the manual valve in the gas line off. Locate the tap(s) for testing pressure. See **FIGURES 38 A, B, C or 39**.)

Remove the bushing and connect a manometer to each 1/8" pressure tap. **NOTE:** A manometer (fluid-filled gauge) is recommended rather than a spring type gauge due to the difficulty of maintaining calibration.

2) Turn on the manual gas valve. Operate the unit with a call for heat. With the burner at full fire, check the manifold pressure.

At sea level, the manifold pressure should be 3.5" w.c.

Be certain the actuator has fully opened the ball valve. This can be verified by the position indicators on top of the actuator (**FIGURE 40)**.

3) In most cases the manifold pressure will be correct and adjustment will not be required. Replace the fittings and check for leaks.

In the rare instance that adjustment is required, the adjustment is made at the single-stage gas valve. Continue with the instructions below for adjusting valve outlet pressure.

Measure the Full Fire Outlet Pressure of the Single-Stage Valve(s) - (can only be done after heat section is operating)

Follow the instructions below to check the valve outlet pressure and make necessary adjustment. **NOTE:** Valve outlet pressure is also checked at high fire.

1) Turn the manual gas valve off. On the single-stage gas valve (either regular valve in **FIGURE 41A** or dual valve in **FIGURE 41B**), locate the 1/8" output pressure tap(s). Connect separate manometers to both 1/8" pipe outlet pressure taps 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.

2) Turn on the manual gas valve. Operate the unit with a call for heat. Check the outlet pressure with burner at full fire.

3) If adjustment is necessary, remove the cap(s) from the adjustment screw(s). Set pressures to correct setting by turning the regulator screws IN (clockwise) to increase pressure. Turn regulator screws OUT (counterclockwise) to decrease pressure.

After an adjustment is made, cycle the heat section. Re-check the outlet pressures of the valve. **When checking a dual valve, make sure that the outlet pressure is the same at both taps.**

When outlet pressures are correct for the installation, remove the manometers and replace the caps. Check for leaks at the pressure tap fittings.

FIGURE 41A - Outlet Pressure Tap and Adjustment Location on Single-Stage, Valve (two styles) used on Heat Sections 100 - 300 in MAPS® Cabinets A and B

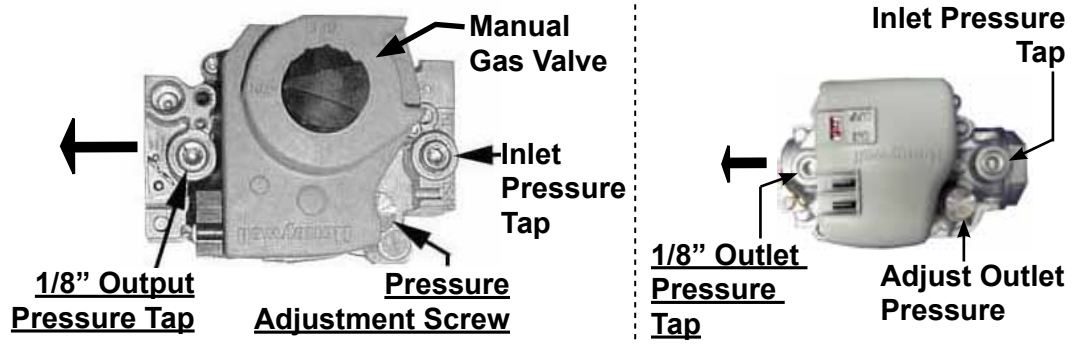
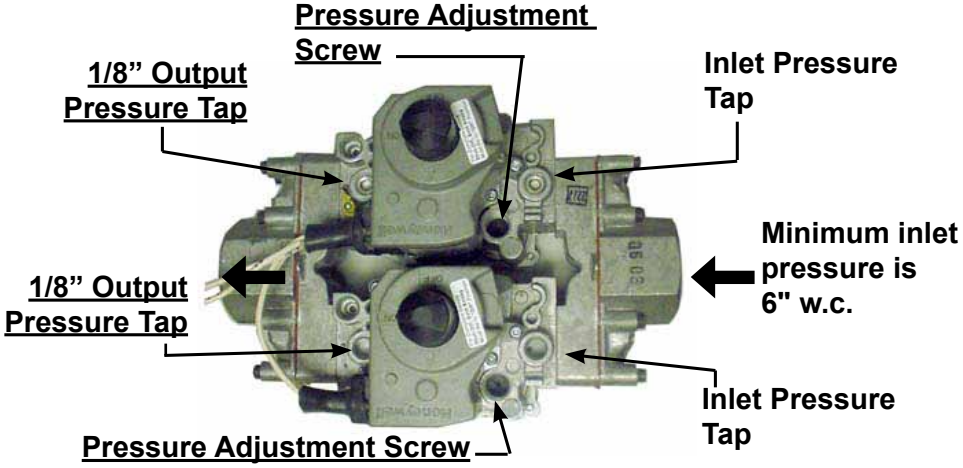


FIGURE 41B - Outlet Pressure Taps and Adjustment Locations on Dual Single-Stage, Valve used on Heat Sections 400 - 1600 in MAPS® Cabinets C and D



9.2 Gas Heat - Models RDCB, RDDB, RDCC, RDDC (cont'd)

9.2.1 Gas Heat Module - Mechanical (cont'd)

9.2.1.2 Gas Piping and Pressures (cont'd)

High Altitude Operation

High Altitude Operation for Modulating Gas Control Option AG70

Option AG70 modulating gas control system does not require a gas pressure adjustment derate at high altitude. The patented control system works on a principle of safe, continuous gas and combustion air monitoring and adjustment. As the mass flow through the combustion system changes, due to the lower oxygen level at high altitude, the control system senses the change, automatically reducing the firing rate of the burner.

Gas Pressure Safety Switches, Option BP4

See location of optional gas pressure safety switches in **FIGURE 38 A, B, C or 39.** The optional gas pressure switches are safety controls designed to protect the manifold and burner from extreme upstream gas piping system failures that would cause an increase or decrease in the regulated gas pressure.

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

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

9.2.2 Gas Heat Module Ignition and Deep Modulation Systems

MAPS® unit with a gas heat section are equipped with a proprietary integrated combustion control system. This system controls the direct spark ignition, safety and modulating valves, and modulates the speed of the venter motor to assist in obtaining the 8:1 or 16:1 firing rate turndown.

Note that during normal operation of this deep modulation control system, the current draw of the venter motor can exceed the full load amp rating on its nameplate. This condition is common when employing electronic wave-chopping technology to reduce the running speed of a single-phase type PSC alternating current motor. The increased current is a result of increased slip, which is the difference between the rotation speeds of the rotor and stator fields. All motors used in MAPS® systems are custom designed and built for this unique modulating application and cannot be replaced with a non-approved motor.

The ignition module requires an analog input voltage greater than 2VDC for ignition startup and above 9.5VDC to achieve high fire.

The function of the ignition system is basically the same in all MAPS® systems, but the components and features vary in the D Cabinet. The normal heat cycle operating sequence of the A, B, & C cabinets and the D cabinet are identified in the following paragraphs. For more detailed information, see either Form O-MAPSIII Cabinet D or Form O-MAPS® Cabinets A/B/C.

9.2.2.1 Ignition System for A, B, and C Cabinets

Ignition and Speed Control System as it applies to ALL Gas Heat Section Sizes of MAPS® Cabinet A, B, and C Models in this manual

MAPS®III&IV Cabinet A, B & C heat sections have an ignition controller module with an ID plug. (See **FIGURE 42**.) The module is the same for all Cabinet C Model Sizes, but the ID plug is unique to the heat section size (400, 500, 600, or 700) being installed.

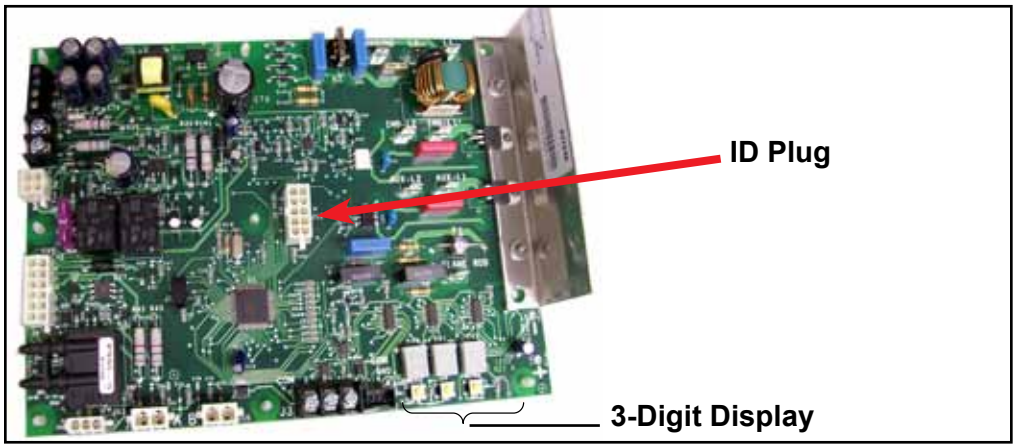


FIGURE 42 - Ignition Control Module with Display in the Electrical Compartment - MAPS® Cabinets A, B, and C

Cabinets A and B have the same module but a unique ID plug for each heat section (Cabinet A Heat Sections 100, 150, 200; Cabinet B Heat Sections 250 and 300).

The module has a three-digit LED display that indicates the active furnace operation. See the table below for a description of the heat mode identified by each LED display. For additional information, refer to operation / maintenance manual, Form O-MAPS Cabinets A/B/C.

Normal Furnace Operation Display - MAPS® Cabinets A, B, and C		
LED Display	**Heat Mode**	**Description**
OFF	OFF Mode (OFF)	System Idle - Control board has power, no faults found, no call for heat.
Pur	PURGE Mode (Pur)	System is purging the heat exchanger – No gas on, no flame, venter motor runs for the specified purge timings. Purge cycles occur immediately before and after each burner operation.
Ign	IGNITION Mode (Ign)	System is initiating burner operation – Ignitor energized, modulating valve moved to ignition setting, gas on. Maintained for the trial-for-ignition period and the five-second flame stabilization period.
HEA	WARM-UP Mode (HEA)	Period between Ignition and Run – System checks completed before modulation control begins.
run	RUN Mode (run)	Normal modulating operation.
rEt	Ignition Retry (rEt)	System has had a failed ignition attempt or has lost flame during burner operation and is beginning another ignition cycle.

9.2.2.2 Ignition System for "D" Cabinet

Ignition Control System as it applies to ALL Heat Sections with one furnace (Sizes 500, 600, 700, 800) AND the First (upstream) furnace of Heat Sections with two furnaces (Sizes 1000, 1200, 1400, 1600) of "D" Cabinet Models

FIGURE 43A - Control Module used in Modulating Gas Control Option AG70 - "D" Cabinet only

NOTE: Each of the individual burner sizes (500, 600, 700, and 800) has a unique control module.

Normal Heat Cycle Operating Sequence with Modulating Gas Control AG70 - "D" Cabinet only

- **1 GREEN FLASH:** Stand-by mode. Ready to accept call for heating.
- **1 AMBER FLASH:** Heating cycle initiated; gas OFF.
- **2 AMBER FLASH:** Heating cycle initiated, all safety checks passed and gas ON.
- **5 AMBER FLASHES:** Suppressed firing rate due to low combustion air or high altitude operation.
- **RAPID GREEN FLASH:** Indicates furnace was manually put into the test mode

Ignition Control System as it applies to second furnace of Heat Sections with two furnaces (Sizes 1000, 1200, 1400, 1600) of "D" Cabinet Models

The downstream furnace in a "D" cabinet with two heat sections 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.

Normal Heat Cycle Operating Sequence - Downstream Furnace of "D" Cabinet Sizes 1000, 1200, 1400, 1600

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.

9. Optional Equipment (cont'd)

9.2 Gas Heat - Models RDCB, RDDB, RDCC, RDDC (cont'd)

9.2.2 Gas Heat Module Ignition Systems (cont'd)

2) Prepurge - The circuit board energizes the venter motor and waits for the pressure switch to close. When the pressure switch is proven closed, the circuit board begins the prepurge time. The ignition system circuit board runs the venter motor for a 30 second prepurge 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 burner during the first 6 seconds, the spark is de-energized. 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, 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.

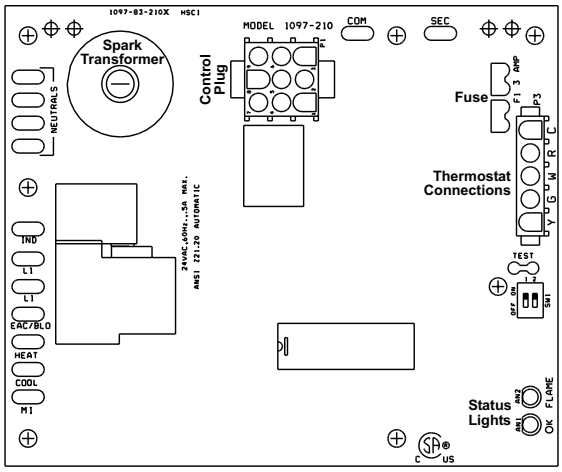
FIGURE 43B – DSI Integrated Control Module on Downstream Furnace - "D" Cabinet only

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)



9.2.3 Venting and Combustion Air

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

FIGURE 44 - Combustion Air Proving Switch

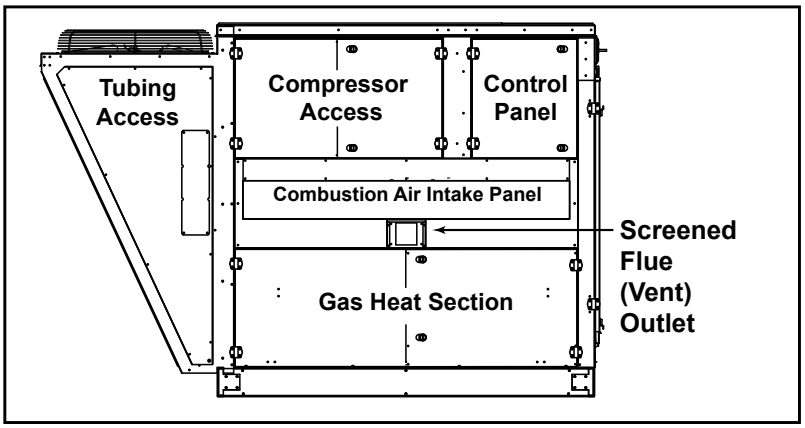
DANGER

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

9.2.3.1 Venting and Combustion Air - MAPS® Cabinets A, B, and C

The combustion air inlet hood is located on the side of the unit near the compressor compartment. See **FIGURE 45**. The flue outlet is also located on this side.

FIGURE 45 - Heat Section Showing Location of Flue Exhaust (vent) and Combustion Air Hood - Cabinet A, B, and C Sizes



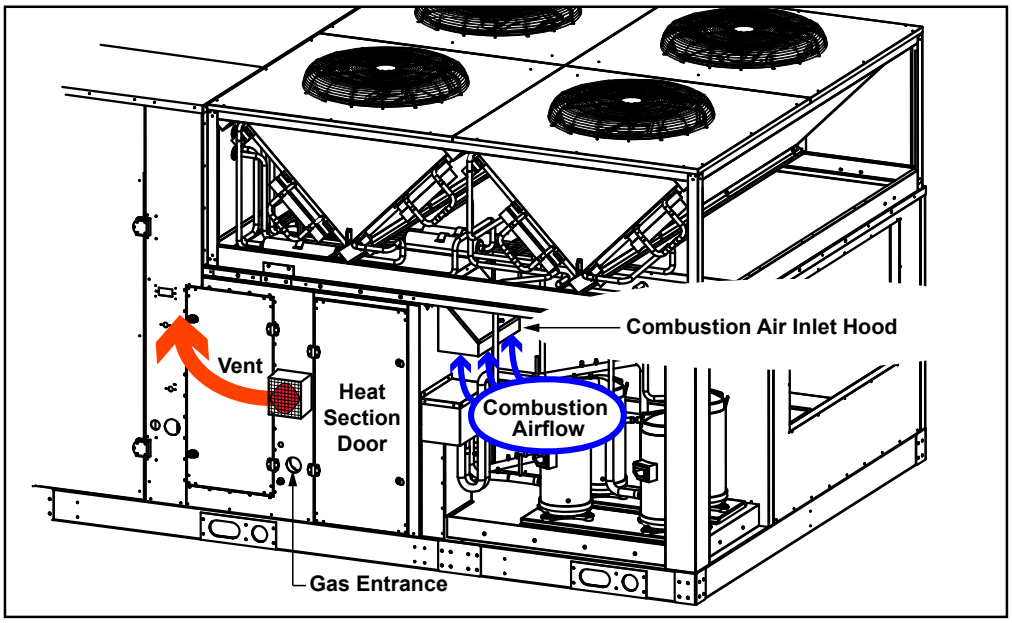
Vent Extension Field Kit for MAPS® Cabinet A, B, or C

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.

9.2.3.2 Venting and Combustion Air - MAPS®III Cabinet D

On a D Cabinet, a screened vent cover was attached to each vent (flue exhaust) in Paragraph 9.2.1.

FIGURE 46 - Heat Section Showing Location of Flue Exhaust (vent) and Combustion Air Hood - Cabinet D Sizes



NOTE: The illustration shows only one furnace. The combustion air hood is in the same location when the heat section has two furnaces. Each furnace has a vent.

9.2.4 High Temperature Limit Control - All MAPS® Cabinet Sizes

All gas furnaces are equipped with a temperature activated auto reset limit control. The control is factory set at 270°F 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 cabinet of a MAPS® Cabinet A, B, or C system or in the heat module of a MAPS® III Cabinet D system.

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

9.3 Electric Heat - Models RECB, REDB, RECC, REDC

9.3.1 Electric Heat

A MAPS® unit 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 or can be equipped with optional SCR modulating control.

Call for heat and staging occur in response to system controls (See Paragraph 8).

Electric Heat Capacity and Sequence of Operation - Cabinet D

Electric Heat Capacity Table - D Cabinet				
Size	240/480/575V		208V	
	KW	MBH	KW	MBH
120	120	410	90	307
180	180	615	135	461

Size (kW)	Voltage	Electric Heaters Sequence of Operation									
		Stage									
		1	2	3	4	5	6	7	8	9	10
120	208	10	10	20	20	20	20	20			
120	240	10	10	20	20	20	20	20			
120	480	30	30	30	30						
120	575	30	30	30	30						
180	208	10	10	20	20	20	20	20	20	20	20
180	240	10	10	20	20	20	20	20	20	20	20
180	480	30	30	30	30	30	30				
180	575	30	30	30	30	30	30				

9.0 Optional Equipment (cont'd)
9.3 lectric Heat - Models RECB, REDB, RECC, REDC (cont'd)

Electric Heat Capacity and Sequence of Operation - Cabinet Sizes A, B, C

Electric Heat Capacity Table						
Size	240/480/600V		208V		230/460/575V	
	KW	MBH	KW	MBH	KW	MBH
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 & 600V apply to RECB & RECC only.

Size (kW)	Size	Cabinet	Electric Heaters Sequence of Operation			
			Stage 1	Stage 2	Stage 3	Stage 4
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	10	10+10	10+10+15	10+10+15+15
60	60	B or C	10	10+10	10+10+20	10+10+20+20
75	75	B or C	15	15+20	15+20+20	15+20+20+20
88	88	B or C	20	20+20	20+20+24	20+20+24+24

FIGURE 47 - SCR Controller for Electric Heat Modulation

9.3.2 Modulating Electric Heat

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

WARNING

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

DANGER

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

10.0 Commissioning and Startup

10.1 General

Follow the procedures listed in Paragraphs 10.2 - 10.4 and fill in the Startup Form in the **APPENDIX**, page 70.

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.

WARNING

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

10.2 Checklist Prior to Startup

10.2.1 All Systems Checklist Prior to Startup:

☐ Check clearances. All clearances must be as illustrated in Paragraph 4.1.

☐ Verify the electrical supply matches voltage rating of the unit. (Refer to the rating plate.)

NOTE: If unit is equipped with an optional phase loss/phase reversal control (Option PL4) and does not start, check the phase rotation of the electrical supply. See Paragraph 7.

- ☐ Check the wiring for loose connections or damaged wire. Tighten connections. Replace damaged wiring. (See Paragraph 7.0 or the wiring diagram for replacement wiring requirements.)
- ☐ Check all field wiring against the wiring diagram. Be sure all field-installed controls are in place. Be sure that wire gauges are as required for the electrical load. All field wiring must comply with the National Electric Code and local regulations.
- ☐ Be certain that all electrical entrances are sealed against the weather.
- ☐ Check that fuses or circuit breakers are in place and sized correctly.
- ☐ 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. Check blower and pulleys for free movement. Check belt tension and alignment. See Paragraph 6.6.**
  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 6.6.
- ☐ Check free rotation of condenser fans.
- ☐ Remove compressor tiedowns and all other shipping supports and restraints.
- ☐ Verify that condensate drain is open and properly trapped. Fill trap with water. See Paragraph 6.5.
- ☐ Crankcase heaters must be allowed to warm up for at least 24 hours prior to startup. If actual startup is scheduled in 24 hours, unlock the disconnect switch and turn on the electricity.
- ☐ If equipped with field-installed energy recovery module, Option ER1, verify checks in Form I-MAPSIII&IV-ER, Paragraph 8.0, have been completed.

10.2.2 Gas Heat Checklist Prior to Startup:

- ☐ Check gas piping for leaks and proper supply gas pressure (6.0" w.c. minimum/14.0" w.c. maximum). 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 vent covers are installed. Check that 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.

NOTE: Redo startup procedures when the cooling season begins.

- ☐ 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.

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

Power Supply Voltage Phasing

Blower Rotation - If blower rotation is not correct, reverse by interchanging two wires on the 3-phase supply connection to the blower motor.

Compressors

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

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

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

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

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

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

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

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

☐ Check the subcooling and superheat.

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.

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.

Two important requirements before checking subcooling & superheat:

1) 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 subcooling and superheat. Disable the hot gas bypass valve by removing the cover and adjusting the spring tension. **Count and record** the number of counterclockwise turns until the spring tension is relieved. (When you can return the bypass valve to its original setting, turn the spring the same number of turns clockwise.) To check setting, see Paragraph 7.7.

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

☐ Measure and record temperature and pressure of the liquid line at the condenser coil outlet. At initial startup, fill out the "Startup Form" (See page 70.)

STEP 1) Record Measurements: Temperature =

_____°F (°C) and Pressure = _____ psig

STEP 2) From **Temperature/Pressure Conversion Chart**, **APPENDIX, page 72,** convert Measured Pressure (STEP 1) to _____°F (°C)

STEP 3) Subtract Measured Temperature (STEP 1) from Temperature from Conversion Chart (STEP 2) _____°F (°C) - _____°F (°C) = _____°F (°C) degrees of Subcooling

Recommended subcooling with outdoor temperature range of 68 to 95°F (21 to 35°C) is 10 to 12 degrees F (5.6 to 6.7 degrees C).

Too much subcooling indicates a refrigerant overcharge. To reduce the subcooling, remove excess refrigerant. Too little subcooling indicates a refrigerant undercharge. To increase subcooling, slowly add R-410A refrigerant.

WARNING

Do not release refrigerant to the atmosphere. When adding or removing refrigerant, the qualified technician must comply with all national, state/province, and local laws.

Instructions for Checking and Adjusting the Superheat of an Isolated Circuit:
Measure and record temperature (insulate probe from surrounding air temperature) and pressure in the suction line at the compressor inlet.

STEP 1) Record Measurements: Temperature = _____°F (°C) and Pressure = _____ psig

STEP 2) From **Temperature/Pressure Conversion Chart**, **APPENDIX, page 72,** convert Measured Pressure (STEP 1) to _____°F (°C)

STEP 3) Subtract Measured Temperature (STEP 1) from Temperature from Conversion Table (STEP 2) _____°F (°C) - _____°F (°C) = _____°F (°C) degrees of Superheat

Recommended superheat range is 8 to 12 degrees F (4.5 to 6.7 degrees C).

Typically, too much superheat indicates that the evaporator coil is undercharged. Too little superheat typically indicates that the evaporator coil is overcharged and may potentially flood liquid refrigerant to the compressor. To reduce the superheat, adjust the thermal expansion valve by turning the adjusting stem counterclockwise. To increase the superheat, adjust the thermal expansion valve by turning the adjusting stem clockwise

☐ **RDB/RDC/RDDB/RDDC//REDB/REDC 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 10 to 12 degrees F (5.6 to 6.7 degrees C). Superheat should be in the 8 to 12 degrees F (4.5 to 6.7 degrees C) range.

☐ If the system is equipped with an optional hot gas bypass, check the valve. Follow the instructions in Paragraph 7.7.

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

☐ If blower speed adjustment is needed to accomplish proper air balance, see Paragraph 6.6.

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 cooling mode lockout setting to 95°F and the discharge air heating setpoint to 95°F. When testing is complete, reset setpoints as required by the application. (For instructions on changing settings on the programmable control, refer to the instruction sheet in the Literature Bag or with the Wiring Diagram.)

10.3 Checklist Startup (cont'd)

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

The installation must obtain a temperature rise within the range specified on the furnace rating plate. Maximum temperature rise for this unit is 100°F.

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

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.
Manipulate discharge temperature setpoint up and down to see if furnace is staging or modulating properly. **NOTE:** Be sure control is returned to proper settings.

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

DANGER

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

DANGER

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

10.3.3 Startup Check for MAPS® Unit with an Energy Recovery Module, Option ER1

☐ Setting the Supply and Exhaust Fans - If the energy recovery module is not equipped with optional variable frequency drives (Options EFD1 and SFD1), it is recommended that the air balance procedures outlined below be performed.

Instructions for MAPS® Unit with an Energy Recovery Module

1. Perform Air Balance Procedure on the MAPS® Unit

a) In order to measure airflow without the pressure drop of the energy recovery module, open the coil access door. (See **FIGURE 15**, page 30.)
b) Energize the MAPS® blower system circuit only. Balance the air to the specific air volume requirements for the application. (If blower speed requires adjustment, follow the instructions in Paragraph 6.6.2.)
c) De-energize the MAPS® blower system circuit. Close and lock the coil access door.

2. Perform Air Balance Procedure on the Energy Recovery <u>Supply Fan</u>

a) On the MAPS® unit, open the control panel door (see **FIGURE 15**, page 30). On the wall next to the blower compartment, locate the pressure tap. Connect a manometer at the pressure tap.

b) Energize the energy recovery supply blower circuit. If the energy recovery module has an inlet damper, there will be a delay while the damper opens and closes the damper end switch that energizes the supply blower.

c) Energize the MAPS® blower system circuit.

d) On the manometer, check the pressure. If the measurement is between 0" and -.50" w.c., the supply fan does not need to be adjusted. If the measurement is not in that range, follow the instructions below:

1) De-energize the energy recovery module and the MAPS® unit. (If the MAPS® unit has a gas heat section, turn off the gas.)
2) Loosen belt tension and remove the belt.
3) Loosen the set screw on the side of the pulley.
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. (See Paragraph 6.6.1).
7) Energize the system and check the pressure reading. When the measurement on the manometer is between 0" and -.50" w.c., the supply fan is set. Disconnect the manometer and close the control panel door.

3. Perform Air Balance procedure on the Energy Recovery <u>Exhaust Fan</u>

The exhaust blower system operates as an independent air system and can be adjusted using standard air balance procedures with no effect to the MAPS® or energy recovery supply air systems.

10.4 Checklist After Startup:

<u>Assumption</u>s: 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/Parts Bag" containing Limited Warranty information, this booklet, the operation/maintenance/service manual, control instructions, and any information on optional controls in an accessible location.

☐ **IMPORTANT:** After at least 8 hours but no longer than a week of operation, recheck the blower wheel including all set screws, 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 setscrew size is 5/16".
Check belt tension after the first 24 hours of operation at full load; see instructions in Paragraph 6.6.1.

STARTUP Form for Reznor® MAPS® Units

REZNOR®

STARTUP FORM

Reset Form | Print Form

Applies to: **MAPS III&IV Model Series RCB, RDB, RDCB, RDDB, RECB, REDB, RCC, RDC, RDCC, RDDC, RECC, and REDC**

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, Sec. 3.1)
- ☐ Verify shipping brackets are removed.
- ☐ Check clearances (I-MAPS, Sec. 4.1)
- ☐ Seal electrical entrances.
- ☐ Check all fans for free movement.
- ☐ Inspect dampers.
- ☐ Check outside air hood and filters. (I-OPT-WH)
- ☐ Verify inlet air filters are installed.
- ☐ Check condensate connections. (I-MAPS, Sec. 6.5)
- ☐ 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, 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, Sec. 6.6)
- ☐ Check optional dirty filter switch. (I-MAPS, Sec. 8.1)

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						
Fan 4						

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, Sec. 7.7)

Gas Heat Section

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

Inlet Gas Pressure _____

Operational Inlet Gas Pressure _____

Maximum Inlet Gas Pressure: 14" w.c.

Minimum Inlet Gas Pressure: 6.0"w.c.

Check Manifold Pressure (Desired outlet pressure of single manifold or first manifold with two heat sections at full fire is 3.7" w.c. Desired outlet pressure of second manifold on unit with two heat sections is 3.6" w.c.

Operational Manifold Gas Pressure:

All "C" Cabinets and "D" Cabinets with one Heat Section _____

Second manifold on D Cabinet with Heat Section Sizes 1000, 1200, 1400, and 1600 _____

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, C or D

DX Cooling Models RCB and RCC and DX with Reheat Models RCC and RDC

Model RCB	Model RCC	Cabinet Size
060		A
078	--	
090		
118	120	
136	--	
160		B
186	--	
200		
190		C
216	--	
298		
410		
360	--	D
480	--	
600	--	
720	--	

Model RDB	Model RDC	Cabinet Size
084		A
102	--	
114		
142	144	
162	--	
184		B
--	196	
210	--	
222	--	
224	--	
236		
--	257	
248		C
262		
272	--	
288	--	
354		
370		
468		
482		
418	--	D
444	--	
484	--	
538	--	
564	--	
602	--	
658	--	
684	--	
722	--	
804	--	
842	--	

Model RDCB, RDDB, RDCC, and RDDC by Cabinet Size and Gas Heat Section Size

Model RDCB	Model RDCC	Gas Heat Section Size													
		-100	-150	-200	-250	-300	-400	-500	-600	-700	-800	-1000	-1200	-1400	-1600
060		A	A	A	--	--	--	--	--	--	--	--	--	--	
078	--	A	A	A	B	B		B*	--	--	--	--	--	--	
090		A	A	A	B	B		B*	--	--	--	--	--	--	
118	120	A	A	A	B	B		B*	--	--	--	--	--	--	
136	--	A	A	A	B	B		B*	--	--	--	--	--	--	
160		--	--	--	B	B		B*	--	--	--	--	--	--	
186	--	--	--	--	B	B		B*	--	--	--	--	--	--	
200		--	--	--	B	B		B*	--	--	--	--	--	--	
190		--	--	--	--	--	C	C	C	C	--	C**	--	--	--
216	--	--	--	--	--	--	C	C	C	C	--	C**	--	--	--
298		--	--	--	--	--	C	C	C	C	--	C**	--	--	--
410		--	--	--	--	--	C	C	C	C	--	C**	--	--	--
360	--	--	--	--	--	--	--	D	D	D	D	D	D	D	D
480	--	--	--	--	--	--	--	D	D	D	D	D	D	D	D
600	--	--	--	--	--	--	--	D	D	D	D	D	D	D	D
720	--	--	--	--	--	--	--	D	D	D	D	D	D	D	D

Model RDDB	Model RDDC	Gas Heat Section Size													
		-100	-150	-200	-250	-300	-400	-500	-600	-700	-800	-1000	-1200	-1400	-1600
084		A	A	A	--	--	--	--	--	--	--	--	--	--	--
102	--	A	A	A	B	B	--	--	--	--	--	--	--	--	--
114		A	A	A	B	B	--	--	--	--	--	--	--	--	--
142	144	A	A	A	B	B	--	--	--	--	--	--	--	--	--
162	--	--	A	A	B	B	--	--	--	--	--	--	--	--	--
184		--	--	--	B	B	--	--	--	--	--	--	--	--	--
--	196	--	--	--	B	B	--	--	--	--	--	--	--	--	--
210	--	--	--	--	B	B	--	--	--	--	--	--	--	--	--
222	--	--	--	--	B	B	--	--	--	--	--	--	--	--	--
224	--	--	--	--	B	B	--	--	--	--	--	--	--	--	--
236		--	--	--	B	B	--	--	--	--	--	--	--	--	--
--	257	--	--	--	B	B	--	--	--	--	--	--	--	--	--
248		--	--	--	--	--	C	C	C	C	--	C**	--	--	--
262		--	--	--	--	--	C	C	C	C	--	C**	--	--	--
272	--	--	--	--	--	--	C	C	C	C	--	C**	--	--	--
288	--	--	--	--	--	--	C	C	C	C	--	C**	--	--	--
354		--	--	--	--	--	C	C	C	C	--	C**	--	--	--
370		--	--	--	--	--	C	C	C	C	--	C**	--	--	--
468		--	--	--	--	--	C	C	C	C	--	C**	--	--	--
482		--	--	--	--	--	C	C	C	C	--	C**	--	--	--
418	--	--	--	--	--	--	--	D	D	D	D	D	D	D	D
444	--	--	--	--	--	--	--	D	D	D	D	D	D	D	D
484	--	--	--	--	--	--	--	D	D	D	D	D	D	D	D
538	--	--	--	--	--	--	--	D	D	D	D	D	D	D	D
564	--	--	--	--	--	--	--	D	D	D	D	D	D	D	D
602	--	--	--	--	--	--	--	D	D	D	D	D	D	D	D
658	--	--	--	--	--	--	--	D	D	D	D	D	D	D	D
684	--	--	--	--	--	--	--	D	D	D	D	D	D	D	D
722	--	--	--	--	--	--	--	D	D	D	D	D	D	D	D
804	--	--	--	--	--	--	--	D	D	D	D	D	D	D	D
842	--	--	--	--	--	--	--	D	D	D	D	D	D	D	D

*** A MAPS® B Cabinet with 500 mbh of gas heat is a Size 250 mbh heat section plus an Option JH25 curb with a 250 mbh duct furnace.**

**** A MAPS® C Cabinet with 1000 mbh of gas heat is a Size 700 mbh heat section plus an Option JH30 curb with a 300 mbh duct furnace.**

Model RECB, REDB, RECC, and REDC by Electric Heat Module and Cabinet Size

Model RECB	Electric Heat Section	
	120	180
360	D	D
480	D	D
600	D	D
720	D	D
Model REDB	**Electric Heat Section**	
	120	180
418	D	D
444	D	D
484	D	D
538	D	D
564	D	D
602	D	D
658	D	D
684	D	D
722	D	D
804	D	D
842	D	D

Model RECB	Model RECC	Electric Heat Section													
		-10S	-15S	-20S	-24S	-15	-20	-25	-30	-35	-39	-50	-60	-75	-88
060		A	A	A	A	A	A	A	A	A	A	--	--	--	--
078	--	--	A	A	A	A	B	A	A	B	A	B	B	B	--
090		--	A	A	A	A	B	A	A	B	A	B	B	B	B
118	120	--	A	A	A	A	B	A	A	B	A	B	B	B	B
136	--	--	A	A	A	A	B	A	A	B	A	B	B	B	B
160		--	--	--	--	B	B	B	B	B	B	B	B	B	B
186	--	--	--	--	--	B	B	B	B	B	B	B	B	B	B
200		--	--	--	--	--	B	B	B	B	B	B	B	B	B
190		--	--	--	--	--	--	--	--	--	C	C	C	C	C
216	--	--	--	--	--	--	--	--	--	--	C	C	C	C	C
298		--	--	--	--	--	--	--	--	--	C	C	C	C	C
410		--	--	--	--	--	--	--	--	--	C	C	C	C	C
Model REDB	**Model REDC**	**Electric Heat Section**													
		-10S	-15S	-20S	-24S	-15	-20	-25	-30	-35	-39	-50	-60	-75	-88
084		A	A	A	A	A	B	A	A	B	A	B	B	B	--
102	--	--	A	A	A	A	B	A	A	B	A	B	B	B	B
114		--	A	A	A	A	B	A	A	B	A	B	B	B	B
142	144	--	A	A	A	A	B	A	A	B	A	B	B	B	B
162	--	--	--	--	--	A	B	A	A	B	A	B	B	B	B
184		--	--	--	--	B	B	B	B	B	B	B	B	B	B
--	196	--	--	--	--	--	B	B	B	B	B	B	B	B	B
210	--	--	--	--	--	--	B	B	B	B	B	B	B	B	B
222	--	--	--	--	--	--	B	B	B	B	B	B	B	B	B
224	--	--	--	--	--	--	B	B	B	B	B	B	B	B	B
236		--	--	--	--	--	B	B	B	B	B	B	B	B	B
--	257	--	--	--	--	--	B	B	B	B	B	B	B	B	B
248		--	--	--	--	--	--	--	--	--	C	C	C	C	C
262		--	--	--	--	--	--	--	--	--	C	C	C	C	C
272	--	--	--	--	--	--	--	--	--	--	C	C	C	C	C
288	--	--	--	--	--	--	--	--	--	--	C	C	C	C	C
354		--	--	--	--	--	--	--	--	--	C	C	C	C	C
370		--	--	--	--	--	--	--	--	--	C	C	C	C	C
468		--	--	--	--	--	--	--	--	--	C	C	C	C	C
482		--	--	--	--	--	--	--	--	--	C	C	C	C	C

Pressure/ Temperature Chart for Checking Superheat and Subcooling

NOTE: Information in this chart was taken from the Temperature Pressure Chart printed in Form IC-2-04 by the Sporlan Valve Company, Washington, MO 63090.

R-410A Refrigerant		
Pressure	Temperature	
PSI	°F	°C
1.8	-55	-48.3
4.3	-50	-45.6
7.0	-45	-42.8
10.1	-40	-40.0
13.5	-35	-37.2
17.2	-30	-34.4
21.4	-25	-31.7
25.9	-20	-28.9
27.8	-18	-27.8
29.7	-16	-26.7
31.8	-14	-25.6
33.9	-12	-24.4
36.1	-10	-23.3
38.4	-8	-22.2
40.7	-6	-21.1
43.1	-4	-20.0
45.6	-2	-18.9
48.2	0	-17.8
49.5	1	-17.2
50.9	2	-16.7
52.2	3	-16.1
53.6	4	-15.6
55.0	5	-15.0
56.4	6	-14.4
57.9	7	-13.9
59.3	8	-13.3
60.8	9	-12.8
62.3	10	-12.2
63.9	11	-11.7
65.4	12	-11.1

R-410A Refrigerant		
Pressure	Temperature	
PSI	°F	°C
67.0	13	-10.6
68.6	14	-10.0
70.2	15	-9.4
71.9	16	-8.9
73.5	17	-8.3
75.2	18	-7.8
77.0	19	-7.2
78.7	20	-6.7
80.5	21	-6.1
82.3	22	-5.6
84.1	23	-5.0
85.9	24	-4.4
87.8	25	-3.9
89.7	26	-3.3
91.6	27	-2.8
93.5	28	-2.2
95.5	29	-1.7
97.5	30	-1.1
99.5	31	-0.6
101.6	32	0.0
103.6	33	0.6
105.7	34	1.1
107.9	35	1.7
110.0	36	2.2
112.2	37	2.8
114.4	38	3.3
116.7	39	3.9
118.9	40	4.4
121.2	41	5.0
123.6	42	5.6

R-410A Refrigerant		
Pressure	Temperature	
PSI	°F	°C
125.9	43	6.1
128.3	44	6.7
130.7	45	7.2
133.2	46	7.8
135.6	47	8.3
138.2	48	8.9
140.7	49	9.4
143.3	50	10.0
156.6	55	12.8
170.7	60	15.6
185.7	65	18.3
201.5	70	21.1
218.2	75	23.9
235.9	80	26.7
254.6	85	29.4
274.3	90	32.2
295.0	95	35.0
316.9	100	37.8
339.9	105	40.6
364.1	110	43.3
389.6	115	46.1
416.4	120	48.9
444.5	125	51.7
474.0	130	54.4
505.0	135	57.2
537.6	140	60.0
571.7	145	62.8
607.6	150	65.6
645.2	155	68.3

Wiring Diagram Option Identification

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

Option	Brief Description	Installed
AG70	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	Contactor	Factory
AN10	Motor Starter	Factory
ARD3	Motorized Intake Damper (for Option ER)	Factory
AR8	Two-Position (open/closed) O/A Damper	Factory
AR25	Modulating OA/RA Dampers requires Option GF control	Factory
AR2D	Motorized Outside Air Damper and cabinet opening for power exhaust (Option PE)	Factory
AR2G	Modulating OA/RA Dampers (requires Option GF control) w/gravity exhaust hood & damper	Factory
AR2H	Modulating OA/RA Dampers (requires Option GF control) w/exhaust opening in cabinet	Factory
AR2K	Outside Air w/3-position damper, Return/Exhaust Air w/3-position damper (MAPS® unit), gravity damper on exhaust outlet	Factory
AR2L	100% Outside Air - on/off inlet damper; gravity damper on exhaust outlet	Factory
AUC9	Hot Gas Bypass	Factory
AUR1	Modulating Reheat	Factory
BA6	Unit flush mounted disconnect on/off switch	Factory
BA7	Dual Disconnects for Emergency - Cab C	Factory
BC2	Convenience Outlet (requires separate power supply)	Fld&Fctry
BD5	Firestat, 200°F (field installed)	Field
BE6	Return Air Temperature & Humidity Sensors (Opt ER1_)	Factory
BE9	Monitors Temperature from Evaporator Coil	Factory
BE10	Monitors Mixed Air Temperature	Factory
BE11	Monitors Duct Static Pressure	Fld&Fctry
BE12	Monitors Building Static Pressure	Fld&Fctry
BE13	Return Air Temperature Sensor	Field
BE14	Return Air Humidity Sensor	Field
BE15	Space CO2 Sensor	Fld&Fctry
BE16	DDC Monitoring Dirty Filter Switch	Factory
BE17	Photoelectric Smoke Detector	Field
BE18	Dirty Filter Pressure Switch	Factory
BE19	OA/RA Override (requires BHB6)	Fld&Fctry
BE20	Manual Schedule Override	Factory
BE21	Contacts only for Occupied/Unoccupied Switch	Factory
BE28	Dirty Filter Switch (for Option ER1)	Factory
BG9	Exhaust Fan Relay	Fld&Fctry
BHB5	Lon Communication Plugin Module	Factory
BHB6	Add'l Inputs & Outputs for Main Controller	Fld&Fctry
BHC5	LON card for Option ER1	Factory
BP4	High and Low Gas Pressure Switches	Factory
BW5D	DDC Monitored Dirty Filter Sensor	Fld&Fctry
CL77	Space Temperature Sensor/Override	Field
CP__	Disconnect Switch	Field
D15	Neutral Air/Discharge Air Temperature Control	Fld&Fctry
D16	Space Temperature Control w/Discharge Air Reset	Fld&Fctry
D17	RECC - Neutral Air/Discharge Air Temperature Control	Fld&Fctry
D18	RECC - Space Temperature Cntrl w/Discharge Air Reset	Fld&Fctry
DT7	Space Relative Humidity Sensor/Control	Field
EFA_	Exhaust Fan Motor HP (for Opt ER1_)	Factory

Option	Brief Description	Installed
EFC4	Building Pressure Control for EFD1 (for Opt ER1_)	Fld & Fctry
EFC7	Proportional to MAPS® Control for EFD1 (for Opt ER1_)	Factory
EFC9	Adjustable Constant Volume Control for EFD1 (ER1_)	Factory
EFD1	Exhaust Fan Motor Variable Frequency Drive (ER1_)	Factory
EFD2	Variable Frequency Drive (for PE Options)	Field
EG1	Single stage control - RECB, REDB	Factory
EG3	Multi stage control - RECB, REDB	Factory
EL_	Exhaust Fan Motor Type (for Option ER1_)	Factory
EM_	Exhaust Fan Drive (for Option ER1_)	Factory
EN2	Contactor (for Option PE or ER1_)	Factory
EN10	Starter (for Option or ER1_)	Factory
ER1_	Energy Recovery Module	Field
GF1	DDC Damper Control with Remote Manual Potentiometer (0-5V input signal)	Fld&Fctry
GF2	DDC Two-Position Damper Control	Fld&Fctry
GF4	DDC Four-Position Damper Control based on two input switches	Fld&Fctry
GF5	DDC Damper Control with Building Pressure Monitor	Fld&Fctry
GF6	DDC Damper Control with Mixed CO2 Control (0-2000 ppm)	Fld&Fctry
GF7	DDC Damper Control with 2-Position Enthalpy Control	Fld&Fctry
GF8	DDC Damper Control with Dual Reference Enthalpy Control	Fld&Fctry
GF9	DDC Damper Control with Dry Bulb Mixed Air Economizer	Fld&Fctry
JHT1	Additional electrical components required for curb furnace JH25 (applies to RDCB/RDDB 500MBH)	Factory
JHT2	Additional electrical components required for curb furnace JH30 (applies to RDCB/RDDB Cabinet C 1000 MBH)	Factory
PE_	Power Exhaust	Fld&Fctry
PL4	Redundant phase loss/reversal protection & high/low voltage	Factory
RB3	Remote Module with Display, Controls, and Alarm Light	Field
RB4	Hand held control access with 12-ft cable and alarm light	Field
SA1	Duct Photoelectric Smoke Detector	Fld&Fctry
SFA_	Supply Fan Motor HP (for Option ER1_)	Factory
SFC3	Neutral Pressure Control for SFD1 (for Option ER1_)	Factory
SFC9	Adjustable Constant Volume Control for SFD1 (ER1_)	Factory
SFD1	Supply Fan Motor Variable Frequency Drive (ER1_)	Factory
SL_	Supply Fan Motor Type (for Option ER1_)	Factory
SN2	Supply Fan Contactor (for Option ER1_)	Factory
SN10	Supply Fan Starter (for Option ER1_)	Factory
VFC2	Variable Frequency Drive DDC External Control 0-5V Input (requires BHB6)	Fld&Fctry
VFC3	VFD Duct Static Pressure Control (0 to 2.5" w.c.)	Fld&Fctry
VFC4	VFD Building Static Pressure Control (-0.5 to 0.5)	Fld&Fctry
VFC5	Variable Frequency Drive Space CO2 Control (0-2000 ppm)	Fld&Fctry
VFC7	Variable Frequency Drive 3-Speed Wall-Mounted Control	Fld&Fctry
VFC8	Variable Frequency Drive 4-Speed Wall-Mounted Control	Fld&Fctry
VFC9	Adjustable Constant Volume Control	Fld&Fctry
VFD2	Variable Frequency Drive	Field
VFD3	Variable Frequency Drive field provided	Factory

References

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

Airflow Pressure Drops ..... See Sales/Technical Catalog C-MAPS
Airflow Ranges..... See Sales/Technical Catalog C-MAPS
Amp Loads..... See Sales/Technical Catalog C-MAPS
Blower Charts (RPM/BHP) ..... See Sales/Technical Catalog C-MAPS
Control Instructions ..... See Form CP-MAPS D15/16
Installation/Operation/Service - Energy Recovery Module, Option ER1..... See Form I-MAPSIII&IV-ER
Installation - Roof Curbs Options CJ3, CJ31, CJ34, CJ49, CJ50, CJ53, CJ54 ..... See Form I-OPT-C
Installation - Outside Air Hood Options AS16 and AS19.....See Form I-OPT-WH
Operation/Maintenance/Service - MAPS® Cabinets A, B, C ..... See Form O-MAPS III&IV Cabinets A/B/C
Operation/Maintenance/Service - MAPS® Cabinet D..... See Form O-MAPS III Cabinet D
Wiring Diagram ..... With the Unit

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INSTALLATION RECORD - to be completed by the installer:

Installer:

Name _____

Company _____

Address _____

_____

_____

Phone _____

Distributor (company from which the unit was purchased):

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 questions on service or repair

- Call (855) TNB-HVAC {855-862-4822}.
- For Sales or Specification needs, contact your Reznor® Representative by calling 800-695-1901.

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