REZNOR®

MAPS®

MAPS® dH™

FORM O-MAPS II (Version B)
Obsoletes Form O-MAPS II (Version A)

Operation/Maintenance/Service

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

MAPS® II Model RDCA

WARNING:
All systems contain chlorodifluoromethane (HCFC-22) or a hydro-fluorocarbon blend (HFC-407C). HCFC-22 is believed to harm the public health and environment by destroying ozone in the upper atmosphere. Do not release HCFC-22 to the atmosphere. The U.S. Clean Air Act requires the recovery of any residual refrigerant.
IMPORTANT: Do not release refrigerant to the atmosphere! If required service procedures include the adding or removing of refrigerant, the service technician must comply with all federal, state and local laws. The procedures discussed in this manual should only be performed by a qualified HVAC technician.
WARNING:
Improper installation, adjustment, alteration, service, or maintenance can cause property damage, injury, or death. Read the installation, operation, and maintenance

Contents

1.0 GENERAL

This booklet includes operation, maintenance, and service information. Before beginning any procedure, carefully review the information, paying particular attention to the warnings. Handling of refrigerant should only be performed by a certified HVAC technician in compliance with all codes and requirements of authorities having jurisdiction.

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

NOTE: Information on gas furnace maintenance and service also applies to MAPS II optional duct furnace curb, Model JHUP.

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

Definitions of Hazard Intensity Levels used in this Manual

There are warning labels on the unit and throughout this manual. For your safety, comply with all warnings during installation, operation, and service of this system. See definitions of Hazard Intensity Levels of warnings below.

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.**

2.0 Maintenance Requirements

This unit will operate with a minimum of maintenance. To ensure long life and satisfactory performance, a system that is operating under normal conditions should be inspected according to the Maintenance Schedule listed below. If in an area where an unusual amount of dust or soot or other impurities are present in the air, more frequent inspection is recommended.

Refer to the illustration in **FIGURE 1A or 1B** and follow the instructions in the referenced paragraph to maintain this equipment. Maintenance requirements and procedures apply to all Models unless noted.

IMPORTANT: Do not release refrigerant to the atmosphere! If required service procedures include the adding or removing of refrigerant, the service technician must comply with all federal, state and local laws. The procedures discussed in this manual should only be performed by a qualified HVAC technician.

Maintenance Schedule

Monthly

- Inspect filters; clean or replace as needed. See Paragraph 3.
- Inspect and clean the condensate drain. See the installation manual, Form I-MAPS II, Paragraph 6.2.

Semi-Annually

- Inspect the unit blower belt for tension, wear, and alignment. Check setscrews. If required, lubricate bearings. See Paragraph 4. (NOTE: These procedures also apply to an optional power exhaust blower assembly.)

Annually

NOTE: Redo the cooling startup procedures when the cooling season begins. Refer to Startup instructions in the installation manual, Form I-MAPS II, Paragraph 10.

Beginning of the cooling season or more frequently in year-round cooling climate:

- Inspect the wiring for any damaged wire. Replace damaged wiring.
- Inspect the condensate drain pan. Clean the coil cabinet and fill the trap. See the installation manual, Form I-MAPS II, Paragraph 6.2.
- Inspect/clean all coils. See Paragraph 5.
- Check compressor operation. See Paragraph 7.
- Check refrigerant pressure and temperatures (superheat and subcool). These checks are done when the system is in operation. See Paragraph 6.

2.0 Maintenance Requirements (cont'd)

Maintenance Schedule (cont'd)

Models RDCA & RDDA with a gas-fired heat section (beginning of the heating season) - See Paragraph 9.:

NOTE: If equipped with an optional Model JHUP curb duct furnace, these same maintenance procedures apply to the duct furnace.

- ☐ Clean all dirt and grease from the combustion air openings and venter assembly.
- ☐ Check the burner and heat exchanger for scale, dust, or lint accumulation. Clean as needed.
- ☐ Check the gas valves to ensure that gas flow is being shutoff completely.

Models RECA & REDA with an electric heat section (beginning of the heating season) - See Paragraph 10.

- ☐ Check the wiring connections.
- ☐ Check the heat section and elements for dust or lint accumulation. Carefully clean as needed.

NOTE: If replacement parts are required, use only factory-authorized parts. For information, call 800-695-1901 or go to www.RezSpec.com

WARNING: Turn off the power before performing all maintenance procedures (except to check refrigerant pressure and temperature). Lock disconnect switch in OFF position. If the system has a heat section, when you turn off the power supply, turn off the gas. See Hazard Levels, page 3.

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

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

HIGH VOLTAGE ELECTRICAL COMPARTMENT

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

AUXILIARY COMPARTMENT

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

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

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

BLOWER SECTION
- Blower Motor

Models RDCA & RDDA With Gas Heat Section (FIGURE 1A *only*):
- Limit Control (capillary type)

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

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

Models RDCA & RDDA With Gas Heat Section (FIGURE 1A *only*):

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

Models RECA & REDA With Electric Heat Section (FIGURE 1B *only*):

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

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

FIGURE 1A - Models RCA, RDA, RDCA, RDDA - Locations of Standard and Optional Controls and Service Ports

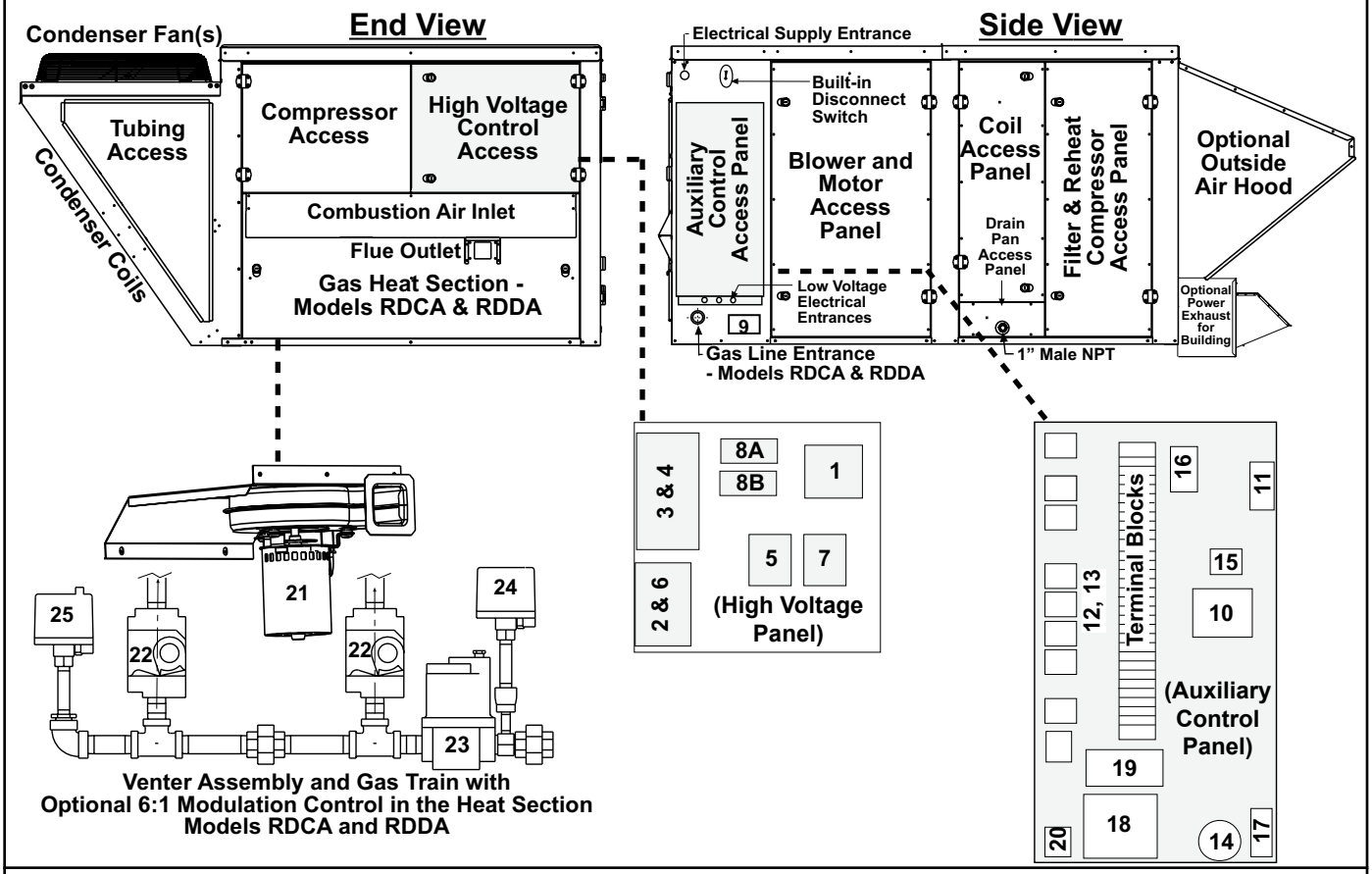
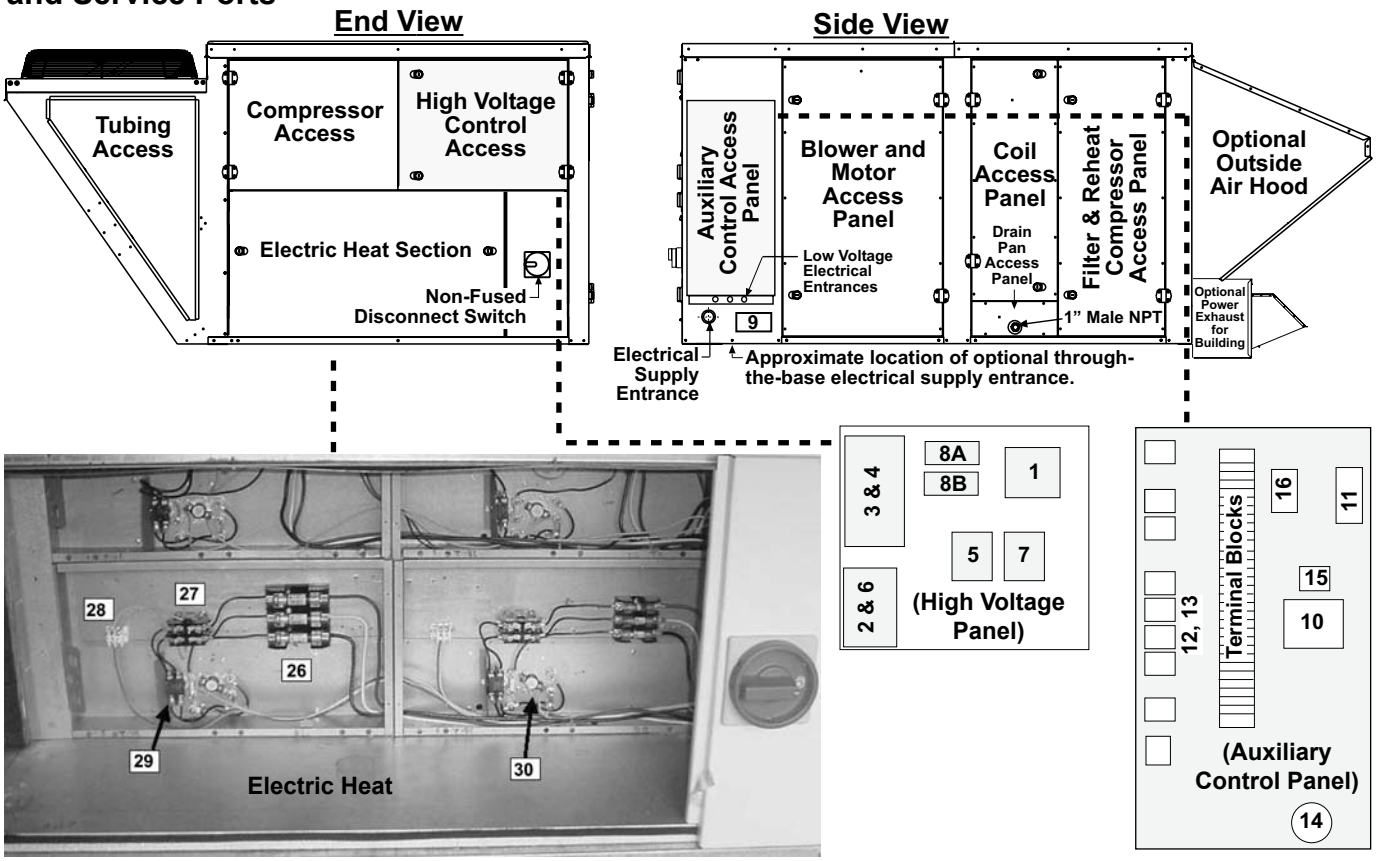


FIGURE 1B - Models RECA and REDA - Locations of Standard and Optional Controls and Service Ports



2.0 Maintenance Requirements (cont'd)

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

Because of the numerous model/size combinations, some items are categorized by Cabinet Size A, B, or C. Use these cross-reference charts to determine the cabinet size of your system.

Model RCA and Model RDA

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

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

Model RDCA and Model RDDA by Gas Heat Section Size

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

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

Model RECA and Model REDA by Electric Heat Module Size

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

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

3.0 Filters

Inlet Air Filters Size, Type, and P/N

Cabinet	A	B	C
Filter Size	20x20	20x25	
Qty	4	4	6
2" Pleated	104111	104113	
4" Pleated	205790	205791	
2" Aluminum	101621	101623	

The filter section is equipped with either 2" permanent aluminum filters or 2" or 4" pleated disposable filters. If filters are replaced, use only these types of filters. ***Do not use*** flat disposable filters.

Filters are easily removed; open the door and slide out.

If equipped with permanent aluminum filters, remove the filters, wash, rinse, allow to dry, and slide them back in the cabinet.

If equipped with disposable filters, replace dirty filters. Exposure to humid makeup air can accelerate filter degradation. Systems with pleated disposable filters require more frequent filter inspection and replacement.

Permanent Filters in the Outside Air Hood

An outside air hood has 1" permanent, aluminum filters at the entrance of the hood. The filters act as a moisture eliminator and bird screen.

When inspecting the inlet air filters, inspect the outside air hood filters. If cleaning is needed, remove the filters, clean, rinse, dry and re-install.

FIGURE 2A - Removing Filters from Outside Air Hood

1" Permanent Aluminum Filters for Outside Air Hood are listed by Cabinet Size A, B, or C (see page 6)

***A** - (4) 16 x 20, **P/N 101607**

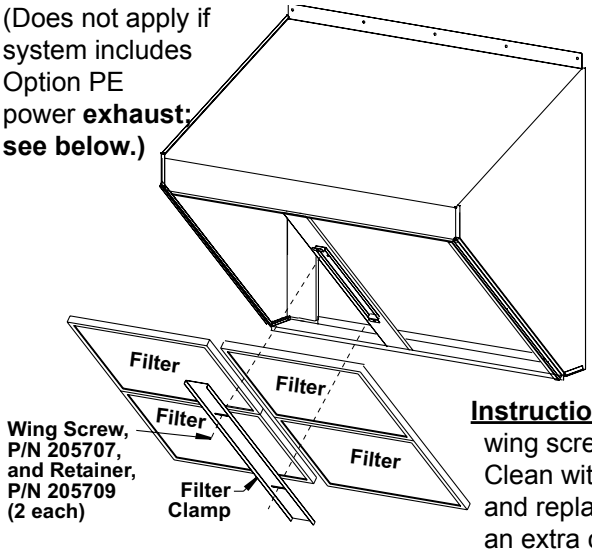
***B** - (4) 16 x 25, **P/N 101609**

C - (3) 16 x 25, **P/N 101609**; (6) 16 x 20, **P/N 101607**

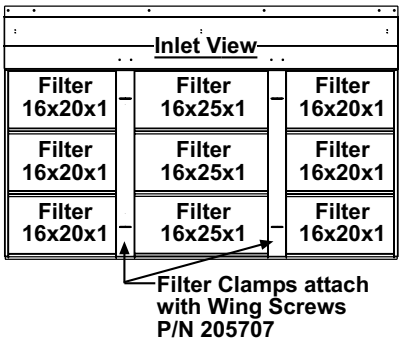
* Apply only to Cabinet Size A and B with outside air hood Option AS16.

Cabinet Sizes A and B with Option AS16 Outside Air Hood

(Does not apply if system includes Option PE power **exhaust; see below.)**



All Cabinet Size C with Outside Air Hood Option AS16 or AS19



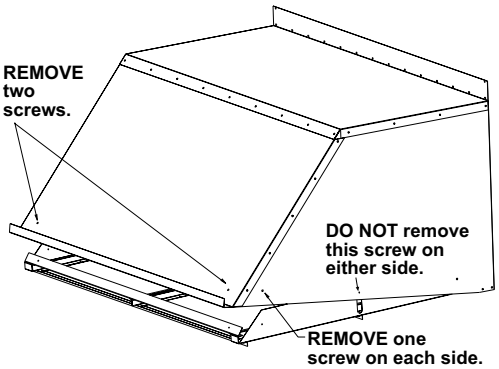
Instructions: Remove filters by loosening the wing screws and sliding the filter clamp(s). Clean with soap and water, allow to dry, and replace. If it is more convenient to keep an extra clean set of filters, quantities, filter sizes, and part numbers are listed.

FIGURE 2B - Removing Filters from Option AS19 Outside Air Hood Installed on a Cabinet Size A or B with power exhaust Option PE1 or PE2

Instructions: 1) Remove the four screws as illustrated. Lower the tray.; **2)** Pull out filters. Clean with soap and water. Allow to dry.; **3)** Slide clean dry filters into tray.; **4)** Re-position tray and replace screws.

1" Permanent Aluminum Filters
A - (4) 18 x 20, **P/N 194903
B - (4) 20 x 25, **P/N 101610

** Apply only to Cabinet Size A and B with outside air hood Option AS19.



4.0 Drive Components

CAUTION: If the blower is unused for more than three months, bearings with a grease fitting should be purged with new grease prior to start-up.

Bearings - Bearings with a grease fitting should be lubricated twice a year with a high temperature, moisture-resistant grease. (Type NLGI-1 or -2 standard grease is recommended.) Be sure to clean the grease fitting before adding grease. Add grease with a handgun until a slight bead of grease forms at the seal. Be careful not to unseat the seal by over lubricating. NOTE: If unusual environmental conditions exist (temperatures below 32°F or above 200°F; moisture; or contaminants), more frequent lubrication is required.

Setscrews - Check all of the setscrews (bearing/blower hubs and pulleys). Torque pulley setscrews a minimum of 110 in-lb to 130 in-lb maximum.

A bearing hub setscrew for a 1-3/8" to 1-3/4" shaft requires a 5/16" socket and a tightening torque of 165 in-lbs.

Belts - Check belt for proper tension and wear. Adjust belt tension as needed. Replace worn belts.

Blower systems are equipped with either Power Twist Plus® linked blower belt or a solid belt. The linked belts are designed in sections allowing for easy sizing and adjustment. The belt is sized at the factory for the proper tension. If the belt needs adjustment, the recommended method of shortening 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 equipped with a solid belt, adjust the belt tension by turning the adjusting screw on the motor base until the belt can be depressed 3/4" (19mm). After correct tension is achieved, re-tighten the locknut on the adjustment screw.

4.0 Drive Components (cont'd)

The belt tension should be checked at regular maintenance inspections. Proper belt tension is important to the long life of the belt and motor.

Be sure the belt is aligned in the pulleys. If belt is removed or replaced, be sure to align directional arrows on the belt to the proper drive rotation.

5.0 Coil Maintenance

Inspect all cooling coils at the beginning of the cooling season or more often if needed.

Coil Access - The entering air side of the condenser coils is visible on the outside of the system. For additional inspection, remove the tubing access panel.

The evaporative coils can be accessed by opening the coil cabinet door (See **FIGURE 1**).

Coil Maintenance - Inspect coils for debris, dirt, grease, lint, pollen, mold, or any element which would obstruct heat transfer or airflow. Inspect coils and tubing for physical damage. Inspect feeders, piping connections, coil headers, and return bends for signs of fatigue, rubbing, and physical damage.

Clean the coils annually, or more often if needed. Use the proper tools and follow the instructions carefully to avoid damaging the coil. Use of a non-acid based coil cleaner is recommended. Due to possible damage to the coil, high pressure spray is not recommended.

Coils in the Cabinet (Evaporative Coils)

1. Verify that the electrical power has been turned off and the disconnect switch locked.
2. Open the access panels.
3. Use a soft brush to remove any dirt and debris from both sides of the coil.
4. Spray with cold or warm (not hot) water and a cleaning solution (non-acid based coil cleaner is recommended). Due to possible damage to the coil, high pressure spray is not recommended. First spray the leaving airflow side, then the inlet airflow side.
   As much as possible, spray the solution perpendicular to the face of the coil.
   Follow the instructions on the cleaning solution. When cleaning process is complete, rinse both sides with cool, clean water.
5. Replace the panels.

Coils on the Side of the Cabinet (Condenser Coils)

The entering airflow side of the condenser coils can be reached for cleaning without removing any components. Remove the access panel on the end of the condenser section to access leaving side and additional coils.

1. Verify that the electrical power has been turned off and the disconnect switch locked.
2. Use a soft brush to remove any dirt and debris from the coil.
3. Spray with cold or warm (not hot) water and a cleaning solution (non-acid based coil cleaner is recommended). Due to possible damage to the coil, high pressure spray is not recommended. Spray up through the coil. Follow the instructions on the cleaning solution. When clean, rinse with cool, clean water.

Condenser Coil Connections

If additional cleaning is required or if coils are removed for any reason, refer to **FIGURES 3A-3L** for making condenser coil connections.

FIGURE 3A - Two Single Circuits

Sizes	Ckt A	Ckt B
059. 060	3 ton	2 ton
077, 078, 102	4.5 ton	2 ton
090, 114	4.5 ton	3 ton
108, 126	6.2 ton	3 ton

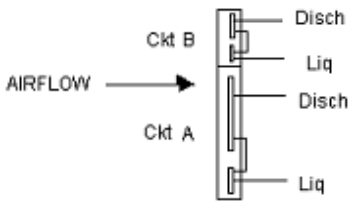


FIGURE 3B - One Twinned Circuit

Sizes	Ckt A
025 (bottom ckt only)	2 ton
037	3 ton

MODELS: 037, 025 (bottom circuit only)

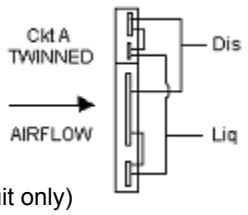


FIGURE 3C - Three Single Circuits

Sizes	Ckt A	Ckt B	Ckt C
184, 220	4.5 ton	6.2 ton	4.5 ton
198, 234	4.5 ton	6.2 ton	6.2 ton

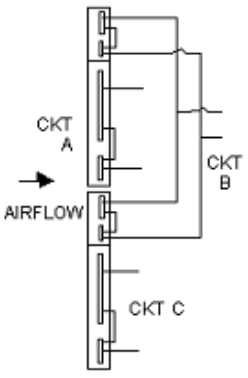


FIGURE 3D - One Twinned Circuit, B is 6.2 tons; and Two Single Circuits, A is 4.5 tons and D is 3 tons

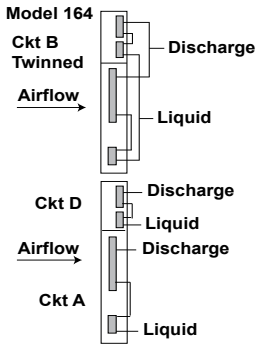


FIGURE 3E - Three Single Circuits

Size	Ckt A	Ckt B	Ckt D
139	4.5 ton	4.5 ton	3 ton

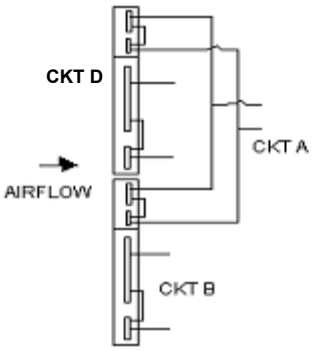


FIGURE 3F - Two Twinned Circuits

Sizes	Ckt A	Ckt B
109	6.2 ton	3 ton
120, 144	6.2 ton	4.5 ton

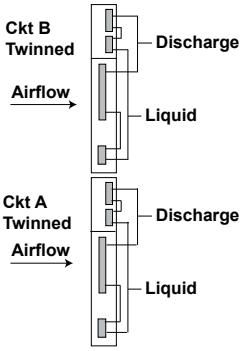


FIGURE 3G - Two Single Circuits, C is 3 tons; A is 4.5 tons; and One Twinned Circuit; B is 6.2 tons

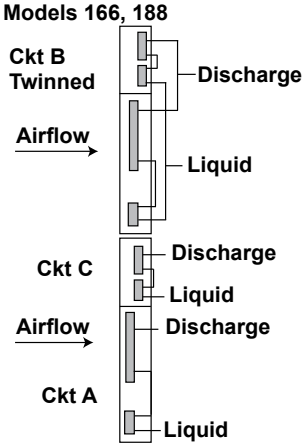


FIGURE 3H - Two Twinned Cooling Circuits; A is 4.5 tons; Circuit B is 10 tons

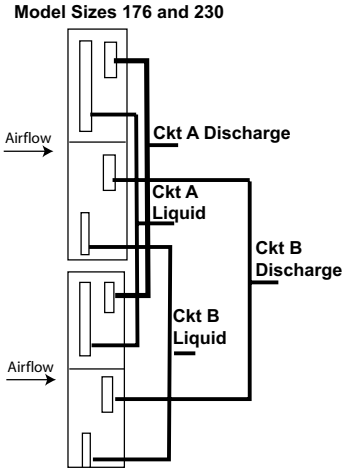


FIGURE 3J - Two Twinned Cooling Circuits; A is 12.4 tons (two 6.2t tandem compressors) and Circuit B is 12 tons

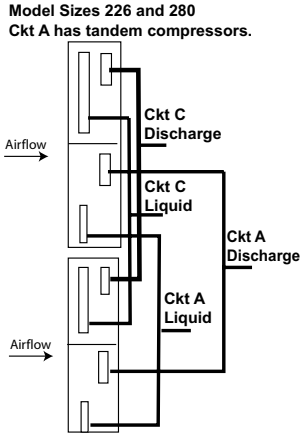


FIGURE 3K - Two Single Cooling Circuits; A is 12.4 tons (two 6.2t tandem compressors) and Circuit B is 12 tons

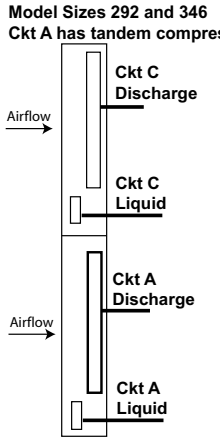
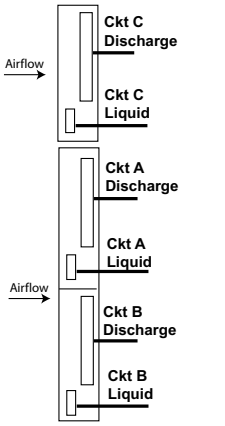


FIGURE 3L - Three Single Cooling Circuits; A is 10 tons, Circuit B is 10 tons, and Circuit C is 10 tons



6.0 Check Refrigerant Pressure and Temperatures

IMPORTANT: Do not release refrigerant to the atmosphere! If required service procedures include the adding or removing of refrigerant, the qualified HVAC service technician must comply with all federal, state or provincial, and local laws.

Check Refrigerant Pressure

Refer to **FIGURE 4A or 4B** for required pressure for cooling systems designed for humid/temperature climates (Sizes 060, 078, 090, 108, 120, 164, 166, 184, and 198 and the cooling circuit in all systems with a reheat cycle).

Refer to **FIGURE 5A or 5B** for required pressure for cooling systems designed for a dry climate (Model RCA/RDCA/RECA 025, 037, 059, 077, 109, 139).

Refer to **FIGURE 6A or 6B** for the re-heat heat pump circuit pressure (All RDA/RDDA/REDA Models).

Connect the pressure gauge and check the pressures.

6.0 Check Refrigerant Pressure and Temperatures (cont'd)

Check Refrigerant Temperatures

Each circuit must be isolated for accurate temperature readings.

Check the cooling circuit superheat (temperature of the gaseous refrigerant in the suction line leaving the evaporator coil). Refer to Paragraph 6, Step 11 on page 15, for instructions on measuring superheat. Recommended superheat range is 8-12°F (4.5-6.7°C).

Check the cooling circuit refrigerant subcooling (temperature of the line on the leaving side of the condenser coil). Attach the sensor to the tubing. Acceptable subcooling readings range from 18-22°F (10.1-12.3°C). Refer to Paragraph 6, Step 11 on page 16, for instructions on measuring subcooling.

FIGURE 4A - Operating Discharge Head Pressure vs Outdoor Ambient Temperature for Model RCA/RDCA/RECA 060, 078, 090, 108, 120, 164, 166, 184, and 198 and the Cooling Circuit on All RDA/RDDA/REDA Models

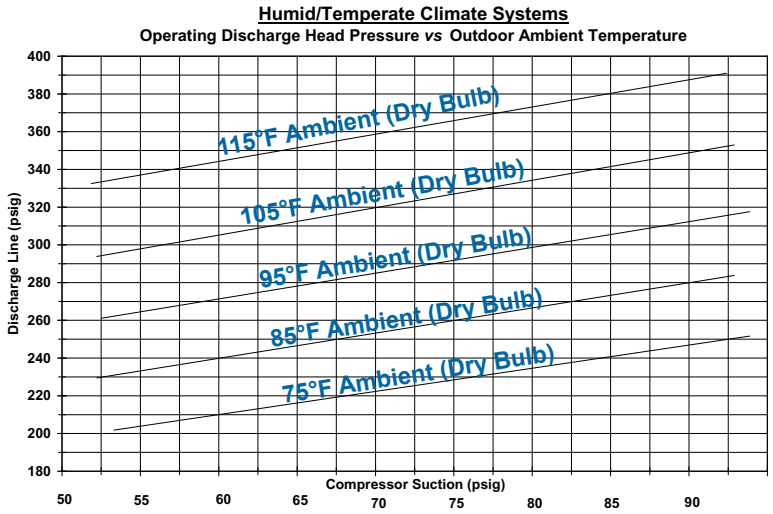
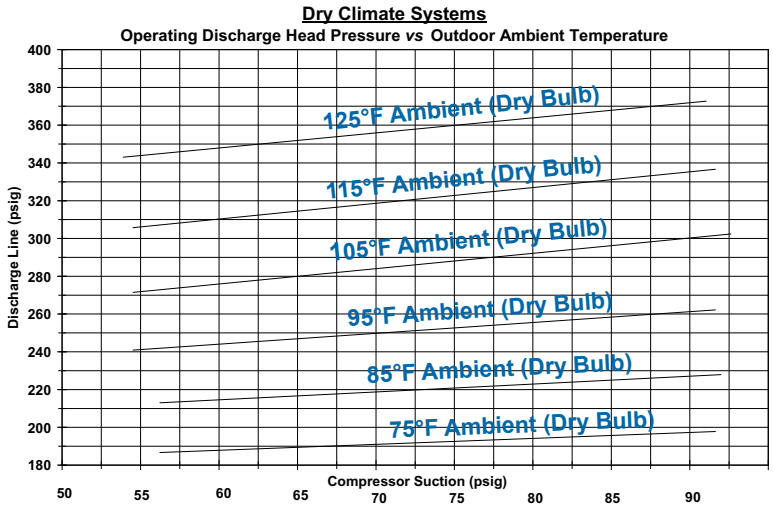


FIGURE 4B - Operating Discharge Head Pressure vs Outdoor Ambient Temperature for Model RCA/RDCA/RECA 059, 077, 109, and 139 (NOTE: Size 025 and 037 discharge gauge pressures are reduced approximately 10 pounds.)



Re-Heat Pump™ Heat Pump Refrigerant System - Models RDA, RDDA, and REDA

Re-Heat Pump Reheat Cycle Performance

Typical Stand-Alone Re-Heat Heat Pump Performance (subtract 8 psig for liquid line pressure)				
Coil Condition	Outside Dry Bulb	Outside Relative Humidity	Suction PSIG	Discharge PSIG
Dry	65°F	30%	60	172
Dry	75°F	30%	62	196
Dry	80°F	30%	70	218
Wet	75°F	70%	76	220
Wet	80°F	70%	84	240
Wet	85°F	70%	94	265

Typical RDA Performance with 55°F Air Entering the Reheat Condenser (primary cooling enabled) (subtract 8 psig for liquid line pressure)				
Coil Condition	Outside Dry Bulb	Outside Relative Humidity	Suction PSIG	Discharge PSIG
Dry	65°F	30%	59	165
Dry	75°F	30%	62	168
Dry	80°F	30%	65	170
Wet	75°F	70%	73	178
Wet	80°F	70%	80	184
Wet	85°F	70%	90	191
Wet	90°F	70%	96	193

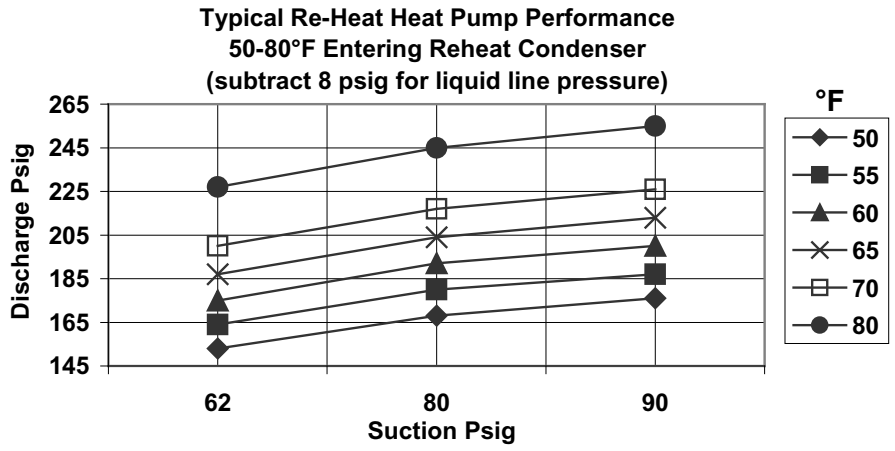
The re-heat heat pump refrigerant circuit is a closed system that includes the same components as the larger cooling circuits. The system is fully charged with either R22 or R407C refrigerant before it leaves the factory. For charging, see page 14.

Both the condenser coil and the compressor are located inside the coil cabinet downstream of the cooling evaporator coil. In this location, they act to raise the temperature (reheat) of the airstream after it has passed through the reheat evaporator coil.

The re-heat heat pump performance can be checked in a stand-alone mode or in conjunction with the primary refrigeration system. In general, suction line super heat should be in the 8 to 15°F (4.5 to 8.4°C) range, and liquid line sub-cooling should be in the 18 to 25°F (10.1 to 14°C) range.

When compared to conventional refrigeration performance, the re-heat suction pressures will tend to be higher and discharge pressures lower.

FIGURE 5 - Operating Head Pressure of the Compressor in the Re-Heat Heat Pump Circuit



7.0 Compressor Maintenance and Replacement

DANGER: The refrigeration circuits are high pressure systems. Hazards exist that could result in personal injury or death. It is therefore required that the removal and installation of a hermetic compressor be performed by qualified personnel only.

DANGER: Never use oxygen to pressurize a refrigeration system. Oxygen can explode on contact with oil and could result in personal injury or death. When using high pressure gas such as nitrogen for this purpose, ALWAYS USE A PRESSURE REGULATOR that can control the pressure down to 1 or 2 psig. Failure to use a regulator will result in extremely high pressure which could exceed the burst pressure of the compressor or other system components and result in personal injury or death.

WARNINGS: For your safety, wear eye protection and gloves when handling refrigerant or oil and when brazing. Have a fire extinguisher nearby when brazing tubing.

Do not lift compressor by copper tubing. To prevent internal damage, compressors must ALWAYS be held upright.

The following instructions include major points of consideration that will ensure proper installation and protect you from potential personal injury. Please use the following 13 steps as a checklist, taking each item in order before proceeding to the next. If more information is required, call the Reznor Service Department.

7.0 Compressor Maintenance and Replacement (cont'd)

Compressor Maintenance Checklist, Steps 1-13

Handling

DANGER: To avoid electrical shock, power to the compressor(s) MUST REMAIN OFF during performance of Steps 1 through 9 below. LOCK DISCONNECT SWITCH OFF (open).

☐ **Step 1. Verify Proper Application**

Verify that the replacement compressor is identical to the model being replaced. All system components are matched to the compressor. Replacing a compressor with a model other than the Thomas and Betts (Reznor) specified replacement will void the product warranty. See part numbers for R22 and R407C compressors on page 13.

☐ **Step 2. Determine Cause of Initial Failure and Remove the Compressor**

In order to prevent a second failure, the cause of the original failure must be determined. Identify the cause and make the necessary repairs. Check fuses/breakers for correct sizing.

CAUTION: DO NOT LIFT compressor by copper tubing; damage will occur. Compressor must remain upright.

WARNING: Wear eye protection and gloves when handling refrigerant or oil and when brazing.

a) BEFORE REMOVING THE FAULTY COMPRESSOR, remove refrigerant charge using proper recovery procedures. Call 1-800-441-9450 for the name of the nearest Dupont authorized distributor or 1-800-ASK-KLEA (IGI) for information on their refrigerant reclaim programs.

b) Disconnect wires. All compressor wiring is connected using a black molded plastic plug. Remove the plug from the compressor.

c) Open access ports so that pressure does not build up in the system. Before unbrazing stubs from the compressor, cut suction and discharge tubing with a tubing cutter.

WARNING: Have a fire extinguisher near. The compressor contains oil. There is a risk of fire when unbrazing stubs.

Use a high temperature torch to disconnect the suction line and the discharge line from the compressor.

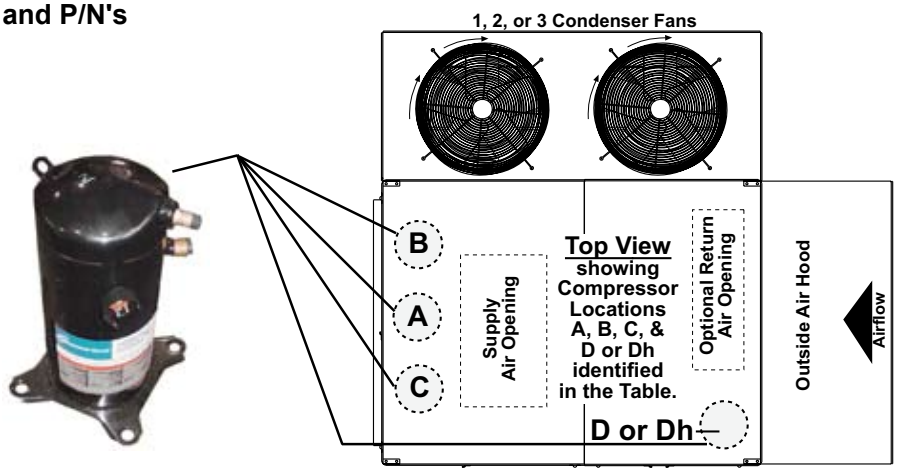
d) Remove the mounting bolts and the compressor. Save the mounting hardware to attach the grommets and sleeves shipped with the replacement compressor.

FIGURE 6 - With disconnect switch off, remove the plug to disconnect compressor wiring.

Molded plug with wires attached

FIGURE 7 - Compressor Locations and P/N's

NOTE: Compressors for RDCA and RECA are the same as for Model RCA. Compressors for RDDA and REDA are the same as for Model RDA.



RCA	RDA	Compressor P/N's by Refrigerant, Location, and Voltage - See FIGURE 7.															
Compressor Location			A			B			C			D - RCA			Dh - RDA	
		Voltage	208/230	460	575**	208/230	460	575**	208/230	460	575**	208/230	460	575**	208/230	460
025	--	Tons	2.0		N/A	N/A			N/A			N/A			N/A	
		R22 P/N	205622	205609												
		R407C P/N	217244	220715												
037	--	Tons	3.0			N/A			N/A			N/A			N/A	
		R22 P/N	205610	205623	205624											
		R407C P/N	220375	216936	220716											
059	--	Tons	3.0			2.0			N/A			N/A			N/A	
		R22 P/N	205610	205623	205624	205622	205609									
		R407C P/N	220375	216936	220716	217244	220715									
060	--	Tons	3.0		N/A	2.0		N/A	N/A			N/A			N/A	
		R22 P/N	205610	205623		205622	205609									
		R407C P/N	220375	216936		217244	220715									
077	--	Tons	4.5			2.0		N/A	N/A			N/A			N/A	
		R22 P/N	205611	205612	205625	205622	205609									
		R407C P/N	217246	216937	N/A	217244	220715									
078	102	Tons	4.5			2.0		N/A	N/A			N/A			2.0	
		R22 P/N	205611	205612	N/A	205622	205609								205622	205609
		R407C P/N	217246	216937		217244	220715								217244	220715
090	114	Tons	4.5			3.0			N/A			N/A			2.0	
		R22 P/N	205611	205612	205625	205610	205623	205624							205622	205609
		R407C P/N	217246	216937	N/A	220375	216936	220716							217244	220715
108	126	Tons	6.2			3.0			N/A			N/A			2.0	
		R22 P/N	205626	205613	205627	205610	205623	205624							205622	205609
		R407C P/N	217245	216938	220717	220375	216936	220716							217244	220715
109	--	Tons	6.2			3.0			N/A			N/A			N/A	
		R22 P/N	205626	205613	205627	205610	205623	205624								
		R407C P/N	217245	216938	220717	220375	216936	220716								
120	144	Tons	6.2			4.5			N/A			N/A			2.0	
		R22 P/N	205626	205613	205627	205611	205612	205625							205622	205609
		R407C P/N	217245	216938	220717	217246	216937	N/A							217244	220715
139	--	Tons	4.5			4.5			N/A			3.0			N/A	
		R22 P/N	205611	205612	205625	205611	205612	205625				205610	205623	205624		
		R407C P/N	217246	216937	N/A	217246	216937	N/A				220375	216936	220716		
164	--	Tons	6.2			4.5			N/A			3.0			N/A	
		R22 P/N	205626	205613	205627	205611	205612	205625				205610	205623	205624		
		R407C P/N	217245	216938	220717	217246	216937	N/A				220375	216936	220716		
166	188	Tons	4.5			6.2			3.0			N/A			2.0	
		R22 P/N	205611	205612	205625	205626	205613	205627	205610	205623	205624				205622	205609
		R407C P/N	217246	216937	N/A	217245	216938	220717	220375	216936	220716				217244	220715
176	230	Tons	4.5			10.0			N/A			N/A			4.5	
		R22 P/N	205611	205612	205625	207351	207352	207353							205611	205612
		R407C P/N	217246	216937	N/A	220712	216939	220718							217246	216937
184	220	Tons	4.5			6.2			4.5			N/A			3.0	
		R22 P/N	205611	205612	205625	205626	205613	205627	205611	205612	205625				205610	205623
		R407C P/N	217246	216937	N/A	217245	216938	220717	217246	216937	N/A				220375	216936
198	234	Tons	4.5			6.2			6.2			N/A			3.0	
		R22 P/N	205611	205612	205625	205626	205613	205627	205626	205613	205627				205610	205623
		R407C P/N	217246	216937	N/A	217245	216938	220717	217245	216938	220717				220375	216936
226	280	Tons	6.2t			6.2t			6.2			N/A			4.5	
		R22 P/N	208/230V - 207354; 460V - 207355; 575V - 207356						205626	205613	205627				205611	205612
		R407C P/N	208/230V - 220714; 460V - 216941; 575V - 220720						217245	216938	220717				217246	216937
292	346	Tons	6.2t			6.2t			12.0			N/A			4.5	
		R22 P/N	208/230V - 207354; 460V - 207355; 575V - 207356						207348	207349	207350				205611	205612
		R407C P/N	208/230V - 220714; 460V - 216941; 575V - 220720						220713	216940	220719				217246	216937
374	428	Tons	10.0			10.0			10.0			N/A			4.5	
		R22 P/N	207351	207352	207353	207351	207352	207353	207351	207352	207353				205611	205612
		R407C P/N	220712	216939	220718	220712	216939	220718	220712	216939	220718				217246	216937
	446	Tons	10.0			10.0			10.0			N/A			6.2	
		R22 P/N	207351	207352	207353	207351	207352	207353	207351	207352	207353				205626	205613
		R407C P/N	220712	216939	220718	220712	216939	220718	220712	216939	220718				217245	216938
		Voltage	208/230	460	575**	208/230	460	575**	208/230	460	575**	208/230	460	575**	208/230	460
Compressor Location			A			B			C			D - RCA			Dh - RDA	

*Compressor D in Model RDA is the reheat pump compressor; **575V is available for Model RCA only and only in the sizes indicated.

e) To test for acid and to assure that excess oil does not remain in the circuit, remove the oil from the failed compressor. Measure the amount of oil and compare to the appropriate table on page 14. (**NOTE:** The type of oil varies by refrigerant.)

If oil level is found to be significantly lower than the charge listed in the table for the compressor, the excess oil should be flushed from the system prior to installing the new compressor. Use a field-supplied flush kit designed for the type of refrigerant.

CAUTION: The compressor may contain harmful acids. Be sure to handle the removed compressor oil with extreme care using proper protective equipment.

7.0 Compressor Maintenance and Replacement (cont'd)

Compressor Maintenance Checklist, Steps 1-13 cont'd)

Oil Charge in R22 Compressors used on MAPS II Units

Compressor (by P/N & Location; refer to FIGURE 7)			Oil Charge (each compressor)		Oil Type	Nominal Circuit Capacity
P/N's	Location	Mfr Designation	(cc)	(oz)		
Oil Charge - MAIN Cooling Circuit Compressors (A, B, C, D) with R22 Refrigerant						
205622 / 205609	A or B	ZR22	1124	38	Conventional White Oil (Sontex 200LT is recommended.)	2 tons
205610 / 205623 / 205624	A, B, C, or D	ZR36	1242	42		3 tons
205611 / 205612 / 205625	A, B, or C	ZR54	1952	66		4.5 tons
205626 / 205613 / 205627	A, B, or C	ZR72	1774	60		6.2 tons
207351 / 207352 / 207353	A, B, or C	ZR125	3253	110		10 tons
207348 / 207349 / 207350	C	ZR144	3253	110		12 tons
207356 / 207355	A or B	ZR144 (twin)	1774	60		12 tons
207354			3253	110		
Oil Charge - Re-heat Heat Pump Circuit Compressor (Dh) with R22 Refrigerant						
205622 / 205609	Dh	ZR22	1000	34	Conventional White Oil (Sontex 200LT is recommended.)	2 tons
205610 / 205623	Dh	ZR36	1064	36		3 tons
205611 / 205612	Dh	ZR54	1064	36		4.5 tons
205626 / 205613	Dh	ZR72	1064	36		6.2 tons

Oil Charge in R407C Compressors used on MAPS II Units

CAUTION: POE oil used with R407C refrigerant is irritating to skin and eyes. Gloves and safety glasses are essential.

Compressor (by P/N & Location; refer to FIGURE 7.)			Oil Charge (each compressor)		Oil Type	Nominal Circuit Capacity
P/N's	Location	Mfr Designation	(cc)	(oz)		
Oil Charge - MAIN Cooling Circuit Compressors (A, B, C, D) with R407C Refrigerant						
217244 / 220715	A or B	ZR22	1124	38	Polyol Ester Oil (POE) - ULTRA 32CC is recommended.	2 tons
220375 / 216936 / 220716	A, B, C, or D	ZR36	1242	42		3 tons
217246 / 216937	A, B, or C	ZR54	1952	66		4.5 tons
217245 / 216938 / 220717	A, B, or C	ZR72	1774	60		6.2 tons
220712 / 216939 / 220718	A, B, or C	ZR125	3253	110		10 tons
220713 / 216940 / 220719	C	ZR144	3253	110		12 tons
2169410 / 220720	A or B	ZR144 (twin)	1774	60		12 tons
220714			3253	110		
Oil Charge - Re-heat Heat Pump Circuit Compressor (Dh) with R407C Refrigerant						
217244 / 220715	Dh	ZR22	1000	34	Polyol Ester Oil (POE) - ULTRA 32CC is recommended.	2 tons
220375 / 216936 / 220716	Dh	ZR36	1064	36		3 tons
217246 / 216937	Dh	ZR54	1064	36		4.5 tons
217245 / 216938 / 220717	Dh	ZR72	1064	36		6.2 tons

Use a field-provided acid test kit (be sure the kit is designed for the appropriate refrigerant) to check the oil for acid. If acid is found, beginning in **Step 4** follow the procedures indicated for burnout cleanup.

CAUTIONS: The compressor may contain harmful acids. Be sure to handle with extreme care using proper protective equipment. After testing for acid and checking the oil charge level, return the oil to the compressor being replaced. Braze the discharge and suction copper closed. Use an approved disposal method to dispose of the compressor and the oil.

FIGURE 8 - Install the new Mounting Grommets (isolators) shipped with the Replacement Compressor

☐ **Step 3. Mount the Replacement Compressor**

Do not remove the dust cover or rubber shipping plugs until all other system connections are complete (i.e. new liquid line filter drier(s) installed and all tubing changes made - see Steps 4 and 5). The amount of time the compressor is open to the atmosphere should be kept to a minimum.

Use the new mounting grommets and sleeves that are shipped with the compressor to mount it. The sleeves will prevent over compression of the grommets. Re-use the mounting bolts from the compressor that was removed. The mounting bolts will bottom out when tight.

☐ **Step 4. Install New Filter Driers (Select the procedure that applies.)**

If the test for acid in **Step 2** did NOT indicate burnout, install a new liquid line filter drier. The filter drier must be the proper type and size for the circuit. Install a temporary field-supplied suction line filter drier.

If the test for acid in **Step 2** did indicate compressor burnout, do the following:

a) Install an acid-removing liquid line filter drier. Size he acid-removing filter drier at least one capacity size larger than normally required for the circuit.
b) Install a temporary filter drier in the suction line. The temporary suction line drier should be sized properly for the circuit and have a service access fitting to monitor pressure drop across the drier.
Step 12 includes the remaining procedures required for cleanup of a compressor burnout. Continue to **Step 5**.

☐ **Step 5. Braze on Suction and Discharge Lines**

Flow an inert gas, such as nitrogen (N2)**,** through the system at approximately 2 psig. This will reduce the possibility of oxidation inside the tubing. Braze on the suction and discharge lines and braze the process tube shut following the recommendations listed below. ***NOTE: If the process tube is to be used for charging the system, it should be brazed shut after the system has been charged.***

WARNING: Wearing eye protection is recommended.

Brazing Recommendations and Procedures

COPPER TUBING: If additional copper tubing is required, use only clean, dehydrated refrigeration grade tubing with sealed ends.

BRAZING ALLOYS: CAUTION: Do not use 95/5, 50/50 or 40/60 soft solder for brazing. Use Sil-Fos or Phos Copper, or similar brazing alloys with high tensile strength on copper welds only. Weld steel to copper only with silver brazing alloys.

BRAZING PROCEDURE: Comply with applicable code requirements and follow safe brazing procedures. The manufacturer recommends the following steps:

a) Exercise extreme care when cutting and forming tubes to keep dirt, filings, and other contaminants out of the system.
b) Do not use excessive amounts of brazing alloy as some of the excess may penetrate the joint and enter the system.
c) If flux must be used, take necessary precautions to ensure that the flux does not enter the system.
d) Use damp cloths or other heat absorbent material to ensure that the factory brazed joints on the compressor do not become damaged. If damp cloths are used, take care not to allow moisture to enter the system.

CAUTION: Do not leave system open to the atmosphere any longer than minimum required. This applies to all refrigerants but is more critical with R407C which uses POE oil. POE oil is extremely susceptible to moisture absorption.

e) Do not overheat brazed joints as excess heat will cause formation of copper oxide on the inside wall of the tubing. To aid in avoiding the formation of copper oxide, flow an inert gas through the system, as explained above.

☐ **Step 6. Check System for Leaks**

After installation is complete, pressurize the system to approximately 75 psig using nitrogen and a few ounces of refrigerant. Check for leaks using a halide torch, soap bubbles, or an electronic halogen leak detector. When all connections test satisfactorily, release pressure using proper recovery procedures, then proceed to the next step.

7.0 Compressor Maintenance and Replacement (cont'd)

Compressor Maintenance Checklist, Steps 1-13 (cont'd)

☐ **Step 7. Evacuate the System**

Use a vacuum pump rated for a minimum capacity of 6 cfm. Vacuum must be pulled on both the discharge (high) and suction (low) sides of the system. ***Evacuate to 500 microns or lower***.

Moisture and air are harmful to the system because they increase the condensing temperature, raise the discharge gas temperature, cause formation of acids, and cause oil breakdown.

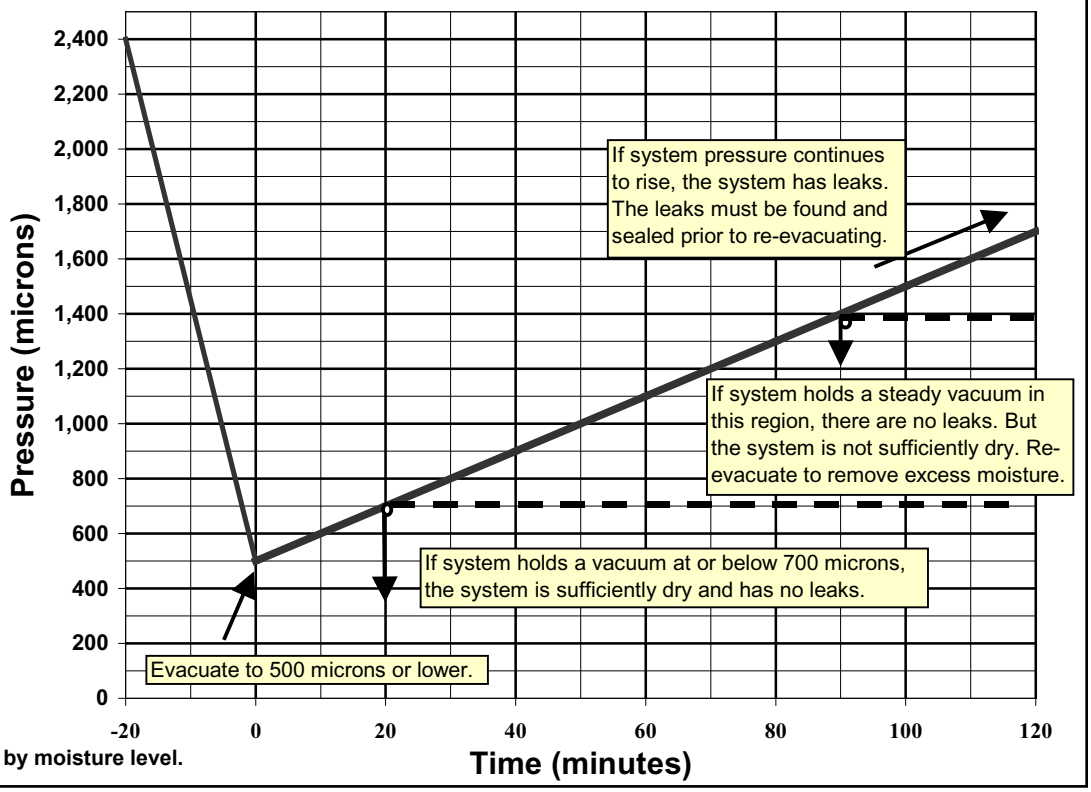
CAUTION: Do not use the replacement compressor as an evacuation assist and *never* apply voltage to a compressor while it is in a vacuum.

Acids are corrosive to the components in the refrigeration system. This includes the piping, refrigerant specialties, and the compressor's mechanical and electrical components. The elevated temperatures can cause copper plating resulting in premature mechanical failure of the compressor.

To establish that the unit is leak-free and moisture-free, a standing vacuum test is recommended. The maximum allowable rise over a 18-minute period is 200 microns. If the rise exceeds this, either there is a leak or moisture still exists in the system. See the chart in **FIGURE 9**.

FIGURE 9 - Pressure Rise vs Time

IMPORTANT NOTE: Always check gauge hose connections for leaks prior to evacuation.



Time varies by moisture level.

☐ **Step 8. Check the Electrical System**

While the system is being evacuated, connect the electrical plug to the compressor. It is a normal practice to replace all starting components any time a compressor is changed.

WARNING: Voltage should not be applied to the compressor when the terminal plug is removed as personal injury could result.

If there is a crankcase heater, connect it. The crankcase heater is energized continuously and is extremely important to proper compressor operation and long life.

FIGURE 10 - Compressor Crankcase Heater

Crankcase Heater (FIGURE 10) - The primary cooling compressor on Sizes 059, 077, 109, and 139 is equipped with a crankcase heater that must be energized for at least 24 hours before starting the unit or after a power outage of more than 8 hours.

The belly band type crankcase heater is an external heater attached to the lower portion of the compressor. These external band heaters require a ground wire to the unit.

☐ **Step 9. Charge the System**

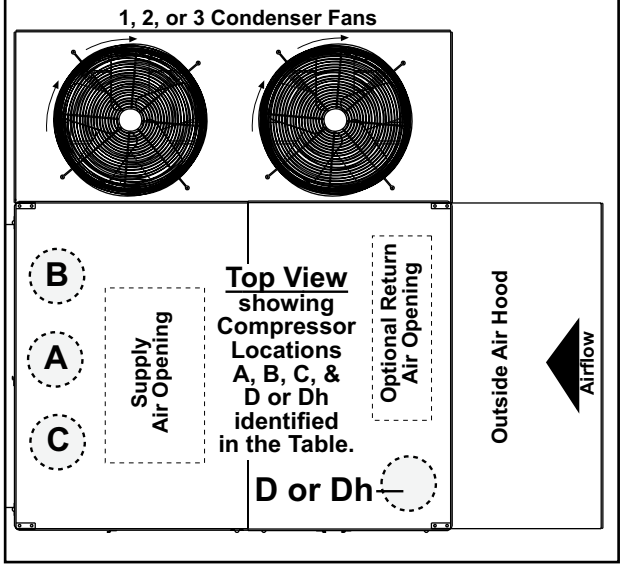
When a vacuum of at least 500 microns is reached, close gauge valve, remove vacuum pump, and break the vacuum using system refrigerant VAPOR. LIQUID ***can be used to break the vacuum if it is connected to the liquid line ONLY.***

Charge the system according to the weights given in the table below. Be sure to compensate the charge for the addition of the suction line filter drier. The preferred subcooling should be **18-22°F (10.1-12.3°C)** at the liquid line, but may vary based on ambient conditions (See **Step 11**).

NOTE : Weighing in the system charge to the specifications will help point out system faults that may still exist. **IMPORTANT: R407C refrigerant MUST always be charged as a liquid.**

Refrigerant Charge by Model Size and Compressor for each Circuit

FIGURE 11 - Compressor Locations



NOTE: Compressor charges for RDCA and RECA are the same as for Model RCA. Compressor charges for RDDA and REDA are the same as for Model RDA.

Compressor Location (See FIGURE 11)		RCA								RDA	
		A		B		C		D		Dh*	
Model RCA	Model RDA	Capacity (tons) and Charge (lbs)									
		Tons	Lbs	Tons	Lbs	Tons	Lbs	Tons	Lbs	Tons	Lbs
25	--	2	5.4	N/A		N/A		N/A		N/A	
37	--	3	6.1	N/A		N/A		N/A		N/A	
59	--	3	6.1	2	5.1	N/A		N/A		N/A	
60	--	3	5.1	2	3.5	N/A		N/A		N/A	
77	--	4.5	7.6	2	5.1	N/A		N/A		N/A	
78	102	4.5	7.3	2	3.7	N/A		N/A		2	3.4
90	114	4.5	7.3	3	5.1	N/A		N/A		2	3.4
108	126	6.2	8.7	3	5.1	N/A		N/A		2	3.4
109	--	6.2	8.9	3	6.2	N/A		N/A		N/A	
120	144	6.2	8.7	4.5	7.3	N/A		N/A		2	3.4
139	--	4.5	8.3	4.5	7.3	N/A		3	6.0	N/A	
164	--	6.2	8.7	4.5	7.3	N/A		3	5.1	N/A	
166	188	4.5	8.2	6.2	9.2	3	5.8	N/A		2	3.4
184	220	4.5	6.8	6.2	8.5	4.5	6.8	N/A		3	4.5
198	234	4.5	7.5	6.2	9.5	6.2	9.5	N/A		3	4.5
176	230	4.5	7.6	10	14.5	N/A		N/A		3	9.2
226	280	12 tons / 19 lbs				6.2	9.5	N/A		3	9.2
292	346	12 tons / 27.8 lbs				12	9.5	N/A		3	9.2
374	446	10	15.6	10	15.6	10	15.6	N/A		3	10.1
	428	10	15.6	10	15.6	10	15.6	N/A		3	10.1
Compressor Location (See FIGURE 11)		RCA								RDA	
		A		B		C		D		Dh*	

* Reheat pump compressor

Model RCA with Option AU25	Capacity (tons) and Charge (lbs)							
	Tons	Lbs	Tons	Lbs	Tons	Lbs	Tons	Lbs
60	3	7.1	2	5.5	N/A		N/A	
78	4.5	9.3	2	5.7	N/A		N/A	
90	4.5	9.3	3	7.1	N/A		N/A	
108	6.2	10.7	3	7.1	N/A		N/A	
120	6.2	10.7	4.5	9.3	N/A		N/A	
164	4.5	9.3	6.2	10.7	N/A		3	5.1
Compressor Location (See FIGURE 11)	RCA with Option AU25							
	A		B		C		D	

7.0 Compressor Maintenance and Replacement (cont'd)

Compressor Maintenance Checklist, Steps 1-13 (cont'd)

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

☐ **Step 10. System Startup**

Assure voltage to compressor does not drop below minimum allowable voltage (eg. 187 volts for 230/208-3-60, 415 volts for 460/3/60, 518 volts for 575/3/60) during the period the compressor is trying to start. **If a low voltage or voltage imbalance condition exists, the electrical problem must be determined and corrected prior to operating the unit**.

Voltage Imbalance - Voltage imbalance is becoming a more common problem. In a 3-phase system, excessive voltage imbalance between phases will cause motors to overheat and compressors to fail. Maximum allowable imbalance is 2%. To determine voltage imbalance, measure and record the voltage of all three phases. Take the measurements at the compressor terminals with the compressor operating.

Voltage Imbalance Formula:

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

If the imbalance is within the 2% tolerance, voltage imbalance is not a problem and the system may be operated. If the imbalance exceeds the 2% tolerance, follow the procedures below.

Solutions to Voltage Imbalance - The cause for a voltage imbalance problem can originate at the power company or can be caused inside the building. Try the following on-site solution to determine if the problem can be easily resolved.

Roll the connections at the compressor terminals one forward. Connect the wire now on Terminal 1 to Terminal 2, 2 to 3, and 3 to 1. Re-measure and re-calculate the voltage imbalance. If the imbalance is within 2%, the system may be operated.

If the imbalance is not within tolerance, roll the connections one more forward. Re-measure and re-calculate the voltage imbalance. If the imbalance is within 2%, the system may be operated. If the voltage imbalance still exceeds 2%, do not start the system. Contact the building owner or person responsible to have an electrician analyze the buildings's power supply and load distribution.

☐ **Step 11. Check Superheat and Subcooling**

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

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

Two important requirements before checking superheat/subcooling:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

IMPORTANT:
Do not release refrigerant to the atmosphere! **If required service procedures include the adding or removing of refrigerant, the qualified HVAC service technician must comply with all federal, state or provincial, and local laws.**

☐ **Step 12.**

If the acid test in **Step 2** indicated a compressor burnout, do the following:

a) Operate the unit for several hours. Check the pressure drop through the temporary suction line filter drier. If the pressure drop exceeds 8 psig, recover the refrigerant, replace the suction line filter drier with the same type as removed, replace the liquid line filter drier, evacuate the circuit, and re-charge with the recovered refrigerant.
   Continue to monitor the pressure drop through the suction line filter drier and repeat the process above until the pressure does not exceed 8 psig after several hours of operation.

b) Allow the system to operate for 4-8 hours. Recover the refrigerant and take an oil sample. Retest the oil for acid.

c) If the test for acid is negative, remove the suction line filter drier, replace the liquid line drier, evacuate, and re-charge the system with the recovered refrigerant.
   If the test indicates acid, replace both the liquid line filter drier and the suction line filter drier and repeat b) and c).

d) Verify subcooling and superheat (Refer to **Step 11**.).

e) When the system is operating properly, remove the gauges.

7.0 Compressor Maintenance and Replacement (cont'd)

Checklist, Steps 1-13 (cont'd)

☐ **Step 12. (cont'd)**

If the acid test in **Step 2** did not indicate a compressor burnout, remove the temporary suction line filter drier.

CAUTION: Before returning to normal operation, remove the temporary suction line filter drier. See Hazard Levels, pg 3.

☐ **Step 13. Review Steps 1 through 12 to ensure that nothing was overlooked.**

8.0 Thermal Expansion Valves

IMPORTANT: Thermostatic expansion valve P/N's listed here are for use with R22 refrigerant only. If the system is charged with R407C refrigerant (check the rating plate), contact your distributor or the factory service department for replacement information.

NOTE: Thermostatic expansion valves for RDCA and RECA are the same as for Model RCA. Thermostaticl expansion valves for RDDA and REDA are the same as for Model RDA.

Model		Thermostatic Expansion Valves (R22 Refrigerant)			Connection Sizes Inlet/Outlet
RCA	RDA	Compressor - Ckt	P/N	Sporlan Model	
025	--	ZR22 - CKT A	204800	BBIVE-2-GA	1/2 / 5/8
037	--	ZR36 - CKT A	204799	BBIVE-3-GA	1/2 / 5/8
059	--	ZR36 - CKT A	204799	BBIVE-3-GA	I/2 / 5/8
		ZR22 - CKT B	204800	BBIVE-2-GA	1/2 / 5/8
060	--	ZR36 - CKTA	204799	BBIVE-3-GA	1/2 / 5/8
		ZR22 - CKT B	204800	BBIVE-2-GA	1/2 / 5/8
077	--	ZR54 - CKT A	204801	BBIVE-5-GA	1/2 / 7/8
		ZR22 - CKT B	204800	BBIVE-2-GA	1/2 / 5/8
078	102	ZR54 - CKTA	204801	BBIVE-5-GA	1/2 / 7/8
		ZR22 - CKTB	204800	BBIVE-2-GA	1/2 / 5/8
090	114	ZR54 - CKT A	204801	BBIVE-5-GA	1/2 / 7/8
		ZR36 - CKT B	204799	BBIVE-3-GA	1/2 / 5/8
108	126	ZR72 - CKT A	178509	BBIVE-6-GA	1/2 / 7/8
		ZR36 - CKT B	204799	BBIVE-3-GA	1/2 / 5/8
109	--	ZR72 - CKT A	178509	BBIVE-5-GA	1/2 / 7/8
		ZR36 - CKT B	204799	BBIVE-3-GA	1/2 / 5/8
120	144	ZR72 - CKT A	178509	BBIVE-6-GA	1/2 / 7/8
		ZR54 - CKT B	204801	BBIVE-5-GA	1/2 / 7/8
139	--	ZR54 - CKT A	204801	BBIVE-3-GA	1/2 / 5/8
		ZR54 - CKT B	204801	BBIVE-5-GA	1/2 / 7/8
		ZR36 - CKT D	204799	BBIVE-3-GA	1/2 / 5/8
164	--	ZR36 - CKT D	177381	BBIVE-3-GA	1/2 / 1/2
		ZR54 - CKT B	204801	BBIVE-5-GA	1/2 / 7/8
		ZR72 - CKT A	178509	BBIVE-6-GA	1/2 / 7/8
166	188	ZR36 - CKT C	204799	BBIVE-3-GA	1/2 / 5/8
		ZR54 - CKT A	204801	BBIVE-5-GA	1/2 / 7/8
		ZR72 - CKT B	178509	BBIVE-6-GA	1/2 / 7/8

Model		Thermostatic Expansion Valves (R22 Refrigerant)			Connection Sizes Inlet/Outlet
RCA	RDA	Compressor - Ckt	P/N	Sporlan Model	
184	220	ZR54 - CKT C	204801	BBIVE-5-GA	1/2 / 7/8
		ZR54 - CKT A	204801	BBIVE-5-GA	1/2 / 7/8
		ZR72 - CKT B	178509	BBIVE-6-GA	1/2 / 7/8
198	234	ZR72 - CKT C	178509	BBIVE-6-GA	1/2 / 7/8
		ZR54 - CKT A	204801	BBIVE-5-GA	1/2 / 7/8
		ZR72 - CKT B	178509	BBIVE-6-GA	1/2 / 7/8
176	230	ZR72 - CKT A	204801	BBIVE-5-GA	1/2 / 7/8
		ZR72 - CKT B	207801	EBSVE-11-GA	5/8 / 1-1/8
226	280	ZR72 - CKT C	178509	BBIVE-6-GA	1/2 / 7/8
		ZRT144 - CKT A&B	207801	EBSVE-11-GA	5/8 / 1-1/8
292	346	ZR72 - CKT C	207801	EBSVE-11-GA	5/8 / 1-1/8
		ZRT144 - CKT A&B	207801	EBSVE-11-GA	5/8 / 1-1/8
374	428	ZR125 - CKT C	207801	EBSVE-11-GA	5/8 / 1-1/8
		ZR125 - CKT A	207801	EBSVE-11-GA	5/8 / 1-1/8
		ZR125 - CKT B	207801	EBSVE-11-GA	5/8 / 1-1/8
	446	ZR125 - CKT C	207801	EBSVE-11-GA	5/8 / 1-1/8
		ZR125 - CKT A	207801	EBSVE-11-GA	5/8 / 1-1/8
		ZR125 - CKT B	207801	EBSVE-11-GA	5/8 / 1-1/8

Re-Heat Pump - Model RDA	Thermostatic Expansion Valves (R22 Refrigerant)			Connection Sizes Inlet/Outlet
	Compressor - Ckt	P/N	Sporlan Model	
102	ZR22 - CKT Dh	177381	BBIVE-3-GA	1/2 / 1/2
114	ZR22 - CKT Dh	177381	BBIVE-3-GA	1/2 / 1/2
126	ZR22 - CKT Dh	177381	BBIVE-3-GA	1/2 / 1/2
144	ZR22 - CKT Dh	177381	BBIVE-3-GA	1/2 / 1/2
188	ZR22 - CKT Dh	177381	BBIVE-3-GA	1/2 / 1/2
220	ZR36 - CKT Dh	179306	BBIVE-5-GA	1/2 / 1/2
230	ZR36 - CKT Dh	178509	BBIVE-6-GA	
234	ZR36 - CKT Dh	179306	BBIVE-5-GA	1/2 / 1/2
280	ZR36 - CKT Dh	179306	BBIVE-5-GA	1/2 / 1/2
346	ZR36 - CKT Dh	178509	BBIVE-6-GA	
428	ZR36 - CKT Dh	178509	BBIVE-6-GA	
446	ZR36 - CKT Dh	194153	BBIVE-8-GA	

9.0 Gas Heat Section Maintenance - Models RDCA and RDDA

This gas heater will operate with a minimum of maintenance. To ensure long life and satisfactory performance, a heater that is operated under normal conditions should be inspected and cleaned at the start of each heating season. If the heater is operating in an area where an unusual amount of dust or soot or other impurities are present in the air, more frequent maintenance is recommended.

When any service is completed, be careful to reassemble correctly to ensure that no unsafe conditions are created. When re-lighting, always follow the lighting instructions on the furnace.

WARNING: Turn off the power before performing maintenance procedures. Lock disconnect switch in OFF position. When you turn off the power supply, turn off the gas at the external manual valve. See Hazard Levels, page 3.

NOTE: If the installation includes a **Model JHUP curb duct furnace**, the procedures described in Paragraph 9 also apply to the duct furnace. For illustration of a curb duct furnace, see Form I-MAPS II, Paragraph 9.4.

Gas-fired Heat Exchanger Maintenance

This gas heat section is equipped with a TCORE$^{2®}$ style heat exchanger. The outside of the heat exchanger is accessible by opening the blower section door and sliding the blower out of the unit. Remove any external dirt or dust accumulation. Visually check the heat exchanger for cracks or holes. If a crack or hole is observed, replace the heat exchanger.

NOTE: Inspection of the lower portion of the heat exchanger is done with the burner removed. See the Burner Service section below for information on inspecting the lower portion of the heat exchanger.

Burner Maintenance

This furnace is equipped with a TCORE$^{2®}$ style burner.

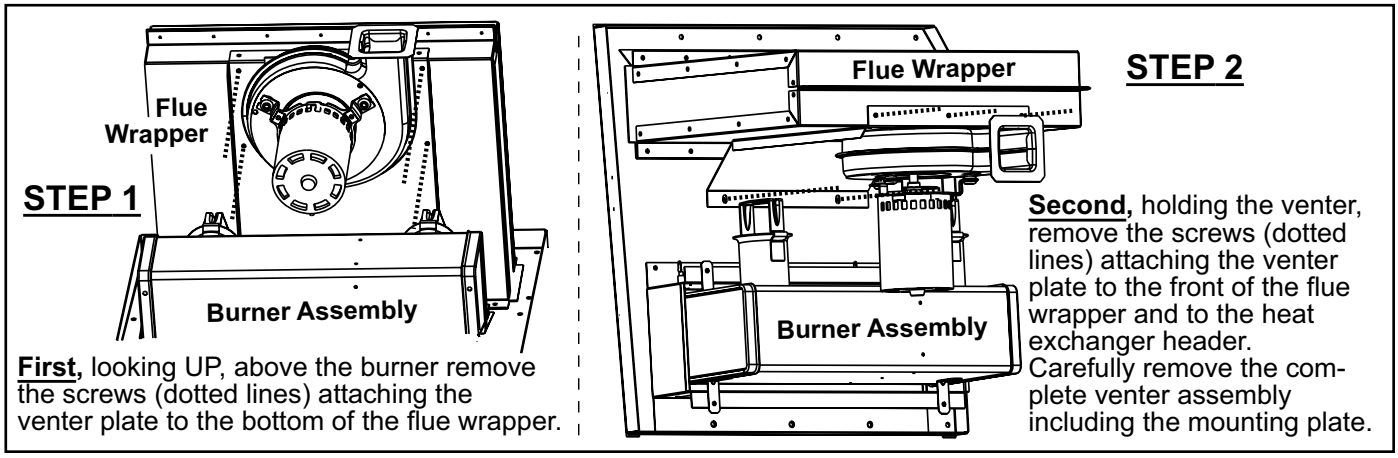
Inspect the gas heat section annually to determine if cleaning is necessary. If there is an accumulation of dirt, dust, and/or lint, clean the compartment and follow the instructions below to remove and clean the burner.

CAUTION: Use of eye protection is recommended.

Burner Removal Instructions (Refer to FIGURES 12A and 12B)

1. Shut off the gas supply.
2. Turn off electric supply.
3. Remove the gas heat section access panel.
4. Remove the venter assembly. Disconnect the tubing. Mark and disconnect the three venter motor wires at the DSI control, capacitor wires at the capacitor (if applicable), and ground screw (located on the control panel). Follow procedure in **FIGURE 12A, STEPS 1 and 2, removing the whole assembly including the large mounting plate.**

FIGURE 12A - Remove the Venter Assembly



5. **Disconnect the Gas Train** - At the gas valves, mark and disconnect the wires. Disconnect the gas supply line at the connection outside the furnace. Carefully remove the burner orifices and orifice adapter locking nuts. Remove the manifold brackets. Slide the complete gas train including valves and optional pressure switches out of the unit.
6. **Remove Burner Assembly -** Remove the screws above and below the burner assembly. Carefully pull the burner assembly out of the cabinet.

Inspect and Clean the Burner

With the burner assembly removed, shine a flashlight on the burner ribbons. Look for carbon buildup, scale, dust, lint, and/or anything that might restrict flow through the spaces between the burner ribbons. Holding the burner assembly so that any foreign material will fall away from the burner, use a stiff bristle brush to loosen and remove any foreign material(s). If the burner is excessively

9.0 Gas Heat Maintenance (cont'd)

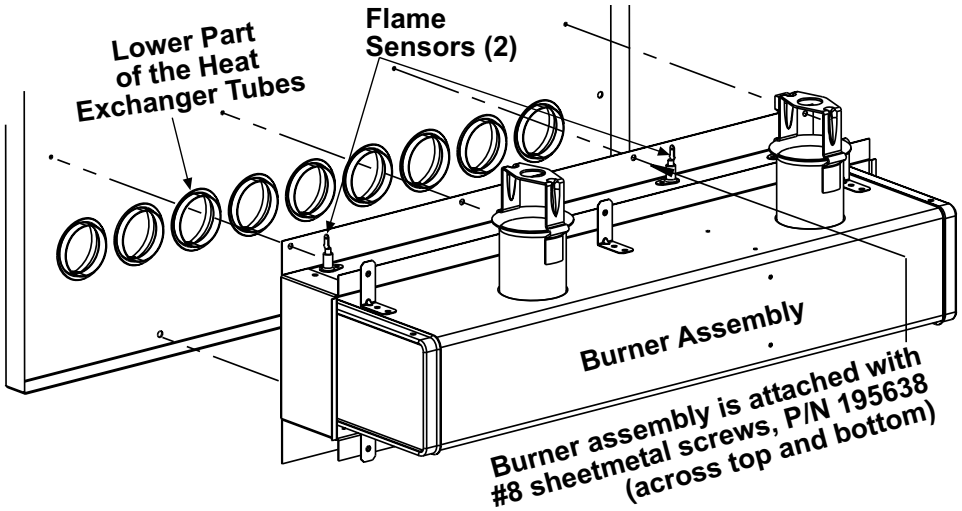
Inspect and Clean the Burner (cont'd)

dirty, remove both of the burner end caps. Remove the screws that hold the end caps to the burner housing. Lightly tap end caps to remove.

Clean all foreign material from the burner and venturi. After the burner is thoroughly cleaned, replace the end caps making certain that they are tight against the burner housing. **NOTE:** If any of the burner components are damaged or deteriorated, replace the burner assembly.

FIGURE 12B - Remove the Burner Assembly

(Venter motor and gas train are already removed in this illustration.)



Inspect the Lower Portion of the Heat Exchanger (with burner assembly removed)

At the burner flame entrance of each tube, shine a bright light into each heat exchanger section. With the light shining into the heat exchanger, observe the outside for visible light. (The outside of the heat exchanger is visible with the blower door open and the blower mounting plate slid out.) Repeat this procedure with each heat exchanger section. If any light is observed, replace the heat exchanger.

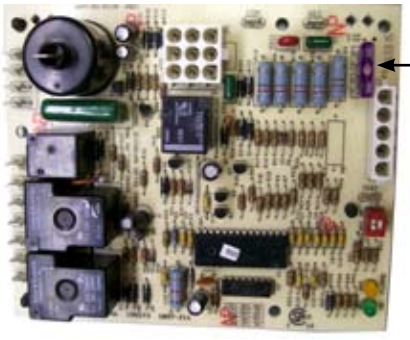
Burner Orifices

Burner orifices usually only need to be replaced when converting gas from natural to propane or propane to natural. If ordering a replacement orifice only, give BTUH content and specific gravity of gas, as well as the model and serial number of the unit and the orifice size. Each burner has two venturi and each venturi takes a different size of orifice. When removing or replacing the burner orifices be careful not to damage the venturi tubes and/or the brackets.

Ignition System

DSI Integrated Control Module (ignition system circuit board) - See **FIGURE 13**. The module monitors the operation of the gas heater including ignition. The only replaceable component is the 3 amp Type ATC or ATO fuse. If the fuse is blown, the problem is most likely an external overload. Correct the problem and replace the fuse.

FIGURE 13 - DSI Integrated Control Module (Ignition System Circuit Board)



CAUTION: Due to high voltage on the spark wire and electrode, do not touch when energized. See Hazard Levels, page 3.

Do not attempt to disassemble the control module. However, each heating season check the lead wires for insulation deterioration and good connections.

Proper operation of the direct spark ignition system requires a minimum flame signal of 1.0 microamps as measured by a microampmeter.

For further information and check out procedure on the direct spark ignition system, refer to Installation Manual (Form I-MAPS II), Paragraph 19 and the Gas Heat Section Troubleshooting Chart in Paragraph 11.

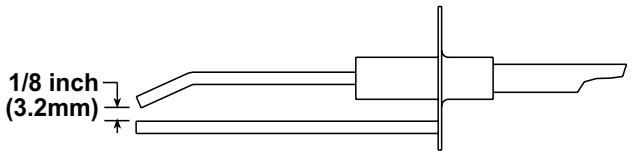
Ignitor

Ignitor - Locate the ignitor. Disconnect the wire; remove the screw and the ignitor. Clean the ignitor assembly with an emery cloth.

Spark gap must be maintained to 1/8". See **FIGURE 14**.

IMPORTANT: When re-assembling, the brown ground wire must remain attached to the ignitor.

FIGURE 14 - Ignitor showing required Spark Gap Measurement



Flame Sensors

Flame Sensor - Refer to **FIGURE 12B** and locate the flame sensors (one on each burner section). Disconnect the wires; remove the screws and the flame sensor. Clean with an emery cloth.

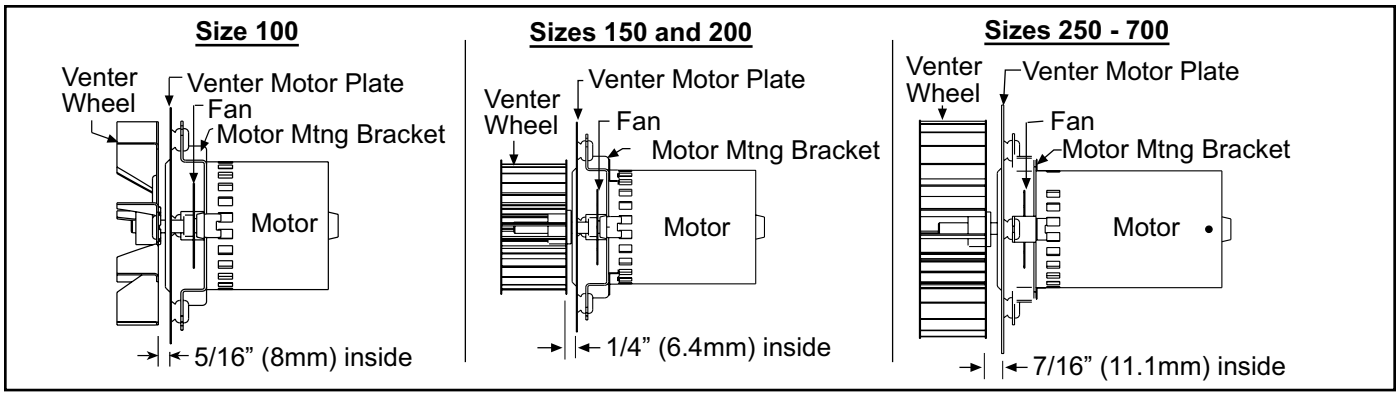
Venter Motor and Wheel

Remove dirt and grease from the motor casing, the venter housing, and the venter wheel. Venter motor bearings are permanently lubricated. Follow these instructions for replacement of the venter motor and wheel assembly. Keep all hardware removed to be used in re-assembling and installing the replacement parts.

Replacement Instructions

1. Turn off the gas and disconnect the electric power.
2. Open the gas heat section access panel and the electrical access panel below the disconnect switch.
3. Disconnect the three venter motor wires at the DSI control, capacitor wires at the capacitor (if applicable), and ground screw (located on the control panel).
4. Holding the venter motor, remove the three or four screws that attach the venter motor mounting plate to the venter housing. Remove the motor and wheel assembly from the gas heater.
5. Re-assemble with the replacement venter motor and wheel assembly. See **FIGURE 15,** for proper spacing.

FIGURE 15 - Venter Wheel Position on Shaft



6. Follow the wiring diagram to re-connect the venter wires.
7. Close the access panel. Restore power to the gas heater and turn on the gas. Check for proper operation.

Re-Assemble the Heat Section Gas Train, Burner, and Venter

Instructions to Re-Assemble the Gas Heat Section (Refer to FIGURES 12A and 12B, pages 21 and 22.)

1. **Attach the Burner Assembly -** Slide the entire burner assembly into position. Insert all of the screws along the top and the bottom.
2. **Attach the Gas Train** - Position the gas train so that the orifice adapters are through the brackets. Attach the manifold to the manifold brackets.

9.0 Gas Heat Section Maintenance (cont'd)

Re-Assemble the Heat Section Gas Train, Burner, & Venter (cont'd)

Install the orifice adapter nuts and the gas orifices being careful not to damage the venturi tubes and/or the brackets. Re-connect the wires to the gas valves.

3. Re-attach the venter assembly. (If replacing venter parts, follow instructions above.) Re-connect the tubing and wires.

4. Close the access panel.

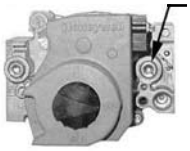
5. Reconnect the gas supply at the union outside of the cabinet. Leak test the connection with leak detecting solution.

6. Turn on the electric and the gas. Check for proper operation.

Gas Valves

WARNING: The operating valve is the prime safety shutoff. All gas supply lines must be free of dirt or scale before connecting to the unit to ensure positive closure. See Hazard Levels, page 3.

Single-Stage Gas Valve (Side View and Top View)



1/8" Outlet Pressure Tap

Carefully remove external dirt accumulation from the valve and check wiring connections.

The combination gas valves must be checked annually to ensure that each valve is shutting off gas flow completely.

Instructions:

1) Locate the 1/8" NPT pressure tap on the first combination valve (see illustration on the left).
2) Turn the manual valve OFF to prevent flow to the manifold. Connect a manometer to the 1/8" outlet pressure tap of the first single-stage valve.
   NOTE: A manometer (fluid-filled gauge) with an inches water column scale is recommended.
   Turn the manual valve ON and the heater off.
3) Use your finger to fully block the burner orifice. Continue blocking the orifice for several seconds and observe the manometer. If any pressure is indicated, the gas valve is leaking. A leaking gas valve must be replaced before the heater is put back in operation.
4) Repeat the test with each single-stage gas valve.

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.

Modulating/ Regulating Valve in Optional 6:1 Gas Control

Units with optional 6:1 turndown (Option AG57) include a modulating/regulating valve in addition to the two single-stage valves. The modulating/regulating valve is controlled by a signal conditioner responding to the system controller to provide the modulated gas flow for 6:1 turndown. The only field maintenance to the modulating gas valve is to carefully remove dirt accumulation and to check wiring connections.

P/N 131470

Maxitrol Signal Conditioner used in Control Option AG57

Combustion Air Pressure Switch

See **FIGURE 1A**, page 5, Item 17, for location. If it is determined that the pressure switch needs replacing, use only the factory-authorized replacement part that is designed for the model and size of gas heater being serviced.

Limit Control

The limit control is located in the blower compartment with the capillary extending across the heat exchanger. (**NOTE:** For Model JHUP curb duct furnace, see Form I-MAPS, Paragraph 9.4 for location.)

If it is determined that the limit control needs replacing, use only a factory-authorized replacement part that is designed for the size of heater.

10.0 Electric Heat Section Maintenance - Models REDA and RECA

DANGER: Turn off the power locking the disconnect switch. Allow the heating elements to cool.

CAUTION: Wearing eye protection is recommended when cleaning the heating elements and cabinet.

Check the heating elements at the beginning of the heating season. Carefully clean all dust and dirt from the heating elements using a brush or steel wool. With a vacuum or air hose, clean the inside of the cabinet especially the bottom and sides where dirt and dust will accumulate.

11.0 Troubleshooting

IMPORTANT: ***Do not release refrigerant to the atmosphere!*** **If required service procedures include the adding or removing of refrigerant, the service technician must comply with all federal, state and local laws. The procedures discussed in this manual should only be performed by a qualified HVAC technician.**

General Refrigeration Circuit

NOTE: Unit is equipped with a phase loss/phase reversal control. If system does not start, check phase of electrical supply.

General Refrigeration Circuit		
SYMPTOM	**POSSIBLE CAUSE**	**REMEDY**
A. Compressor will not start.	1. Power off, loose electrical connections or fuse open.	1. Check disconnect switch, fuses and wiring. Replace parts or repair as necessary
	2. Compressor contactor not closing.	2. Check voltage to contactor coil, transformer, slave relay, system. Replace parts as necessary.
	3. Internal compressor thermal overload open.	3. If compressor is hot, allow 2 hours to cool. See D. below.
	4. Compressor defective.	4. Check compressor for electrical failure. Compressor may be seized; check refrigerant. If necessary, replace compressor.
	5. High or low pressure switch open or defective.	5. If manual reset (high pressure), reset switch. (Switch opens at 400 psi and will not reset above 250 psi.) If auto reset (low pressure) does not reset and everything else is OK, replace switch.
B. Compressor starts but cuts out on low pressure (low pressure switch activates at 8 psig.)	1. Low refrigerant charge.	1. Check refrigerant pressures.
	2. Airflow restricted.	2. Check for dirty evaporator coil, dirty filters, dampers closed, iced evaporator coil, improper belt, check motor amps, check duct design.
	3. Restriction in refrigerant line.	3. Check refrigerant pressure, check and adjust thermal expansion valve. If not functioning properly, check for pressure drop across the filter drier.
	4. Defective low pressure switch.	4. Check calibration of switch.
C. Compressor starts but cuts out on high pressure switch.	1. Refrigerant overcharge.	1. Check pressures, charge by sub cooling.
	2. Condenser fan motor defective.	2. Check fan motor.
	3. Condenser coil inlet obstructed or dirty.	3. Check coil and inlet clearances and for possible air recirculation.
	4. Air or non-condensables in system.	4. Check high side equalized pressure reading with equivalent outdoor temperature.
	5. Defective high pressure switch.	5. Check calibration of switch.
	6. Restriction in discharge or liquid line.	6. Check refrigerant line pressures, check thermal expansion valves.
D. Compressor cuts out on thermal overload.	1. Low voltage.	1. Check voltage.
	2. Sustained high discharge pressure.	2. Check running amperage and conditions described in I.
	3. High suction and discharge pressures.	3. Check thermal expansion valve setting, check for air in system.
	4. Defective compressor overload.	4. If compressor is hot, allow compressor to cool for two hours. Recheck for open circuit.
	5. Defective run capacitor.	5. Check run capacitor for compressor and fan motor.
	6. Improper refrigerant charge.	6. Check subcooling.
	7. Bearings or pistons too tight.	7. Check for low oil level.
	8. Allow time for compressor to cool.	8. Check dome temperature of the compressor.
E. Noisy compressor.	1. Refrigerant overcharge.	1. Check pressures and subcooling.
	2. Liquid floodback.	2. Check thermal expansion valve setting. Check for refrigerant overcharge.
	3. Tubing rattle.	3. Dampen tubing vibration by taping or clamping. Carefully bend tubing away from contact where possible.
	4. Compressor defective.	4. Check internal parts; replace.
F. Noisy unit operation.	1. Blower rotational noise.	1. Check blower, motor and drive for faulty adjustment or noisy bearings, loose parts, and/or blower out of balance.
	2. Air noise.	2. Check ductwork. Air velocity too high.
	3. Chattering contactor.	3. Check for adequate control voltage, check for shorts or breaks, check thermostat, check contact points.
	4. Tubing rattle.	4. Dampen by taping or clamping, carefully bend tubing away from contact when possible.

(continued)

11.0 Troubleshooting (cont'd)

General Refrigeration Circuit (cont'd)		
SYMPTOM	**POSSIBLE CAUSE**	**REMEDY**
G. High suction pressure	1. Excessive load on evaporator coil.	1. Check for high entering wet bulb temperature. Check for excessive air.
	2. Compressor is unloaded.	2. Check head pressure, check thermal expansion valve if not functioning properly, check pressure drop across filter drier.
	3. Expansion valve not secured to suction line or valve defective.	3. Check the thermal expansion valve, ensure bulb is insulated.
H. High discharge pressure.	1. Thermal expansion valve setting.	1. Check thermal expansion setting and calibrate superheat.
	2. Air inlet to condenser dirty or obstructed.	2. Check for proper clearances and possible air recirculating.
	3. Condenser fan motor defective.	3. Check condenser fan motor and capacitor.
I. Suction pressure is too low.	1. Refrigerant undercharge.	1. Check pressures and subcooling.
	2. Blower running backward.	2. Interchange any two wires from 3 phase disconnect.
	3. Loose blower, pulley or belts.	3. Check drive pulley alignment, belt tension.
	4. Defective or improperly adjusted expansion valve.	4. Check superheat and adjust thermal expansion valve.
	5. Dirty filter.	5. Check filter and evaporator coil.
	6. Too little air flow or low entering air temperature.	6. Check airflow and entering air wet bulb conditions.
	7. Restriction in suction or liquid line.	7. Check refrigerant circuit for restriction.
J. Head pressure too low.	1. Insufficient refrigerant charge.	1. Check subcooling, check for leak.
	2. Defective or improperly adjusted expansion valve.	2. Check superheating and adjust thermal expansion valve.
	3. Low suction pressure.	3. See “suction pressure too low” above.
	4. Defective compressor.	4. See “high suction pressure” above.
K. Compressor short cycles.	1. Thermostat location or malfunction.	1. Check thermostat, check heat anticipator setting.
	2. Improper refrigerant charge.	2. Check subcooling, verify superheat.
	3. Defective high or low pressure control.	3. Check high or low pressure switch.
	4. Liquid floodback.	4. Possible tight bearings, see above.
	5. Defective expansion valve.	5. Check thermal expansion valve and superheat.
	6. Poor air distribution.	6. Check ductwork for recirculating.
	7. High discharge pressure.	7. See “high discharge pressure” above.
	8. Leaking discharge valves in compressor.	8. See “high suction pressure” above.
L. Running cycle is too long or unit operates continuously.	1. Refrigeration undercharged.	1. Check subcooling.
	2. Dirty filter or evaporator coil.	2. Check filter, coil and airflow.
	3. Dirty or clogged condenser coil.	3. Check coil and airflow.
	4. Air or other non-condensables in system.	4. Check equalized high side pressure with equivalent outdoor temperature.
	5. Defective compressor.	5. See “high suction pressure” above.
	6. Restriction in suction and liquid line.	6. Check for restrictions in refrigerant circuit.
	7. Control contacts stuck.	7. Check wiring.
M. Supply air temperature is too high.	1. Refrigerant undercharge or leak in system.	1. Check subcooling and check for leaks.
	2. Evaporator plugged with dirt or ice.	2. Check evaporator, airflow and filter.
	3. Improperly adjusted or defective expansion valve.	3. Check superheat & adjust thermal expansion valve, check bulb.
	4. Defective compressor.	4. Check compressor for proper operation.
	5. High discharge pressure.	5. See “high discharge pressure” above.
	6. Airflow is too high.	6. Check external static pressure.
N. Supply air temperature is too low.	1. Airflow is too low.	1. Check evaporator coil; check filters, check for closed dampers or grills, check drive for loose parts, belts, or misalignment; check external static pressure.
	2. Return air temperature too low.	2. Check entering air wet bulb conditions.
O. Liquid line is too hot.	1. Refrigerant undercharge.	1. Adjust the charge by subcooling.
	2. High discharge pressure.	2. See I. above.

Troubleshooting Gas Heat Section - Model RDCA, Model RDDA, and an Optional Model JHUP Duct Furnace

Check the Lights on the DSI Integrated Control Module (Ignition System Circuit Board)

The ignition system circuit board monitors the operation of the heater and includes two LED signal lights that indicate normal operation and various abnormal conditions. If the heater fails to operate properly, check this signal to determine the cause and/or to eliminate certain causes. See operating sequence on the wiring diagram.

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 or Flame Rollout 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)

Do not attempt to repair the DSI integrated control module (circuit board); the only field replaceable component is the fuse. **IMPORTANT:** When using a mul-

timeter to troubleshoot the 24 volt circuit, place the meter's test leads into the 5 or 9 pin connectors located on the ignition control. Do not remove connectors or terminals from the electrical components. Doing so can result in misinterpreted readings due to the ignition control board's fault mode monitoring circuits.

Troubleshooting - Gas Heat Section and Optional Curb Duct Furnace

PROBLEM	PROBABLE CAUSE	REMEDY
Venter motor will not start	1. No power to unit.	1. Turn on power; check supply fuses or main circuit breaker.
	2. No 24 volt power to ignition system circuit board.	2. Turn up thermostat; check control transformer output.
	3. Integrated circuit board fuse blown.	3. Correct cause. Replace fuse (type ATC or ATO, 32VDC, 3A).
	4. No power to venter motor.	4. Tighten connections at circuit board and/or motor terminals.
	5. Integrated circuit board defective.	5. Replace integrated circuit board.
	6. Defective venter motor.	6. Replace venter motor. See Paragraph 9.
Burner will not light	1. Manual valve not open.	1. Open manual valve.
	2. Air in the gas line.	2. Bleed gas line (initial startup only).
	3. Gas pressure too high or too low.	3. See installation manual, Form I-MAPS II, Paragraph 9.3.
	4. No Spark: a) Loose wire connections.	4. a) Be certain all wire connections are solid.
	b) Transformer failure.	b) Be sure 24 volts is available.
	c) Incorrect spark gap.	c) Maintain spark gap at 1/8".
	d) Spark cable shorted to ground.	d) Replace worn or grounded spark cable.
	e) Spark electrode shorted to ground.	e) Replace if ceramic spark electrode is cracked or grounded.
	f) Burner not grounded.	f) Make certain circuit board is grounded to ignitor.
	g) Ignition system circuit board not grounded.	g) Make certain circuit board is grounded to furnace chassis.
	h) Unit not properly grounded.	h) Make certain unit is properly field grounded to earth ground and properly phased (L1 to hot lead L2 to neutral).
	i) Ignition system circuit board fuse blown.	i) Correct cause. Replace fuse (type ATC or ATO, 32VDC, 3A).
	j) Faulty circuit board.	j) If 24 volt is available to the circuit board and all other causes have been eliminated, replace board.
	5. Lockout device interrupting control circuit by above causes.	5. Reset lockout by interrupting control.
	6. Combustion air proving switch not closing	6a) Remove obstructions from vent. 6b) Replace faulty tubing to pressure switch..
	7. Faulty combustion air proving switch.	7. Replace combustion air proving switch.
	8. Valve not operating. a) Defective valve.	8. a) If 24 volt is measured at the valve connections and valve remains closed, replace valve.
	b) Loose wire connections	b) Check and tighten all wiring connections.
	9. Circuit board does not power valves. a) Loose wire connections.	9. a) Check and tighten all wiring connections.
	b) Flame sensor grounded.	b) Be certain flame sensor lead is not grounded or insulation or ceramic is not cracked. Replace as required.
	c) Incorrect gas pressure.	c) See installation manual, Form I-MAPS II, Paragraph 9.3.
	d) Cracked ceramic at sensor.	d) Replace sensor.
Burner cycles on and off	1. Gas pressure too high or too low.	1. See installation manual, Form I-MAPS II, Paragraph 9.3.
	2. Burner not grounded	2. Make certain integrated circuit board is grounded to ignitor.
	3. Circuit board not grounded.	3. Make certain integrated circuit board is grounded to furnace chassis.
	4. Faulty integrated circuit board	4. If 24 volt is available to the circuit board and all other causes have been eliminated, replace board.
	5. Combustion air proving switch not closing.	5. a) Make sure unit is properly vented. b) Remove obstructions from vent. c) Replace faulty tubing to pressure switch.
	6. Faulty combustion air proving switch.	6. Replace combustion air proving switch.
	7. Flame sensor grounded.	7. Be certain flame sensor lead is not grounded or insulation or ceramic is not cracked. Replace as required.
	8. Cracked ceramic at sensor.	8. Replace sensor.
	9. Incorrect polarity.	9. Reverse line volt leads to integrated circuit board.
No heat (Heater Operating)	1. Incorrect valve outlet pressure or orifice.	1. Check valve outlet pressure. See Rating plate for manifold pressure.
	2. Cycling on limit control.	2. Check air throughput.
Venter motor will not run	1. Circuit open.	1. Check wiring and connections.
	2. Defective integrated circuit board.	2. Replace board.
	3. Defective motor.	3. Replace motor.
Venter motor cuts out on overload	1. Low or high voltage supply.	1. Correct electric supply.
	2. Defective motor.	2. Replace motor.

11.0 Troubleshooting (cont'd)

Troubleshooting the Electric Heat Section - Models REDA and RECA

PROBLEM	PROBABLE CAUSE	REMEDY
Unit does not operate	1. No power to unit	1. Turn on power; check supply fuses or main circuit breaker.
	2. Blown fuses	2. Check and replace if necessary.
	3. Defective or incorrect wiring.	3. Check wiring and connections. Refer to wiring diagram provided with unit.
	4. Defective or burned out control transformer	4. Check secondary voltage with voltmeter. Replace if necessary.
Fan operates but element does not heat	1. Dirty filters	1. Check filters and clean or replace if necessary.
	2. Defective air proving switch	2. Check and replace if necessary.
	3. Blown element fuses	3. Check and replace element fuses if necessary.
Insufficient heat	1. Burned out element	1. Turn off power and check element resistance with ohmmeter. Replace if open.
	2. Blown fuses	2. Check and replace if necessary.
	3. Cycling on limit control	3.
		a) Check air throughput (temperature rise).
		b) Check motor rpm against nameplate rating. Replace motor if speed is too slow.
		c) Defective limit control. Check wiring and connections. Check continuity through control and replace if necessary.
	4. Defective or incorrect wiring.	4. Check wiring and connections. Refer to wiring diagram provided with unit.

Index

Record installation information on the back of the installation manual, Form I-MAPS II.

Keep ALL booklets for future reference.

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