RN SERIES

Packaged Rooftop Units, Heat Pumps,
& Outdoor Air Handling Units



Installation, Operation, & Maintenance

⚠ 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.

A copy of this IOM should be kept with the unit.

⚠ WARNING

- Do not store 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.

- Startup and service must be performed by a Factory Trained Service Technician.

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Safety

Attention should be paid to the following statements:

NOTE - Notes are intended to clarify the unit installation, operation, and maintenance.

⚠ **CAUTION** - Caution statements are given to prevent actions that may result in equipment damage, property damage, or personal injury.

⚠ **WARNING** - Warning statements are given to prevent actions that could result in equipment damage, property damage, personal injury or death.

⚠ **DANGER** - Danger statements are given to prevent actions that will result in equipment damage, property damage, severe personal injury or death.

⚠ WARNING

ELECTRIC SHOCK, FIRE OR EXPLOSION HAZARD

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

Improper servicing could result in dangerous operation, serious injury, death, or property damage.

- Before servicing, disconnect all electrical power to the furnace. More than one disconnect may be provided.
- When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.
- Verify proper operation after servicing. Secure all doors with key-lock or nut and bolt.

⚠ CAUTION

WHAT TO DO IF YOU SMELL GAS

- Do not try to turn on unit.
- Shut off main gas supply.
- Do not touch any electric switch.
- Do not use any phone in the building.
- Never test for gas leaks with an open flame.
- Use a gas detection soap solution and check all gas connections and shut off valves.

⚠ WARNING

Electric shock hazard. Before servicing, shut off all electrical power to the unit, including remote disconnects, to avoid shock hazard or injury from rotating parts. Follow proper Lockout-Tagout procedures.

⚠ WARNING

FIRE, EXPLOSION OR CARBON MONOXIDE POISONING HAZARD

Failure to replace proper controls could result in fire, explosion, or carbon monoxide poisoning. Failure to follow safety warnings exactly could result in serious injury, death or property damage. Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this appliance.

⚠ WARNING

During installation, testing, servicing, and troubleshooting of the equipment it may be necessary to work with live electrical components. Only a qualified licensed electrician or individual properly trained in handling live electrical components shall perform these tasks.

Standard NFPA-70E, an OSHA regulation requiring an Arc Flash Boundary to be field established and marked for identification of where appropriate Personal Protective Equipment (PPE) be worn, should be followed.

⚠ WARNING

ROTATING COMPONENTS

Unit contains fans with moving parts that can cause serious injury. Do not open door containing fans until the power to the unit has been disconnected and fan wheel has stopped rotating.

⚠ WARNING

GROUNDING REQUIRED

All field installed wiring must be completed by qualified personnel. Field installed wiring must comply with NEC/CEC, local and state electrical code requirements. Failure to follow code requirements could result in serious injury or death. Provide proper unit ground in accordance with these code requirements.

⚠ WARNING

VARIABLE FREQUENCY DRIVES

Do not leave VFDs unattended in hand mode or manual bypass. Damage to personnel or equipment can occur if left unattended. When in hand mode or manual bypass mode VFDs will not respond to controls or alarms.

⚠ CAUTION

Electric motor over-current protection and overload protection may be a function of the Variable Frequency Drive to which the motors are wired. Never defeat the VFD motor overload feature. The overload ampere setting must not exceed 115% of the electric motor’s FLA rating as shown on the motor nameplate.

⚠ WARNING

UNIT HANDLING

To prevent injury or death lifting equipment capacity shall exceed unit weight by an adequate safety factor. Always test-lift unit not more than 24 inches high to verify proper center of gravity lift point to avoid unit damage, injury or death.

⚠ CAUTION

Failure to properly drain and vent coils when not in use during freezing temperature may result in coil and equipment damage.

⚠ CAUTION

Rotation must be checked on all MOTORS AND COMPRESSORS of 3 phase units at startup by a qualified service technician. Scroll compressors are directional and can be damaged if rotated in the wrong direction. Compressor rotation must be checked using suction and discharge gauges. Fan motor rotation should be checked for proper operation. Alterations should only be made at the unit power connection

⚠ WARNING

Do not use oxygen, acetylene or air in place of refrigerant and dry nitrogen for leak testing. A violent explosion may result causing injury or death.

⚠ WARNING

WATER PRESSURE

Prior to connection of condensing water supply, verify water pressure is less than maximum pressure shown on unit nameplate. To prevent injury or death due to instantaneous release of high pressure water, relief valves should be field supplied on system water piping.

⚠ WARNING

Always use a pressure regulator, valves and gauges to control incoming pressures when pressure testing a system. Excessive pressure may cause line ruptures, equipment damage or an explosion which may result in injury or death.

⚠ CAUTION

To prevent damage to the unit, do not use acidic chemical coil cleaners. Do not use alkaline chemical coil cleaners with a pH value greater than 8.5, after mixing, without first using an aluminum corrosion inhibitor in the cleaning solution.

⚠ WARNING

Some chemical coil cleaning compounds are caustic or toxic. Use these substances only in accordance with the manufacturer's usage instructions. Failure to follow instructions may result in equipment damage, injury or death.

⚠ CAUTION

Do not clean DX refrigerant coils with hot water or steam. The use of hot water or steam on refrigerant coils will cause high pressure inside the coil tubing and damage to the coil.

⚠ CAUTION

Door compartments containing hazardous voltage or rotating parts are equipped with door latches to allow locks. Door latch are shipped with nut and bolts requiring tooled access. If you do not replace the shipping hardware with a pad lock always re-install the nut & bolt after closing the door.

⚠ CAUTION

Cleaning the cooling tower or condenser water loop with harsh chemicals such as hydrochloric acid (muriatic acid), chlorine or other chlorides, can damage the refrigerant-to-water heat exchanger. Care should be taken to avoid allowing chemicals to enter the refrigerant-to-water heat exchanger. See Appendix A - Heat Exchanger Corrosion Resistance for more information.

⚠ WARNING

OPEN LOOP APPLICATIONS

Failure of the condenser as a result of chemical corrosion is excluded from coverage under AAON Inc. warranties and the heat exchanger manufacturer's warranties.

⚠ WARNING

WATER FREEZING

Failure of the condenser due to freezing will allow water to enter the refrigerant circuit and will cause extensive damage to the refrigerant circuit components. Any damage to the equipment as a result of water freezing in the condenser is excluded from coverage under AAON warranties and the heat exchanger manufacturer warranties.

⚠ WARNING

COMPRESSOR CYCLING

5 MINUTE MINIMUM OFF TIME
To prevent motor overheating compressors must cycle off for a minimum of 5 minutes.

5 MINUTE MINIMUM ON TIME
To maintain the proper oil level compressors must cycle on for a minimum of 5 minutes.

The cycle rate must not exceed 6 starts per hour.

1. Startup and service must be performed by a Factory Trained Service Technician.

2. Use only with type of the gas approved for the furnace. Refer to the furnace rating plate.

3. The unit is for outdoor use only. See General Information section for more information.

4. Provide adequate combustion ventilation air to the furnace. If a vent duct extension is used, a class III approved vent is required. See the Locating Units and Gas Heating sections of the Installation section of the manual.

5. Always install and operate furnace within the intended temperature rise range and duct system external static pressure (ESP) as specified on the unit nameplate.

6. The supply and return air ducts must be derived from the same space. It is recommended ducts be provided with access panels to allow inspection for duct tightness. When a down flow duct is used with electric heat, the exhaust duct should be an L shaped duct.

7. Clean furnace, duct and components upon completion of the construction setup. Verify furnace operating conditions including input rate, temperature rise and ESP.

8. Every unit has a unique equipment nameplate with electrical, operational, and unit clearance specifications. Always refer to the unit nameplate for specific ratings unique to the model you have purchased.

9. READ THE ENTIRE INSTALLATION, OPERATION AND MAINTENANCE MANUAL. OTHER IMPORTANT SAFETY PRECAUTIONS ARE PROVIDED THROUGHOUT THIS MANUAL.

10. Keep this manual and all literature safeguarded near or on the unit.

RN Series Feature String Nomenclature

Model Options : **Unit Feature Options**

GEN SIZE VLT CONFIG A1 A2 A3 A4 B1 B2 B3 1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN–025– 3 – 0 –B B 0 2– 3 8 4 : A 0 0 0 – D 0 B – D E H – 0 B A – 0 D 0 0 0 0 L – 0 0 – 0 0 B 0 0 0 0 0 B

BASE MODEL

SERIES AND GENERATION

RN

UNIT SIZE

006 = 6 ton Capacity
007 = 7 ton Capacity
008 = 8 ton Capacity
009 = 9 ton Capacity
010 = 10 ton Capacity
011 = 11 ton Capacity
013 = 13 ton Capacity
015 = 15 ton Capacity
016 = 16 ton Capacity
018 = 18 ton Capacity
020 = 20 ton Capacity
025 = 25 ton Capacity
026 = 26 ton Capacity
030 = 30 ton Capacity
031 = 31 ton Capacity
040 = 40 ton Capacity
050 = 50 ton Capacity
055 = 55 ton Capacity
060 = 60 ton Capacity
065 = 65 ton Capacity
070 = 70 ton Capacity
075 = 75 ton Capacity
090 = 90 ton Capacity
105 = 105 ton Capacity
120 = 120 ton Capacity
130 = 130 ton Capacity
140 = 140 ton Capacity

VOLTAGE

1 = 230V/1Φ/60Hz
2 = 230V/3Φ/60Hz
3 = 460V/3Φ/60Hz
4 = 575V/3Φ/60Hz
8 = 208V/3Φ/60Hz
9 = 208V/1Φ/60Hz

INTERIOR PROTECTION

0 = Standard - Vertical Discharge and Return
A = Interior Corrosion Protection - Vertical Discharge and Return

Model Option A: COOLING/HEAT PUMP

A1: REFRIGERANT STYLE

0 = Air Handling Unit
B = R-410A - High Efficiency
C = R-410A - Standard Efficiency
E = R-410A Variable Capacity Scroll Compressor - High Efficiency
F = R-410A Variable Capacity Scroll Compressor - Standard Efficiency
J = R-410A VFD Compatible Scroll Compressor
K = R-410A VFD Compatible Scroll Compressor + Microchannel Condenser

A2: UNIT CONFIGURATION

0 = No Cooling
A = Air-Cooled Cond. + Std Evap. Coil
B = Air-Cooled Cond. + 6 Row Evap. Coil
J = Water-Cooled Cond. + Std Evap. Coil
K = Water-Cooled Cond. + 6 Row Evap. Coil
P = Air-Cooled Cond. + 6 Row Evap. Coil + Mixed Air Bypass
Q = Air-Cooled Cond. + 6 Row Evap. Coil + Return Air Bypass
R = Water-Cooled Cond. + 6 Row Evap. Coil + Return Air Bypass
T = Water-Cooled Cond. + 6 Row Evap. Coil + Mixed Air Bypass
U = Chilled Water Coil - 4 Row
W = Chilled Water Coil - 6 Row
2 = Non-Compressorized + Std Evap. Coil
4 = Non-Compressorized + 6 Row Evap. Coil
6 = Air-Source Heat Pump
7 = Water-Source/Geothermal Heat Pump

RN Series Feature String Nomenclature

Model Options : **Unit Feature Options**

GEN	SIZE	VLT	CONFIG	A1	A2	A3	A4	B1	B2	B3	1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	6C	7	8	9	10	11	12	13	14A	14B	15	16	17	18	19	20	21	22	23
RN	025	3	0	B	B	0	2	3	8	4	:	A	0	0	0	D	0	B	D	E	H	0	B	A	0	D	0	0	0	0	L	0	0	0	0	B	0	0	0	0	0	B

Model Option A: COOLING/HEAT PUMP

A3: COIL COATING

0 = Standard
1 = Polymer E-Coated Evap. and Cond.
2 = Stainless Steel Casing Evap and Cond
8 = Polymer E-Coated Cond.
9 = Polymer E-Coated Cooling Coil
A = Stainless Steel Evap. Coil Casing + Polymer E-Coated Cond. Coil
B = Stainless Steel Casing Cond & Polymer E-Coated Cooling Coil
C = Stainless Steel Casing Cond. Only
D = Stainless Steel Cooling Coil Casing

A4: COOLING/HEAT PUMP STAGING

0 = No Cooling
1 = 1 Stage
2 = 2 Stage
4 = 4 Stage
9 = Modulating - Lead VCC
A = Modulating - All VCC
B = 1 Stage + 1 Stage Auxiliary Heat
C = 2 Stage + 1 Stage Auxiliary Heat
D = 4 Stage + 1 Stage Auxiliary Heat
E = Modulating - Lead VCC + 1 Stage Aux. Heat
F = Modulating - All VCC + 1 Stage Aux. Heat
H = Single Serpentine 8 fpi
J = Half Serpentine 8 fpi
K = Single Serpentine 10 fpi
L = Half Serpentine 10 fpi
M = Single Serpentine 12 fpi
N = Half Serpentine 12 fpi
P = 1 Stage + 2 Stage Auxiliary Heat
Q = 2 Stage + 2 Stage Auxiliary Heat
R = 4 Stage + 2 Stage Auxiliary Heat
S = Modulating - Lead VCC + 2 Stage Aux. Heat
T = Modulating - All VCC + 2 Stage Aux. Heat
U = 1 Stage + 4 Stage Auxiliary Heat
V = 2 Stage + 4 Stage Auxiliary Heat
W = 4 Stage + 4 Stage Auxiliary Heat
Y = Modulating - Lead VCC + 4 Stage Aux. Heat
Z = Modulating - All VCC + 4 Stage Aux. Heat

Model Option B: HEATING

B1: HEATING TYPE

0 = No Heating
1 = Electric Heat
2 = Natural Gas Aluminized
3 = Natural Gas Stainless Steel
4 = High Altitude Natural Gas Aluminized
5 = High Altitude Natural Gas Stainless Steel
6 = LP Gas Aluminized
7 = LP Gas Stainless Steel
8 = High Altitude LP Gas Aluminized
9 = High Altitude LP Gas Stainless Steel
C = Steam Distributing Standard
D = Steam Distributing Polymer E-Coated
E = Hot Water Standard
F = Hot Water Polymer E-Coated

RN Series Feature String Nomenclature

Model Options : **Unit Feature Options**

GEN	SIZE	VLT	CONFIG	A1	A2	A3	A4	B1	B2	B3	1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	6C	7	8	9	10	11	12	13	14A	14B	15	16	17	18	19	20	21	22	23
RN	025	3	0	B	B	0	2	3	8	4	A	0	0	0	D	0	B	D	E	H	0	B	A	0	D	0	0	0	0	L	0	0	0	0	B	0	0	0	0	0	B

B2: HEATING DESIGNATION

0 = No Heating
1 = Heat 1
2 = Heat 2
3 = Heat 3
4 = Heat 4
6 = Heat 6
7 = Heat 7
8 = Heat 8
9 = Heat 9
A = Heat A
B = Heat B
C = Heat C
D = Heat D
E = Heat E
F = Heat F
G = Heat G
H = 1 Row Coil
J = 2 Row Coil
K = Heat K
L = Heat L
M = Heat M
N = Heat N
P = Heat P

Model Option B: HEATING

B3: HEATING STAGING

0 = No Heating
1 = 1 Stage
2 = 2 Stage
3 = 3 Stage
4 = 4 Stage
5 = 5 Stage
6 = 6 Stage
7 = 7 Stage
8 = 8 Stage
9 = Modulating Gas/SCR Electric
A = Modulating/SCR Electric, 0-10V Control Signal
H = Single Serpentine 8 fpi
J = Half Serpentine 8 fpi
K = Single Serpentine 10 fpi
L = Half Serpentine 10 fpi
M = Single Serpentine 12 fpi
N = Half Serpentine 12 fpi

Feature 1: RETURN/OUTSIDE AIR

1A: RETURN/OUTSIDE AIR SECTION

0 = Manually Adjustable OA Opening + RA Opening
A = Economizer
B = Econ + Power Exhaust
C = Econ + Power Return
D = Econ + PE - Discharge Damper Volume Control
E = Econ + PE - Discharge Damper Volume Control + 0-10V External Control
F = Low cfm Total Energy Recovery Wheel
G = Low cfm Total ERW + Bypass
H = Low cfm Sensible ERW
J = Low cfm Sensible ERW + Bypass
K = 100% Outside Air - No Return Air
L = Motorized Outside Air Damper + RA Opening
M = Motorized Outside Air Damper - No Return Air
N = Empty ERW Option Box - No Power Exhaust
P = Empty ERW Option Box + Power Exhaust
Q = 1% Purge Low cfm Total ERW
R = 1% Purge Low cfm Total ERW + Bypass
S = 1% Purge Low cfm Sensible ERW
T = 1% Purge Low cfm Sensible ERW + Bypass
U = High cfm Total ERW
V = High cfm Total ERW + Bypass
W = High cfm Sensible ERW
Y = High cfm Sensible ERW + Bypass
Z = 1% Purge High cfm Total ERW
1 = 1% Purge High cfm Total ERW + Bypass
2 = 1% Purge High cfm Sensible ERW
3 = 1% Purge High cfm Sensible ERW + Bypass
4 = Single Total Energy Recovery Wheel + Bypass
5 = 100% Return Air

RN Series Feature String Nomenclature

Model Options : **Unit Feature Options**

GEN	SIZE	VLT	CONFIG	A1	A2	A3	A4	B1	B2	B3	1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	6C	7	8	9	10	11	12	13	14A	14B	15	16	17	18	19	20	21	22	23
RN	025	3	0	B	B	0	2	3	8	4	: A	**0**	**0**	**0**	D	0	B	D	E	H	0	B	A	0	D	0	0	0	0	L	0	0	0	0	B	0	0	0	0	0	B

Feature 1: RETURN/OUTSIDE AIR

1B: RETURN/EXHAUST AIR BLOWER CONFIGURATION

0 = Standard – None
A = 1 Blower + Standard Eff. Motor
C = 1 Blower + Premium Eff. Motor
D = 2 Blowers + Premium Eff. Motors
E = 1 Blower + Premium Eff. + 1 VFD
F = 2 Blowers + Premium Eff. + 1 VFD
G = 2 Blowers + Premium Eff. + 2 VFDs

1C: RETURN/EXHAUST AIR BLOWER

0 = Standard - None
A = 12”x9” Forward Curved
B = 15” Backward Curved Plenum
C = 18.5” Backward Curved Plenum
D = 22” Backward Curved Plenum
F = 27” Backward Curved Plenum
G = 22” Direct Drive Axial Flow
H = 35.5” Direct Drive Axial Flow
J = 15” BC Plenum - 50% Width with Banding
K = 18.5” BC Plenum - 70% Width with Banding
L = 22” BC Plenum - 70% Width with Banding
M = 27” BC Plenum - 70% Width with Banding
N = 30” Backward Curved Plenum
P = 42” 9 Blade Direct Drive Axial Flow
Q = 42” 12 Blade Direct Drive Axial Flow
R = 24” Backward Curved Plenum
S = 33” Backward Curved Plenum

1D: RETURN/EXHAUST AIR BLOWER MOTOR

0 = Standard - None
C = 1 hp - 1760 rpm
D = 2 hp - 1760 rpm
E = 3 hp - 1760 rpm
F = 5 hp - 1760 rpm
G = 7.5 hp - 1760 rpm
H = 10 hp - 1760 rpm
L = 15 hp - 1760 rpm
M = 20 hp - 1760 rpm
N = 1 hp - 1170 rpm
P = 2 hp - 1170 rpm
Q = 3 hp - 1170 rpm
R = 5 hp - 1170 rpm
S = 7.5 hp - 1170 rpm
T = 10 hp - 1170 rpm
U = 15 hp - 1170 rpm
V = 20 hp - 1170 rpm
W = 25 hp - 1170 rpm
Y = 30 hp - 1170 rpm
3 = 25 hp - 1760 rpm
4 = 30 hp - 1760 rpm
5 = 40 hp - 1760 rpm
6 = 50 hp - 1760 rpm

RN Series Feature String Nomenclature

Model Options : **Unit Feature Options**

GEN	SIZE	VLT	CONFIG	A1	A2	A3	A4	B1	B2	B3	1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	6C	7	8	9	10	11	12	13	14A	14B	15	16	17	18	19	20	21	22	23
RN	025	3	0	B	B	0	2	3	8	4	:	A	0	0	0	**D**	**0**	**B**	D	E	H	0	B	A	0	D	0	0	0	0	L	0	0	0	0	B	0	0	0	0	0	B

Feature 2: OUTSIDE AIR CONTROL

0 = Standard - None
A = 3 Position Actuator - Sensible Limit
B = 3 Position Actuator - Enthalpy Limit
C = Fully Modulating Actuator - Sensible Limit
D = Fully Modulating Actuator - Enthalpy Limit
E = DDC Actuator
F = Constant Volume Outside Air
G = Options A + F
H = Options B + F
J = Options C + F
K = Options D + F
L = Options E + F
M = 3 Pos. Act. - Sensible Limit + CO_2 Override
N = 3 Pos. Act. - Enthalpy Limit + CO_2 Override
P = Fully Mod. Act. - Sensible + CO_2 Override
Q = Fully Mod. Act. - Enthalpy + CO_2 Override
R = DDC Actuator + CO_2 Override
S = Dual Minimum Position Potentiometers + Fully Mod. Act. - Sensible Limit
T = Dual Minimum Position Potentiometers + Fully Mod. Act. - Enthalpy Limit
U = 2 Position Actuator

Feature 3: HEAT OPTIONS

0 = Standard - None
A = Regulator (2psi) with vent limiting device
B = Regulator (5psi) with vent limiting device
C = Regulator (2psi) vented
D = Regulator (2psi) vented
E = Discharge Air Override
F = Options A + E
G = Options B + E
H = Options C + E
J = Options D + E
K = Auxiliary Heat K
L = Auxiliary Heat L
M = Auxiliary Heat M
N = Auxiliary Heat N
P = Auxiliary Heat P
Q = Auxiliary Heat Q
R = Auxiliary Heat R
S = Auxiliary Heat S
T = Auxiliary Heat T
U = Auxiliary Heat U
V = Auxiliary Heat V
W = Auxiliary Heat W

Feature 4: MAINTENANCE OPTIONS

0 = Standard - None
A = Field Wired 115V Outlet
B = Factory Wired 115V Outlet
C = Blower Aux. Contact
D = Remote Start/Stop Terminals
E = Options A + C
F = Options A + D
G = Options B + C
H = Options B + D
J = Options A + C + D
K = Options B + C + D
L = Options C + D

RN Series Feature String Nomenclature

Model Options : **Unit Feature Options**

GEN	SIZE	VLT	CONFIG	A1	A2	A3	A4	B1	B2	B3	1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	6C	7	8	9	10	11	12	13	14A	14B	15	16	17	18	19	20	21	22	23
RN	025	3	0	B	B	0	2	3	8	4	:	A	0	0	0	D	0	B	D	E	H	0	B	A	0	D	0	0	0	0	L	0	0	0	0	B	0	0	0	0	0	B

Feature 5: SUPPLY AIR OPTIONS

5A: SUPPLY AIR BLOWER CONFIGURATION

0 = 1 Blower + Standard Eff. Motor
A = 2 Blowers + Standard Eff. Motors
B = 1 Blower + Premium Eff. Motor
C = 2 Blowers + Premium Eff. Motors
D = 1 Blower + Premium Eff. + 1 VFD
F = 2 Blowers + Premium Eff. + 1 VFD
G = 2 Blowers + Premium Eff. + 2 VFDs

5B: SUPPLY AIR BLOWER

B = 15” Backward Curved Plenum
C = 18.5” Backward Curved Plenum
D = 24” Backward Curved Plenum
E = 27” Backward Curved Plenum
F = 30” BC Plenum - 90% Width + 1750 rpm Max - Aluminum Wheel
G = 15” BC Plenum - 70% Width
H = 18.5” BC Plenum - 70% Width
J = 18.5” Backward Curved Plenum
K = 18.5” BC Plenum - 60% Width
L = 30” BC Plenum - 1600 rpm Max - Aluminum Wheel
M = 13.5” Backward Curved Plenum
N = 13.5” BC Plenum - 70% Width
P = 24” BC Plenum - 60% Width
Q = 27” BC Plenum - 60% Width
R = 22” Backward Curved Plenum
S = 22” BC Plenum - 70% Width
T = 17” Backward Curved Plenum
U = 17” BC Plenum - 70% Width
V = 33” Backward Curved Plenum
W = 36.5” Backward Curved Plenum
Y = 42.5” Backward Curved Plenum

5C: SUPPLY AIR BLOWER MOTOR

C = 1 hp - 1760 rpm
D = 2 hp - 1760 rpm
E = 3 hp - 1760 rpm
F = 5 hp - 1760 rpm
G = 7.5 hp - 1760 rpm
H = 10 hp - 1760 rpm
L = 15 hp - 1760 rpm
M = 20 hp - 1760 rpm
N = 1 hp - 1170 rpm
P = 2 hp - 1170 rpm
Q = 3 hp - 1170 rpm
R = 5 hp - 1170 rpm
S = 7.5 hp - 1170 rpm
T = 10 hp - 1170 rpm
U = 15 hp - 1170 rpm
V = 20 hp - 1170 rpm
W = 25 hp - 1170 rpm
Y = 30 hp - 1170 rpm
3 = 25 hp - 1760 rpm
4 = 30 hp - 1760 rpm
5 = 40 hp - 1760 rpm
6 = 50 hp - 1760 rpm

Feature 6: FILTERS

6A: PRE FILTER

0 = Standard - None
A = 2” Pleated - 30% Eff. - MERV 8
B = Metal Mesh Outside Air Filter
C = Lint Screen Filter
D = Exhaust Air ERW Filter
F = Options A + D
G = Options B + D
H = Options A + B + D

6B: UNIT FILTER

0 = 2” Throwaway
or 2” Pleated - 30% Eff. - MERV 8
A = 2” Pleated - 30% Eff. - MERV 8
B = 4” Pleated - 30% Eff. - MERV 8
C = 2” Permanent Filter + Replaceable Media
F = 4” Pleated - 65% Eff. - MERV 11
G = 4” Pleated - 85% Eff. - MERV 13
H = 4” Pleated - 95% Eff. - MERV 14

RN Series Feature String Nomenclature

Model Options : **Unit Feature Options**

GEN	SIZE	VLT	CONFIG	A1	A2	A3	A4	B1	B2	B3	1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	**6C**	**7**	**8**	**9**	**10**	11	12	13	14A	14B	15	16	17	18	19	20	21	22	23
RN	025	3	0	B	B	0	2	3	8	4	A	0	0	0	D	0	B	D	E	H	0	B	**A**	**0**	**D**	**0**	**0**	0	0	L	0	0	0	0	B	0	0	0	0	0	B

6C: FILTER OPTIONS
0 = Standard
A = Clogged Filter Switch
B = Magnehelic Gauge
C = Options A + B

Feature 7: REFRIGERATION CONTROL

0 = Standard
A = 5 Min. Time Delay Relay - Comp. Off
B = 20 Sec. Time Delay Relay - Comp. Staging
C = Fan Cycling
D = Adjustable Lockouts - Each Circuit
E = Freeze Stats - Each Circuit
F = Options A + B
G = Options A + C
H = Options A + D
J = Options A + E
K = Options B + C
L = Options B + D
M = Options B + E
N = Options C + D
P = Options C + E
Q = Options D + E
R = Options A + B + C
S = Options A + B + D
T = Options A + B + E
U = Options A + C + D
V = Options A + C + E
W = Options A + D + E
Y = Options B + C + D
Z = Options B + C + E
1 = Options B + D + E
2 = Options C + D + E
3 = Options A + B + C + D
4 = Options A + B + C + E
5 = Options A + B + D + E
6 = Options A + C + D + E
7 = Options B + C + D + E
8 = Options A + B + C + D + E

Feature 8: REFRIGERATION OPTIONS

0 = Standard
A = Hot Gas Bypass Lead Stage
or Hot Gas Bypass Lag Stage with Lead Variable Capacity Compressor
B = Hot Gas Bypass Lead and Lag Stages
C = Hot Gas Reheat
D = Modulating Hot Gas Reheat
E = 0°F Low Ambient Lead Stage
F = Options A + C
G = Options B + C
H = Options A + D
J = Options B + D
K = Options A + E
L = Options B + E

Feature 9: REFRIGERATION ACCESSORIES

0 = Standard
A = Sight Glass
B = Compressor Isolation Valves
C = Options A + B
D = ECM Condenser Fan - Multiple Speed
E = ECM Condenser Fan - Head Pressure Control
F = VFD Controlled Condenser Fans - Variable Speed
G = Options A + D
H = Options B + D
J = Options A + B + D
K = Options A + E
L = Options B + E
M = Options A + B + E
N = Options A + F
P = Options B + F
Q = Options C + F

Feature 10: POWER OPTIONS

0 = Standard Power Block
A = 100 Amp Power Switch
B = 150 Amp Power Switch
C = 225 Amp Power Switch
D = 400 Amp Power Switch
E = 600 Amp Power Switch
F = 60 Amp Power Switch

RN Series Feature String Nomenclature

Model Options : **Unit Feature Options**

GEN	SIZE	VLT	CONFIG	A1	A2	A3	A4	B1	B2	B3	1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	6C	7	8	9	10	11	12	13	14A	14B	15	16	17	18	19	20	21	22	23
RN	025	3	0	B	B	0	2	3	8	4	: A	0	0	0	D	0	B	D	E	H	0	B	A	0	D	0	0	**0**	**0**	L	0	0	0	0	B	0	0	0	0	0	B

Feature 11: SAFETY OPTIONS

0 = Standard
A = Return and Supply Air Firestat
B = Return Air Smoke Detector
C = Supply Air Smoke Detector
D = Options B + C
E = Options A + B
F = Options A + C
G = Options A + B + C
H = Remote Smoke Detector Terminals
J = Options A + H
K = Options B + H
L = Options C + H
M = Options D + H
N = Options A + B + H
P = Options A + C + H
Q = Options A + B + C + H

Feature 12: CONTROLS

0 = Standard
A = Low Limit Controls
B = Phase and Brown Out Protection
C = Energy Recovery Wheel Defrost
D = Energy Recovery Wheel Rotation Detection
E = Compressor Power Factor Correction
F = Options A + B
G = Options A + C
H = Options A + D
J = Options A + E
K = Options B + C
L = Options B + D
M = Options B + E
N = Options C + D
P = Options C + E
Q = Options D + E
R = Options A + B + C
S = Options A + B + D
T = Options A + B + E
U = Options A + C + D
V = Options A + C + E
W = Options A + D + E
Y = Options B + C + D
Z = Options B + C + E
1 = Options B + D + E
2 = Options C + D + E
3 = Options A + B + C + D
4 = Options A + B + C + E
5 = Options A + B + D + E
6 = Options A + C + D + E
7 = Options B + C + D + E
8 = Options A + B + C + D + E

RN Series Feature String Nomenclature

Model Options : **Unit Feature Options**

GEN	SIZE	VLT	CONFIG	A1	A2	A3	A4	B1	B2	B3	1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	6C	7	8	9	10	11	12	**13**	**14A**	**14B**	**15**	**16**	**17**	**18**	19	20	21	22	23
RN	025	3	0	B	B	0	2	3	8	4	A	0	0	0	D	0	B	D	E	H	0	B	A	0	D	0	0	0	0	**L**	**0**	**0**	**0**	**0**	**B**	**0**	0	0	0	0	B

Feature 13: SPECIAL CONTROLS

0 = Terminal Block for Thermostat Control
D = VAV Unit Controller - VAV Cool + CV Heat
E = Constant Volume Unit Controller - CV Cool + CV Heat
F = Makeup Air Unit Controller - CV Cool + CV Heat
H = Field Installed DDC Controls by Others
J = Factory Installed DDC Controls Furnished by Others
K = Factory Installed DDC Controls Furnished by Others w/ Isolation relays
L = Terminal Block for Thermostat Control with Isolation Relays
U = Digital Precise Air Controller, D-PAC
V = Precise Air Controller, PAC
W = Terminal Block for Variable Capacity Compressor Thermostat
Y = VAV Single Zone Heat Pump Unit Controller - VAV Cool + VAV Heat
Z = Constant Volume Heat Pump Unit Controller - CV Cool + CV Heat
1 = Makeup Air Heat Pump Unit Controller - CV Cool + CV Heat
2 = VAV Single Zone Unit Controller VAV Cool + CV Heat
3 = VAV Single Zone Unit Controller VAV Cool + VAV Heat
4 = Field Installed DDC Controls by Others
5 = Field Installed DDC Controls Furnished by Others with Isolation Relays
6 = Factory Installed DDC Controls Furnished by Others with Isolation Relays (SPA)

Feature 14: PREHEAT

14A: PREHEAT CONFIGURATION

0 = Standard - None
A = Steam Distributing Preheat Coil - 1 Row
B = Steam Distributing Preheat Coil - 2 Row
C = Hot Water Preheat Coil - 1 Row
D = Hot Water Preheat Coil - 2 Row

14B: PREHEAT SIZING

0 = Standard - None
A = Single Serpentine 8 fpi
B = Half Serpentine 8 fpi
C = Single Serpentine 10 fpi
D = Half Serpentine 10 fpi
E = Single Serpentine 12 fpi
F = Half Serpentine 12 fpi

Feature 15: Glycol Percentage

0 = Standard
A = 20% Propylene Glycol
B = 40% Propylene Glycol
C = Field Adjustable for Glycol %

Feature 16: INTERIOR CABINET OPTIONS

0 = Standard
B = Service Lights

Feature 17: EXTERIOR CABINET OPTIONS

0 = Standard
A = Base Insulation
B = Burglar Bars
C = Condenser Coil Guards
D = Options A + B
E = Options A + C
F = Options B + C
G = Options A + B + C

Feature 18: CUSTOMER CODE

0 = Standard

RN Series Feature String Nomenclature

Model Options : **Unit Feature Options**

GEN	SIZE	VLT	CONFIG	A1 A2 A3 A4	B1 B2 B3	1A 1B 1C 1D	2 3 4	5A 5B 5C	6A 6B 6C	7 8 9 10 11 12 13	14A 14B	15 16 17 18	**19**	**20**	**21**	**22**	23
RN	– 025	– 3	– 0	– BB02	– 384	: A000	– D0B	– DEH	– 0BA	– 0D0000L	– 00	– 00B0	**0**	**0**	**0**	**0**	B

Feature 19: CODE OPTIONS

0 = Standard - ETL U.S.A. Listing
B = Chicago - Cool + Gas
C = Chicago - Cool + Electric Heat
D = Chicago - Cool Only
E = Chicago - Gas Only
F = Chicago - Electric Heat Only
G = Chicago - No Cool + No Heat
H = ETL U.S.A. + Canada Listing
K = California OSHPD Certification
L = Shake Table Cert. (ASCE 7-05/ICC-ES AC 156)
M = Seismic Construction (Non-Certified)
N = California OSHPD Certification + Chicago
P = Shake Table Cert. (ASCE 7-05/ICC-ES AC 156) + Chicago
Q = Seismic Construction (Non-Certified) + Chicago

Feature 20: CRATING

0 = Standard
A = Export Crating
B = Export Crating - No Condenser Section

Feature 21: WATER-COOLED CONDENSER

0 = Standard - None
A = Balancing Valves
B = Water Flow Switch
C = Motorized Shut-off Valve
D = Head Pressure Control
E = Options A + B
F = Options A + C
G = Options A + D
H = Options B + C
J = Options B + D
L = Options A + B + C
M = Options A + B + D
R = SMO 254 Brazed Plate Heat Exchanger
S = Options A + R
T = Options B + R
U = Options C + R
V = Options D + R
W = Options A + B + R
Y = Options A + C + R
Z = Options A + D + R
1 = Options B + C + R
2 = Options B + D + R
3 = Options C + D + R
4 = Options A + B + C + R
5 = Options A + B + D + R

Feature 22: CONTROL VENDORS

0 = None
A = WattMaster Orion Controls System
B = JENEsys Control System with Web UI
C = WattMaster Orion Controls System with Specials
E = Remote Mounted AAON Mini Controller
F = JENEsys Control System with Web UI + Fox
G = JENEsys Control System with Web UI + Lon
H = JENEsys Control w/ Web UI + BACnet MSTP
J = JENEsys Control w/ Web UI + BACnet IP
K = JENEsys Control w/ Web UI + Modbus RTU
L = JENEsys Control w/ Web UI + Modbus TCP

RN Series Feature String Nomenclature

Model Options										:	Unit Feature Options																								
GEN	SIZE	VLT	CONFIG	A1	A2	A3	A4	B1	B2	B3	1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	6C	7	8	9	10	11	12	13	14A	14B	15	16	17	18	19	20	21	22	**23**
RN	**– 025**	**– 3**	**– 0**	**– B**	**B**	**0**	**2**	**–**	**3**	**8**	**4**	**:**	**A**	**0**	**0**	**0**	**–**	**D**	**0**	**B**	**–**	**D**	**E**	**H**	**–**	**0**	**B**	**A**	**–**	**0**	**D**	**0**	**0**	**0**	**0**	**L**	**–**	**0**	**0**	**–**	**0**	**0**	**B**	**0**	**0**	**0**	**0**	**0**	**B**

Feature 23: TYPE

B = Standard - AAON Gray Paint
U = Special Pricing Authorization + Special Paint
X = Special Pricing Authorization + AAON Gray Paint
1 = Standard Paint + 2 Year Parts Only Warranty
4 = Standard Paint + 5 Year Parts Only Warranty
9 = Standard Paint + 10 Year Parts Only Warranty

General Information

RN Series packaged rooftop units, heat pumps and outdoor air handling units have been designed for outdoor installation only. Units are assembled, wired, charged and run tested at the factory.

Startup and service must be performed by a Factory Trained Service Technician.

⚠ WARNING

Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury or loss of life. Startup and service must be performed by a Factory Trained Service Technician. A copy of this IOM should be kept with the unit.

⚠ CAUTION

These units must not be used as a "construction heater" at anytime during any phase of construction. Very low return air temperatures, harmful vapors, and misplacement of the filters will damage the unit and its efficiency.

Certification of Gas Heat Models

a. AAON gas heat exchangers have successfully completed 10,000 burner operation cycles and corrosion resistance as specified per test standard ANSI 21.47. All gas heat exchangers used in AAON appliances are certified for use downstream of evaporator or cooling coils.
b. Certified as a Category III forced air furnace with or without cooling.
c. Certified for outdoor installation only.
d. Certified for installation on a combustible roof with a minimum of 12" high curb.

Certification of Steam or Hot Water Heat Models

a. Certified as a forced air heating system with or without cooling.
b. Certified for outdoor installation only.
c. Certified for installation on a combustible roof with a minimum of 12" high curb.

Certification of Electric Heat Models

a. Certified as an electric warm air furnace with or without cooling.
b. Certified for outdoor installation only.
c. Certified for installation on a combustible roof with a minimum of 12" high curb.

Certification of Cooling Models

a. Certified as a commercial central air conditioner with or without electrically operated compressors.
b. Certified for outdoor installation only.
c. Certified for installation on a combustible roof with a minimum of 12" high curb.
d. Certified with refrigerant R-410A coils or with chilled water cooling coils.

Codes and Ordinances

RN Series units have been tested and certified, by ETL, in accordance with UL Safety Standard 1995/CSA C22.2 No. 236, ANSI Safety Standard Z21.47b-2008/CSA 2.3b-2008, and ANSI Safety Standard Z83.8-2006/CSA 2.6-2006.

System should be sized in accordance with the American Society of Heating, Refrigeration and Air Conditioning Engineers Handbook.

Installation of RN Series units must conform to the ICC standards of the International Mechanical Code, the International Building Code, and local building, plumbing and waste water codes. In the absence of local codes installation must conform to the current (United States) National Fuel Gas Code ANSI-Z223.1/NFPA 54 or the current (Canada) National Fuel & Propane Installation Code CSA B149.1 or B149.2, and Mechanical Refrigeration Code CSA B52. All appliances must be electrically grounded in accordance with local codes, or in the absence of local codes, the current National Electric Code, ANSI/NFPA 70 or the current Canadian Electrical Code CSA C22.1.

⚠ CAUTION

The Clean Air Act of 1990 bans the intentional venting of refrigerant as of July 1, 1992. Approved methods of recovery, recycling, or reclaiming must be followed.

⚠ WARNING

Coils and sheet metal surfaces present sharp edges and care must be taken when working with equipment.

⚠ WARNING

Failure to observe the following instructions will result in premature failure of your system and possible voiding of the warranty.

Receiving Unit

When received, the unit should be checked for damage that might have occurred in transit. If damage is found it should be noted on the carrier's freight bill. A request for inspection by carrier's agent should be made in writing at once. Nameplate should be checked to ensure the correct model sizes and voltages have been received to match the job requirements.

If repairs must be made to damaged goods, then the factory should be notified before any repair action is taken in order to protect the warranty. Certain equipment alteration, repair, and manipulation of equipment without the manufacturer's consent may void the product warranty. Contact the AAON Warranty Department for assistance with handling damaged goods, repairs, and freight claims: (918) 583-2266.

Note: Upon receipt check shipment for items that ship loose such as filters and remote sensors. Consult order and shipment documentation to identify potential loose-shipped items. Loose-shipped items may have been placed inside unit cabinet for security. Installers and owners should secure all doors with locks or nuts and bolts to prevent unauthorized access.

Figure 1 - Lockable Handle

The warranty card must be completed in full and returned to AAON not more that 3 months after unit is delivered.

Storage

If installation will not occur immediately following delivery, store equipment in a dry protected area away from construction traffic and in the proper orientation as marked on the packaging with all internal packaging in place. Secure all loose-shipped items.

Packaged Direct Expansion (DX) Units

⚠ WARNING

COMPRESSOR CYCLING

5 MINUTE MINIMUM OFF TIME

To prevent motor overheating compressors must cycle off for a minimum of 5 minutes.

5 MINUTE MINIMUM ON TIME

To maintain the proper oil level compressors must cycle on for a minimum of 5 minutes.

The cycle rate must not exceed 6 starts per hour.

All DX refrigeration systems are factory assembled, leak tested, charged with refrigerant, and run tested.

All refrigerant systems include an evaporator, condenser, liquid line filter driers, thermal expansion valves (TXV) and scroll compressors. Compressors are equipped with a positive pressure forced lubrication system.

⚠ CAUTION

CRANKCASE HEATER OPERATION

Some units are equipped with compressor crankcase heaters, which should be energized at least 24 hours prior to cooling operation, to clear any liquid refrigerant from the compressors.

Never cut off the main power supply to the unit, except for servicing, emergency, or complete shutdown of the unit. When power is cut off from the unit crankcase heaters cannot prevent refrigerant migration into the compressors. This means the compressor will cool down and liquid refrigerant may accumulate in the compressor. The compressor is designed to pump refrigerant gas and damage may occur when power is restored.

If power to the unit must be off for more than an hour, turn the thermostat system switch to "OFF", or turn the unit off at the control panel, and leave the unit off until the main power switch has been turned on again for at least 24 hours for units with compressor crankcase heaters. This will give the crankcase heater time to clear any liquid accumulation out of the compressor before it is started.

Always control the unit from the thermostat, or control panel, never at the main power supply, except for servicing, emergency or complete shutdown of the unit.

During the cooling season, if the air flow is reduced due to dirty air filters or any other reason, the cooling coils can get too cold which will cause excessive liquid to return to the compressor. As the liquid concentration builds up, oil is washed out of the compressor, leaving it starved for lubrication.

The compressor life will be seriously shorted by reduced lubrication and the pumping of excessive amounts of liquid oil and refrigerant.

⚠ CAUTION

Polyolester (POE) and Polyvinylether (PVE) oils are two types of lubricants used in hydrofluorocarbon (HFC) refrigeration systems. Refer to the compressor label for the proper compressor lubricant type.

Note: Low Ambient Operation
Air-cooled DX units without a low ambient option, such as condenser fan cycling or the 0°F low ambient option, will not operate in the cooling mode of operation properly when the outdoor temperature is below 55°F. Low ambient and/or economizer options are recommended if cooling operation below 55°F is expected.

Note: Multiple Units with Multiple Thermostats
When several heating and cooling units are used to condition a space all unit thermostat switches must be set in either heating mode, cooling mode or off. Do not leave part of the units switched to the opposite mode. Cooling only units should be switched off at the thermostat during the heating season.

Gas or Electric Heating
The unit is designed to heat a given amount of air while operating. If this amount of air is greatly reduced, approximately 1/3 during the heating season, the gas heat exchanger or electric heating coil may overheat, and may cut the burner or heater off entirely by action of the safety high temperature limit devices which are factory mounted at the heat exchanger and supply fan areas.

Airflow should be adjusted after installation to obtain an air temperature rise within the range specified on the unit rating plate at the required external static pressure.

Should overheating occur with a gas heat exchanger, or the gas supply fail to shut off, shut off the manual gas valve to the furnace before shutting off the electrical supply.

Prolonged overheating of the heat exchanger will shorten its life.

If unit has not been selected as a 100% outside air unit (makeup air unit) the return air duct must be sealed to the unit and the return air temperature must be maintained between 55°F and 80°F.

Table 1 - Electric and Gas Heating Capacities

Model Option B2	Gas Heat		Electric Heat Capacity	
	Input Capacity	Output Capacity		
	MBH	MBH	kW (208V)	kW (230V, 460V, 575V)
1 = *Heat 1*	60.0	48.0	7.5	10
2 = *Heat 2*	90.0	72.0	15.0	20
3 = *Heat 3*	100.0	80.0	22.5	30
4 = *Heat 4*	270.0	218.7	30.0	40
5 = *Heat 5*	140.0	112.0	37.5	50
6 = *Heat 6*	390.0	315.9	45.1	60
7 = *Heat 7*	160.0	128.0	60.1	80
8 = *Heat 8*	405.0	328.1	75.1	100
9 = *Heat 9*			90.1	120
A = *Heat A*			120.1	160
B = *Heat B*			150.2	200
C = *Heat C*	540.0	432.0	180.2	240
D = *Heat D*	810.0	648.0	210.3	280
E = *Heat E*	1080.0	864.0	240.3	320
F = *Heat F*	195.0	156.0		
G = *Heat G*	292.5	234.0		
K = *Heat K*	150.0	120.0		
L = *Heat L*	210.0	168.0		
M = *Heat M*	800.0	640.0		
N = *Heat N*	1600.0	1280.0		
P = *Heat P*	2400.0	1920.0		

Wiring Diagrams
Unit specific wiring diagrams are laminated and affixed inside the controls compartment door.

Condensate Drain Pan
Unit requires drain traps to be connected to the condensate drain pan of the unit. The 6-25 and 30 ton units include one drain pan connection and the 26 and 31-140 ton units include two drain pan connections. Condensate drain pipes or p-traps for each connection are factory supplied and shipped loose in the controls compartment for field installation.

If codes require a condensate drain line, the line should be the same pipe size or larger than the drain connection, include a p-trap, and pitch downward toward drain. An air break should be used with long runs of condensate lines.

⚠ CAUTION

Unit should not be operated without a p-trap. Failure to install a p-trap may result in overflow of condensate water.

Installation

AAON equipment has been designed for quick and easy installation.

Locating Units
The curb should be mounted first and must be located so that duct connections will be clear of structural members of the building.

Verify rooftop or foundation can support the total unit weight, including accessory weights.

⚠ WARNING

When locating gas fired units, it is recommended the unit be installed so that the flue discharge vents are located at least 120 inches away from any opening through which combustion products could enter the building.

⚠ WARNING

Distances from adjacent public walkways, adjacent buildings, operable windows and building openings, shall conform to local codes and/or the National Fuel Gas Code, ANSI Z223.1/NFPA 54, or the National Gas & Propane Code, CSA B149.1

Do not position flue opening to discharge into a fresh air intake of any other piece of equipment. Unit should also be installed so that the flow of combustion intake air is not obstructed from reaching the furnace.

Vent opening must not be blocked by snow. A minimum 12" curb must be used or the vent outlet shall be greater than 12" off the ground/roof.

Flue gas is dangerously hot and contains containments. The user is responsible for determining if vent gases may degrade building materials.

The National Gas and Propane Installation Code, B149.1 specifies a 6 ft. horizontal vent terminal clearance to gas and electric meters and relief devices.

Local codes may supersede or further place restrictions on vent termination locations.

Table 2 - A Cabinet Unit Clearances

Location	Unit Size
	6-8 and 10 tons
Front - (Controls Side)	48"
Back - (Outside Air)	36"
*Left Side	*6"
Right Side	48"
Top	Unobstructed
*Units with a water-cooled condenser or chilled water coil require 48" of clearance on the left side for service access. DX and no cooling air handling units with an energy recovery wheel require 24" of clearance on the left side for service access.	

Table 3 - B Cabinet Unit Clearances

Location	Unit Size
	9 and 11-15 tons
Front - (Controls Side)	48"
Back - (Outside Air)	48"
*Left Side	*6"
Right Side	48"
Top	Unobstructed
*Units with a water-cooled condenser or chilled water coil require 48" of clearance on the left side for service access. DX and no cooling air handling units with an energy recovery wheel require 24" of clearance on the left side for service access.	

Table 4 - C Cabinet Unit Clearances

Location	Unit Size
	16-25 and 30 tons
Front - (Controls Side)	48”
Back - (Outside Air)	48”
*Left Side	*6”
Right Side	60”
Top	Unobstructed
*Units with a water-cooled condenser or chilled water coil require 48” of clearance on the left side for service access.	

Figure 2 - RN Series A, B and C Cabinet, 6-25 and 30 tons

Table 5 - D Cabinet Unit Clearances

Location	Unit Size
	26 and 31-70 tons
Front - (Controls Side)	48”
Back - (Outside Air)	48”
*Left Side	*48”
*Right Side	*70”
Top	Unobstructed
*Right and left side unit clearances are interchangeable on units that do not have hydronic heating. Units with hydronic heating require 70” right side access for service.	

Figure 3 - RN Series D Cabinet, 26, 31-50, 60 and 70 tons

Table 6 - E Cabinet Unit Clearances

Location	Unit Size
	55, 65 and 75-140 tons
Front - (Controls Side)	60”
Back - (Outside Air)	48”
Left Side	72”
Right Side	72”
Top	Unobstructed

Figure 4 - RN Series E Cabinet, 55, 65 and 75-140 tons

Setting the Curb

Make openings in roof decking large enough to allow for duct penetration and workspace only. Do not make openings larger than necessary. Set the curb to coincide with the openings. Make sure the curb is level. Unit must be level in both horizontal axes to support the unit and reduce noise and vibration.

⚠ CAUTION

All roofing work should be performed by competent roofing contractors to avoid any possible leakage.

⚠ CAUTION

Where the supply or warm air duct passes through a combustible roof, a clearance of 1 inch must be maintained between the outside edges of the duct and combustible material in accordance with National Fire Protection Association Standard No. 90A. Provide flashings or enclosure between structure and roof and all joints must be sealed with mastic roofing to ensure a watertight seal.

Be careful to install the provided neoprene gasket according to the following figure prior to setting the unit on the curb.

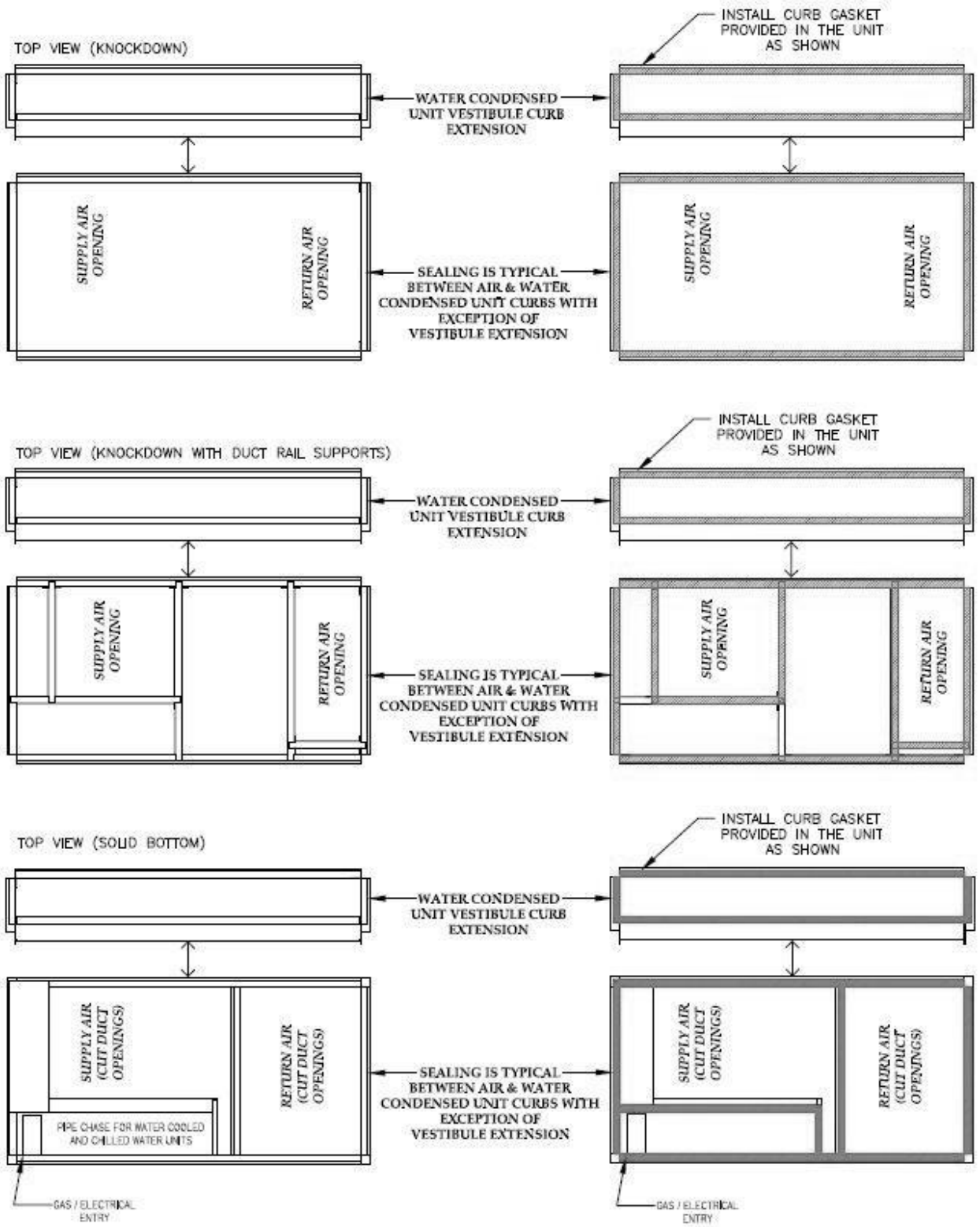


Figure 5 - RN Series 6-8 and 10 ton Unit Gasket Locations

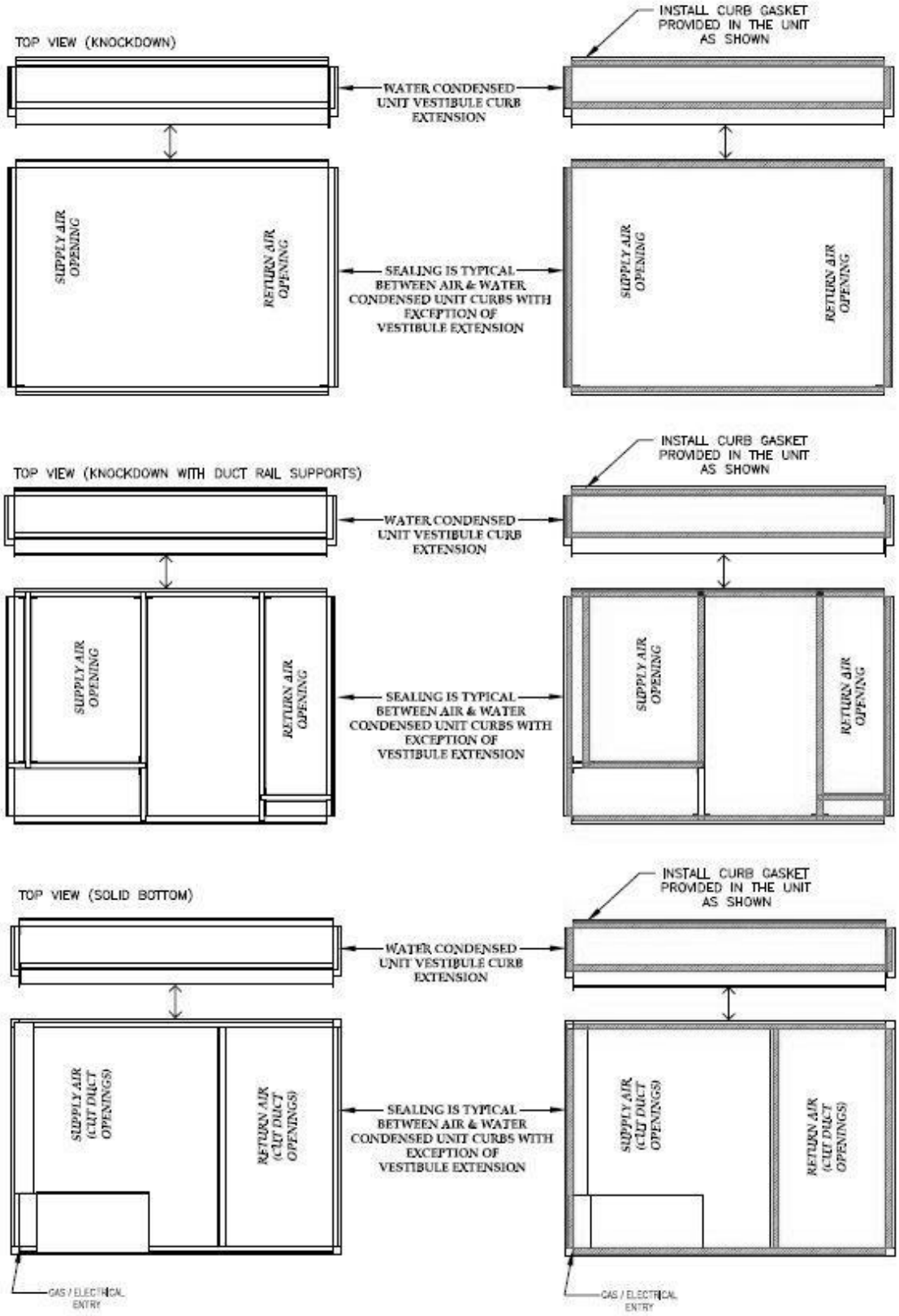


Figure 6 - RN Series 9 and 11-15 ton Unit Gasket Locations

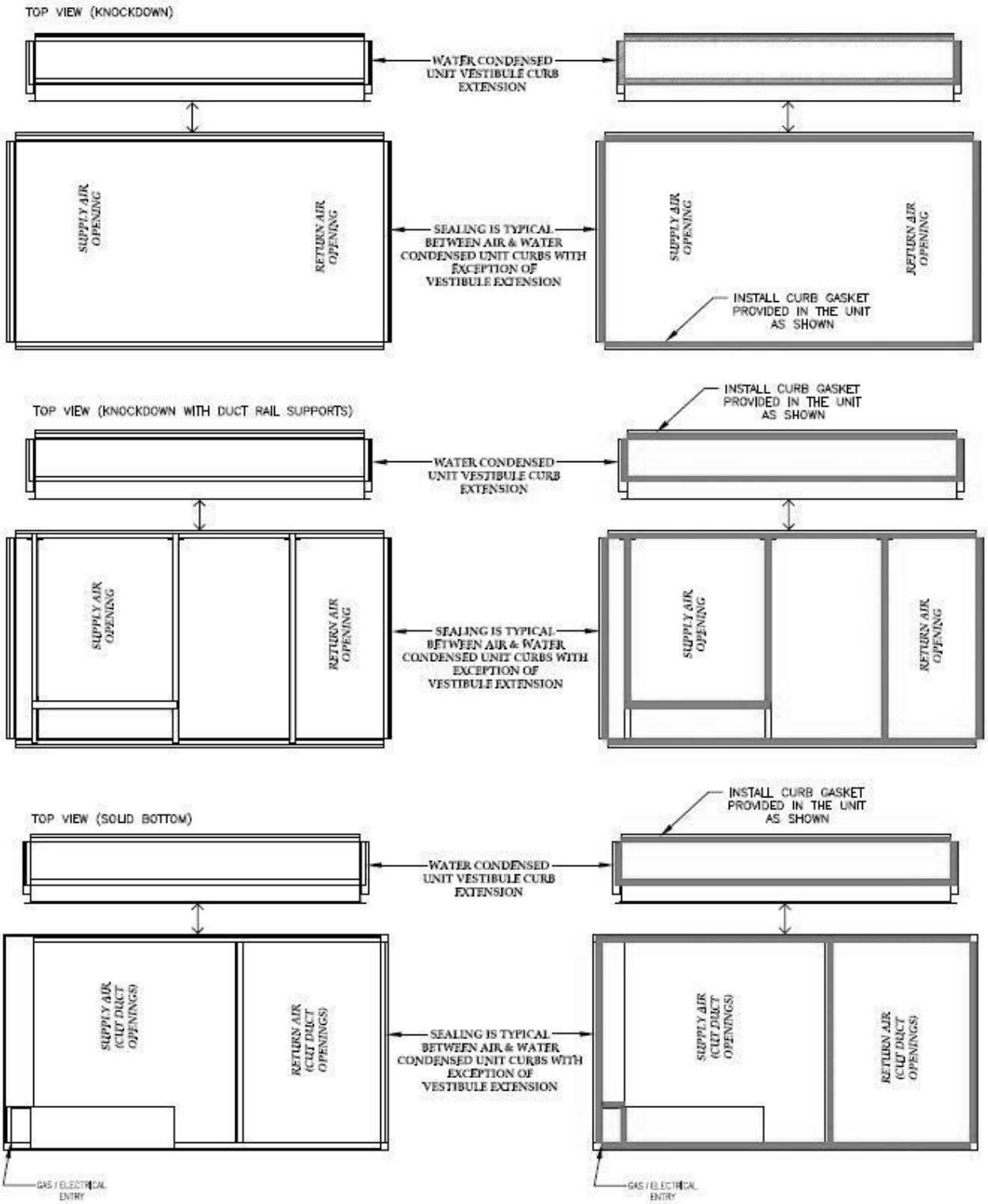


Figure 7 - RN Series 16-25 and 30 ton Unit Gasket Locations

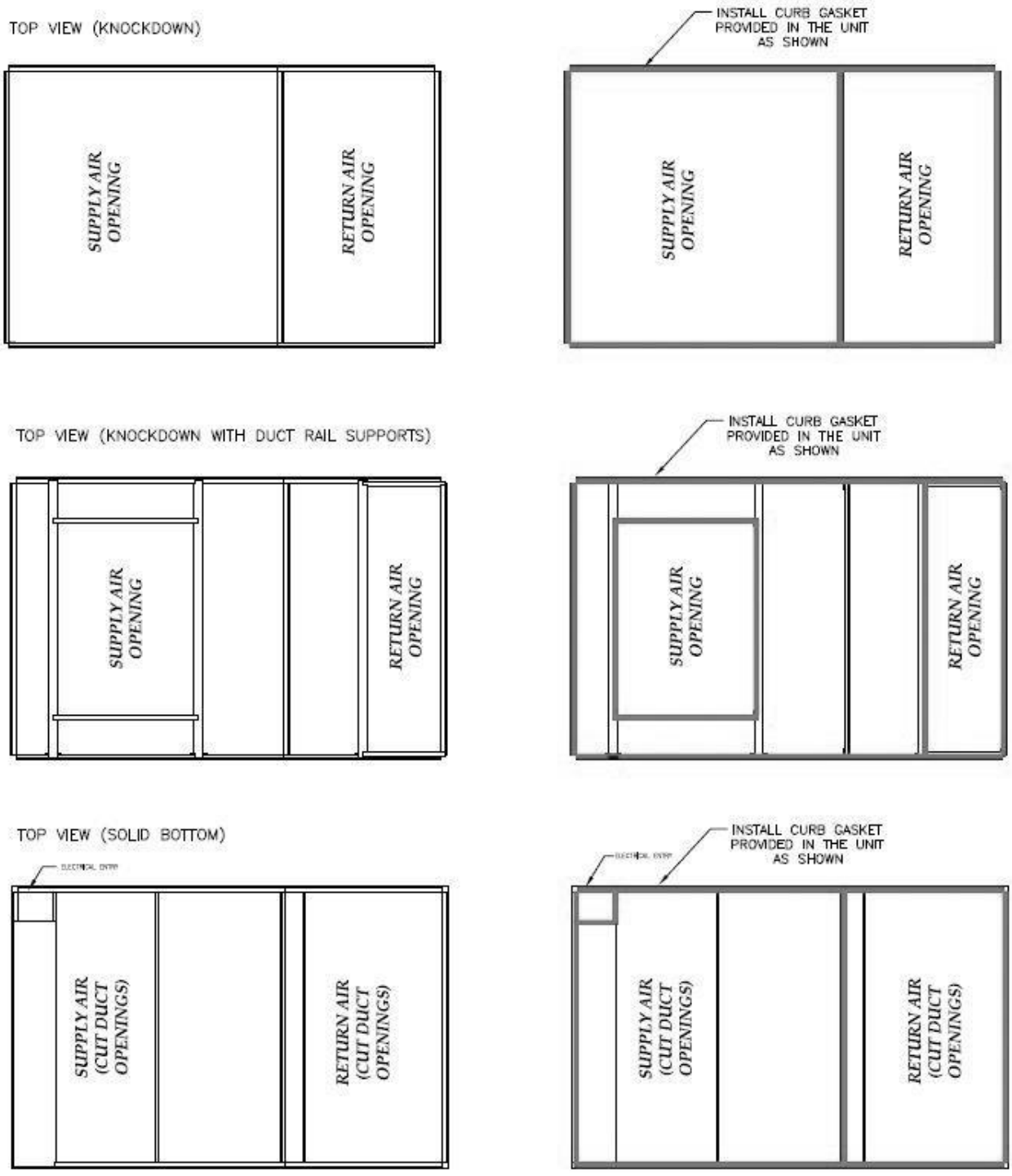


Figure 8 - RN Series 26, 31-50, 60, and 70 ton Unit Gasket Locations

⚠ CAUTION

Incorrect lifting can cause damage to the unit.

Forklifting the Unit (6-25 and 30 ton)
6-25 and 30 ton units can be lifted using a forklift. 9, 11-25 and 30 ton units must have forks 72" in length or the forks must have 72" fork extensions. 6-8 and 10 ton units must have forks at least 48" in length. Standard units can be lifted from all sides except the condenser side. Units with power exhaust can be lifted from the controls side or the access (right) side. Units with energy recovery wheels or power return can only be fork lifted from the access (right) side.

Forks must be perpendicular to the unit and they must be in far enough that the back of the forks are no more than 6" away from the edge of the unit.

⚠ CAUTION

FORKLIFTING
9, 11-25 AND 30 TON UNITS

Forks or Fork Extensions must be 72" in length.

⚠ CAUTION

FORKLIFTING
6-8 AND 10 TON UNITS

Forks or Fork Extensions must be at least 48" in length.

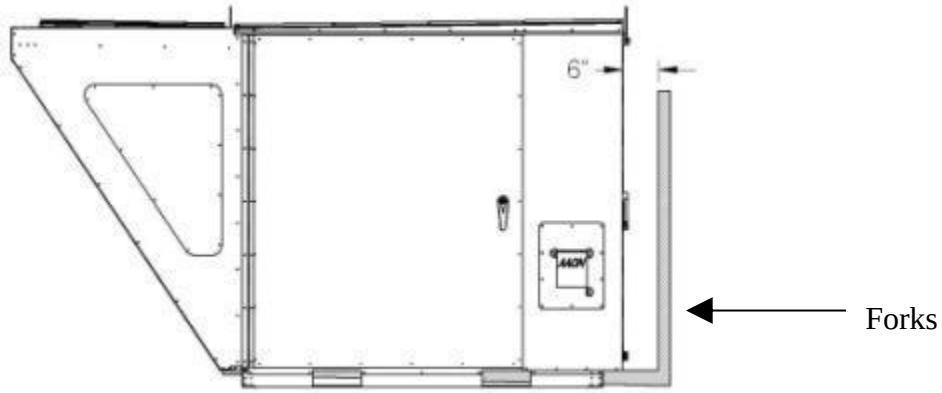


Figure 9 - Forklifting an RN Series A, B and C Cabinet, 6-25 and 30 tons

Lifting the Unit
If cables or chains are used to hoist the unit they must be the same length. Minimum cable length is 99" for 6-25 and 30 ton units and 180" for 26 and 31-50, 60 and 70 ton units. Spreader bars are required for 55, 65 and 75-140 ton units. Care should be taken to prevent damage to the cabinet, coils, and condenser fans.

It is recommended to lift the unit with the outside air hood in the downward shipping position. However, the unit may be lifted

with the outside air hood in the open position.

Before lifting unit, be sure that all shipping material has been removed from unit. Secure hooks and cables at all lifting points / lugs provided on the unit.

Hoist unit to a point directly above the curb and duct openings. Be sure that the gasket material has been applied to curb.

Carefully lower and align the unit with utility and duct openings. Lower the unit until the unit skirt fits around the curb. Some units are designed to overhang the curb. Take care that any recessed base rails fit around the curb. Make sure the unit is properly seated on the curb and is level.

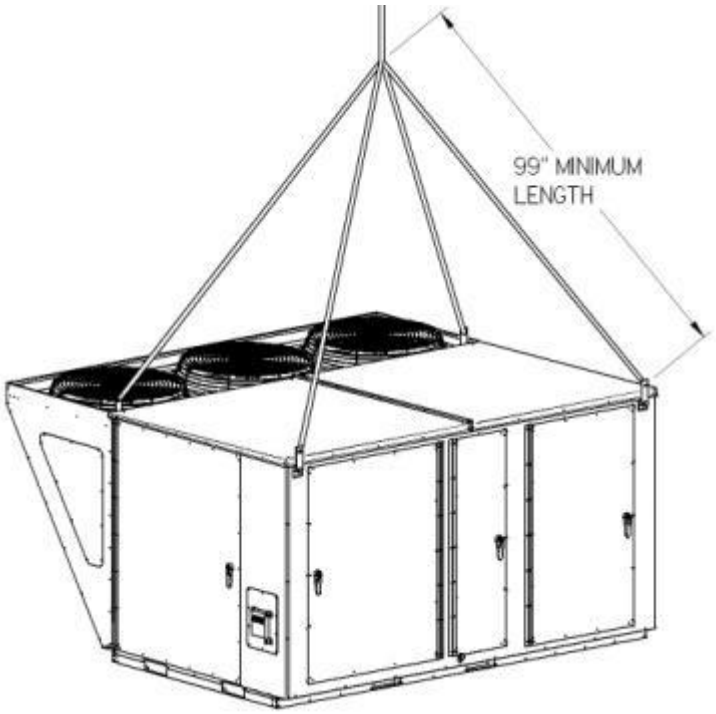


Figure 10 - Lifting Details of a 6-25 and 30 ton Standard or Power Exhaust Unit

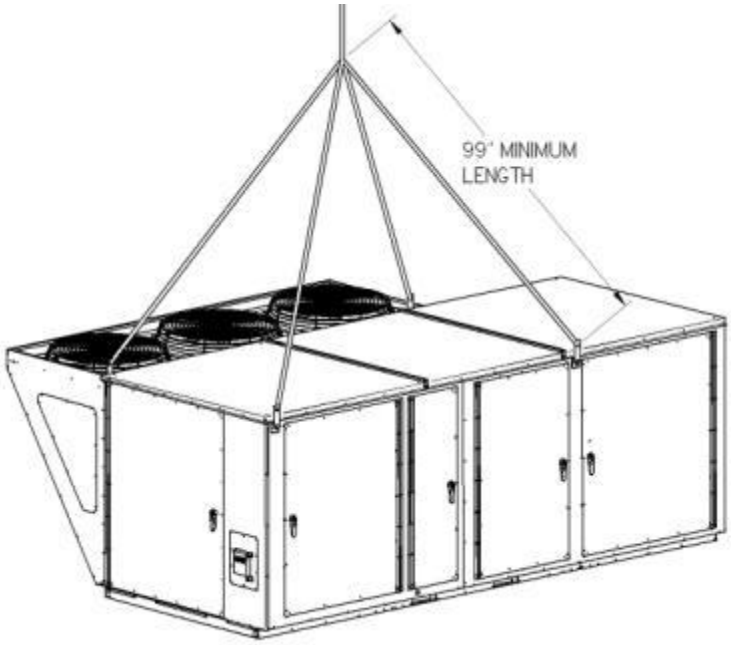


Figure 11 - Lifting Details of a 6-25 and 30 ton Energy Recovery Wheel or Power Return Unit

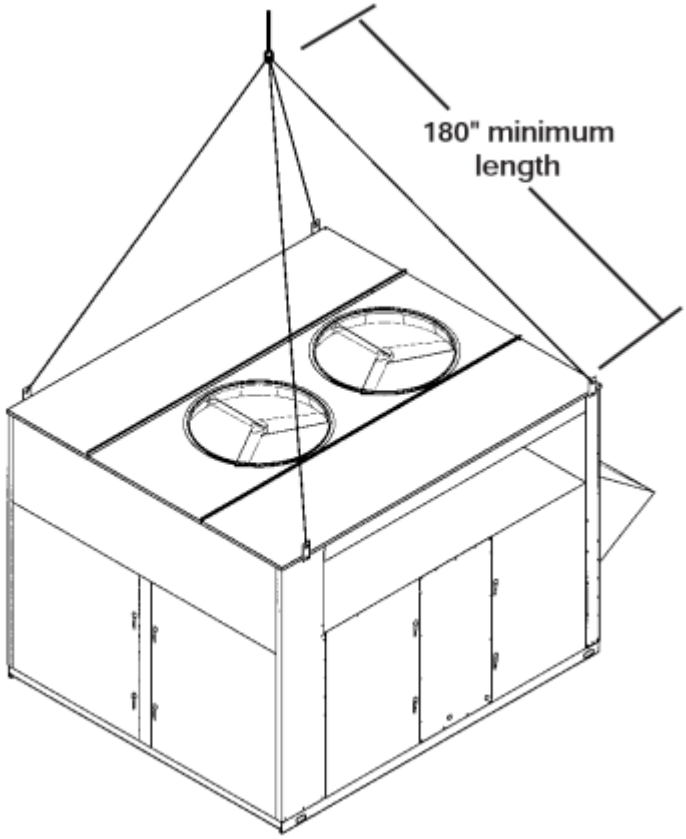


Figure 12 - Lifting Details of a 26, 31-50, 60 and 70 ton Unit

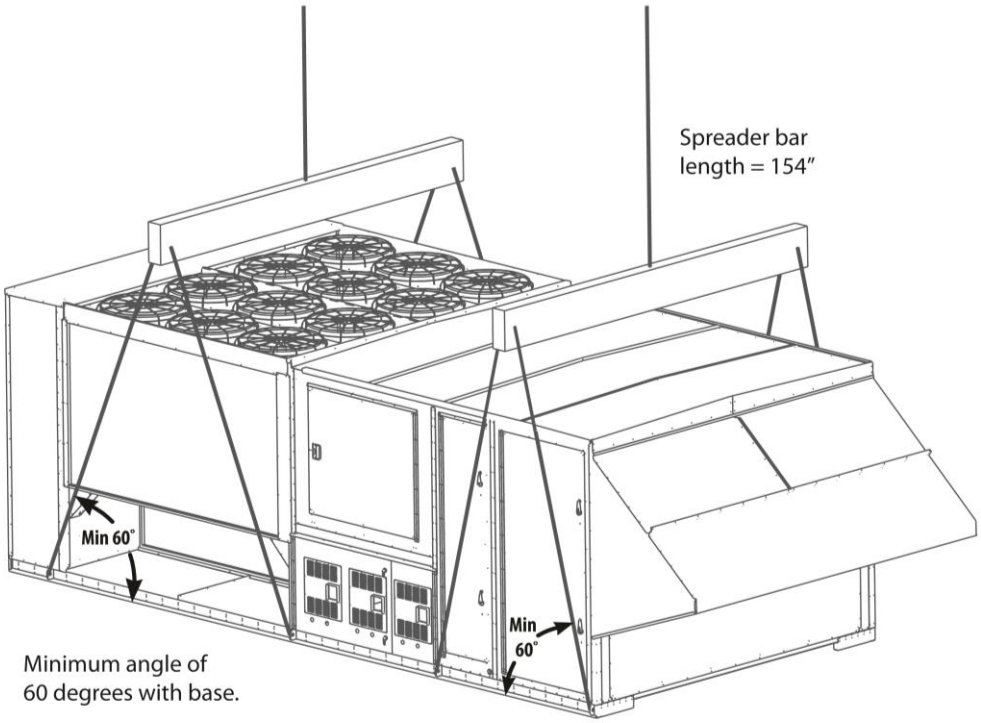


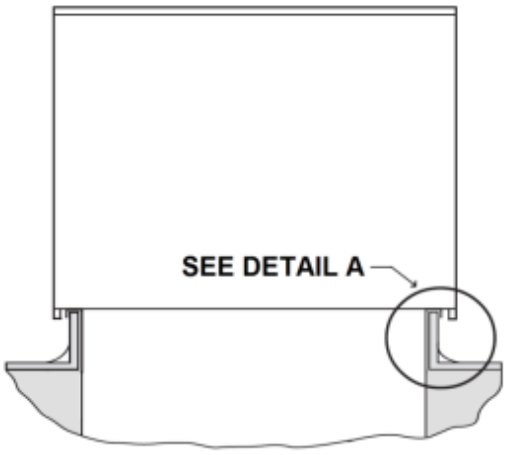
Figure 13 - Lifting Details of a 55, 65 and 75-140 ton Unit

Duct Connection

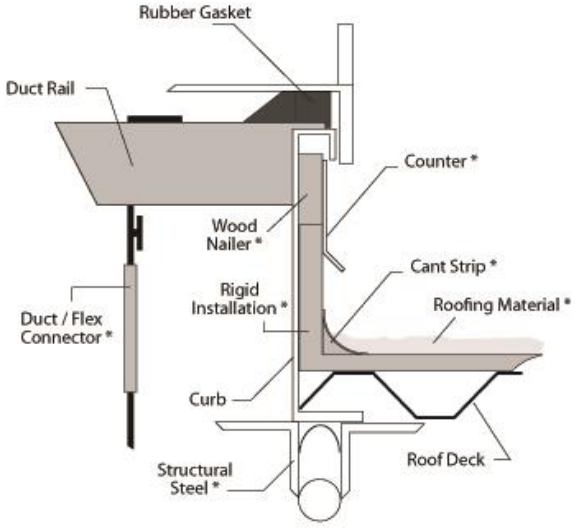
Note: If outside air will be in contact with the air tunnel base of an A, B or C cabinet unit (6-25 and 30 tons), the unit should include the base insulation option or the base must be field insulated. D and E cabinet (26 and 31-140 tons) units include base insulation standard.

CAUTION

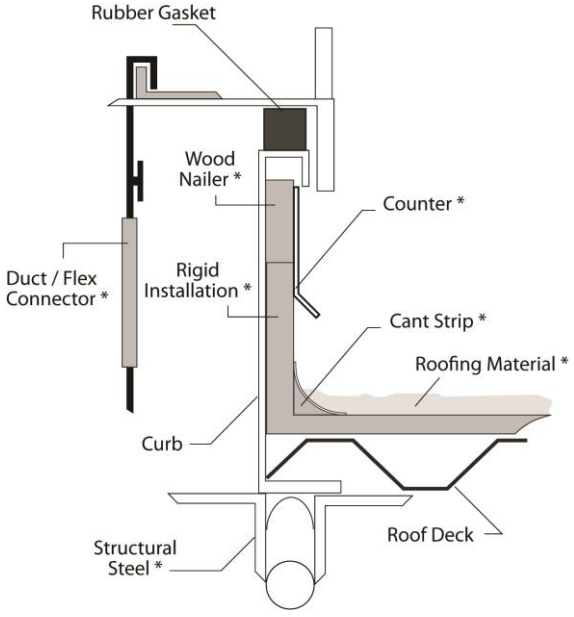
Do not drill or punch holes in the base of the unit, from inside the unit or from below the unit to attach ductwork. Leaking may occur if unit base is punctured.



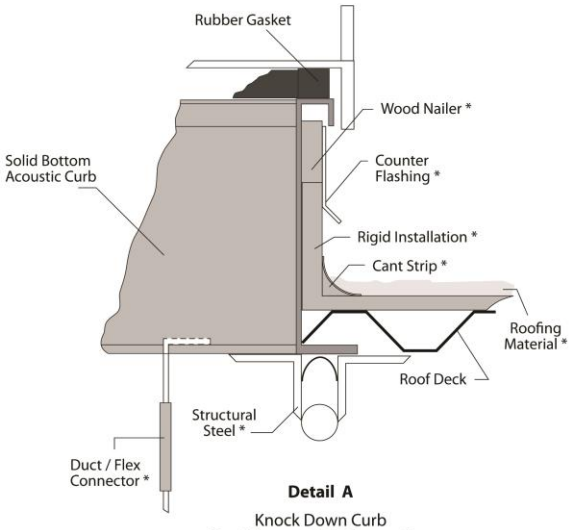
SECTIONAL VIEW OF UNIT ON ROOF CURB



Detail A
Knock Down Curb
Duct Support Rail Connection
* Field Supplied



Detail A
Unit Base Connection
* Field Supplied



Detail A
Knock Down Curb
Duct Support Rail Connection
* Field Supplied

Figure 14 - Duct Connection

Seismic Curb Installation

Using a standard curb with a seismic unit will void the certification of the unit. All mounting details listed must be followed to achieve seismic certification. The AAON unit must be certified to ICC-ES AC156 when using a seismic curb for seismic certifications to apply. Any deviations or modifications to the unit or curb will void all seismic certification.

Structural engineer of record must approve building anchorage to unit or curb in compliance with OSP-0180-10. Use provided self tapping screws to attach base of unit to seismic curb bracket.

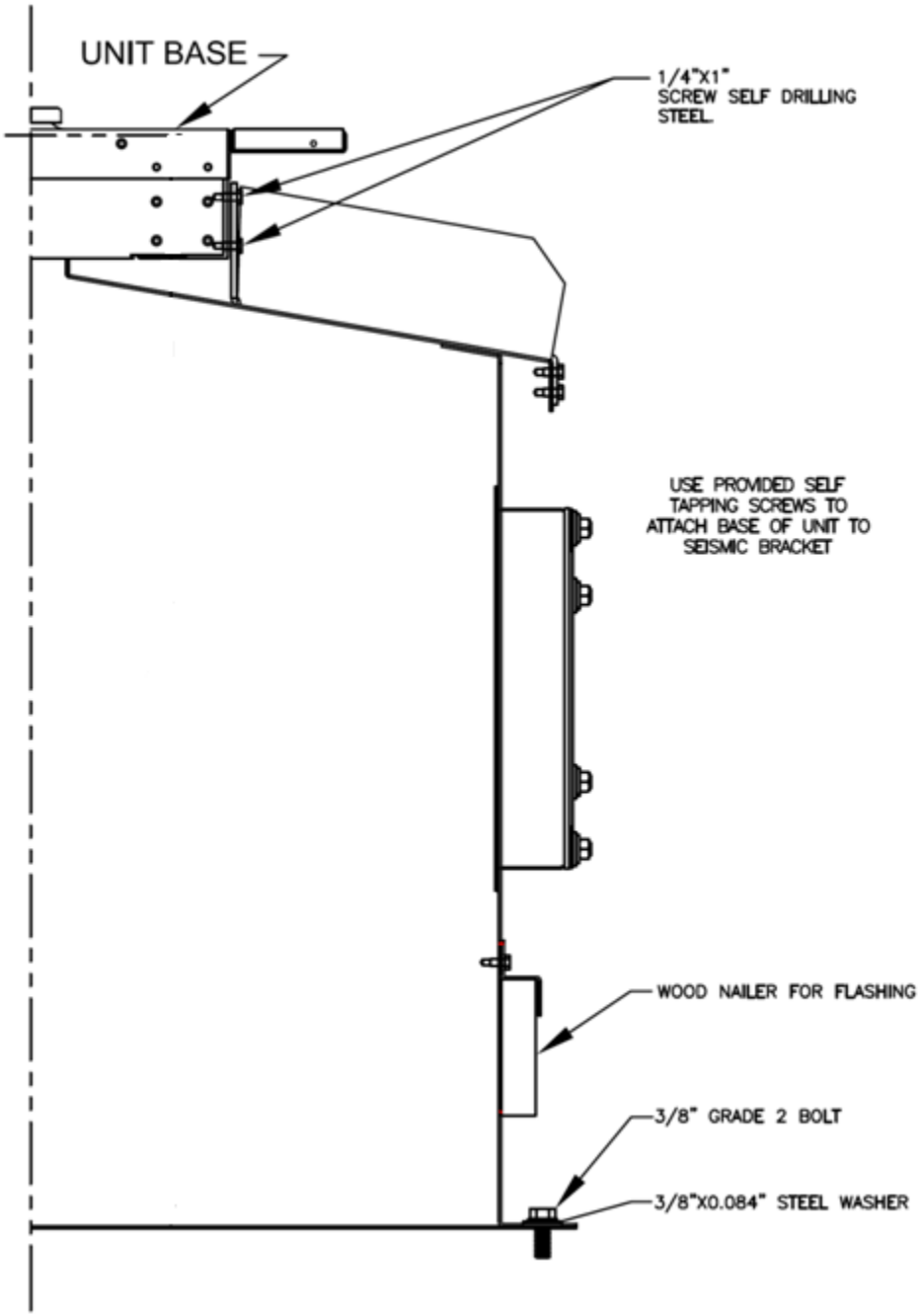


Figure 15 - Solid Bottom Seismic Curb with Filters

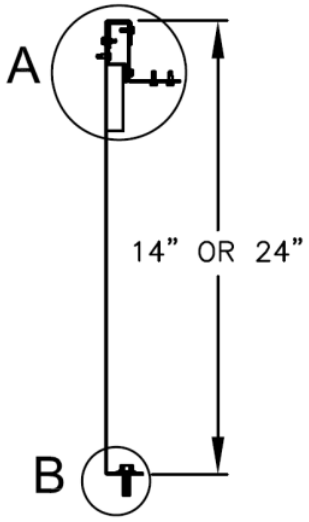


Figure 16 - Seismic Solid Bottom Curb without Filters Cross Section

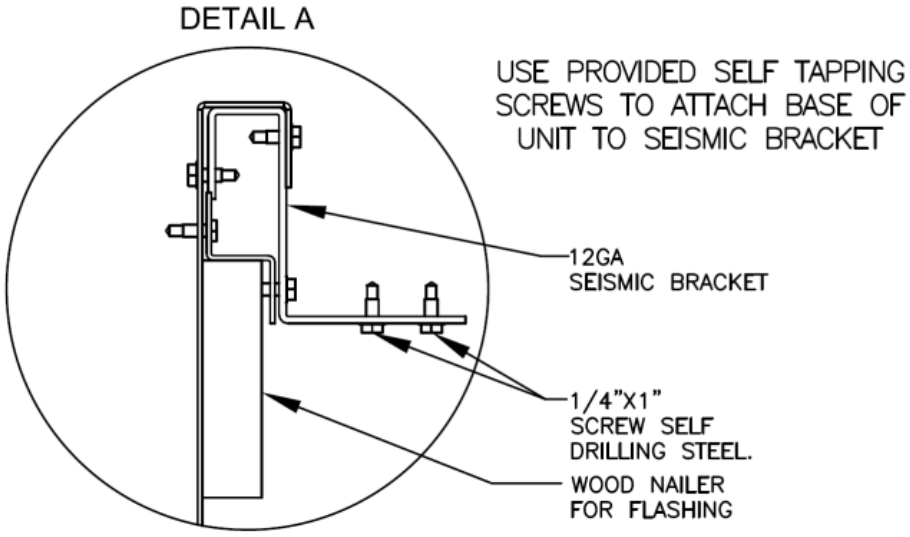


Figure 17 - Seismic Solid Bottom Curb without Filters Detail A

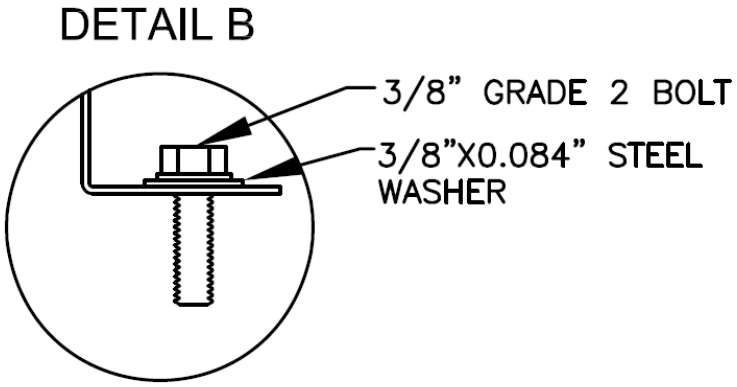


Figure 18 - Seismic Solid Bottom Curb without Filters Detail B

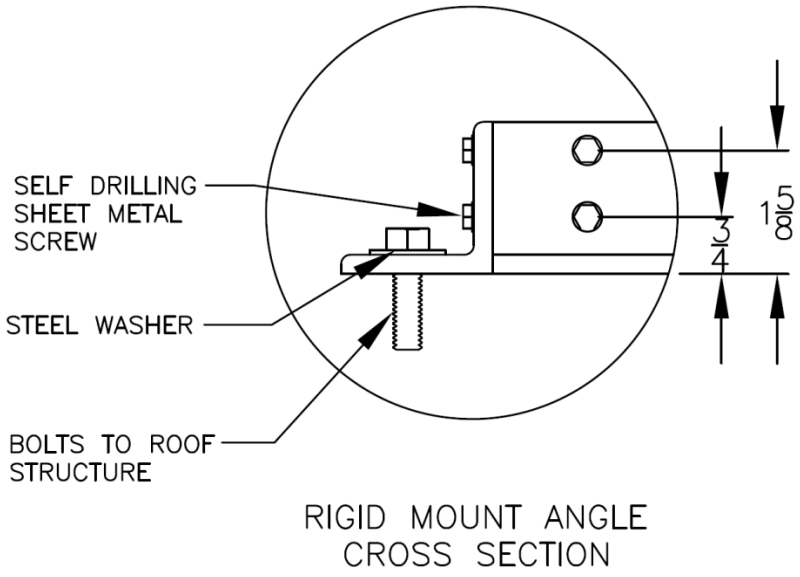


Figure 19 - Seismic Rigid Mount Curb

Condenser Hail Guards

90-140 ton Units

Condenser hail guards fold down and become a condenser coil shipping cover on 90-140 ton RN Series units with copper tube and aluminum fin condenser coils. Condenser hail guards must be opened before startup of the unit.

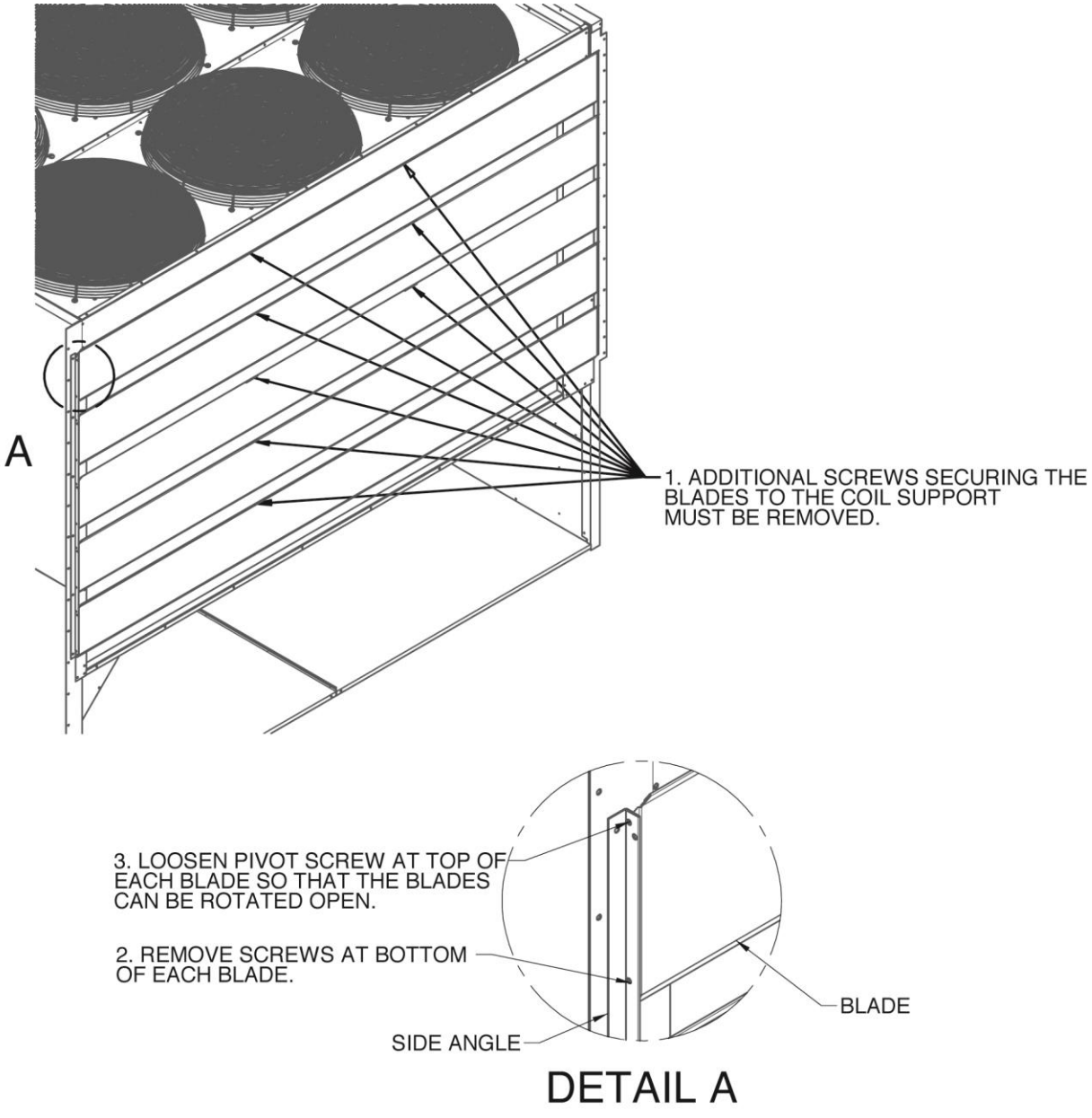


Figure 20 - 90-140 ton Condenser Coil Guard Installation Instructions 1

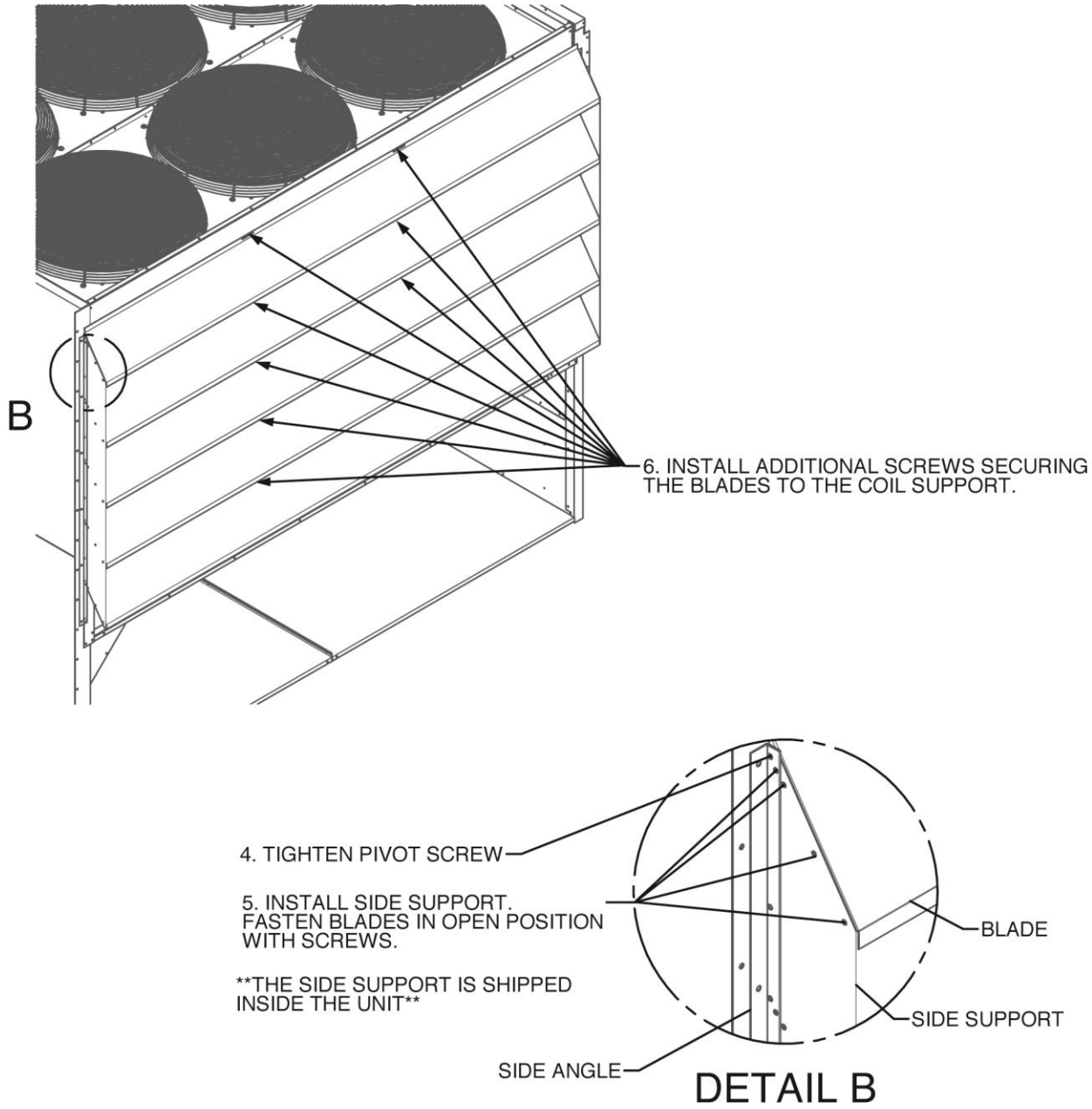


Figure 21 - 90-140 ton Condenser Coil Guard Installation Instructions 2

Outside Air Rain Hood

Rain hood must be opened before startup of the unit. Fresh air intake adjustments should be made according to building ventilation of local code requirements.

6-25 and 30 ton Units

Remove the two screws at the bottom of the rain hood that secure it in the shipping position. Remove the screws that attach the side pieces of the hood to the top of the hood.

Rotate the side pieces so that the holes along one edge line up with the holes on the top piece and the flange is on the inside of the rain hood.

Attach the side pieces to the top of the hood using the provided screws and attached the side pieces to the end of the unit through the flange.

Apply silicon caulking along the top and both sides of the rain hood. Take care to seal the top corners where the rain hood attaches to the unit.

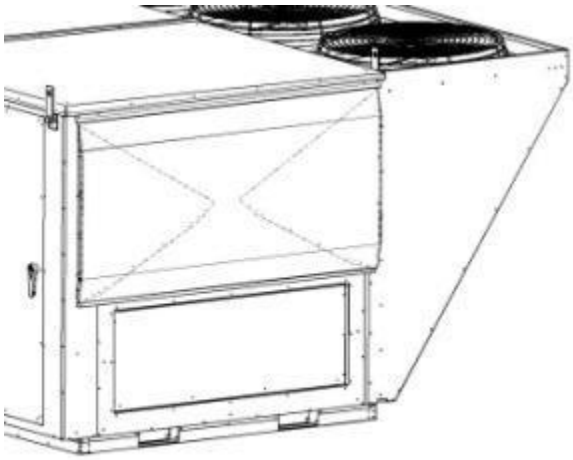


Figure 22 - 6-25 and 30 ton
Closed Rain Hood

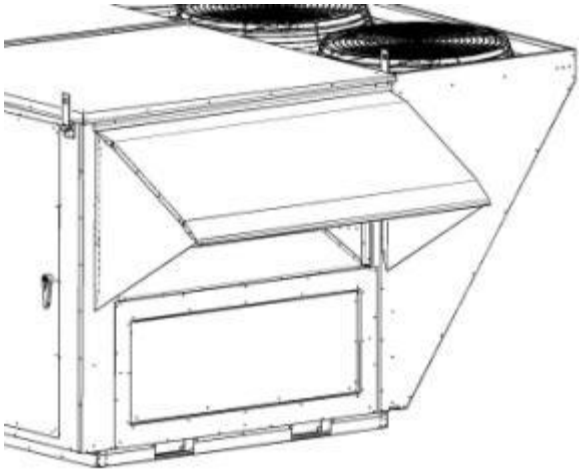


Figure 23 - 6-25 and 30 ton
Open Rain Hood

26 and 31-140 ton Units
Remove the shipping screws from each side of the closed hood.

Lift hood outward and attach the sides of the hood to the side of the unit.

Apply silicon caulking along the top and both sides of the rain hood. Take care to seal the top corners where the rain hood attaches to the unit.

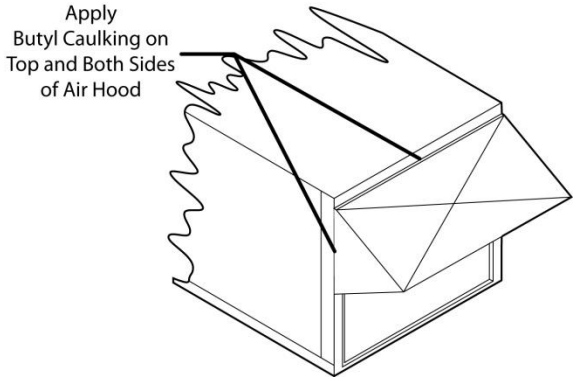


Figure 24 - 26 and 31-140 ton
Open Rain Hood

Metal Mesh Filters (6-25 and 30 ton Units)
Metal mesh outside air filters require installation of the filter rack on the intake of the rain hood.

Clips which hold the metal mesh filters in the filter rack should face outward.

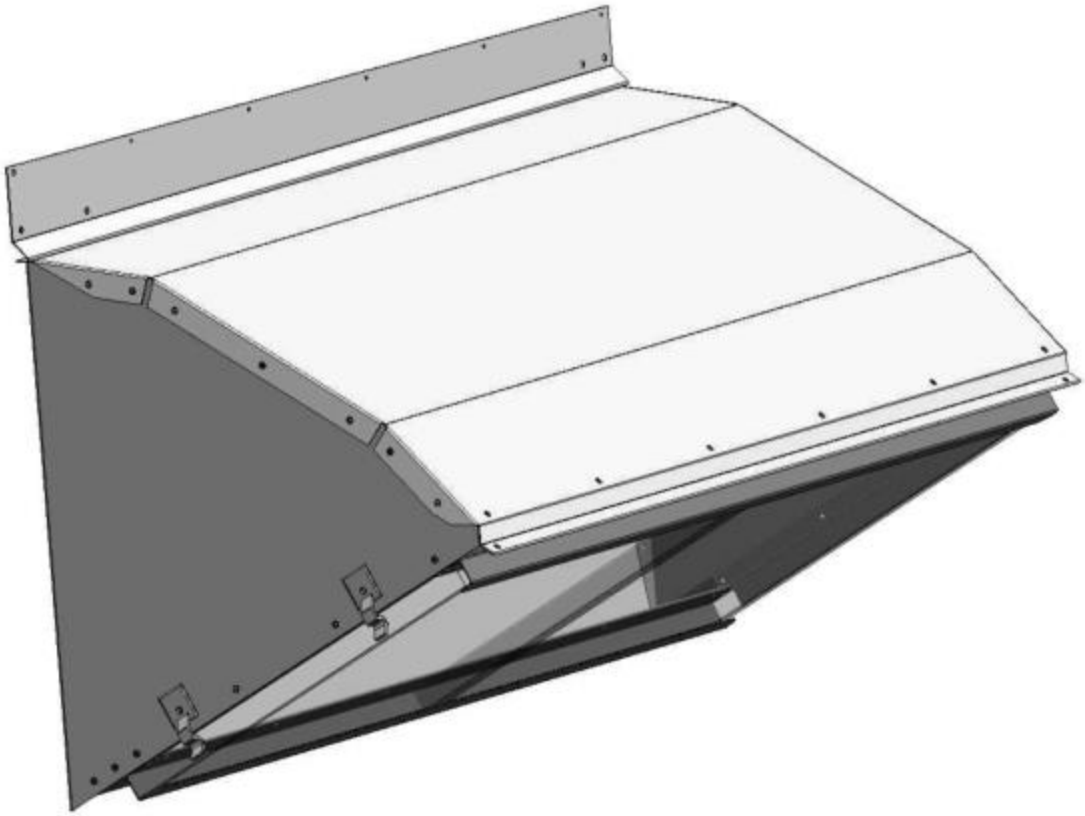


Figure 25 - Rain Hood with Metal Mesh Filter Rack Installation

Electrical

Verify the unit nameplate agrees with power supply. Connect power and control wiring to the unit as shown in Figure I12 and in the unit specific wiring diagram, which shows factory and field wiring and is attached to the inside of the door of the controls compartment.

⚠ WARNING

Electric shock hazard. Before attempting to perform any installation, service, or maintenance, shut off all electrical power to the unit at the disconnect switches. Unit may have multiple power supplies. Failure to disconnect power could result in dangerous operation, serious injury, death, or property damage.

Route power and control wiring, separately, through the utility entry in the base of the unit. Do not run power and control signal wires in the same conduit. The utility entry on 9-25 and 30 ton units is located in the unit base in the front right hand corner of the unit (compressor compartment). The utility entry on 26 and 31-70 ton units is located in the unit base in the front left hand corner in the unit (controls compartment). The utility entry on 55, 65 and 75-140 ton units is located in the center front of the unit. See unit drawing for specific location.

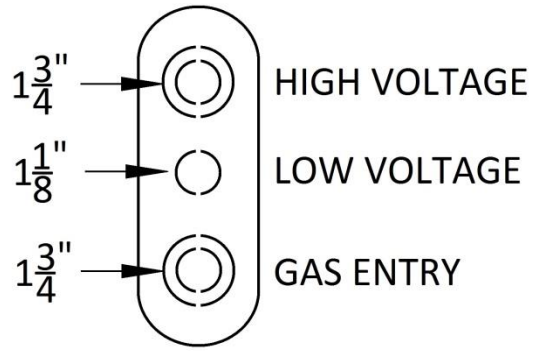


Figure 26 - Unit Utility Entry

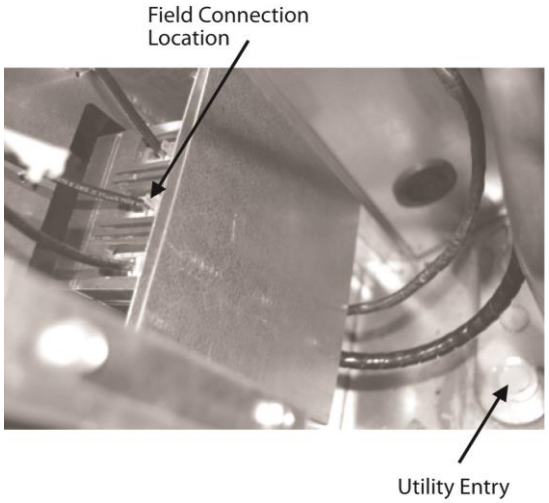


Figure 27 - Back View of Power Switch from Compressor and Control Compartment (6-50, 60, and 70 ton Units)

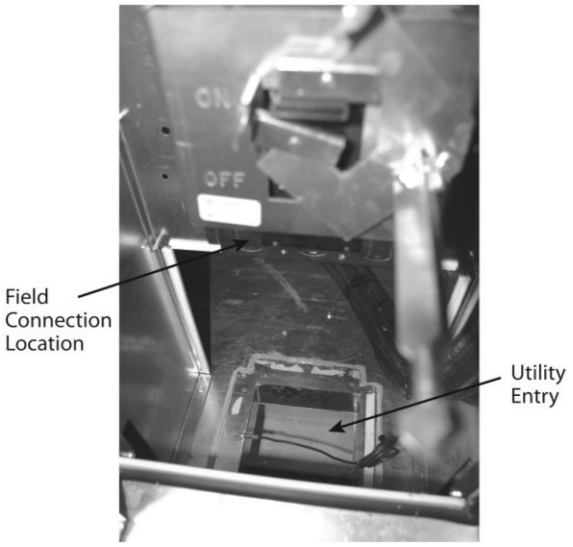


Figure 28 - Front View of Utility Entry and Power Switch from Control Compartment (55, 65 and 70-140 ton Units)

Size supply conductors based on the unit MCA rating. Supply conductors must be rated a minimum of 75°C.

Protect the branch circuit in accordance with code requirements. The unit must be electrically grounded in accordance with local codes, or in the absence of local codes, the current National Electric Code, ANSI/NFPA 70 or the current Canadian Electrical Code CSA C22.1.

Note: All units are factory wired for 208V, 230V, 460V, or 575V. The transformer configuration must be checked by a qualified technician prior to service, especially if unit is to be connected to a 208V or 230V supply. For 208V service interchange the yellow and red conductor on the low voltage control transformer.

Red-Black for 208V
Yellow-Black for 230V

Wire power leads to the unit's terminal block or main disconnect. All wiring beyond this point has been completed by the manufacturer and cannot be modified

without effecting the unit's agency/safety certification.

Supply voltage must be within the min/max range shown on the unit nameplate. Available short circuit current should not exceed the short circuit current rating (SCCR) shown on the unit nameplate.

⚠ CAUTION

Three phase voltage imbalance will cause motor overheating and premature failure.

Three phase voltage imbalance will cause motor overheating and premature failure. The maximum allowable imbalance is 2.0%.

Voltage imbalance is defined as 100 times the maximum deviation from the average voltage divided by the average voltage.

Example:
(221V+230V+227V)/3 = 226V, then 100*(226V-221V)/226V = 2.2%, which exceeds the allowable imbalance.

Check voltage imbalance at the unit disconnect switch and at the compressor terminal. Contact your local power company for line voltage corrections.

Installing contractor must check for proper motor rotation and check blower motor amperage listed on the motor nameplate is not exceeded. Motor overload protection may be a function of the variable frequency drive and must not be bypassed.

⚠ CAUTION

Rotation must be checked on all MOTORS AND COMPRESSORS of three phase units. Supply fan, exhaust fan, return fan, and condenser fan motors should all be checked by a qualified service technician at startup and any wiring alteration should only be made at the unit power connection.

⚠ CAUTION

Scroll compressors are directional and will be damaged by operation in the wrong direction. Low pressure switches on compressors have been disconnected after factory testing. Rotation should be checked by a qualified service technician at startup using suction and discharge pressure gauges and any wiring alteration should only be made at the unit power connection.

Wire control signals to the unit's low voltage terminal block located in the controls compartment.

If any factory installed wiring must be replaced, use a minimum 105°C type AWM insulated conductors.

Variable Speed Compressors
Variable speed compressors with VFD speed control are available on 55, 65 and 75-140 ton units. Variable speed compressors should not be operated outside the factory determined frequency range. The factory determined compressor VFD frequency range is given below in Table 7.

Table 7 - Variable Speed Compressor VFD Frequency Range

Model (RN-)	*Compressor VFD Range (Hz)*
208V and 230 V Units	
055, 065 & 075-140	35-60 Hz
460V and 575V Units	
055, 065, 075, 090, 120, 130	35-75 Hz
105, 140	35-60 Hz

⚠ CAUTION

No variable speed compressor shall operate below 35 Hz. Operating variable speed compressors outside the frequency range specified in this manual voids all warranties and may result in compressor failure.

Thermostat Control Wiring

If a thermostat is used for unit control, thermostat should be located on an inside wall 4-5 feet above the floor where it will not be subjected to drafts, sun exposure, or heat from electrical fixtures of appliances. Control wiring must deliver adequate voltage to components to assure proper operation. Control voltage returning from controller circuit must be a minimum of 21 VAC. To assure proper wiring use the following chart to determine the allowable wiring distances.

Table 8 - Control Wiring

Wire Size (Stranded) - Copper Conductors Only	Total Wire Distance Allowable
20 AWG	200 ft
18 AWG	350 ft
16 AWG	500 ft
14 AWG	750 ft
12 AWG	1250 ft

Total Wire Distance Allowable =
(Quantity of Control Wires) x
(Control Wire Distance)

Take the total wire distance allowable and divide by the quantity of wires to be connected. This indicates the distance allowable for that size wire. The wiring to the unit must not exceed the total wire distance allowable. If the voltage at the connectors is less than 21 VAC, isolation relays must be installed. If under external control 21 VAC must be field verified.

All external devices must be powered via a separate external power supply.

Example:
A total of 8 wires must be pulled 75ft to a control the unit. What size wire should be used?

According to the Table 8, 16 AWG allows for 63ft (500 ft/8 wires) and 14 AWG allows for 94ft (750 ft/8 wires). Thus, 14 AWG should be used.

Gas Heating

⚠ WARNING

FOR YOUR SAFETY
Read the entire gas heating installation section of this manual before beginning installation of the gas heating section.

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

Gas piping must be installed in accordance with local codes, or in the absence of local codes, installation must conform to the

current (United States) National Fuel Gas Code ANSI-Z223.1/NFPA 54 or the current (Canada) National Fuel & Propane Installation Code CSA B149.1 or B149.2.

Table 9 - 6-8 and 10 ton Gas Connections

Model Option B2	Input MBH	Connections	
		Quantity	Size
2	90.0	1	1/2” NPT
K	150.0		
L	210.0		3/4” NPT

Table 10 - 9 and 11-15 ton Gas Connections

Model Option B2	Input MBH	Connections	
		Quantity	Size
F	195.0	1	3/4” NPT
G	292.5		
6	390.0		

Table 11 - 16-25 and 30 ton Gas Connections

Model Option B2	Input MBH	Connections	
		Quantity	Size
4	270	1	3/4” NPT
8	405		1” NPT
C	540		

Table 12 - 26 and 31-70 ton Gas Connections

Model Option B2	Input MBH	Connections	
		Quantity	Size
*A	540	2	3/4” NPT
*B	780		
C	540	1	1-1/2” NPT
D	810		
E	1080		

*Obsolete

Table 13 - 55, 65 and 75-140 ton Gas Connections

Model Option B2	Input MBH	Connections	
		Quantity	Size
M	800	2	1” NPT
N	1600	2	1-1/2” NPT
P	2400		

After verifying gas inlet pressure and manifold pressure the service technician must time the gas flow rate through the gas meter with a stopwatch to verify the gas input rate.

Unit nameplate input rate value has been calculated at the altitude where the unit was shipped. Above 2,000 ft the input rate is adjusted 4% for every 1,000 ft.

Figure 29 - RN Series Gas Heat Exchanger

Table 14 - Natural Gas (ft^3/hr) Maximum Piping Capacities
Specific Gravity = 0.6, Supply Pressure ≤ 0.5 psi, Pressure Drop = 0.5" w.c.

	Length of Pipe				
Pipe Size	20 ft	50 ft.	100 ft.	150 ft.	200 ft.
1/2"	120	73	50	40	35
3/4"	250	151	103	84	72
1"	465	285	195	160	135
1-1/4"	950	580	400	325	280
1-1/2"	1460	900	620	500	430
2"	2750	1680	1150	950	800
2-1/2"	4350	2650	1850	1500	1280

Table 15 - Propane (kBtu/hr) Maximum Piping Capacities
Specific Gravity = 1.52, Supply Pressure = 11" w.c., Pressure Drop, 0.5" w.c.

	Length of Pipe				
Pipe Size	20 ft	50 ft.	100 ft.	150 ft.	200 ft.
1/2"	189	114	78	63	55
3/4"	393	237	162	132	112
1"	732	448	307	252	213
1-1/4"	1496	913	630	511	440
1-1/2"	2299	1417	976	787	675
2"	4331	2646	1811	1496	1260

Do not use gas piping smaller than unit gas connections. Natural gas pipe runs longer than 20 feet and propane gas pipe runs longer than 50 feet may require a larger supply pipe than the unit connection size. Some utility companies may also require pipe sizes larger than the minimum sizes listed.

Piping Sizing Examples
A 100 ft pipe run is needed for a 1080 MBH natural gas heater. The natural gas has a rating of 1000 Btu/ft^3 and a specific gravity of 0.6 (Obtain these values from the local gas supplier.)

$$1080\,MBH \times \frac{ft^3}{1000\,BTU} = 1080\ ft^3/hr$$

From the natural gas maximum capacities table, at 100 ft and 1080 ft^3/hr the required minimum pipe size is 2".

A 100 ft pipe run is needed for a 270 MBH propane gas heater.
270 *MBH* = 270 kBtu/hr

From the propane gas maximum capacities table, at 100 ft and 270 kBtu/hr the required minimum pipe size is 1".

Inlet and Manifold Pressures
For natural gas units, the minimum inlet gas pressure to the unit is 6" w.c. and maximum inlet gas pressure to the unit is 10.5" w.c. For propane units, the minimum inlet gas pressure to the unit is 11" w.c. and the maximum inlet gas pressure to the unit is 13" w.c. A field provided 1/8" NPT pressure tap is required to be installed in the piping just upstream of the shutoff valve for test gage connection to allow checking of the gas supply pressure at the unit.

A factory installed pressure tap on the outlet end of the gas valve can be used to verify a

manifold pressure of 3.5” w.c. for natural gas, or 10.5” w.c. for propane.

⚠ CAUTION

Heater should be disconnected from the gas supply piping during pressure testing of the supply piping system with pressures in excess of ½ psi. Gas valves can be damaged if subjected to more than ½ psi.

Gas Pressure Regulator & Overpressure Protection Device

A gas pressure regulator must be installed if natural gas supply pressure to the unit is greater than 10.5” w.c. and less than 2 psi (55.4” w.c.) and if propane gas supply pressure is greater than 13” w.c. and less than 2 psi (55.4” w.c.). Regulators must comply with the latest edition of the Standard for Line Pressure Regulators, ANSI Z21.80/CSA 6.22.

Both a gas pressure regulator and overpressure protection device (OPD) must be installed if gas supply pressure to the unit is greater than 2 psi (55.4” w.c.) and less than 5 psi (138.4” w.c.), in compliance with ANSI Z21.80/CSA 6.22. For proper heater operation, pressure to the regulator MUST NOT be greater than 5 psi (138.4” w.c.).

Piping Supports

Gas supply piping must be supported directly at the connection to the unit and at intervals listed in the following table with metal straps, blocks, or hooks. Piping should not be strained or bent.

Table 16 - Gas Piping Supports

Pipe Size	Support Intervals
1/2” to 3/4”	Every 6 ft
3/4” to 1”	Every 8 ft
1-3/4” or Larger (Horizontal)	Every 10 ft
1-1/4” or Larger (Vertical)	Every Floor

Additional Gas Piping Considerations

Local codes will usually require a field provided and installed manual main shutoff valve and union external to the unit. Main shutoff valve should be labeled. A drip leg should be installed near the unit connection to trap sediment and condensate. Pipe joint compounds used on all gas piping connections should be resistant to liquid petroleum gases. If flexible gas piping to the unit, or in the unit, must be replaced connectors cannot be reused, only new connectors may be used.

Heat exchanger comes equipped with a condensate drain which should be plumbed to the appropriate drain according to the (United States) National Fuel Gas Code ANSI-Z223.1/NFPA 54 or the current (Canada) National Fuel & Propane Installation Code CSA B149.1 or B149.2, the International Building Code, and any applicable local and regional codes and regulations.

The condensate drain connection is located next to the gas entry location. For 6-50, 60 and 70 ton units, the heat exchanger condensate drain connection from the unit is a 5/8” barbed nylon elbow connection. For 55, 65 and 75-140 ton units, the heat exchanger condensate drain connection from the unit is a 1/2” PVC connection. For 55, 65 and 75-140 ton units, the heat exchanger condensate drain can be tied into the evaporator condensate drain, if code allows.

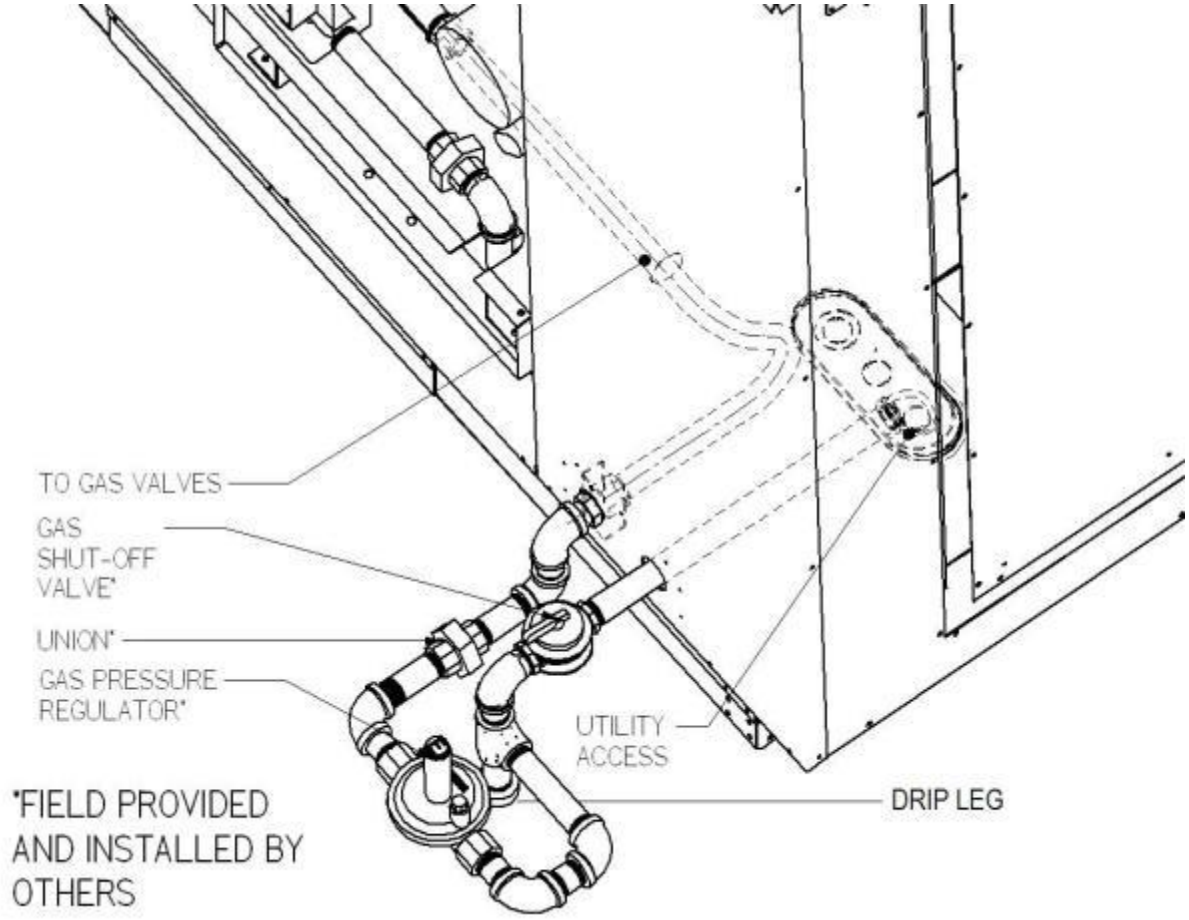


Figure 30 - Example 6-25 and 30 ton through the Base Gas Piping

Leak Testing

All components of gas supply system, including manual shut off valves and the piping in the interior of the unit, should be leak tested with a soap solution before operating the appliance and at least on an annual basis thereafter.

⚠ DANGER

LEAK CHECK GAS PIPE

The gas pipe in the unit should be checked for leaks before startup. Leak checking is the responsibility of the installing contractor. All connections should be checked for leaks annually after installation. Failure to leak check could result in fire, explosion, or other hazardous situations.

⚠ DANGER

Do not use open flame or other source of ignition for leak testing. Fire or explosion could result causing property damage, personal injury, or death.

⚠ CAUTION

Some soaps used for leak detection can be corrosive to certain metals. Rinse piping thoroughly after leak test has been completed.

All gas fired heat exchangers are completely tested at the factory before shipment. This will remove nearly all of the oils that have been used in the manufacturing process. However, trace amounts may remain. When performing the initial startup at the jobsite, it is highly recommended that people or any other living animals, which may be sensitive to the residual odors or gases, NOT be present in the conditioned space during the startup. In all cases, including the initial factory firing and testing, any of the gases will be under the acceptable level of concentration for human occupancy.

⚠ WARNING

Those sensitive to odors or gases from trace amounts of residual oils should NOT be present in the conditioned space during the startup of a gas fired installation.

Refrigerant-to-Water Heat Exchanger
Condenser water pump, condenser water piping, cooling tower or geothermal loop, pressure gauges, strainers, piping insulation and all components of the waterside piping must be field installed.

Open Loop Applications
This product contains one or more refrigerant-to-water heat exchangers made of 316 Stainless Steel. 316 Stainless Steel is subject to severe corrosion and failure when exposed to chlorides.

⚠ WARNING

OPEN LOOP APPLICATIONS

Failure of the condenser as a result of chemical corrosion is excluded from coverage under AAON Inc. warranties and the heat exchanger manufacturer's warranties.

Do not allow water containing any form of chlorides to enter this heat exchanger.

Common forms of chlorides include:

1. Sea water mist entering an open cooling tower system.
2. Contaminated makeup water containing salt water.
3. Disinfecting the water loop with solutions containing sodium hypochlorite.

Chlorides will result in a premature failure of the condenser.

Failure of the condenser as a result of chemical corrosion is excluded from coverage under AAON warranties and the heat exchanger manufacturer warranties.

Failure of the condenser will allow water to enter the refrigerant circuit and will cause extensive damage to the refrigerant circuit components. Any damage to the equipment as a result of condenser failure from chemical corrosion due to the fluid in the condenser is excluded from coverage under AAON warranties and the heat exchanger manufacturer warranties.

⚠ WARNING

OPEN LOOP APPLICATIONS

SMO 254 brazed plated refrigerant-to-water heat exchangers are recommended with all open loop applications. Failure to use a SMO 254 heat exchanger may result in premature failure of your system and possible voiding of the warranty.

⚠ CAUTION

Cleaning the cooling tower or condenser water loop with harsh chemicals such as hydrochloric acid (muriatic acid), chlorine or other chlorides, can damage the refrigerant-to-water heat exchanger. Care should be taken to avoid allowing chemicals to enter the refrigerant-to-water heat exchanger. See Appendix A - Heat Exchanger Corrosion Resistance for more information.

Freezing Water in the Heat Exchanger

This product contains one or more refrigerant-to-water heat exchangers. A refrigerant-to-water heat exchanger contains refrigerant in one passage and water in another passage. Water is subject to freezing at 32°F. When water freezes in a heat exchanger significant forces are exerted on the components of the heat exchanger where the water is confined.

⚠ WARNING

WATER FREEZING

Failure of the condenser due to freezing will allow water to enter the refrigerant circuit and will cause extensive damage to the refrigerant circuit components. Any damage to the equipment as a result of water freezing in the condenser is excluded from coverage under AAON warranties and the heat exchanger manufacturer warranties.

Failure of the condenser due to freezing will allow water to enter the refrigerant circuit and will cause extensive damage to the refrigerant circuit components. Any damage to the equipment as a result of water freezing in the condenser is excluded from coverage under AAON warranties and the heat exchanger manufacturer warranties.

Unit is capable of operating with Entering Water Temperatures (EWT) as low as 57°F, during the cooling mode, without the need for head pressure control. If the EWT is expected to be lower than 57°F or a more stable operation is desired, a factory provided head pressure control water valve option is available.

Glycol solution should be used if ambient temperatures are expected to fall below freezing or if the loop entering water temperature to the unit is below 50°F while operating in the heating mode (heat pump units only). Adding glycol to condenser water causes an increase in pressure drop and also results in a decrease in unit performance. A minimum concentration of 20% glycol solution is recommended.

Table 17 - Glycol Freezing Points

% Glycol	Ethylene Glycol	Propylene Glycol
20	18°F	19°F
30	7°F	9°F
40	-7°F	-6°F
50	-28°F	-27°F

Water loop piping runs through unheated areas or outside the building should be insulated.

Water Piping

Installing contractor must ensure a differential pressure switch or water flow switch is installed between the condenser water supply and return connections. This sensor provides a signal to the unit controller that water flow is present in the refrigerant-to-water heat exchanger and the

unit can operate without damaging unit components.

⚠ WARNING

WATER PRESSURE

Prior to connection of condensing water supply, verify water pressure is less than maximum pressure shown on unit nameplate. To prevent injury or death due to instantaneous release of high pressure water, relief valves should be field supplied on water piping. Supply water connection may require a backflow preventer to prevent supply makeup water from backing up into the public water system.

Table 18 - Standard Brazed Plate Heat Exchanger Water Connections

Model (RN-)	Supply and Return Connection Size
006, 007	1" NPT
008, 010, 009, 011, 013, 015, 016, 018, 020	1 1/2" NPT
025, 030	2" NPT
026, 031, 040	2 1/2" Grooved Pipe
050, 055, 060, 070	3" Grooved Pipe
065, 075, 090, 105	4" Grooved Pipe
120, 130, 140	5" Grooved Pipe

Table 19 - SMO 254 Brazed Plate Heat Exchanger Water Connections

Model (RN-)	Supply and Return Connection Size
016, 018, 020, 025, 030	1 1/2" NPT

Only use approved water pipe material. Avoid using galvanized material for water lines/fittings as the material is corrosive and may cause fouling of the water system.

Condenser water pump must be field sized and installed between the cooling tower/geothermal loop and self-contained unit. System should be sized in accordance with the ASHRAE Handbook. Use engineering guidelines to maintain equal distances for supply and return piping and limit bend radiuses to maintain balance in the system. Balancing valves, permanent thermometers and gauges may be required.

⚠ CAUTION

WATER PIPING

Follow national and local codes when installing water piping. Connections to the unit should incorporate vibration eliminators to reduce noise and vibration and shutoff valves to facilitate servicing. Supply and return water piping must be at least as large as the unit connections and larger depending on length of runs, rise and bends.

Before connection to the unit the condenser water system should be flushed to remove foreign material that could cause condenser fouling. Install a screen strainer with a minimum of 20 Mesh ahead of the condenser inlet to prevent condenser fouling and internal tube damage.

Mineral content of the condenser water must be controlled. All makeup water has minerals in it and as the water is evaporated in the cooling tower, these minerals remain. As the mineral content of the water increases, the conductivity of the water increases.

Field provided and installed water treatment program must be compatible with stainless steel, copper, aluminum, ABS plastic, and PVC. Batch feed processes should never be

used as concentrated chemicals can cause corrosion. Never use hydrochloric acid (muriatic acid) or chlorine as it will corrode stainless steel.

⚠ CAUTION

PVC (Polyvinyl Chloride) and CPVC (Chlorinated Polyvinyl Chloride) are vulnerable to attack by certain chemicals. Polyolester (POE) oils used with R-410A and other refrigerants, even in trace amounts, in a PVC or CPVC piping system will result in stress cracking of the piping and fittings and complete piping system failure.

⚠ CAUTION

Each heat exchanger is equipped with a refrigerant pressure relief device to relieve pressure should excessive condensing pressures (>675 psig) occur. Codes may require installing contractor to connect and route relief piping outdoors. The relief valve has a 5/8" male flare outlet connection.

NOTE: Ball valves should be installed in the condenser water supply and return lines for unit isolation and water flow balancing. All manual flow valves should be of the ball valve design. Globe or gate valves should not be used due to high pressure drops and poor throttling characteristics.

Pressure and temperature ports are recommended in condenser water supply and return lines for system balancing. These openings should be 5 to 10 pipe diameters from the unit water connections. To allow for mixing and temperature stabilization, wells in the water piping should extend at least ½ pipe diameter into the pipe.

⚠ CAUTION

Installing contractor is responsible for properly sizing and installing water system components. Improper fluid flow due to valves, piping, or improper pump operation may result in unacceptable unit operation and void warranty.

Piping systems should not exceed 10 ft/sec fluid velocity to ensure tube wall integrity and reduce noise.

Condensate Drain Piping

6-25 and 30 ton units are equipped with one condensate drain pan connection, on the right side of the unit, and are furnished with a p-trap for field installation. 26 and 31-140 ton units are equipped with two condensate drain connections, one on the left side of the unit and one on the right side of the unit, and are furnished with two p-traps for field installation.

All drain connections must be used and individually trapped to ensure a minimum amount of condensate accumulation in the drain pans. ABS type cement should be used to join the drain pipe connections.

Drainage of condensate directly onto the roof may be acceptable in certain areas, refer to local codes. If condensate is to drain directly onto the roof a small drip pad should be placed below the drain to protect the roof from possible damage.

If condensate is piped into the building drainage system, the drain pipe should

penetrate the roof external to the unit itself. The drain line should be pitched away from the unit at least 1/8 inch per foot. On longer runs an air break should be used to ensure proper drainage.

⚠ CAUTION

Unit should not be operated without a p-trap. Failure to install a p-trap may result in overflow of condensate water into the unit.

Draw-through cooling coils will have a negative static pressure in the drain pan area. This will cause an un-trapped drain to back up due to air being pulled up through the condensate drain piping.

Condensate drain trapping and piping should conform to all applicable governing codes.

Heating Coils

One or two row hot water and steam heating and preheating coils can be factory installed. All valve controls for heating operation are field supplied and field installed. Hot water and steam coil connections are spun copper tube.

Water coils should not be subjected to entering air temperatures below 38°F to prevent coil freeze-up. If air temperature across the coil is going to be below this value, use a glycol solution to match the coldest air expected.

Table 20 - Steam Coil Connection Sizes

Model (RN-)	Steam Coil Connection Size
006-140	2 1/8”

Table 21 - Hot Water Coil Connection Sizes

Model (RN-)	Hot Water Coil Connection Size
006, 007, 008, 009, 010, 011, 013, 015	1 3/8”
016, 018, 020, 025, 030	1 5/8”
026, 031, 040, 050, 060, 070	2 1/8” (standard)/ 1 3/8” (preheat coil)
055, 065, 075, 090, 105, 120, 130, 140	2 1/8”

Chilled Water Coil

Four or six row chilled water cooling coils can be factory installed. All valve controls for cooling operation are field supplied and field installed. Chilled water coil connections are spun copper tube.

Table 22 - Chilled Water Coil Connection Sizes

Model (RN-)	Chilled Water Coil Connection Size
006, 007, 008, 009, 010, 011, 013, 015	1 5/8”
016, 018, 020, 025, 030	2 1/8”
026, 031, 040	2 5/8”
050, 055, 060, 065, 070, 075, 090, 105, 120, 130, 140	2 1/8”

⚠ WARNING

Piping shall be in accordance with national and local codes. Pressure limiting devices, backflow preventers and all other safety requirements are the sole responsibility of the installing contractor.

Startup

(See back of the manual for startup form.)

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Startup and service must be performed by a Factory Trained Service Technician.

⚠ WARNING

Electric shock hazard. Shut off all electrical power to the unit to avoid shock hazard or injury from rotating parts.

During startup, it is necessary to perform routine checks on the performance of the unit. This includes checking the air flow, air filters, condenser water flow, dampers, heaters, and refrigerant charge.

Supply Fans

RN Series units are equipped with direct drive backward curved plenum fan assemblies that are selected to deliver the air volume specified according to unit size and job requirements. This is either done with air volume bands in the blower wheels or with variable frequency drives. Field airflow adjustment may be required at startup.

Air volume bands for the wheels are sized according to the unit's air delivery specifications and can also be ordered from the factory for field installation. Wheels come standard with a 10% air volume band, as a safety factor, in case additional air volume is required from the unit.

Air Flow Adjustment

If reduced air volume is required an air volume band or larger air volume band can be installed within the blower wheel to reduce the amount of air delivered by the wheel.

If the unit is factory equipped with the air volume band and additional air volume is required, the band can be removed from the wheel.

Use fan program in AAON ECat to determine the new band size for the required cfm and static pressure.

The following photos of a wheel are provided for practical guidelines only in order to identify the air band location in the wheel. Actual field installation of the air band into the wheel will require access into and through the blower wheel venture, which may require removal of the blower motor and wheel.

Air volume bands are made of aluminum, sized and equipped with easy bend tabs that are to be inserted into pre-punched slots provided on the wheel. Once the band has been inserted into the slots, it MUST BE secured by bending the tabs over from the back side of the wheel and also MUST BE secured from the inside by connecting the ends together with a pop-rivet in the holes provided on the ends of the band.

If the band is field installed, a hand held pop-rivet tool is recommended for connecting the band ends together. Caution must be taken to assure that the band is tightly installed and no damage, denting or alteration to the wheel or blades occurs during the installation.

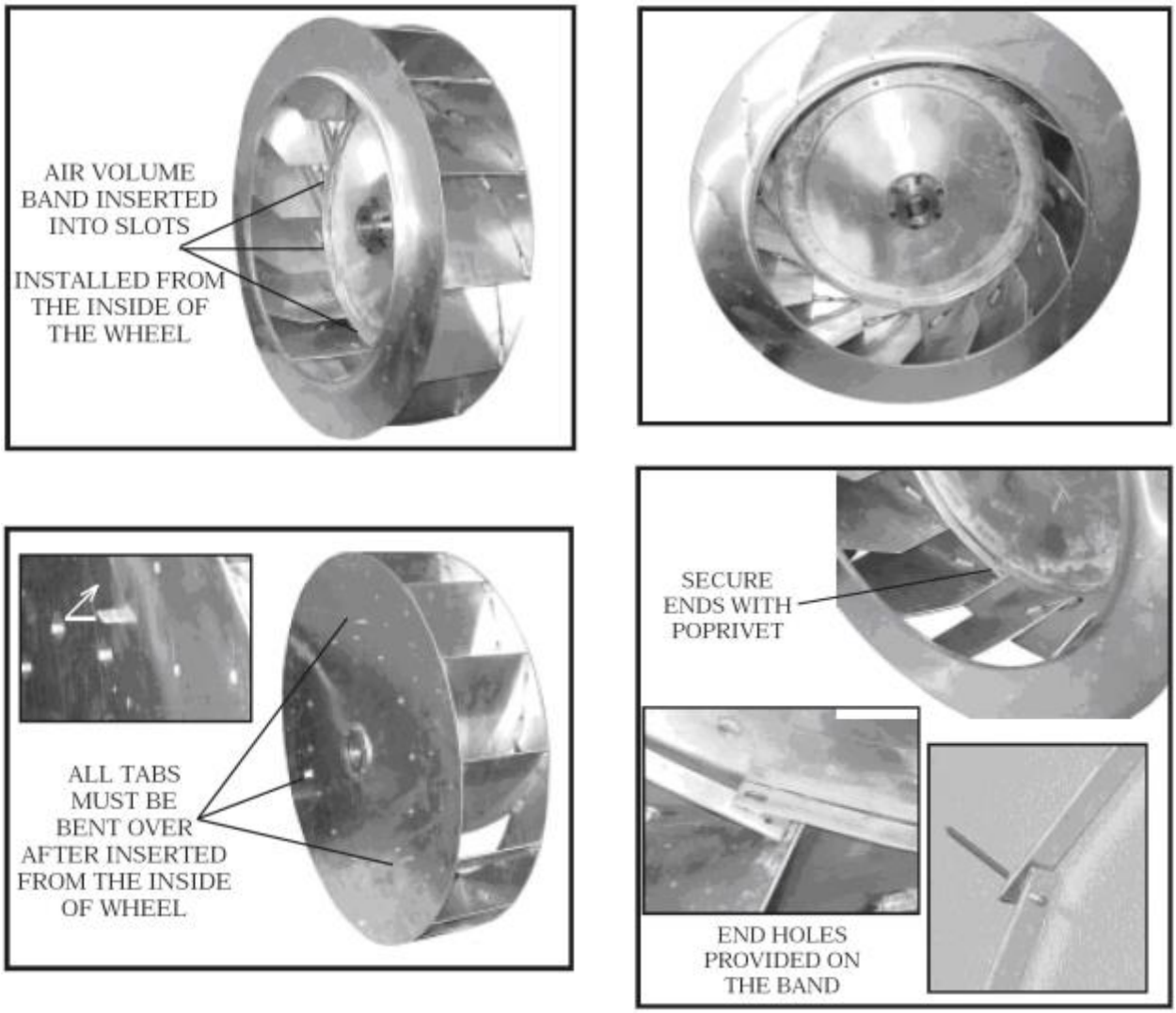


Figure 31 - Supply Fan Banding

Power Return Axial Flow Fans
(16-25 and 30 tons)
Blade Pitch Angle Setting Instructions

Step 1: Determine the new required pitch for the fan blades
Use the fan program in AAON ECat.

Step 2: Maintain the balance of fan
Mark the HUB/RET castings across a single joint, so the fan can be reassembled in the same orientation.

Mark the location of any balancing weight. Balancing weight will be on the outer bolt circle, in the form of washers, and/or longer bolts, or an additional balancing nut.

Number the blades and blade sockets, so that they can be replaced into their original positions.

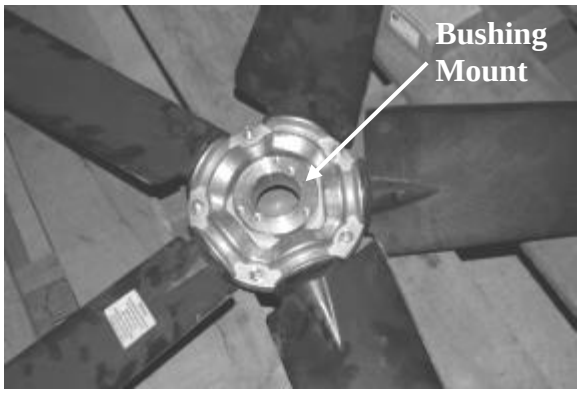


Figure 32 - Fan with the HUB on the Top and RET on the Bottom

Step 3: Determine the direction of rotation
Right, R, is clockwise when facing the discharge side of the fan and Left, L, is counterclockwise when facing the discharge side of the fan.

Step 4: Determine the bushing mount location
The bushing mount is the center section of the hub through which the fan is mounted to the shaft, and typically contains either setscrews or a center-tapered hole where the bushing inserts.

Location A is with the bushing mount on air inlet side of the fan.
Location B is with the bushing mount on air discharge side of the fan.

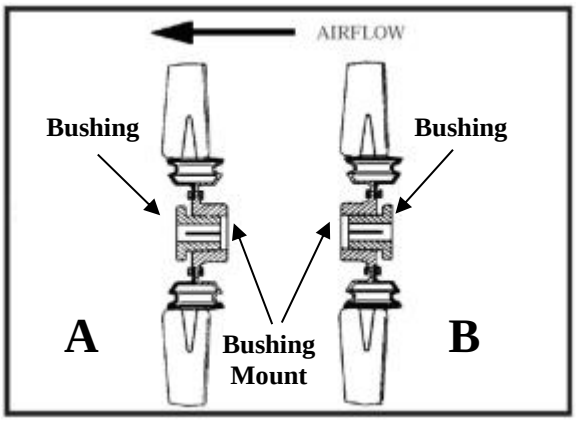


Figure 33 - Bushing Mount Location

Step 5: Determine the pin location groove
Disassemble fan on a flat surface and note in which groove the pin is located.

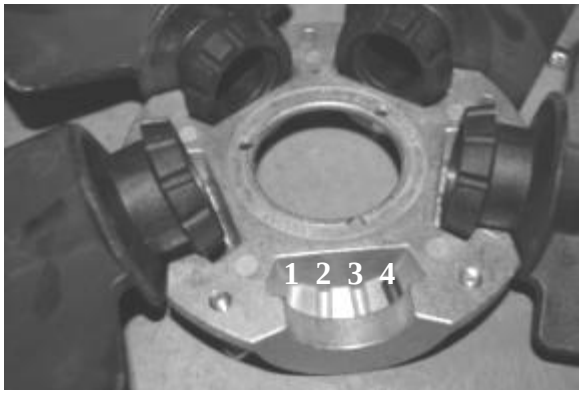


Figure 34 - RET with Pin in Groove 4

Step 6: Determine whether the pin is in the HUB or RET

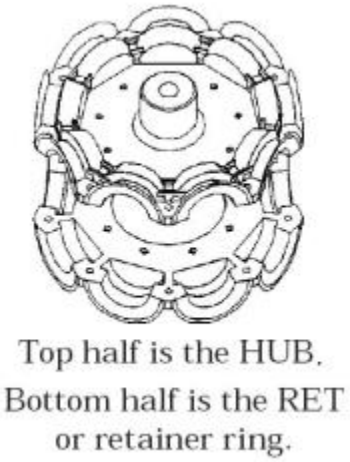


Figure 35 - Fan HUB and RET Castings

Step 7: Determine the current blade pitch and the pin location for the new blades

Table 23 - Pin Location

Type	Bushing Mount	Blade Pitch Angle									
		20°	25°	28°	30°	33°	35°	38°	40°	45°	50°
5Z	A	-	RET	-	RET	RET	RET	HUB	HUB	HUB	HUB
	B	-	HUB	-	HUB	HUB	HUB	RET	RET	RET	RET

Table 24 - Pin Groove Location

Type	Rot.	Blade Pitch Angle									
		20°	25°	28°	30°	33°	35°	38°	40°	45°	50°
5Z	R	-	4	-	3	2	1	4	3	2	1
	L	-	1	-	2	3	4	1	2	3	4

Step 8: Replace fan blades in the new pin location and reassemble the fan
Replace the blades with the pin in the 1, 2, 3, or 4 groove position of either the HUB or RET. Assemble the fan making sure to place the blades in their previous blade sockets, to match up the previous orientation of HUB and RET and to replace any balancing weights in their previous locations. Tighten bolts in a cross pattern to 5-6 ft-lbs. of torque.

Power Return and Exhaust Axial Flow Fans (26 and 31-140 tons)
Blade Pitch Angle Setting Instructions

Step 1: Determine the new required pitch for the fan blades
Use the fan program in AAON ECat. Contact the AAON parts department to acquire the new pitch pins for the fan blades.

Step 2: Maintain the balance of fan
Mark the hub plate castings across a single joint, so the fan can be reassembled in the same orientation.

Mark the location of any balancing weight. Balancing weight will be on the outer bolt circle, in the form of washers, and/or longer bolts, or an additional balancing nut.

Number the blades and blade sockets, so that they can be replaced into their original positions.

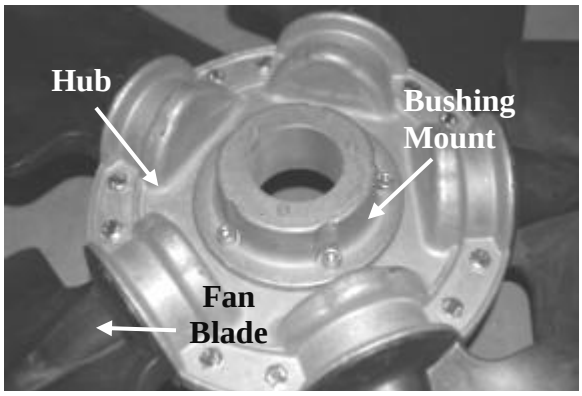


Figure 36 - Assembled Fan

Step 3: Remove the mounting nuts and bolts and separate hub plate castings

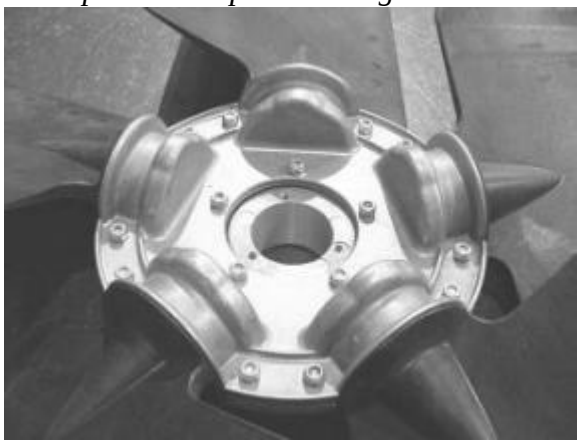


Figure 37 - Back of the Fan

Step 4: Remove the fan blades and replace the pitch pins

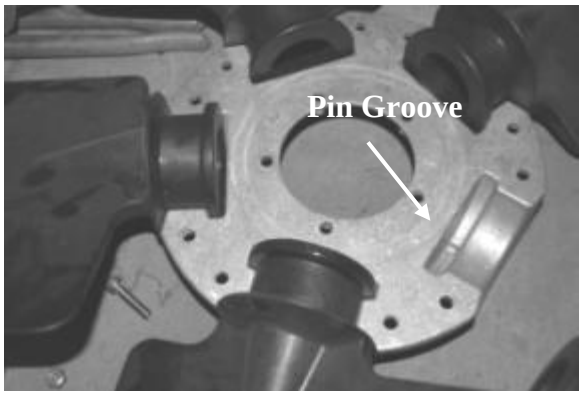


Figure 38 - Pin Groove Location

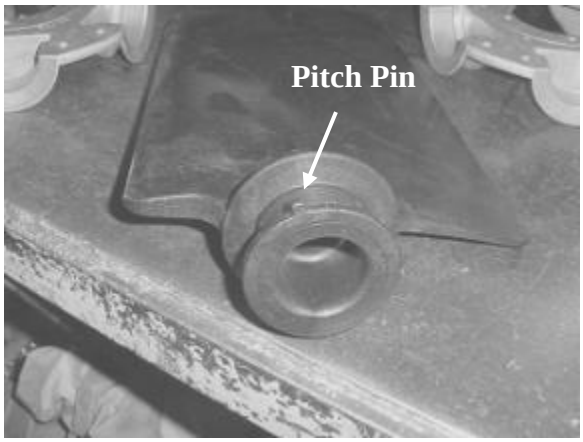


Figure 39 - Pitch Pin Location

Figure 40 - Example Pitch Pin

Step 5: Replace the fan blades with the pitch pin of the blade in the same groove and reassemble the fan.

Replace the blades and assemble the fan making sure to place the blades in their previous blade sockets, to match up the previous orientation of hub plate casings and to replace any balancing weights in their previous locations. Tighten bolts in a cross pattern to 6.7 ft-lbs. of torque.

Step 6: Install the fan in the unit.

After placing the fan on the shaft, place the key in the shaft, make sure the screw on the bushing is aligned over the key and then tighten the screw to 9 ft-lbs torque.

Filters

Do not operate the unit without filters in place. Unit should be checked for correct filter placement during startup. Operation of the equipment without filters will result in a clogged evaporator coil.

⚠ CAUTION

Before completing startup and leaving the unit a complete operating cycle should be observed to verify that all components are functioning properly.

Adjusting Refrigerant Charge

Adjusting the charge of a system in the field must be based on determination of liquid sub-cooling and evaporator superheat. On a system with a TXV liquid sub-cooling is more representative of the charge than evaporator superheat but both measurements must be taken.

⚠ CAUTION

The Clean Air Act of 1990 bans the intentional venting of refrigerant (CFC's and HCFC's) as of July 1, 1992. Approved methods of recovery, recycling or reclaiming must be followed. Fines and/or incarceration may be levied for non-compliance.

Before Charging

Unit being charged must be at or near full load conditions before adjusting the charge.

Units equipped with hot gas reheat must be charged with the hot gas reheat valves closed while the unit is in cooling mode to get the proper charge. After charging, unit should be operated in reheat (dehumidification) mode to check for correct operation.

Units equipped with heat pump options should be charged in heating mode to get the proper charge. After charging, unit should be operated in cooling mode to check for correct charge. Charge may need to be adjusted for cooling mode. If adjustments are made in the cooling mode heating mode must be rerun to verify proper operation.

After adding or removing charge the system must be allowed to stabilize, typically 10-15 minutes, before making any other adjustments.

The type of unit and options determine the ranges for liquid sub-cooling and evaporator superheat. Refer to the table below when determining the proper sub-cooling.

Checking Liquid Sub-Cooling

Measure the temperature of the liquid line as it leaves the condenser coil.

Read the gauge pressure at the liquid line close to the point where the temperature was taken. You must use liquid line pressure as it will vary from discharge pressure due to condenser coil pressure drop.

Convert the pressure obtained to a saturated temperature using the appropriate refrigerant temperature-pressure chart.

Subtract the measured liquid line temperature from the saturated temperature to determine the liquid sub-cooling.

Compare calculated sub-cooling to the table below for the appropriate unit type and options.

Checking Evaporator Superheat

Measure the temperature of the suction line close to the compressor.

Read gauge pressure at the suction line close to the compressor.

Convert the pressure obtained to a saturated temperature using the appropriate refrigerant temperature-pressure chart.

Subtract the saturated temperature from the measured suction line temperature to determine the evaporator superheat.

Compare calculated superheat to the table below for the appropriate unit type and options.

Table 25 - Acceptable Refrigeration Circuit Values

Air-Cooled Cond./Air-Air Heat Pump	
Sub-Cooling	12-18°F
Sub-Cooling with Hot Gas Reheat	15-22°F
Superheat	8-15°F
Water-Cooled Cond./Water Source Heat Pump	
Sub-Cooling	4-8°F
Superheat	8-15°F

⚠ CAUTION

Thermal expansion valve must be adjusted to approximately 8-15°F of suction superheat. Failure to have sufficient superheat will damage the compressor and void the warranty.

Adjusting Sub-cooling and Superheat Temperatures

The system is overcharged if the sub-cooling temperature is too high and the evaporator is fully loaded (low loads on the evaporator result in increased sub-cooling) and the evaporator superheat is within the temperature range as shown in the table above (high superheat results in increased sub-cooling).

Correct an overcharged system by reducing the amount of refrigerant in the system to lower the sub-cooling.

⚠ CAUTION

DO NOT OVERCHARGE!

Refrigerant overcharging leads to excess refrigerant in the condenser coils resulting in elevated compressor discharge pressure.

The system is undercharged if the superheat is too high and the sub-cooling is too low

Correct an undercharged system by adding refrigerant to the system to reduce superheat and raise sub-cooling.

If the sub-cooling is correct and the superheat is too high, the TXV may need adjustment to correct the superheat.

Table 26 - R-410A and R-22 Refrigerant Temperature-Pressure Chart

	PSIG			PSIG			PSIG			PSIG			PSIG	
(°F)	R-410A	R-22	(°F)	R-410A	R-22	(°F)	R-410A	R-22	(°F)	R-410A	R-22	(°F)	R-410A	R-22
20	78.3	43.1	**50**	142.2	84.1	**80**	234.9	143.6	**110**	364.1	226.4	**140**	540.1	337.4
21	80.0	44.2	**51**	144.8	85.7	**81**	238.6	146.0	**111**	369.1	229.6	**141**	547.0	341.6
22	81.8	45.3	**52**	147.4	87.4	**82**	242.3	148.4	**112**	374.2	232.8	**142**	553.9	345.9
23	83.6	46.5	**53**	150.1	89.1	**83**	246.0	150.8	**113**	379.4	236.1	**143**	560.9	350.3
24	85.4	47.6	**54**	152.8	90.8	**84**	249.8	153.2	**114**	384.6	239.4	**144**	567.9	354.6
25	87.2	48.8	**55**	155.5	92.6	**85**	253.7	155.7	**115**	389.9	242.8	**145**	575.1	359.0
26	89.1	50.0	**56**	158.2	94.4	**86**	257.5	158.2	**116**	395.2	246.1	**146**	582.3	363.5
27	91.0	51.2	**57**	161.0	96.1	**87**	261.4	160.7	**117**	400.5	249.5	**147**	589.6	368.0
28	92.9	52.4	**58**	163.8	98.0	**88**	265.4	163.2	**118**	405.9	253.0	**148**	596.9	372.5
29	94.9	53.7	**59**	166.7	99.8	**89**	269.4	165.8	**119**	411.4	256.5	**149**	604.4	377.1
30	96.8	55.0	**60**	169.6	101.6	**90**	273.5	168.4	**120**	416.9	260.0	**150**	611.9	381.7
31	98.8	56.2	**61**	172.5	103.5	**91**	277.6	171.0	**121**	422.5	263.5			
32	100.9	57.5	**62**	175.4	105.4	**92**	281.7	173.7	**122**	428.2	267.1			
33	102.9	58.8	**63**	178.4	107.3	**93**	285.9	176.4	**123**	433.9	270.7			
34	105.0	60.2	**64**	181.5	109.3	**94**	290.1	179.1	**124**	439.6	274.3			
35	107.1	61.5	**65**	184.5	111.2	**95**	294.4	181.8	**125**	445.4	278.0			
36	109.2	62.9	**66**	187.6	113.2	**96**	298.7	184.6	**126**	451.3	281.7			
37	111.4	64.3	**67**	190.7	115.3	**97**	303.0	187.4	**127**	457.3	285.4			
38	113.6	65.7	**68**	193.9	117.3	**98**	307.5	190.2	**128**	463.2	289.2			
39	115.8	67.1	**69**	197.1	119.4	**99**	311.9	193.0	**129**	469.3	293.0			
40	118.1	68.6	**70**	200.4	121.4	**100**	316.4	195.9	**130**	475.4	296.9			
41	120.3	70.0	**71**	203.6	123.5	**101**	321.0	198.8	**131**	481.6	300.8			
42	122.7	71.5	**72**	207.0	125.7	**102**	325.6	201.8	**132**	487.8	304.7			
43	125.0	73.0	**73**	210.3	127.8	**103**	330.2	204.7	**133**	494.1	308.7			
44	127.4	74.5	**74**	213.7	130.0	**104**	334.9	207.7	**134**	500.5	312.6			
45	129.8	76.1	**75**	217.1	132.2	**105**	339.6	210.8	**135**	506.9	316.7			
46	132.2	77.6	**76**	220.6	134.5	**106**	344.4	213.8	**136**	513.4	320.7			
47	134.7	79.2	**77**	224.1	136.7	**107**	349.3	216.9	**137**	520.0	324.8			
48	137.2	80.8	**78**	227.7	139.0	**108**	354.2	220.0	**138**	526.6	329.0			
49	139.7	82.4	**79**	231.3	141.3	**109**	359.1	223.2	**139**	533.3	333.2			

Gas Heater Instructions

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: IF YOU DO NOT FOLLOW THESE INSTRUCTIONS EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

A. This appliance does not have a pilot. It is equipped with a ignition device which automatically lights the burner. Do not try to light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

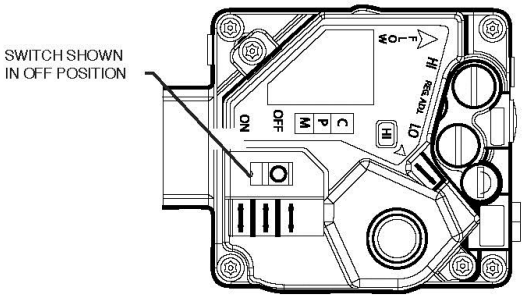
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to move the on/off switch.

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

OPERATING INSTRUCTIONS

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



5. Remove control access panel.
6. Move the on/off switch to the "OFF" position.
7. WAIT five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
8. Move the on/off switch to the "ON" position.
9. Replace control access panel.
10. Turn on all electric power to the appliance.
11. Set thermostat to desired setting.
12. If the appliance will not operate, follow the instructions "To Turn Off Gas to Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be preformed.
3. Remove control access panel.
4. Move the on/off switch to the "OFF" position.
5. Replace control access panel.

Direct Ignition • P72570

Figure 41 - Gas Heater Instructions

Condenser Fan Electronically Commutated Motor (ECM) Startup

The fan cycling option uses a fan cycle switch to switch between one of the discrete speed inputs (see Table 27) on the motor thus cycling between two preset speeds based upon discharge pressure of the unit. By connecting 24VAC to a single or combination of the yellow, white, or orange wires, the motor will run at the discrete speeds in Table 27.

With Customer Provided Unit Controls or WattMaster Unit Controls the WattMaster Condenser Head Pressure Module is used for variable speed control of the motor to maintain a head pressure. The motor should be factory wired to the PWM outputs of the WattMaster Condenser Head Pressure Module. See WattMaster literature for further information.
(http://www.orioncontrols.com)

With JENEsys Unit Controls the controller modulates the ECM to maintain head pressure.

Note
High voltage wires out of the motor:
Black & Brown - 1 Phase Line Voltage
Green - Ground

Low control voltage wires out of the motor:
Blue - Common
Yellow - Variable Speed Control

Table 27 - ECM Condenser Fan Cycling Options

Color	Terminal	Customer Connection	Option 1	Option 2	Option 3	Option 4	Option 5
Black	0.50 BWS	L1	208-230 VAC	208-230 VAC	208-230 VAC	208-230 VAC	208-230 VAC
Brown	0.50 BWS	L2	208-230 VAC	208-230 VAC	208-230 VAC	208-230 VAC	208-230 VAC
Green	#10 EYELET	Ground	GND	GND	GND	GND	GND
Blue	0.50 BWS	Common	Common	24 VAC	24 VAC	24 VAC	24 VAC
Yellow	0.50 BWS	Signal	PWM		24 VAC		24 VAC
White	0.50 BWS	Signal				24 VAC	24 VAC
Orange	0.50 BWS	Signal		24 VAC		24 VAC	
		RPM	300-1100	300	500	850	1100
		Rotation	CCW	CCW	CCW	CCW	CCW
		ECM Toolbox ID	Variable	Speed 4	Speed 3	Speed 2	Speed 1
		20% PWM RPM	300				
		100% PWM RPM	1100				

VFD Controlled Condenser Fan Startup

With Customer Provided Unit Controls the VFD's are factory provided and factory programmed. VFD's receives input from pressure transducers on each refrigerant circuit and vary the fan speed based on the pressure inputs to maintain a discharge (head) pressure. Standard pressure setpoint is 340 psi for standard air-cooled systems and 400 psi for modulating hot gas reheat air-cooled systems.

With WattMaster Unit Controls the WattMaster Condenser Head Pressure Module is used to maintain a discharge pressure. The VFD should be factory wired to the outputs of the WattMaster Condenser Head Pressure Module. See WattMaster literature for additional information. (http://www.orioncontrols.com).

With JENEsys Unit Controls the controller directly modulates the VFD to maintain a discharge pressure.

Operation

Unit operations should be controlled with thermostat, or unit controller, never at the main power supply, except for servicing, emergency, or complete shutdown of the unit.

Thermostat Operation

Heating

Thermostat system switch - "Heat"
Thermostat fan switch - "Auto" or "On"
Thermostat temperature set to desired point.

Cooling

Thermostat system switch - "Cool"
Thermostat fan switch - "Auto" or "On"
Thermostat temperature set to desired point.

Air Circulation

Thermostat system switch - "Off"
Thermostat fan switch - "Auto" or "On"
No change of the thermostat temperature.
With these settings, the supply blower will run continuously but the supply air will not be heated, cooled, or dehumidified.

System Off

Thermostat system switch - "Off"
Thermostat fan switch - "Auto"
No change of the thermostat temperature.
With these settings the system is shut down, with the exception of control system power.

Night and Weekend Unoccupied Operation

To reduce the operating time of the unit when the space is unoccupied, such as nights and weekends, it is recommended that the temperature setting be raised about 5°F while unoccupied during the cooling season and lowered about 10°F during the heating season.

Packaged DX Cooling Operation and Control

When a call for cooling (G and Y1, Y2, etc.) is made the supply blower motors and compressors will energize.

⚠ WARNING

COMPRESSOR CYCLING

5 MINUTE MINIMUM OFF TIME
To prevent motor overheating compressors must cycle off for a minimum of 5 minutes.

5 MINUTE MINIMUM ON TIME
To maintain the proper oil level compressors must cycle on for a minimum of 5 minutes.

The cycle rate must not exceed 6 starts per hour.

Gas Heater Operation

When heat (G and W1, W2, etc.) is called for the combustion motor starts and the ignition control is energized. The control sends 24 VAC to the main gas valve and high voltage to the igniter. If a burner flame has been detected within 10 seconds, the spark is extinguished and the flame continues. If a flame has not been detected after 10 seconds, the gas valve closes, the spark ceases and the induced draft blower continues to purge the heat exchanger. After 45 seconds of purge, the ignition system will attempt to light the burners again. Should no flame be detected after 3 tries, the ignition control will lock out the system. Power to the ignition control must be cycled to reset the heater control.

On a fault the gas train is shut down by a main limit located in the heat exchanger area or by an auxiliary limit mounted in the supply fan compartment.

Electric Heating Operation
When a call for heating (G and W1, W2, etc.) is made the supply blower motors and electric resistance heaters will energize. Heating is accomplished by passing electrical current through a specified amount of resistance heaters which will produce the required heat.

On a fault condition the main limit located in the supply air or the auxiliary limit located downstream the supply blower will remove power from all contactors.

Steam or Hot Water Preheating and Heating Operation
Valve control for steam and hot water heating coils are by others. Heating is accomplished by passing steam or hot water through the steam or hot water coil assembly.

Chilled Water or Non-Compressorized DX Cooling Operation
Controls for chilled water cooling coils and non-compressorized DX coil are by others.

Maintenance

(See back of the manual for maintenance log)

At least once each year, a trained, qualified service technician should check out the unit. Fans, evaporator coils, and filters should be inspected at least monthly.

Gas Heating

⚠ WARNING

Once a year, before the unit is in operation for the heating season, a qualified service technician should inspect all flue product carrying areas of the furnace and main burners for continued safe operation.

⚠ DANGER

LEAK CHECK GAS PIPE

The gas pipe in the unit should be checked for leaks before startup. Leak checking is the responsibility of the installing contractor. All connections should be checked for leaks annually after installation. Failure to leak check could result in fire, explosion, or other hazardous situations.

Make sure all gas supply lines have been purged of air before turning on the electrical power switch. Turn the gas valve to the on position (see startup instructions). Turn the main electrical power on and set the controls to the heating mode of operation.

The combustion ventilation motor should operate. The control will automatically supply energy to the igniter and the gas valve after the heating call is made.

The flame sensing probe detects the presence of the flame. Should no flame be detected in 10 seconds, the ignition system will recycle. If no flame is detected after 3 tries, ignition system will lockout.

Remove the call for heating. The main gas valves should be extinguished.

The supply fans are controlled by the ignition system. In the fan "Auto" mode the fan comes on 45 seconds after the flame is proved and goes off 120 seconds after the heating call is removed.

Furnace combustion ventilation air and flue openings should be checked annually for debris and obstructions. If vent extensions are used they must meet category III requirements.

This appliance contains a wire screen at the vent outlet. Each heating season, prior to placing the appliance in heat mode maintenance check that no debris or foreign matter has accumulated in the vent outlet. A good practice is to check for debris each time the air filters are changed.

In the event the vent outlet becomes blocked do not attempt to start the appliance in heat mode until the entire vent opening is cleared.

In the event the unit shut down because the vent was blocked a qualified technician or service agency should monitor the unit prior to re-starting.

The gas burner and heat exchanger should never require cleaning. If cleaning is necessary, this indicates faulty operation of the unit. Cleaning should only be done by a qualified service agency and only after consultation with an AAON service representative.

If induced draft blower/motor assembly has to be replaced, care must be taken to provide an airtight seal between the blower housing and the burner box.

Gas Heat Exchanger Removal

⚠ WARNING

Electric shock hazard. Shut off all electrical power to the unit to avoid shock hazard or injury from rotating parts.

⚠ DANGER

LEAK CHECK GAS PIPE

The gas pipe in the unit should be checked for leaks before startup. Leak checking is the responsibility of the installing contractor. All connections should be checked for leaks annually after installation. Failure to leak check could result in fire, explosion, or other hazardous situations.

Removal

Disconnect all wiring on the heat exchanger.

Disconnect flex gas lines and pull out of the way.

Remove screws around the perimeter of the heat exchanger face plate that connect it to the unit. Only the outermost screws should be removed.

Pull the heat exchanger straight back and out of the unit. It may be necessary to remove some of the control door jambs.

Reinstallation

Ensure that the neoprene gasket is installed around the perimeter of the heat exchanger.

Insert heat exchanger into opening so that the back of the main plate is against the unit bulkhead.

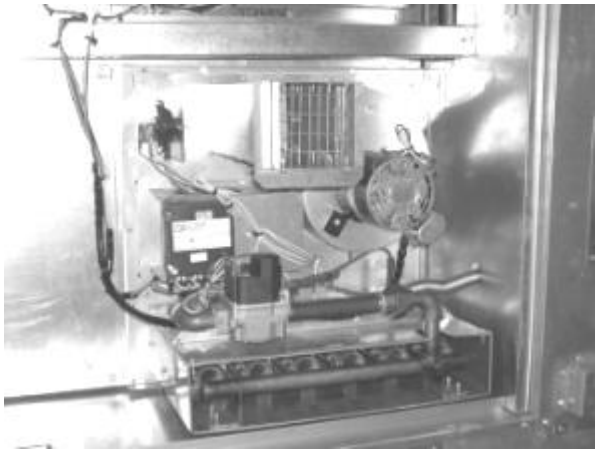


Figure 42 - Gas Heat Exchanger

Attach the heat exchanger to the bulkhead using the holes around the perimeter.

Connect flex gas lines to the piping on the heat exchanger. If flexible gas piping in the unit must be replaced connectors cannot be reused, only new connectors must be used.

Connect wiring per the wiring diagram on the controls compartment door.

Purge gas lines to the gas valves at the unit.

DX Cooling

Set unit controls to cooling mode of operation with supply fans on. Check the fan for correct operating direction, amperage and voltage. Check compressor operation, rotation, amperage and voltage to the unit nameplate (check the amperage on the load side of the compressor contactor).

Condenser Fans (6-25 and 30 ton)
Condenser fans and motors can be removed and reinstalled as individual assemblies.

⚠ WARNING

Electric shock hazard. Shut off all electrical power to the unit to avoid shock hazard or injury from rotating parts.

⚠ WARNING

Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life. Startup and service must be performed by a Factory Trained Service Technician.

Removal
Take off the fan grill by removing the screws that attach it to the orifice.

The condenser fan motor wires can then be accessed and disconnected.

Remove the screws that attach the orifice to the condenser assembly. The screws are located on the top of the orifice around the perimeter, and in some cases, through the side of the condenser assembly into the orifice.

With the wires disconnected and the screws removed, the fan, motor and orifice assembly can be lifted off the unit.

Figure 43 - Removal of a Condenser Fan Assembly

Reinstallation
Set the condenser fan, motor and orifice assembly back into the condenser assembly with the motor wires on the side closest to the control panel.

Attach the orifice to the condenser assembly using all of the points where screws were removed.

Reconnect the fan motor wires.

Attach the fan grill at all of the points where screws were removed.

Condensate Drain Pans
Drain pans will have moisture present and require periodic cleaning to prevent microbial growth. Cleaning of the drain pans will also prevent any possible plugging of the drain lines and overflow of the pan itself. Cleaning of the drain pans and inside of the unit should be done only by qualified service technician.

Evaporator Coil (6-25 and 30 ton)

⚠ WARNING

Electric shock hazard. Shut off all electrical power to the unit to avoid shock hazard or injury from rotating parts.

Removal
Evacuate refrigerant from the systems.

Remove the TXV bulbs from the suction lines. Disconnect the suction and liquid line copper connections to the evaporator coil.

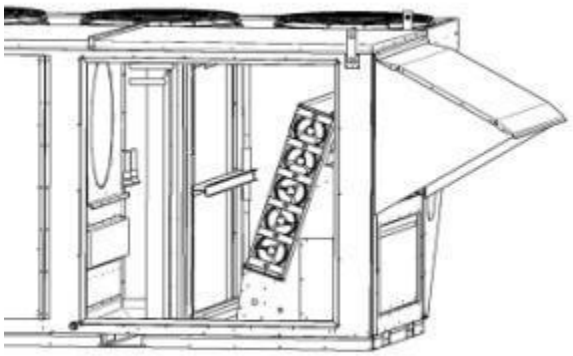


Figure 44 - Evaporator Coil Access

Remove the screws attaching the filter rack to the evaporator coil blank-off panels at the door opening and along the top of the coil.

Remove the screws attaching the filter rack to the back wall. Angle filter rack away from coil so it fits through the door opening. It may be necessary to remove economizer damper assembly.

Remove screws attaching access side, back, and top blank-off panels to the evaporator coil and the unit.

Angle the coil so that it fits through the door opening.

Remove the evaporator coil.

Reinstallation
Install the coil in the unit drain pan. There should be about a 1/4" gap between the upstream side of the coil and the back of the drain pan.

Secure the coil to the back wall of the unit with the blank-off panel. Attach the top and access side blank-off panels to the coil.

Attach the filter rack to the back, top, and access side coil blank-off panels upstream of the coil. Reinstall economizer damper assembly if necessary.

Connect the suction and liquid copper connections to the evaporator coil. Reinstall the TXV bulbs on the suction lines.

Evacuate the refrigerant systems. Weigh in the nameplate refrigerant charge.

See Adjusting Refrigerant Charge section to check for proper sub-cooling and superheat of the refrigerant systems.

Brazed Plate Heat Exchanger Cleaning
Because of a normally high degree of turbulence in brazed plate heat exchangers, for many applications the heat exchanger channels are self cleaning. For applications that are not self cleaning (i.e. hard water at high temperatures, etc.) or applications where additional cleaning is desired, it is possible to clean the brazed plate heat exchanger by circulating a cleaning liquid.

Use a tank with weak acid, 5% phosphoric acid (H_3PO_4) or, if the exchanger is frequently cleaned, 5% oxalic acid ($H_2C_2O_4$). Pump the cleaning liquid through the exchanger. For optimum cleaning, the cleaning solution flow rate should be a minimum of 1.5 times the

normal flow rate, preferably in a back-flush mode. After cleaning, the heat exchanger must be rinsed with clean water. A solution of 1-2% sodium hydroxide (NaOH) or sodium bicarbonate (NaHCO) before the last rinse ensures that all acid is neutralized.

E-Coated Coil Cleaning
Documented routine cleaning of e-coated coils is required to maintain coating warranty coverage.

⚠ WARNING

Electric shock hazard. Shut off all electrical power to the unit to avoid shock hazard or injury from rotating parts.

Surface loaded fibers or dirt should be removed prior to water rinse to prevent restriction of airflow. If unable to back wash the side of the coil opposite of the coils entering air side, then surface loaded fibers or dirt should be removed with a vacuum cleaner. If a vacuum cleaner is not available, a ***soft non-metallic*** bristle brush may be used. In either case, the tool should be applied in the direction of the fins. Coil surfaces can be easily damaged (fin edges bent over) if the tool is applied across the fins.

Use of a water stream, such as a garden hose, against a surface loaded coil will drive the fibers and dirt into the coil. This will make cleaning efforts more difficult. Surface loaded fibers must be completely removed prior to using low velocity clean water rinse.

A ***monthly*** clean water rinse is recommended for coils that are applied in coastal or industrial environments to help to remove chlorides, dirt, and debris. It is very important when rinsing, that water temperature is less than 130°F and pressure is than 900 psig to avoid damaging the fin edges. An elevated water temperature (not to exceed 130°F) will reduce surface tension, increasing the ability to remove chlorides and dirt.

⚠ CAUTION

High velocity water from a pressure washer or compressed air should only be used at a very low pressure to prevent fin and/or coil damages. The force of the water or air jet may bend the fin edges and increase airside pressure drop. Reduced unit performance or nuisance unit shutdowns may occur.

Quarterly cleaning is essential to extend the life of an e-coated coil and is required to maintain coating warranty coverage. Coil cleaning shall be part of the unit's regularly scheduled maintenance procedures. Failure to clean an e-coated coil will void the warranty and may result in reduced efficiency and durability.

⚠ CAUTION

Harsh chemicals, household bleach, or acid cleaners should not be used to clean outdoor or indoor e-coated coils. These cleaners can be very difficult to rinse out of the coil and can accelerate corrosion and attack the e-coating. If there is dirt below the surface of the coil, use the recommended coil cleaners.

For routine quarterly cleaning, first clean the coil with the below approved coil cleaner. After cleaning the coils with the approved cleaning agent, use the approved

chloride remover to remove soluble salts and revitalize the unit.

Recommended Coil Cleaner
The following cleaning agent, assuming it is used in accordance with the manufacturer's directions on the container for proper mixing and cleaning, has been approved for use on e-coated coils to remove mold, mildew, dust, soot, greasy residue, lint, and other particulate:

Enviro-Coil Concentrate, Part Number H-EC01.

Recommended Chloride Remover
CHLOR*RID DTS™ should be used to remove soluble salts from the e-coated coil, but the directions must be followed closely. This product is not intended for use as a degreaser. Any grease or oil film should first be removed with the approved cleaning agent.

Remove Barrier - Soluble salts adhere themselves to the substrate. For the effective use of this product, the product must be able to come in contact with the salts. These salts may be beneath any soils, grease or dirt; therefore, these barriers must be removed prior to application of this product. As in all surface preparation, the best work yields the best results.

Apply CHLOR*RID DTS - Apply directly onto the substrate. Sufficient product must be applied uniformly across the substrate to thoroughly wet out surface, with no areas missed. This may be accomplished by use of a pump-up sprayer or conventional spray gun. The method does not matter, as long as the entire area to be cleaned is wetted. After the substrate has been thoroughly wetted, the salts will be soluble and is now only necessary to rinse them off.

Rinse - It is highly recommended that a hose be used, as a pressure washer will damage the fins. The water to be used for the rinse is recommended to be of potable quality, though a lesser quality of water may be used if a small amount of CHLOR*RID DTS is added. Check with CHLOR*RID International, Inc. for recommendations on lesser quality rinse water.

Microchannel Coil Cleaning
Documented routine cleaning of microchannel coils with factory provided e-coating is required to maintain coating warranty coverage. See E-Coated Coil Cleaning section.

Air cooled heat exchangers may include microchannel coils. Only clean water is recommended for cleaning microchannel coils. The water pressure used to clean should not exceed 140 psi, from no closer than 3 inches from the coils, and with the water aimed perpendicular to the coils.

⚠ CAUTION

Do not use any detergents or coil cleaners with microchannel condenser coils. Use pressurized clean water, with pressure not to exceed 140 psi. Nozzle should be 6" and 80° to 90° from coil face. Failure to do so could result in coil damage.

Field installed coil coatings are not recommended with microchannels.

Supply Fans

⚠ WARNING

Electric shock hazard. Shut off all electrical power to the unit to avoid shock hazard or injury from rotating parts.

⚠ CAUTION

Blower wheels and bands must be inspected for excessive dust build up periodically and cleaned if required. Excessive dust build up on blower wheels may cause an unbalanced state; leading to vibration and/or component failure. Damages due to excessive dust build up will not be covered under factory warranty.

Lubrication
All original fan motors and bearings are furnished with factory lubrication. Some applications will require that bearings be re-lubricated periodically. The schedule will depend on the operating duty, temperature variations or other severe atmospheric conditions.

Bearings should be re-lubricated when at normal operating temperatures, but not running. Rotate the fan shaft by hand and add only enough grease to purge the seals. DO NOT OVERLUBRICATE.

Recommended greases are:
SHELL OIL - DOLIUM R
CHEVRON OIL - SRI No. 2
TEXACO INC. - PREMIUM RB

Removal (6-25 and 30 tons)
Remove fan access panel. Panel is attached with eight 3/8" bolts.

Remove the wire connections from Auxiliary Limit Switch (if applicable) which is mounted in the brace at the fan opening.

Remove the brace located at the fan opening.

Remove the six bolts that connect the motor mount to the blower frame. Two bolts are on the angle on the back of the motor mount box, two are on the bottom inside the motor mount box and two are on the inside front of the motor mount box.

Figure 45 - 9-25 and 30 ton Supply Fan

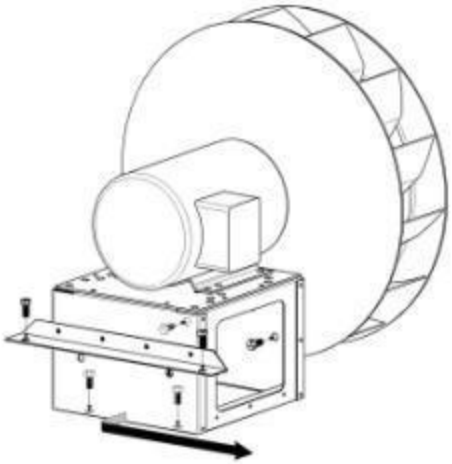


Figure 46 - Bolts which Connect Motor Mount to Blower Fan

Slide the motor mount back away from the air inlet, so that the blower wheel is clear of the inlet. A screw driver or crowbar can be used to help accomplish this. Use the pry slots on the back side of the motor mount.

Pull the motor mount to the edge of the blower frame at the opening.

Remove the motor mount with the motor and blower wheel attached. Large motors will require more than one person.

Care must be taken not to damage the compressors or refrigerant lines when removing the motor and fan assembly.

Phase and Brownout Protection
Voltage monitor should be wired according to unit specific wiring diagram include in the control compartment.

Before applying power to the unit the voltage monitor should be set up. The three knobs on the front of the monitor should be adjusted.

Figure 47 - Voltage Monitor

Adjust the top knob labeled *LINE VOLT* to the operating voltage. This should be the operating voltage for the equipment and the measured voltage on the single or three phase lines.

Adjust the knob labeled *%±* to either *SINGLE PHASE* on the left side of the dial or *3 PHASE* on the right side of the dial. After selecting single or three phase set the knob to the percentage of Over or Under voltage desired. A typical over and under voltage percentage is 10%.

Adjust the bottom knob labeled RESTART DELAY. For automatic restart after recovery of voltage select from 2 seconds up to 5 minutes. After recovery of line voltage this is how long the monitor will wait before energizing the output relay. For manual reset adjust the knob fully clockwise to MR. After recovery of line voltage the MANUAL RESET button located between the 2 LEDs must be pressed.

Now that the settings have been made, you can apply the supply and line voltages to the monitor. The monitor will only operate when the supply voltage is available.

On power up, with the line voltage and the supply voltage applied, the monitor takes 3 to 10 seconds to evaluate the line voltage, compare that voltage to the knob settings and then energize if all parameters are satisfied or will remain off if any operating parameter is incorrect.

All of the knob adjustments are adjustable after power up, except the voltage range will not change and going from single or three phase to the other will not change (i.e. within 440 to 480 VAC, but not to 208 or 230 VAC).

LED Codes
<u>Powering up with voltage present which matches knob settings:</u>
1. On/Off LED = Alternating Green/Red
Phase Loss LED = Out
2. On/Off LED = Out
Phase Loss LED = Alt. G/R
3. On/Off LED = Alt. G/R
Phase Loss LED = Out
4. On/Off LED = Alt. G/R Flashing
Phase Loss LED = Green
5. On/Off LED = Green
Phase Loss LED = Green

Powering up with no voltage present:
1. On/Off LED = Alternating Green/Red
Phase Loss LED = Out

Going into trip condition after operating conditions were good:
1. On/Off LED = Green
Phase Loss LED = Green
2. On/Off LED = Green Flashing
Phase Loss LED = Red
3. On/Off LED = Red
Phase Loss LED = Red

Going to good condition from trip condition - automatic reset:
1. On/Off LED = Red
Phase Loss LED = Red
2. On/Off LED = Alt. G/R Flashing
Phase Loss LED = Green
3. On/Off LED = Green
Phase Loss LED = Green

Going to good condition from trip condition - manual reset:
1. On/Off LED = Red
Phase Loss LED = Red
2. On/Off LED = Alt. G/R Flashing
Phase Loss LED = Green
3. Manual Reset button is pressed
4. On/Off LED = Green
Phase Loss LED = Green

Variable Capacity Compressor Controller

Units with variable capacity scroll compressors may include the following compressor controller. The following is an explanation of the terminals and troubleshooting alert flash codes of the controller. For more information on the compressor controller, see Emerson Climate Bulletin AE8-1328.

Figure 48 - Variable Capacity Compressor Controller

Low Voltage Terminals

24COM	Module Common
24VAC	Module Power
C1 & C2	Demand Input – & +
P1	Pressure Common
P2	Pressure Input
P3	Pressure Power 5VDC
P4	Pressure Shield
P5 & P6	Pressure Output – & +
T1 & T2	Discharge Temperature Sensor

High Voltage Terminals

A1 & A2	Alarm Relay Out
M1 & M2	Contractor
L1	Control Voltage N
L2	Control Voltage L
U1 & U2	Digital Unloader Solenoid
V1 & V2	Vapor Injection Solenoid

⚠ WARNING

To avoid damaging the Compressor Controller do not connect wires to terminals C3, C4, T3, T4, T5, or T6.

The compressor controller modulates the compressor unloader solenoid in an on/off pattern according to the capacity demand signal of the system. The following table shows the linear relationship between the demand signal and compressor capacity

modulation. The compressor controller protects the compressor against high discharge temperature. Refer to Appendix B for the relationship between thermistor temperature readings and resistance values.

Table 28 - Demand Signal vs. Compressor Capacity Modulation

Demand Signal (VDC)	Loaded %	Unloaded %	Time Loaded	Time Unloaded	% Compressor Capacity
1.00	Off	Off	Off	Off	0%
1.44	10%	90%	1.5 sec	13.5 sec	10%
3.00	50%	50%	7.5 sec	7.5 sec	50%
4.20	80%	20%	12 sec	3 sec	80%
5.00	100%	0%	15 sec	0 sec	100%

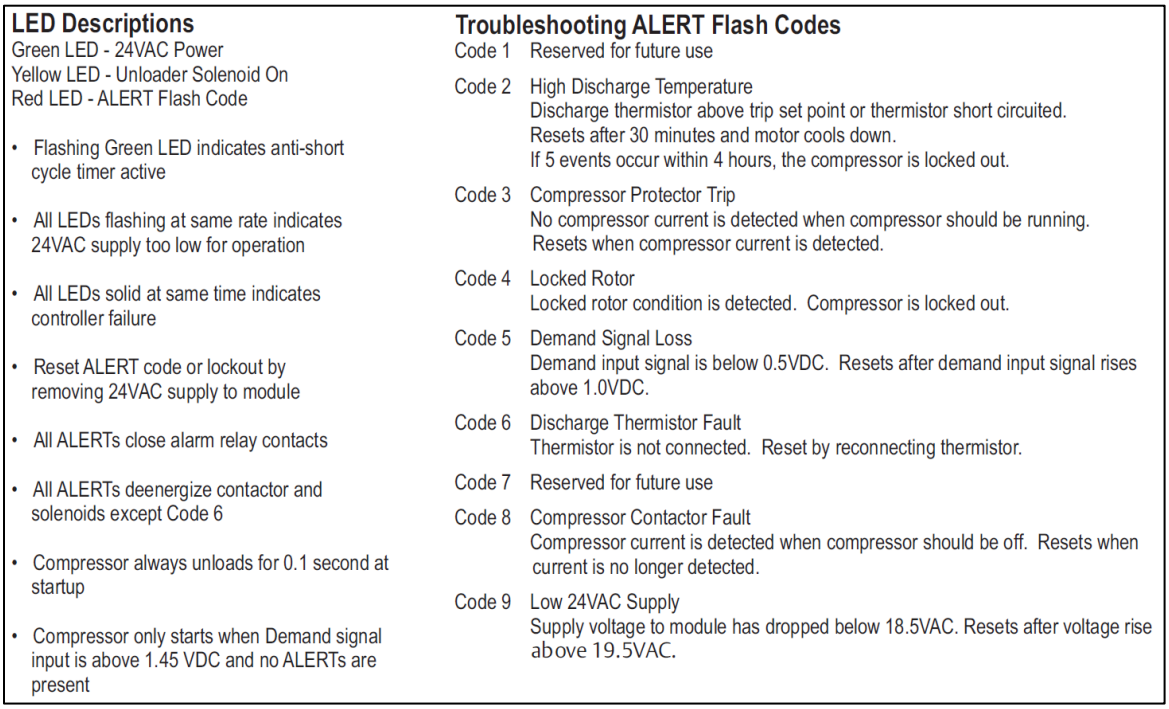


Figure 49 - Compressor Controller Flash Code Details

Filter Replacement

Monthly air filter inspection is required to maintain optimum unit efficiency.

⚠ WARNING

Electric shock hazard. Shut off all electrical power to the unit to avoid shock hazard or injury from rotating parts.

It is strongly recommended that filter media be replaced monthly. Filters are located upstream of the evaporator coil in the filter and economizer section. Open access door and pull filters straight out to inspect all of the filters. Replace filters with the size indicated on each filter or as shown in the tables below. Arrow on the replacement filters must point towards the blower. (RAB = Return Air Bypass, PE = Power Exhaust and PR = Power Return)

Table 29 - 6-8 and 10 ton Pre Filters

Feature 6A	Quantity / Size	Type
0	No Pre Filters	
A	4 / 16” x 20” x 2”	Pleated, 30% Eff, MERV 8
B	2 / 16” x 20” x 1”	Metal Mesh, Outside Air
C	2 / 40” x 16” x 5/16” with RAB, Feature A2 = Q, R 2 / 40” x 16” x 5/16”	Lint Screen

Table 30 - 9 and 11-15 ton Pre Filters

Feature 6A	Quantity / Size	Type
0	No Pre Filters	
A	4 / 20” x 25” x 2”	Pleated, 30% Eff, MERV 8
B	2 / 20” x 25” x 1”	Metal Mesh, Outside Air
C	2 / 49” x 20” x 5/16” with RAB, Feature A2 = Q, R 3 / 47” x 12” x 5/16”	Lint Screen

Table 31 - 16-25 and 30 ton Pre Filters

Feature 6A	Quantity / Size	Type
0	No Pre Filters	
A	6 / 20” x 25” x 2”	Pleated, 30% Eff, MERV 8
B	3 / 20” x 25” x 1”	Metal Mesh, Outside Air
C	2 / 55” x 25” x 5/16” with RAB, Feature A2 = Q, R 3 / 55” x 16” x 5/16”	Lint Screen

Table 32 - 26, 31 and 40 ton Pre Filters

Feature 6A	Quantity / Size	Type
0	No Pre Filters	
A	8 / 24” x 24” x 2” with RAB, Feature A2 = Q, R 16 / 12” x 24” x 2”	Pleated, 30% Eff, MERV 8
B	6 / 16” x 25” x 1” with PE or PR, Feature 1A = B, C 4 / 16” x 25” x 1”	Metal Mesh, Outside Air
C	8 / 24” x 24” x 5/16”	Lint Screen

Table 33 - 50, 60 and 70 ton Pre Filters

Feature 6A	Quantity / Size	Type
0	No Pre Filters	
A	24 / 12” x 24” x 2”	Pleated, 30% Eff, MERV 8
B	6 / 16” x 25” x 1” with PE or PR, Feature 1A = B, C 4 / 16” x 25” x 1”	Metal Mesh, Outside Air
C	12 / 47” x 12” x 5/16”	Lint Screen

Table 34 - RN Series 55, 65, 75-140 ton Pre Filters

Feature 6A	Quantity / Size	Type
0	No Pre Filters	
A	21 / 20” x 24” x 2” & 7 / 16” x 20” x 2”	Pleated, 30% Eff, MERV 8
B		Metal Mesh, Outside Air
C		Lint Screen

Table 35 - 6-8 and 10 ton Unit Filters

Feature 6B	Quantity / Size	Type
0	4 / 16” x 20” x 2” with RAB, Feature A2 = Q, R 2 / 20” x 20” x 2” and 1/12” x 24” x 2”	Pleated, 30% Eff, MERV 8
B	4 / 16” x 20” x 4” with RAB, Feature A2 = Q, R 2 / 20” x 20” x 4” and 1/12” x 24” x 4”	Pleated, 30% Eff, MERV 8
C	4 / 16” x 20” x 2” with RAB, Feature A2 = Q, R 2 / 20” x 20” x 2” and 1/12” x 24” x 2”	Permanent Filter Frame - Replaceable Media
F	4 / 16” x 20” x 4”	Pleated, 65% Eff, MERV 11
G		Pleated, 85% Eff, MERV 13
H		Pleated, 95% Eff, MERV 14

Table 36 - 9 and 11 ton Unit Filters

Feature 6B	Quantity / Size	Type
0	4 / 20” x 25” x 2” with RAB, Feature A2 = Q, R 6 / 12” x 24” x 2”	Fiberglass Throwaway, 25% Eff, MERV 4
A	4 / 20” x 25” x 2” with RAB, Feature A2 = Q, R 6 / 12” x 24” x 2”	Pleated, 30% Eff, MERV 8
B	4 / 20” x 25” x 4” with RAB, Feature A2 = Q, R 6 / 12” x 24” x 4”	Pleated, 30% Eff, MERV 8
C	4 / 20” x 25” x 2” with RAB, Feature A2 = Q, R 6 / 12” x 24” x 2”	Permanent Filter Frame - Replaceable Media
F	4 / 20” x 25” x 4”	Pleated, 65% Eff, MERV 11
G		Pleated, 85% Eff, MERV 13
H		Pleated, 95% Eff, MERV 14

Table 37 - 13 and 15 ton Unit Filters

Feature 6B	Quantity / Size	Type
0	4 / 20” x 25” x 2” with RAB, Feature A2 = Q, R 6 / 12” x 24” x 2”	Pleated, 30% Eff, MERV 8
B	4 / 20” x 25” x 4” with RAB, Feature A2 = Q, R 6 / 12” x 24” x 4”	Pleated, 30% Eff, MERV 8
C	4 / 20” x 25” x 2” with RAB, Feature A2 = Q, R 6 / 12” x 24” x 2”	Permanent Filter Frame - Replaceable Media
F	4 / 20” x 25” x 4”	Pleated, 65% Eff, MERV 11
G		Pleated, 85% Eff, MERV 13
H		Pleated, 95% Eff, MERV 14

Table 38 - 16-25 and 30 ton Unit Filters

Feature 6B	Quantity / Size	Type
0	6 / 20” x 25” x 2” with RAB, Feature A2 = Q, R 9 / 16” x 20” x 2”	Pleated, 30% Eff, MERV 8
B	6 / 20” x 25” x 4” with RAB, Feature A2 = Q, R 9 / 16” x 20” x 4”	Pleated, 30% Eff, MERV 8
C	6 / 20” x 25” x 2” with RAB, Feature A2 = Q, R 9 / 16” x 20” x 2”	Permanent Filter Frame - Replaceable Media
F	6 / 20” x 25” x 4”	Pleated, 65% Eff, MERV 11
G		Pleated, 85% Eff, MERV 13
H		Pleated, 95% Eff, MERV 14

Table 39 - 26, 31 and 40 ton Unit Filters

Feature 6B	Quantity / Size	Type
0	8 / 24” x 24” x 2” with RAB, Feature A2 = Q, R 16 / 12” x 24” x 2”	Pleated, 30% Eff, MERV 8
B	8 / 24” x 24” x 4” with RAB, Feature A2 = Q, R 16 / 12” x 24” x 4”	Pleated, 30% Eff, MERV 8
C	8 / 24” x 24” x 2” with RAB, Feature A2 = Q, R 16 / 12” x 24” x 2”	Permanent Filter Frame - Replaceable Media
F	8 / 24” x 24” x 4” with RAB, Feature A2 = Q, R 16 / 12” x 24” x 4”	Pleated, 65% Eff, MERV 11
G	8 / 24” x 24” x 4” with RAB, Feature A2 = Q, R 16 / 12” x 24” x 4”	Pleated, 85% Eff, MERV 13
H	8 / 24” x 24” x 4” with RAB, Feature A2 = Q, R 16 / 12” x 24” x 4”	Pleated, 95% Eff, MERV 14

Table 40 - 50, 60 and 70 ton Unit Filters

Feature 6B	Quantity / Size	Type
0	24 / 12” x 24” x 2”	Pleated, 30% Eff, MERV 8
B	24 / 12” x 24” x 4”	Pleated, 30% Eff, MERV 8
C	24 / 12” x 24” x 2”	Permanent Filter Frame - Replaceable Media
F	24 / 12” x 24” x 4”	Pleated, 65% Eff, MERV 11
G		Pleated, 85% Eff, MERV 13
H		Pleated, 95% Eff, MERV 14

Table 41 - RN Series 55, 65, and 70-140 ton Unit Filters

Feature 6B	Quantity / Size	Type
0	35 / 18” x 20” x 2”	Pleated, 30% Eff, MERV 8
B	21 / 20” x 24” x 4” & 7 / 16” x 20” x 4”	Pleated, 30% Eff, MERV 8
C	35 / 18” x 20” x 2”	Permanent Filter Frame - Replaceable Media
F	21 / 20” x 24” x 4” & 7 / 16” x 20” x 4”	Pleated, 65% Eff, MERV 11
G		Pleated, 85% Eff, MERV 13
H		Pleated, 95% Eff, MERV 14

Table 42 - 6-8 and 10 ton Energy Recovery Wheel Filters

Feature 1A	Quantity / Size	Type
F, G, H, J, Q, R, S, T	1 / 25” x 16” x 4”	Pleated, 30% Eff, MERV 8
	With Energy Recovery Wheel Exhaust Air Filters, Feature 6A - D, F, G OA - 1 / 25” x 16” x 2” EA - 1 / 25” x 16” x 2”	Pleated, 30% Eff, MERV 8

Table 43 - 9 and 11-15 ton Energy Recovery Wheel Filters

Feature 1A	Quantity / Size	Type
F, G, H, J, Q, R, S, T	2 / 16” x 20” x 4”	Pleated, 30% Eff, MERV 8
	With Energy Recovery Wheel Exhaust Air Filters, Feature 6A - D, F, G OA - 2 / 16” x 20” x 2” EA - 2 / 16” x 20” x 2”	Pleated, 30% Eff, MERV 8

Table 44 - 16-25 and 30 ton Energy Recovery Wheel Filters

Feature 1A	Quantity / Size	Type
F, G, H, J, Q, R, S, T, U, V, W, Y, Z, 1, 2, 3	3 / 20” x 25” x 4”	Pleated, 30% Eff, MERV 8
	With Energy Recovery Wheel Exhaust Air Filters, Feature 6A - D, F, G OA - 3 / 20” x 25” x 2” EA - 6 / 14” x 20” x 2”	Pleated, 30% Eff, MERV 8

Table 45 - 26 and 31-70 ton Energy Recovery Wheel Filters

Feature 1A	Quantity / Size	Type
F, G, H, J, Q, R, S, T, U, V, W, Y, Z, 1, 2, 3	4 / 24” x 24” x 4”	Pleated, 30% Eff, MERV 8
4	3 / 24” x 24” x 4”	

Table 46 - RN Series 55, 65 and 75-140 ton Energy Recovery Wheel Filters

Feature 1A	Quantity / Size	Type
F, G, H, J, Q, R, S, T	10 / 24” x 24” x 2”	Pleated, 30% Eff, MERV 8
U, V, W, Y, Z, 1, 2, 3	10 / 24” x 20” x 2”	

Table 47 - 26 and 31-70 ton Preheat Filters

Feature		Quantity / Size	Type
14A	14B		
A, B, C, D	A, B, C, D, E, F	6 / 16” x 25” x 1”	Metal Mesh, Outside Air
		with PE or PR, Feature 1A = B, C 4 / 16” x 25” x 1”	

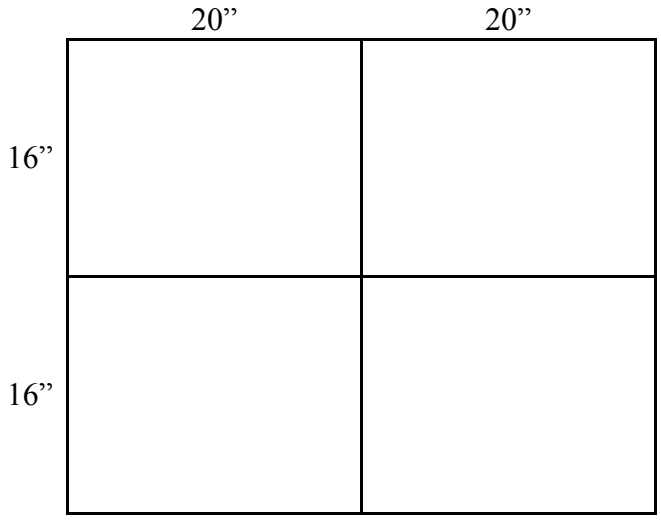


Figure 50 - RN Series 6-8 and 10 ton Standard Filter Layout
(Viewed from the Upstream Side of the Cooling Coil)

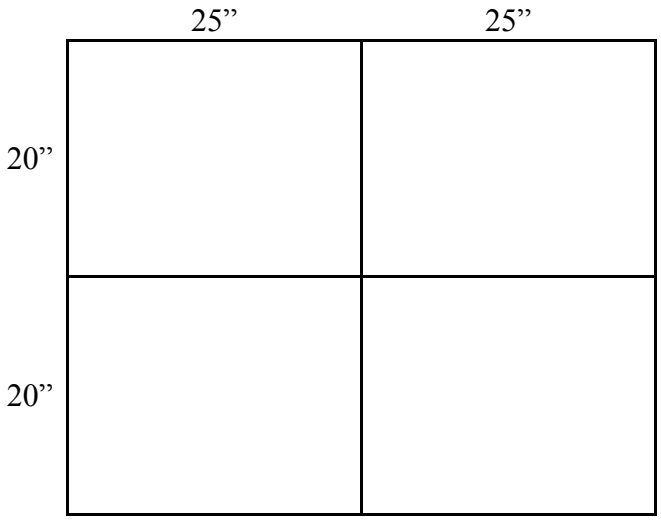


Figure 51 - RN Series 9 and 11-15 ton Standard Filter Layout
(Viewed from the Upstream Side of the Cooling Coil)

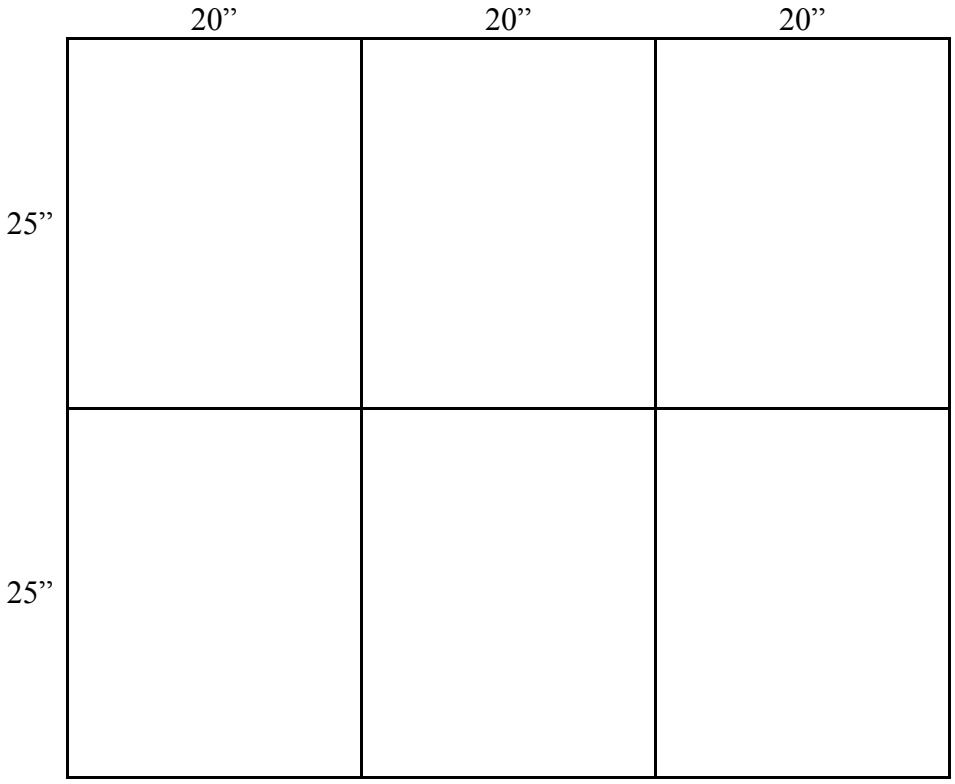


Figure 52 - RN Series 16-25 and 30 ton Standard Filter Layout
(Viewed from the Upstream Side of the Cooling Coil)

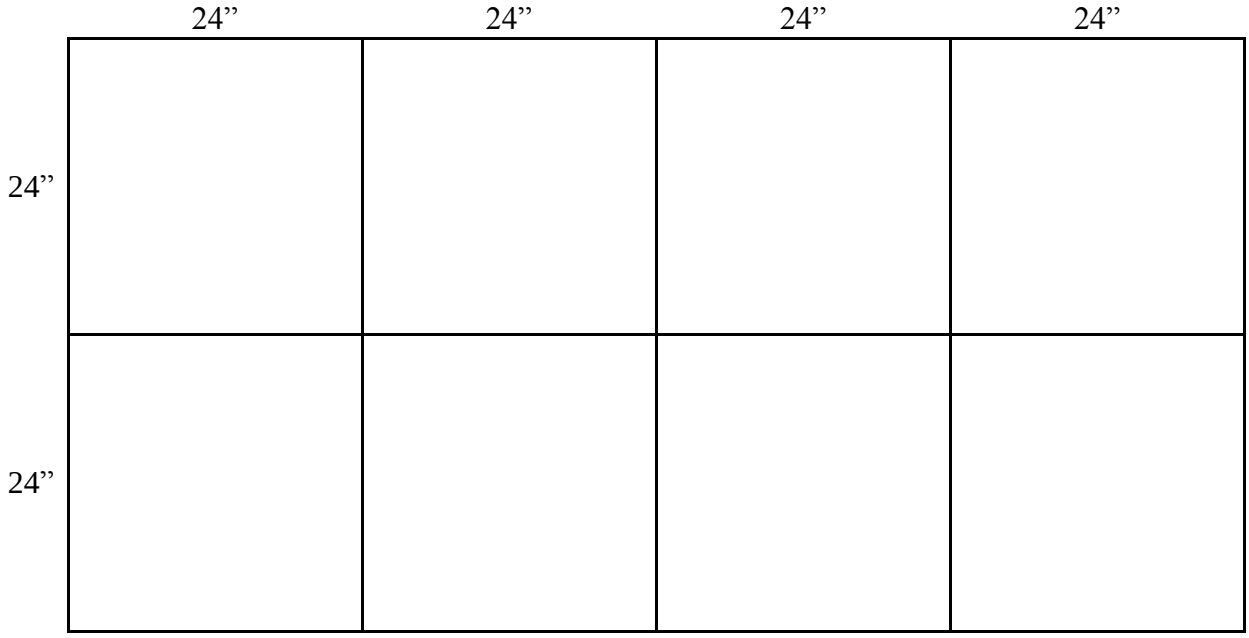


Figure 53 - RN Series 26, 31 and 40 ton Standard Filter Layout
(Viewed from the Upstream Side of the Cooling Coil)

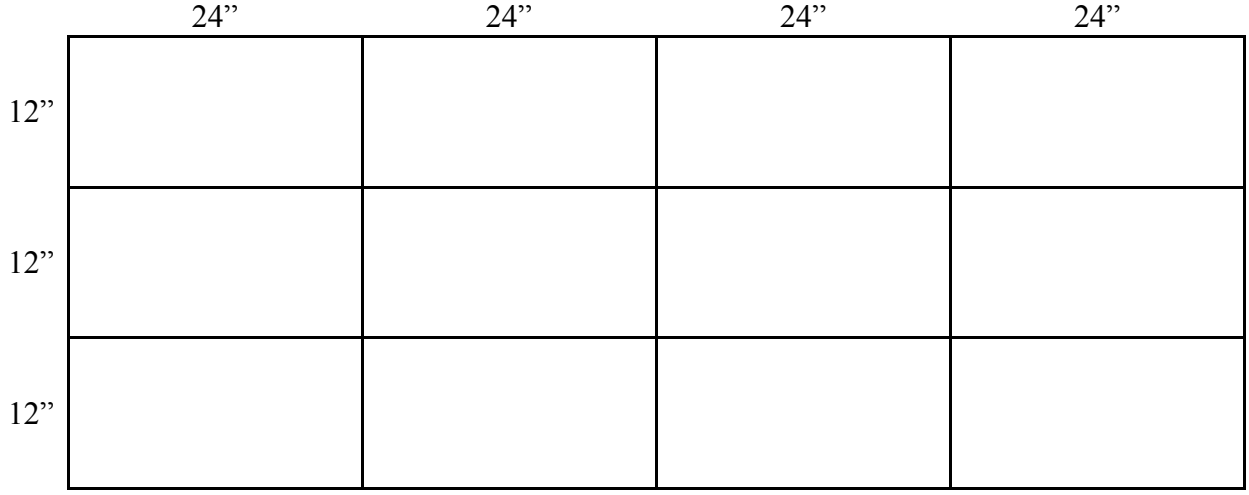


Figure 54 - RN Series 50-70 ton Standard Filter Layout
(Viewed from the Upstream Side of the Cooling Coil)
Note: 50-70 ton units include two coils and thus two filter layouts.

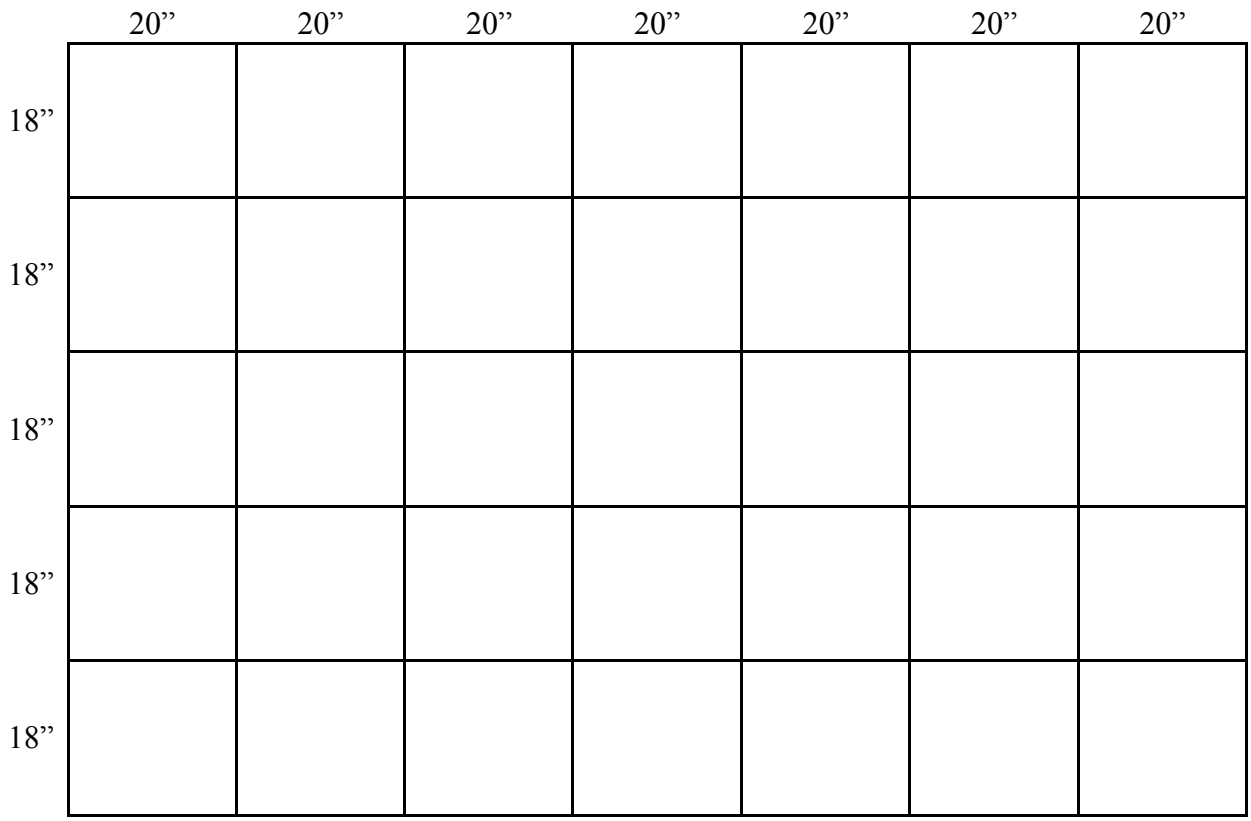


Figure 55 - RN Series 55, 65 and 75-140 ton Standard Filter Layout, 2” filters
(Viewed from the Upstream Side of the Cooling Coil)

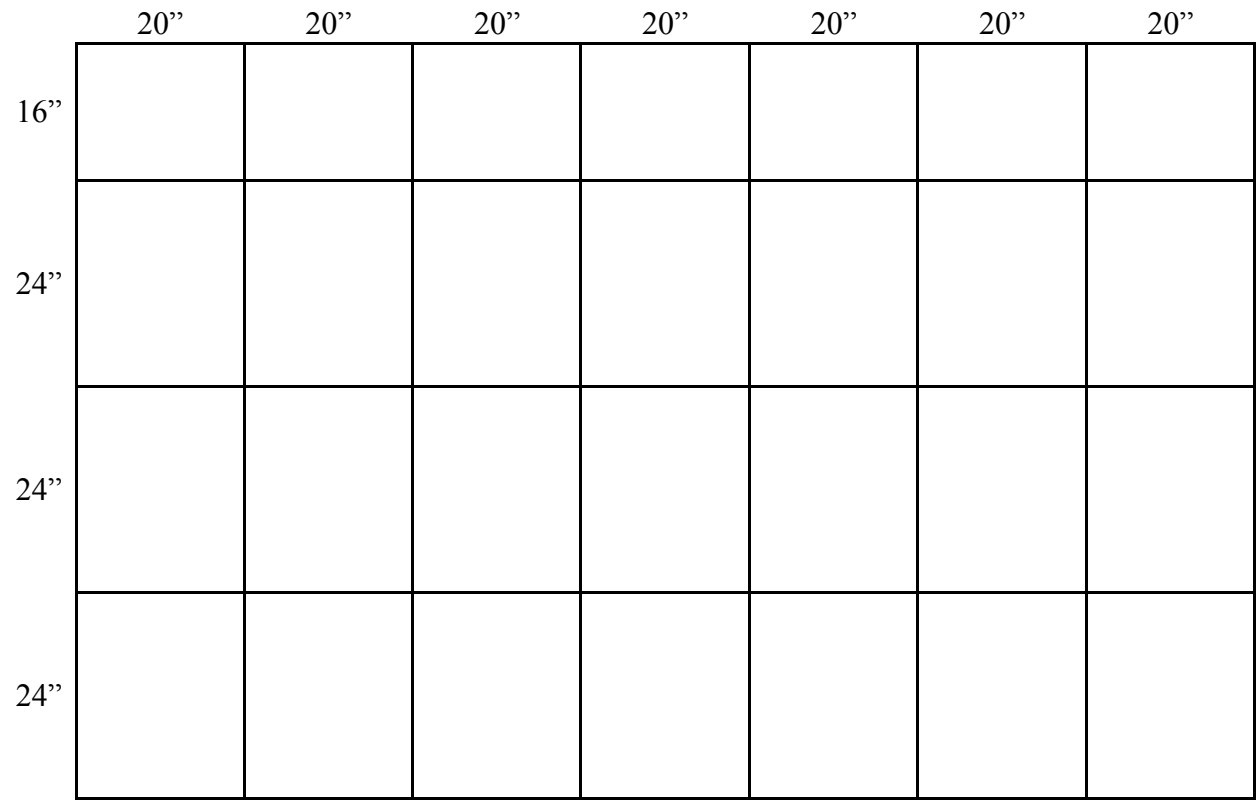


Figure 56 - RN Series 55, 65 and 75-140 ton Standard Filter Layout, 4” Filters and 2” Pre-Filters with 4” High Efficiency Filters
(Viewed from the Upstream Side of the Cooling Coil)

Replacement Parts
Parts for AAON equipment may be obtained from AAON at www.aaonparts.com. When ordering parts reference the unit serial number and part number.

AAON
Warranty, Service and Parts Department
2424 S. Yukon Ave.
Tulsa, OK 74107
Ph: 918-583-2266
Fax: 918-382-6364
www.aaon.com

Note: Before calling, technician should have model and serial number of the unit available for the service department to help answer questions regarding the unit.

Appendix A - Heat Exchanger Corrosion Resistance

Corrosion Resistance of Copper and Stainless Steel in Brazed Plate Heat Exchangers - Points to Measure and Check in a Water Analysis

The resistance guide provides the corrosion resistance of stainless steel type AISI 316 and pure Copper (99.9%) in water, to a number of important chemical factors. The actual corrosion is a very complex process influenced by many different factors in combination.

Explanations: + Good resistance under normal conditions
0 Corrosion problems may occur especially when more factors are valued 0
- Use is not recommended

Water Containing	Concentration (mg/l or ppm)	Time Limits - Analyze Before	AISI 316	SMO 254	Copper Alloy	Nickel Alloy
Alkalinity (HCO_3^-)	< 70	Within 24 Hours	+	+	0	+
	70-300		+	+	+	+
	> 300		+	+	0/+	+
Sulfate (SO_4^{2-})	< 70	No Limit	+	+	+	+
	70-300		+	+	0/-	+
	> 300		0	0	-	+
HCO_3^-/ SO_4^{2-}	> 1.0	No Limit	+	+	+	+
	< 1.0		+	+	0/-	+
Electrical Conductivity	< 10µS/cm	No Limit	+	+	0	+
	10-500 µS/cm		+	+	+	+
	> 500 µS/cm		+	+	0	+
pH	< 6.0	Within 24 Hours	0	0	0	+
	6.0-7.5		0/+	+	0	+
	7.5-9.0		+	+	+	+
	> 9.0		+	+	0	+
Ammonium (NH_4^+)	< 2	Within 24 Hours	+	+	+	+
	2-20		+	+	0	+
	> 20		+	+	-	+
Chlorides (Cl^-)*	< 300	No Limit	+	+	+	+
	> 300		0	+	0/+	+
Free Chlorine (Cl_2)	< 1	Within 5 Hours	+	+	+	+
	1-5		+	+	0	+
	> 5		0/+	+	0/-	+
Hydrogen Sulfide (H_2S)	< 0.05	No Limit	+	+	+	+
	> 0.05		+	+	0/-	+
Free (aggressive) Carbon Dioxide (CO_2)	< 5	No Limit	+	+	+	+
	5-20		+	+	0	+
	> 20		+	+	-	+

*See Chloride Content Table

Water Containing	Concentration (mg/l or ppm)	Time Limits - Analyze Before	AISI 316	SMO 254	Copper Alloy	Nickel Alloy
Total Hardness (°dH)	4.0-8.5	No Limit	+	+	+	+
Nitrate (NO_3)	< 100	No Limit	+	+	+	+
	> 100		+	+	0	+
Iron (Fe)	< 0.2	No Limit	+	+	+	+
	> 0.2		+	+	0	+
Aluminum (Al)	< 0.2	No Limit	+	+	+	+
	> 0.2		+	+	0	+
Manganese (Mn)	< 0.1	No Limit	+	+	+	+
	> 0.1		+	+	0	+

Chloride Content

Chloride Content	Maximum Temperature			
	60°C (140°F)	80°C (176°F)	120°C (248°F)	130°C (266°F)
= 10 ppm	SS 304	SS 304	SS 304	SS 316
= 25 ppm	SS 304	SS 304	SS 316	SS 316
= 50 ppm	SS 304	SS 316	SS 316	Ti / SMO 254
= 80 ppm	SS 316	SS 316	SS 316	Ti / SMO 254
= 150 ppm	SS 316	SS 316	Ti / SMO 254	Ti / SMO 254
= 300 ppm	SS 316	Ti / SMO 254	Ti / SMO 254	Ti / SMO 254
> 300 ppm	Ti / SMO 254	Ti / SMO 254	Ti / SMO 254	Ti / SMO 254

Appendix B - Thermistor Temperature vs. Resistance Values

Deg C	Deg F	Resistance (kOhms)
-40	-40	2889.6
-35	-31	2087.22
-30	-22	1522.20
-25	-13	1121.44
-20	-4	834.72
-15	5	627.28
-10	14	475.74
-5	23	363.99
0	32	280.82
5	41	218.41
10	50	171.17
15	59	135.14
20	68	107.44
25	77	86.00
30	86	69.28
35	95	56.16
40	104	45.81
45	113	37.58
50	122	30.99
55	131	25.68
60	140	21.40
65	149	17.91

Deg C	Deg F	Resistance (kOhms)
70	158	15.07
75	167	12.73
80	176	10.79
85	185	9.20
90	194	7.87
95	203	6.77
100	212	5.85
105	221	5.09
110	230	4.45
115	239	3.87
120	248	3.35
125	257	2.92
130	266	2.58
135	275	2.28
140	284	2.02
145	293	1.80
150	302	1.59
155	311	1.39
160	320	1.25
165	329	1.12
170	338	1.01
175	347	0.92
180	356	0.83

RN Series Startup Form

Date:_____
Job Name:_____
Address:_____
_____
Model Number:_____
Serial Number:_____ Tag:_____
Startup Contractor:_____
Address:_____ Phone:_____
_____

Pre Startup Checklist		
Installing contractor should verify the following items.		
1. Is there any visible shipping damage?	Yes ☐	No ☐
2. Is the unit level?	Yes ☐	No ☐
3. Are the unit clearances adequate for service and operation?	Yes ☐	No ☐
4. Do all access doors open freely and are the handles operational?	Yes ☐	No ☐
5. Have all electrical connections been tested for tightness?	Yes ☐	No ☐
6. Does the electrical service correspond to the unit nameplate?	Yes ☐	No ☐
7. On 208/230V units, has transformer tap been checked?	Yes ☐	No ☐
8. Has overcurrent protection been installed to match the unit nameplate requirement?	Yes ☐	No ☐
9. Have all set screws on the fans been tightened?	Yes ☐	No ☐
10. Do all fans rotate freely?	Yes ☐	No ☐
11. Is all copper tubing isolated so that it does not rub?	Yes ☐	No ☐
12. Has outside air rain hood been opened?	Yes ☐	No ☐
13. Have the damper assemblies been inspected?	Yes ☐	No ☐
14. Are the air filters installed with proper orientation?	Yes ☐	No ☐
15. Have condensate drain and p-trap been connected?	Yes ☐	No ☐

Supply Fan Assembly

Alignment ☐ Check Rotation ☐ Nameplate Amps_____

Number	hp	L1	L2	L3
1				
2				

Band Size_____ VAV Controls_____

VFD Frequency_____

Energy Recovery Wheel Assembly				
Wheel(s) Spin Freely ☐		Check Rotation ☐		FLA_____
Number	hp	L1	L2	L3
1				
2				

Power Return/Exhaust Assembly				
Alignment ☐		Check Rotation ☐		Nameplate Amps_____
Number	hp	L1	L2	L3
1				
2				

Outside Air/Economizer Dampers
Operation Check ☐
Damper Actuator Type:
Economizer Changeover Type and Operations:
Damper Wiring Check ☐
Gears Check ☐

Ambient Temperature	
Ambient Dry Bulb Temperature _____°F	Ambient Wet Bulb Temperature _____°F

Unit Configuration	
Water-Cooled Condenser ☐	Air-Cooled Condenser ☐
No Water Leaks ☐	
Condenser Safety Check ☐	
Water Flow _____GPM	
Water Inlet Temperature _____°F	
Water Outlet Temperature _____°F	

Compressors / DX Cooling						
Number/stage	L1	L2	L3	Head Pressure PSIG	Suction Pressure PSIG	Crankcase Heater Amps
1						
2						
3						
4						

Refrigeration System 1 – Cooling Mode					
	Pressure	Saturated Temperature	Line Temperature	Sub-cooling	Superheat
Discharge				N/A	N/A
Suction				N/A	
Liquid					N/A
Refrigeration System 2 – Cooling Mode					
	Pressure	Saturated Temperature	Line Temperature	Sub-cooling	Superheat
Discharge				N/A	N/A
Suction				N/A	
Liquid					N/A
Refrigeration System 3 – Cooling Mode					
	Pressure	Saturated Temperature	Line Temperature	Sub-cooling	Superheat
Discharge				N/A	N/A
Suction				N/A	
Liquid					N/A
Refrigeration System 4 – Cooling Mode					
	Pressure	Saturated Temperature	Line Temperature	Sub-cooling	Superheat
Discharge				N/A	N/A
Suction				N/A	
Liquid					N/A
Refrigeration System 1 – Heating Mode (Heat Pump only)					
	Pressure	Saturated Temperature	Line Temperature	Sub-cooling	Superheat
Discharge				N/A	N/A
Suction				N/A	
Liquid					N/A
Refrigeration System 2 – Heating Mode (Heat Pump only)					
	Pressure	Saturated Temperature	Line Temperature	Sub-cooling	Superheat
Discharge				N/A	N/A
Suction				N/A	
Liquid					N/A
Refrigeration System 3 – Heating Mode (Heat Pump only)					
	Pressure	Saturated Temperature	Line Temperature	Sub-cooling	Superheat
Discharge				N/A	N/A
Suction				N/A	
Liquid					N/A

Refrigeration System 4 – Heating Mode (Heat Pump only)					
	Pressure	Saturated Temperature	Line Temperature	Sub-cooling	Superheat
Discharge				N/A	N/A
Suction				N/A	
Liquid					N/A

Air-Cooled Condenser				
Alignment ☐		Check Rotation ☐		Nameplate Amps_____
Number	hp	L1	L2	L3
1				
2				
3				
4				
5				
6				

Water/Glycol System		
1. Has the entire system been flushed and pressure checked?	Yes ☐	No ☐
2. Has the entire system been filled with fluid?	Yes ☐	No ☐
3. Has air been bled from the heat exchangers and piping?	Yes ☐	No ☐
4. Is the glycol the proper type and concentration (N/A if water)?	Yes ☐	No ☐
5. Is there a minimum load of 50% of the design load?	Yes ☐	No ☐
6. Has the water piping been insulated?	Yes ☐	No ☐
7. What is the freeze point of the glycol (N/A if water)? _____		

Gas Heating			
Natural Gas ☐ Propane ☐		Purge Air from Lines ☐	Verify Pilot Spark ☐
Stage	Manifold Pressure (w.c.)	Stage	Manifold Pressure (w.c.)
1		3	
2		4	

Electric Heating			
Stages_____			
Limit Lockout ☐		Aux. Limit Lockout ☐	
Stage	Amps	Stage	Amps
1		5	
2		6	
3		7	
4		8	

Maintenance Log

This log must be kept with the unit. It is the responsibility of the owner and/or maintenance/service contractor to document any service, repair or adjustments. AAON Service and Warranty Departments are available to advise and provide phone help for proper operation and replacement parts. The responsibility for proper start-up, maintenance and servicing of the equipment falls to the owner and qualified licensed technician.

Entry Date	Action Taken	Name/Tel.

Literature Change History

May 2007
Update of IOM unit service clearances. Length of front and back clearances from 60" to 48" and length of left and right side clearances from 100" each to interchangeable 48" and 70". (Note: Units with hydronic heat must have 70" right side access for service.) Gas piping sizes table on page 10 was updated with new gas heater information.

November 2007
Update of the IOM *Gas Piping Connection Sizes* table. Connection sizes of Model Option B2 = A and B were changed to ¾" and the connection size of Model Option B2 = C, D, and E was changed to 1 ½".

September 2008
Update of the IOM adding information about 16-25 and 30 ton RN Series units.

May 2009
Update of the IOM adding information about 9-15 ton RN Series units. The part number for the IOM was changed from R15710 to R79510.

June 2009
Update of the IOM making corrections to some of the values in the tables of Appendix A and adding e-coated coil cleaning instructions.

August 2009
Update of the IOM correcting the Gas Heater Operation section to have the same sequence of operation for both natural gas and propane gas heaters.

September 2009
Update of the IOM adding Refrigerant-to-Water heat exchanger and Thermostat Control Wiring information and correcting Table I7 Natural Gas Maximum Piping Capacities.

April 2010
Update of the IOM adding information about 6-10 ton RN Series units. The part number for the IOM was changed from R79510 to R90720.

October 2010
Update of the IOM to include 100% Return Air option in Feature 1, and Single Zone VAV controllers in feature 13. Feature 15 was changed from an empty feature to include Glycol percentage options.

February 2011
Added information regarding the charging of a heat pump and added additional information regarding freezing water in the heat exchanger.

April 2011
Updated the condenser water connection sizes in Table I12 and added Table I13 – SMO 254 Brazed Plate Heat Exchanger Water Connections.

June 2011
Updated 2" Pleated 30% efficiency filters from MERV 7 to MERV 8.

March 2012
Updated manual to include 55, 65 and 75-140 unit sizes. Instructions for piping gas heat exchanger condensate, if code requires, were added in the gas heating section. Added hot water, steam, and chilled water coil connection sizes. The part number of this IOM was changed from R90720 to R90721.

June 2012
Update of the IOM adding brazed plate heat exchanger cleaning instructions and adding compressor lubricant warning.

October 2012
Update of the IOM adding seismic curb installation instructions and adding VFD controlled and ECM driven condenser fan information.

November 2012
Update of the IOM adding information about compressor cycling.

June 2013
Added options to the feature string, added curb gasket information, added auxiliary electric heating capacities table, added section for microchannel coil cleaning, added section for variable capacity compressor controller, and added Appendix B.

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RN Series Installation, Operation & Maintenance

R90721 · Rev. B · 130603

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