

AAON[®]

RL SERIES

HEATING • COOLING & COMBINATION ROOFTOP UNITS



INSTALLATION, SERVICE & OWNERS INFORMATION MANUAL



WARNING

If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

FOR YOUR SAFETY

DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

FOR YOUR SAFETY WHAT TO DO IF YOU SMELL GAS

- EXTINGUISH ANY OPEN FLAME.
- DO NOT TOUCH ANY ELECTRICAL SWITCH.
- DO NOT TRY TO LIGHT ANY APPLIANCE.
- 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.

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Owner should pay particular attention to the words: **NOTE, CAUTION AND WARNING.**
NOTES are intended to clarify or make the installation easier. **CAUTIONS** are given to prevent equipment damage. **WARNINGS** are given to alert owner that personal injury and/or equipment damage may result if installation procedure is not handled properly.

It is the intent of AAON, Inc. to provide accurate and current specification information. However, in the interest of product improvement, AAON, Inc. reserves the right to change pricing, specifications and/or design of its products without notice, obligation or liability.

GENERAL DESCRIPTION

The units are designed as self-contained heating, cooling or combination units for outdoor or indoor installation using the refrigerant shown on the rating plate, chilled water, natural gas, electric resistance, steam or hot water.

UNPACKING

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.

CERTIFICATION

• GAS HEAT MODELS

- (a) Design Certified as a forced air furnace with or without cooling unit.
- (b) Certified for outdoor installation only.
- (c) Certified for installation on combustible roof with a minimum of 12" high curb.
- (d) Certified with Heat Exchanger located downstream from Evaporator coil.

• STEAM OR HOT WATER HEAT MODELS

- (a) Certified as a forced air furnace with or without cooling unit.
- (b) Certified for outdoor or indoor installation.
- (c) Certified for installation on combustible roof with a minimum of 12" high curb.
- (d) ARI certified coils.

• ELECTRIC HEAT MODELS

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

• COOLING MODELS

- (a) Certified as a commercial central air-conditioner with or without electrically operated compressor.
- (b) Certified for outdoor installation only.
- (c) Certified for installation on combustible roof with a minimum of 12" high curb.
- (d) ARI certified coils.

• CHILLED WATER AIR HANDLERS

- (a) Certified for indoor or outdoor use.

CODES AND ORDINANCES

System should be sized in accordance with National Warm Air Heating and Air Conditioning Association Literature, or the Guide of American Society of Heating, Refrigeration and Air Conditioning Engineers. The installation must conform with local building codes or, in the absence of local codes with (United States) National Fuel Gas Code "ANSI-Z83.8B", (Canada) current CAN / CGA- 2.6B-MØØ. Installation Codes for Gas Burning Appliances and Equipment, current C.S.A. Standard C22.1, Canadian Electrical Code Part 1, and C.S.A. Standard B52 Mechanical Refrigeration Code, and Local Plumbing or Waste Water Codes.

WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a qualified installer, service agency or the gas supplier.

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

IMPORTANT

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.

OWNER'S INFORMATION

WARNING

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

DIRECT EXPANSION (DX) COOLING UNITS

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

If power must be cut off for more than an hour, turn the thermostat system switch to "OFF", and leave it off until the main power switch has been turned on again for at least twenty four 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 required to run.

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

During the cooling season, if the air flow is reduced due to dirty air filters or any other reason, the cooling coils will get too cold and 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 compressors must be on a minimum of 4 minutes and off for a minimum of 5 minutes. The cycle rate must not exceed 8 starts per hour.

THE COMPRESSOR LIFE WILL BE SERIOUSLY SHORTENED BY THIS REDUCED LUBRICATION, AND THE PUMPING OF EXCESSIVE AMOUNTS OF LIQUID OIL AND REFRIGERANT.

GAS OR ELECTRIC HEATING

The system is designed to cool or heat a given amount of air each minute it operates. If this amount of air is greatly reduced (approximately 1/3 during the heating season), the heat exchanger / heater coil will overheat, and may cut the burner / heater off entirely by action of the safety high temperature limit device which is incorporated in the exchanger or heating area.

GAS HEAT UNITS - Should overheating occur, 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.

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a qualified installer, service agency or if gas fired units, the gas supplier. Refer to installation instructions provided with the unit and this manual.

CAUTION: While the following incorrect operations may not cause damage to the system, they will impair the performance, and may cause the built-in safety devices to cut the system off completely.

1. LOW AMBIENT OPERATION

The cooling section of a direct expansion (DX) unit will not operate properly when the outdoor temperature is below 40° degrees. Outside air intake options are recommended if operation below 40° degrees is expected.

2. MULTIPLE UNIT OPERATION

When several units are used in conditioning the space, and part or all of them are combination heating-cooling units, all systems thermostat switches must be set at either heating or cooling (or set at "off"). Do not leave part of the systems switched to the opposite mode. All cooling only units should be switched to "off" at the thermostat during the heating season.

WIRING DIAGRAMS

A complete set of unit specific wiring diagrams in both ladder and point-to-point form are laminated in plastic and located inside the control compartment.

CONDENSATE PIPING

The unit requires a drain trap to be connected to the drainpan at the unit. If codes require a condensate drain line, the line should be the same pipe size as the drain nipple and should pitch downward toward drain.

The condensate drain pipe ("P" trap) is factory supplied and is shipped loose in the control access compartment for field installation. An air break should be used with long runs of condensate lines.



WARNING

Scroll compressors will be damaged by operation with the wrong rotation. THE LOW PRESSURE SWITCH HAS BEEN DISCONNECTED AFTER TESTING AT THE FACTORY.

The wiring must be reconnected and proper rotation determined at the time of start-up by a qualified service technician using suction and discharge pressures gauges. Any alteration should only be made at the unit power connection.

HEATING & COOLING SYSTEMS

NORMAL OPERATION

HEATING

Set the thermostat system switch to "HEAT".
Set the thermostat fan switch to "AUTO" or "ON".
Set the thermostat temperature at the desired point.

COOLING

Set the thermostat system switch to "COOL".
Set the thermostat fan switch to "AUTO" or "ON".
Set the thermostat temperature at the desired point.

AIR CIRCULATION

Set the thermostat system switch to "OFF".
Set the thermostat fan switch to "ON".
Do not change temperature setting.
With these settings, the air circulating blower will run continuously but the air will not be heated or cooled.

SYSTEM OFF

Set the thermostat system switch to "OFF".
Set the thermostat fan switch to "AUTO".
Do not change temperature setting.
With these settings, the system is shut down, with the exception of the control system power (24 volts), and the crankcase heater of the compressor (about 60 watts).

DO NOT TURN OFF THE MAIN POWER SWITCH.

NIGHT AND VACANT WEEKEND OPERATION

If it is desired to reduce the operating time during the night, and during periods when the space is unused, it is recommended that the temperature setting be raised about five degrees during these periods of the cooling season, and lowered about ten degrees during the heating season.

GAS HEATING SYSTEM

The heating section is for use with natural gas supply pressure of 6" to 10.5" Water Column. A 1/8" pressure tap must be supplied by the installer in the piping just ahead of the gas valve. The rating plate on the furnace shall be inspected to make sure that the unit is stamped for the proper gas. The pressure tap on the outlet end of the gas valve should be removed and the valve adjusted for the proper manifold pressure to 3.5" for natural gas. The burner area is not sealed and combustion air is supplied by a centrifugal blower which draws in fresh air through a protected opening. This air is introduced into the burner tubes by the action of the induced draft blower. This insures an even flow of primary and secondary air to the burners.

The heating system and safety controls are 100% tested on each unit before it leaves the factory.

INSTALLATION IS TO BE ADJUSTED TO OBTAIN AN AIR TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.

The units are equipped with a direct spark ignition system which proves the burner operation during each call for heat.

Power to the ignition control is 24 volts to reduce hazards. Burner ignition is by a high intensity spark. When heat is called for, the cooling system is inoperable except for the indoor blower motor. Actual heating is accomplished by firing gas into the heat exchanger assembly.

ELECTRIC HEATING SYSTEM

Heating is accomplished by passing electrical current through a specified amount of resistance heaters which will produce the required heat. The indoor blower motor will energize at the same time as the heaters.

STEAM OR HOT WATER HEATING SYSTEM

Heating is accomplished by passing steam or hot water through the steam or hot water coil assembly.

COOLING SECTION

All direct expansion refrigeration systems are factory assembled, charged with refrigerant, tested and operated. Refrigerant systems include multiple circuit evaporator and condenser coils providing two or more stages of cooling. These systems are provided with liquid line filter driers, expansion valves and fully hermetic compressors. Compressors are equipped with a positive pressure forced lubrication system. The air cooled condenser coil(s) is constructed of copper tubes with aluminum fins, the air is pulled through with propeller fans. Evaporative and water cooled condensing models are described in following sections. The evaporator coil is draw through or blow through, made of copper tubes with aluminum fins.

The refrigeration section of these appliances has been found acceptable with applicable provisions of "ANSI / UL 1995" and current "C.S.A. Standard C22.2" by E.T.L.

NOTE: Crankcase Heater Operation

Some units are equipped with a compressor crankcase heater, which should be energized at least 24 hours prior to setting the thermostat for cooling operation.

COOLING SECTION • CHILLED WATER or NON-COMPRESSORIZED UNIT

Chilled water or non-compressorized units have factory installed coils. These systems are provided with internal header connections for field connection. Coils are aluminum fin / copper tube construction.

INSTALLATION

AAON rooftop units are designed for fast, easy installation. The curb is mounted first and must be located so that duct connections will be clear of structural members of the building.

SETTING THE CURB

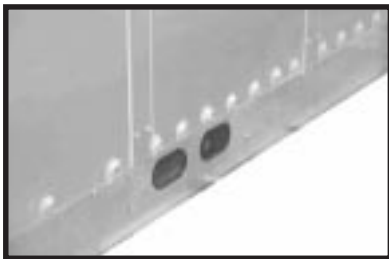
When using the factory curb, make openings in roof decking large enough to allow for duct penetrations and workspace only. Do not make openings larger than necessary. Set the curb to coincide with the openings. Make sure the curb is level.

SETTING THE UNIT

If cables or chains are used to hoist the unit they must be the same length and care should be taken to prevent damage to the cabinet / coils or condenser fans. It is recommended lifting 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 marked lifting points / lugs provided on the unit.

SEE UNIT LIFTING INSTRUCTION DETAIL AT THE REAR OF THIS MANUAL.



UNIT MUST BE RIGGED AT ALL MARKED LIFTING POINTS (Typical)

NOTE: Some applications may require the unit to be built and shipped in two separate sections. See "Unit Section Splicing" instructions page for more information.

Hoist unit to a point directly above the curb and duct openings. Lower unit while guiding the unit to align with utility opening and duct openings. Be sure that the gasket material has been applied to curb. Continue lowering the unit until the unit skirt fits around the curb. Make sure the unit is properly seated on the curb and is level.

For gas fired units, the unit shall be installed so that the flue discharge vents are located at least 120" away from any opening through which combustion products could enter the building. The unit shall also be installed so that the flow of combustion and ventilating air is not obstructed from reaching the furnace. Do not position flue opening to discharge into a fresh air intake of any other piece of equipment.

SERVICE CLEARANCES

LOCATION	UNIT SIZE	
	045 - 135	134 - 230
Front -Vestibule Door Side	100"	142"
Back -Opposite of Front	100"	142"
Left Side -Condenser End	100"	100"
Right Side -Return Air End	100"	100"
Top	UNOBSTRUCTED	



CAUTION

If outside air is in contact with the bottom of the unit, the unit must have the bottom insulation option or be field insulated.

DO NOT DRILL OR PUNCH HOLES IN BASE OF UNIT FROM INSIDE THE UNIT OR FROM BELOW TO ATTACH DUCTWORK. LEAKING MAY OCCUR IF UNIT BASE IS PUNCTURED.



WARNING

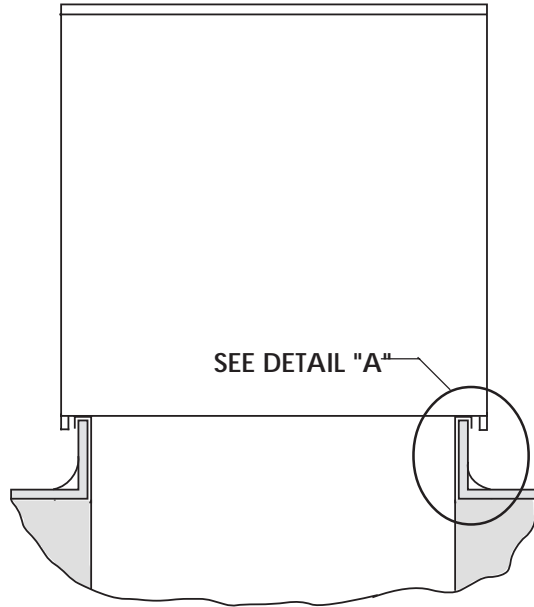
Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a qualified installer, service agency or the gas supplier.

Install the gas fired unit to assure the flow of combustion and ventilating air is not obstructed from reaching the heater and that the flue outlet is located at least 120 inches away from any opening through which combustion products could enter the building.

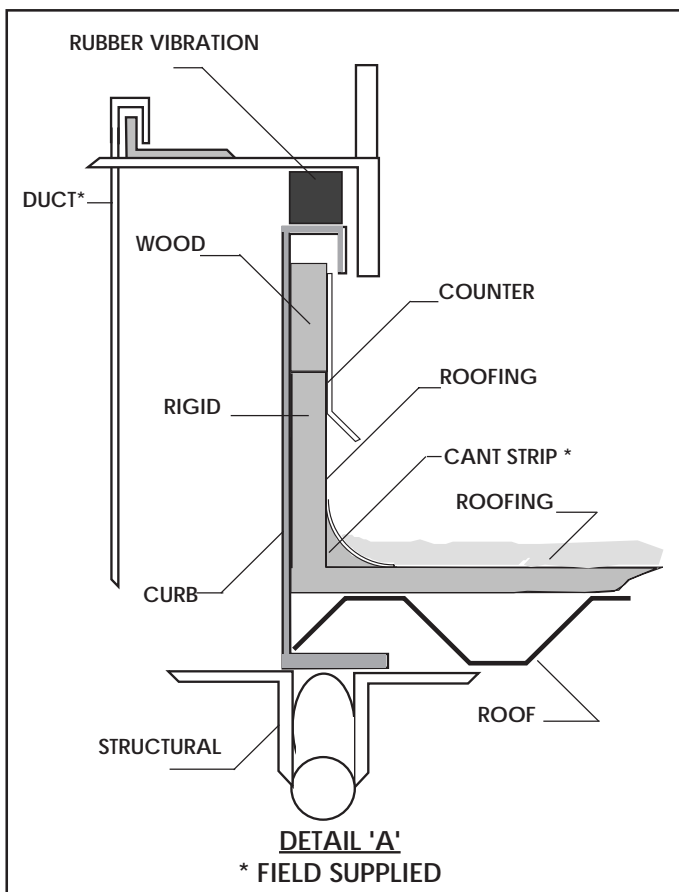
INSTALLATION continued

! WARNING

INSULATION MATERIALS MAY
BE COMBUSTIBLE



SECTIONAL VIEW OF UNIT ON ROOF CURB
(Diagrams are for practical guidelines only)



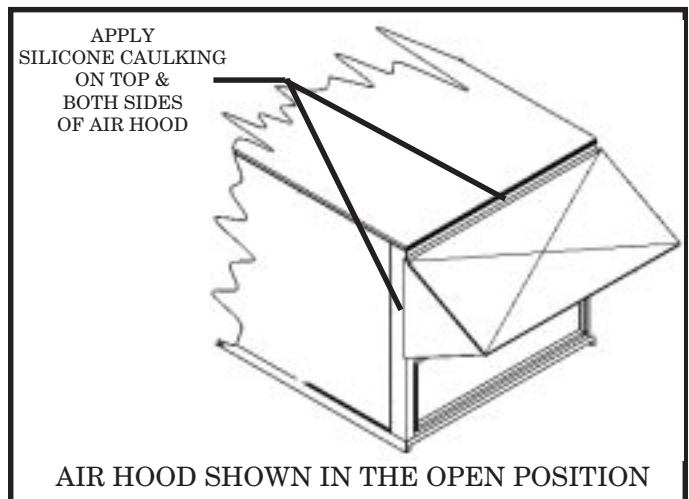
! CAUTION

Where the supply or warm air duct passes through a combustible roof, a clearance of one 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.

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

OUTSIDE AIR HOOD

For proper unit operation, the air hood must be opened at start-up as shown below:



Remove shipping screws from each side of the hood in the "closed" position. Lift hood to the "open" position and secure with sheet metal screws and seal both sides and top of hood with silicone caulking.

Air hoods may vary according to unit size and options. The illustration shown is for practical guidelines for all outside air hoods.

Outdoor air intake adjustments should be made according to building ventilation or local code requirements.

INSTALLATION continued

Unit Section Splicing

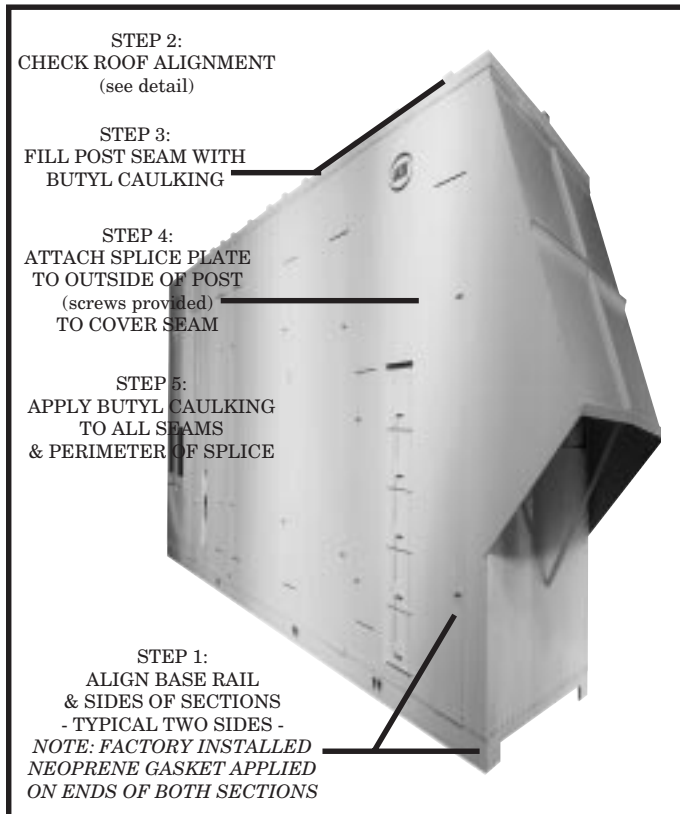
AAON 'RL' units are designed and built according to unit size and / or job specifications. Some applications may require the unit to be built and shipped in two separate sections. The following illustrations are provided as practical guidelines for splicing the two sections.

It is recommended to lift and set the largest section first, checking for the correct location and position. In order to simplify the connection of the two sections, it is important, once the first section is in place, to position and set the second section AS CLOSE AS POSSIBLE to the first section. The least amount of travel between the two sections will allow the use of a "come-a-long" tool, (one on each side of the unit, connected at the base slots) to equally pull the second section against the first section. The two sections must be tightly adjoined before the splicing parts can be installed.

Because the adjoining section is "unit specific", all parts required for splicing the sections together are provided from the factory.

Once the unit is completely assembled, it is important to visually inspect all exposed areas and fill any gaps with Butyl caulking.

NOTE: Installation of splice plates are typical for both sides of unit.



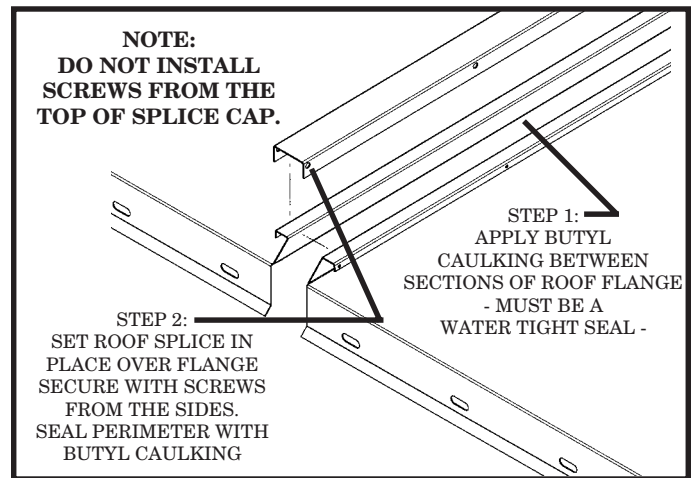
UNIT BASE AND SIDES

During the splicing process it is equally important to check the alignment of the roof and the connecting flange. Prior to connecting the sections, to create a water tight seal, Butyl caulking must be applied between the two roof flange sections.

The roof splice cap is provided from the factory and must be installed over the two sections connecting flange and secured with screws along the length of the cap.

NOTE: ATTACH SPLICE CAP WITH SCREWS FROM EACH SIDE OF THE CAP ONLY. DO NOT INSTALL SCREWS FROM THE TOP.

Once the splice cap is secured into place, Butyl caulking must be used to seal the perimeter of the cap against the roof of the unit.



UNIT ROOF FLANGE SPLICE DETAIL

IMPORTANT RELATED ELECTRICAL REQUIREMENTS

Before attempting to make wire connections from section to section it is important to refer to the specific wiring diagram located in the unit controls compartment to obtain additional details related to the wiring of the unit.

The adjoining section is factory wired and ready for field connection. The electrical wiring is unit specific and designed according to the overall unit configuration.

A factory supplied and mounted terminal block is located in the main section of the unit that must be used in making the rough-in wire connections.

Each wire being spliced from section to section is tagged at both ends according to its termination. Note that junctions for wiring the sections together are separated according to voltage.

CAUTION

All wire terminations MUST BE made before applying power to the unit. The unit will not operate unless all circuits are made.

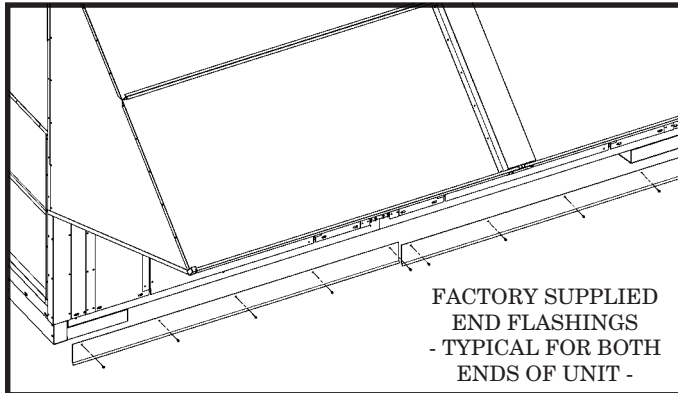
INSTALLATION continued

RL 'D & E' 142" Wide Units End Flashing Installation Detail

On AAO 'RL' (142" wide - D & E cabinet units) the cabinet width will overhang the trailer on each side. In order to secure and protect the unit during transit the sheetmetal end flashings have been removed from the unit. The slot created at each end of the unit at the base allows for the unit to set firmly on the trailer deck.

Sheetmetal flashings are shipped loose with the unit and once the unit is set into place the flashings **MUST BE** installed on each end of the unit to complete the finished seal at the base. The flashings are unit specific and designed to cover the slot at each end of the unit to prevent water run-off into the curb.

Failure to attach and seal the end of the unit with the flashings will result in water leakage into the curb.



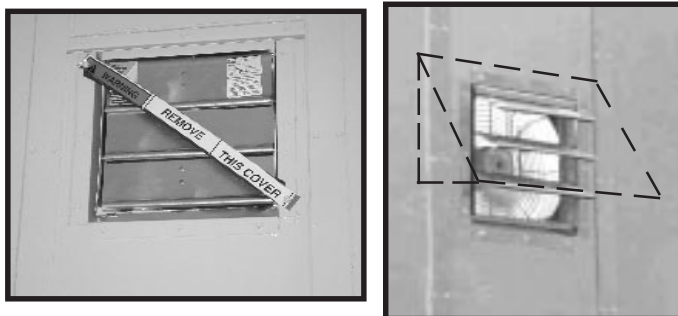
IMPORTANT

In order to prevent water leakage into the roof curb, the factory provided sheetmetal flashings **MUST BE** attached to the unit base to cover the shipping slots at both ends of the unit.

COMPRESSOR COMPARTMENT EXHAUST FAN

Prior to unit operation the compressor compartment exhaust fan shipping support **MUST BE** removed from the exterior of the unit.

The exhaust fan also requires the installation of the exterior rain hood provided with the unit.



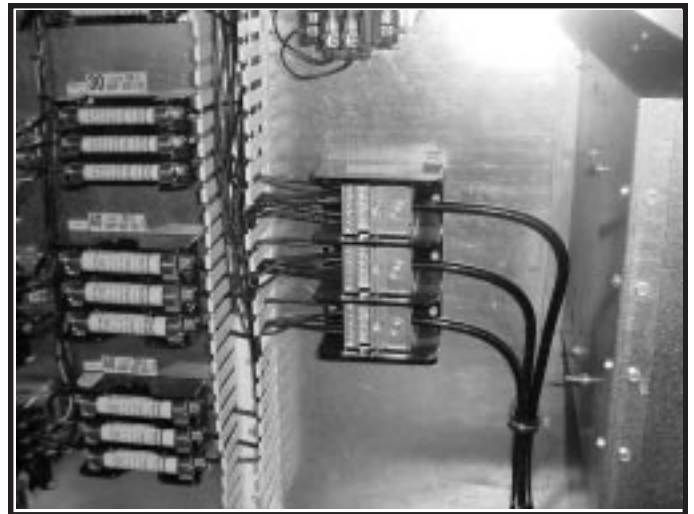
COMPRESSOR COMPARTMENT EXHAUST FAN

ELECTRICAL

Check the unit data plate voltage to make sure it agrees with the power supply. Connect power to the unit according to the wiring diagram provided with the unit.

The power and control wiring may be brought up through the utility entry. Protect the branch circuit in accordance with code requirements. Control wires should not be run inside the same conduit. The unit must be electrically grounded in accordance with the current National Electric Code, ANSI/NFPA No. 70. In Canada use current C.S.A. Standard C22.1 Canadian Electric Code Part 1.

Power wiring is to the unit terminal block or main disconnect. All wiring beyond this point has been done by the manufacturer and cannot be modified without effecting the unit's agency / safety certification.



AIRFLOW IS TO BE ADJUSTED AFTER INSTALLATION TO OBTAIN AN AIR TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.

START-UP TECHNICIAN **MUST** CHECK BLOWER MOTOR AMPERAGE TO ENSURE THAT THE AMPERAGE LISTED ON THE MOTOR NAMEPLATE IS NOT EXCEEDED.



CAUTION

On three phase units the rotation must be checked on **ALL MOTORS AND COMPRESSORS**. **SCROLL COMPRESSORS ARE DIRECTIONAL**. Rotation must be checked on start-up by a qualified service technician using suction and discharge gauges. Scroll compressors will **FAIL** if run in the wrong direction. Blower and condenser rotation should be checked and only be altered if necessary at the power connection.

INSTALLATION continued

GAS PIPING

Size gas piping to supply the unit with 6" to 10.5" water column pressure for natural gas or 11" water column pressure for propane when all gas consuming devices in the building connected to the same gas system are operating. Install piping in accordance with local codes, the piping must conform with the latest ANSI-Z83.8B National Fuel Gas Code; in Canada, Current Standard CAN / CGA-2.6B-MØØ, Installation Codes for Gas Burning Appliances and Equipment. Some utility companies will require pipe sizes larger than the minimum sizes listed.

GAS PIPING SIZES

HEAT EXCHANGERS	PIPE SIZE
(8) - Gas Heat Exchangers or Less	2"
(10) to (14) - Gas Heat Exchangers	3"

NOTE: Codes may require the use of a manual main gas shut-off valve and union, (furnished by others) installed in the gas line external to the unit.

GAS PIPING is to be supported DIRECTLY AT CONNECTION TO UNIT and must not be strained or bent and shall be supported by metal straps, blocks or hooks.

Pipe joint compounds used on all gas piping connections shall be resistant to the action of petroleum gases.


An 1/8" NPT plugged tap is required immediately ahead of the unit gas control valve.

All piping connections shall be checked with a soap solution for gas leaks before operating the appliance.

The furnace must be isolated by closing the manual shut off valve or disconnected from the gas supply piping during pressure testing of the piping system with pressures in excess of 1/2 PSIG.

The flow of combustion and ventilating air shall not be blocked or otherwise obstructed in any way.

NOTE: 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 start-up at the jobsite, it is highly recommended that people or any other living animals, that may be sensitive to the residual odors or gases, NOT be present in the conditioned space during the start-up. 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 start-up of a gas-fired installation.

After electrical power is turned on, set unit controls for heating, and check for operation.

When checking burner operation, flames should be observed as blue with slight or no yellow tipping. There should be no sign of flames floating or lifting off or away from the main burners.

NOTE: In case emergency shut down is required, turn off the main manual gas shut-off valve and disconnect main electrical power to unit. These devices should be properly labeled by the installer.


 **WARNING**

DO NOT USE OPEN FLAME OR OTHER SOURCE OF IGNITION FOR LEAK TESTING.
When pressure testing the gas supply piping, the furnace must be isolated or disconnected by closing the individual manual shut-off valve from the gas supply. Gas valves can be damaged if subjected to more than 0.5 psig pressure.

GAS PRESSURE REGULATOR & OVER-PRESSURE PROTECTION DEVICE

On applications where gas service to the unit is greater than 10.5" w.c. and less than 2-psi, a gas pressure regulator must be installed.

At supply pressures in excess of 2-psi and less than 5-psi, ANSI Z21.80 line regulator standard requires a means (an over-pressure protection device / OPD) to limit the downstream pressure to 2-psi maximum, in the event of regulator failure.

 **CAUTION**

Some soaps used for leak detection are corrosive to certain metals. Carefully rinse piping thoroughly after leak test has been completed.

In compliance with the ANSI Standard, installations exceeding 2-psi or less than 5-psi nominal require a tested and approved over-pressure protection device for use with the regulator.

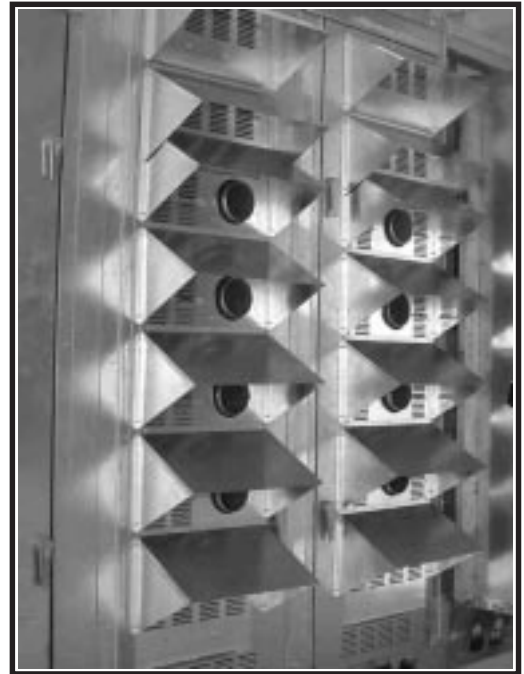
For proper heater operation, pressure to the regulator MUST NOT BE greater than 5-psi.

INSTALLATION continued

GAS FIRED HEATING UNITS - RAIN HOOD INSTALLATION

AFTER UNIT INSTALLATION & BEFORE UNIT STARTUP / OPERATION:

Gas fired heating units will have exterior rain hoods shipped with them. They are fastened in place with sheet metal screws. See the photos of the hoods on the exterior of the unit. Notice that higher heating capacity units will have two banks of the gas-fired heat exchangers shown. ALL of these hoods must be installed immediately after the unit is set in place.

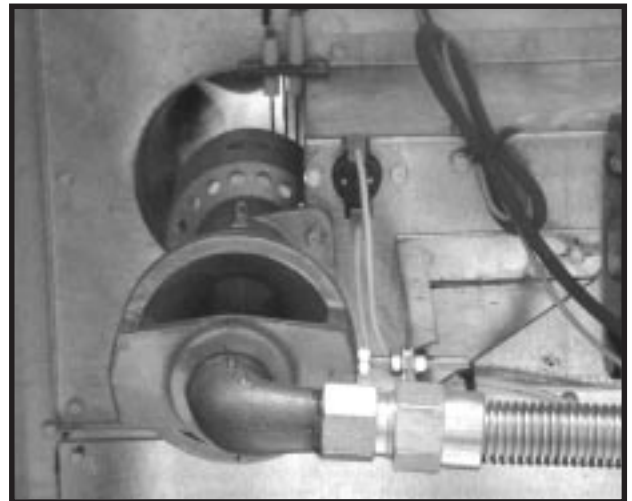
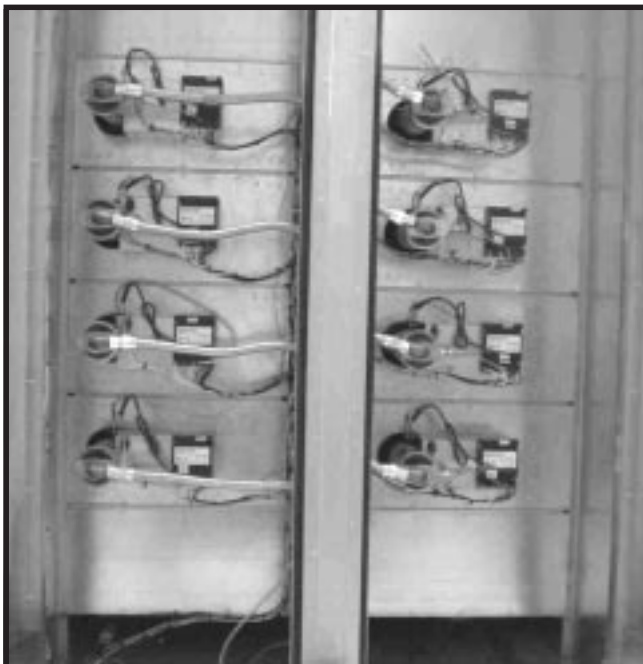


WARNING

All exterior rain hoods must be in place before the gas-fired heater is initially started. Improper and dangerous operating conditions will otherwise result.

Flue discharge vents **MUST BE** located at least 120" away from any opening through which combustion products could enter the building or discharge into any fresh air intake of other equipment. The flow of combustion and ventilating air can not be obstructed from reaching the furnace.

GAS HEATING INFORMATION



CAUTION

Before leaving installation, a complete operating cycle should be observed to verify that all components are functioning properly.

INSTALLATION continued

GAS UNIT LIGHTING INSTRUCTIONS



FOR YOUR SAFETY READ BEFORE OPERATING

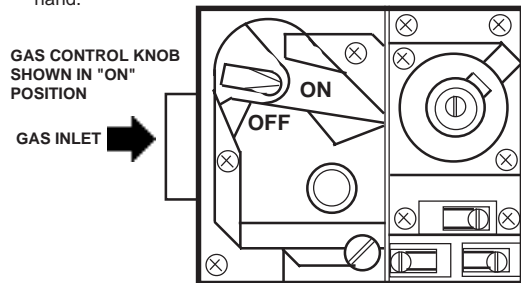
WARNING: IF YOU DO NOT FOLLOW THESE INSTRUCTIONS EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do **not** try to light the pilot 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 push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- 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 pilot by hand.
5. Open control access panel.
6. Push in gas control knob slightly and turn clockwise  to "OFF". NOTE: Knob cannot be turned to "OFF" unless knob is pushed in slightly. Do not force.
7. WAIT five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you 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. Turn gas control knob counterclockwise  to "ON".
9. Close 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 performed.
3. Open control access panel.
4. Push in gas control knob slightly and turn clockwise  to "OFF". Do not force.
5. Close control access panel.

ACCESS DOORS

A lockable access door is provided to the compressor and electrical compartment. A light switch is on the wall of the compressor control compartment.



LOCKABLE DOOR
HANDLES





WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit to OFF at disconnect switch(es). Unit may have multiple power supplies.

START-UP TECHNICIAN MUST CHECK MOTOR AMPERAGE TO ENSURE THAT THE AMPERAGE LISTED ON THE MOTOR NAMEPLATE IS NOT EXCEEDED.

PRE STARTUP

After the installation and immediately before the startup of the condenser be sure that these items have been checked.

1. Verify that electrical power is available to the unit.
2. Verify that any remote stop/start device is requesting the condenser to start.

While performing the Startup, use the Startup Form at the rear of this booklet to record motor amps and any other comments.

Use the General Check List at the top of the Form to make a last check that all the components are in place and the power supply is energized.

NOTE: Condensing fan operation must start with the first compressor.

Cycle through all the compressors to confirm that all are operating within tolerance.

When unit is running, observe the system for a complete operation cycle to verify that all systems are functioning properly.



COLOR-CODED WIRING DIAGRAM



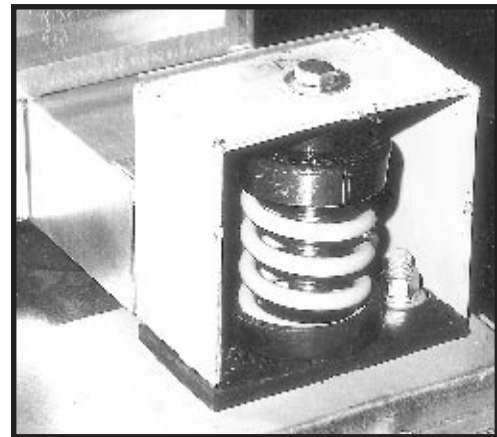
IMPORTANT

Vibration Spring Isolators **MUST BE** adjusted from the shipping position prior to unit start up.

Spring Isolator Adjustment

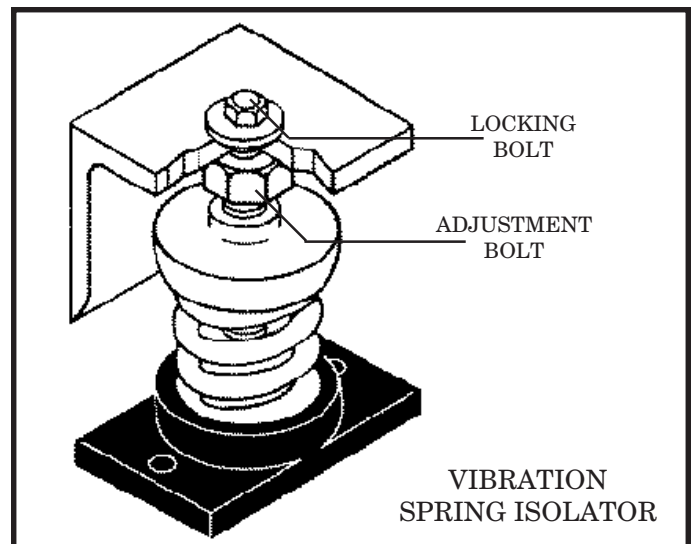
AAON 'RL' units are equipped with spring isolators in the blower section for vibration attenuation.

Prior to unit shipment the isolators are set in the lock down position and the blower section deck is resting on a wood base to protect the unit during transit.



Once the unit is set into place it is important that all of the isolators are adjusted out of the shipping position and the shipping material is discarded before the unit is put into operation.

The isolators can be adjusted by first loosening the locking bolt located on top of the frame. The adjustment bolt located just below the frame is used to set the spring into the operating position. After the isolator is set for operation the locking bolt must be tightened against the frame.



STARTUP continued



WARNING

Before attempting service or maintenance, SHUT OFF all electrical power to the unit to avoid injury from rotating parts.

Supply Air Wheel

AAON units are equipped with a Backward Inclined Blower Wheel that is set to deliver the air volume specified according to unit size and/or job requirements.

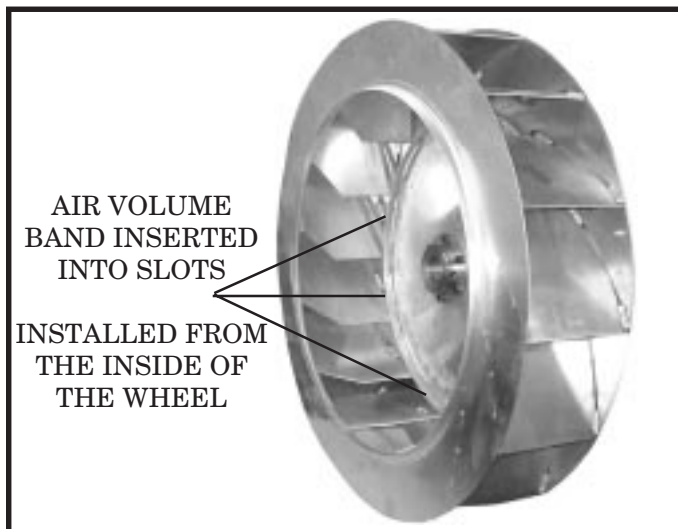
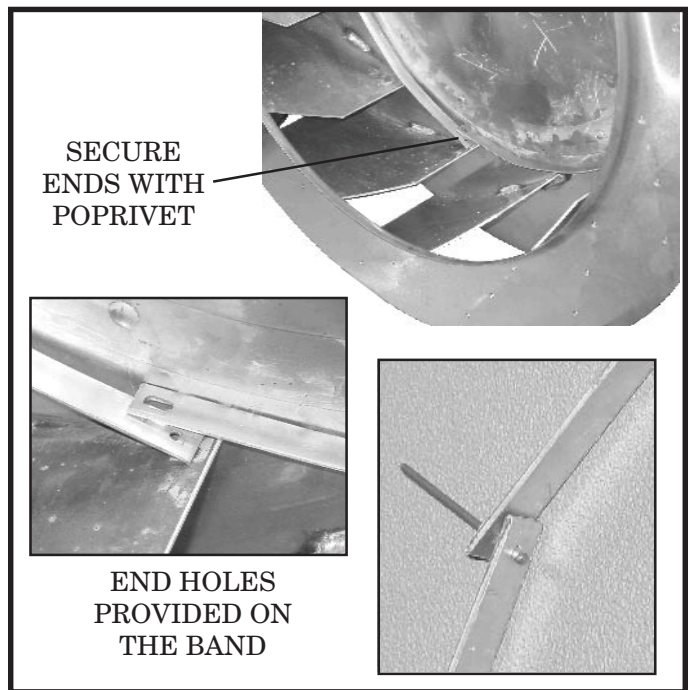
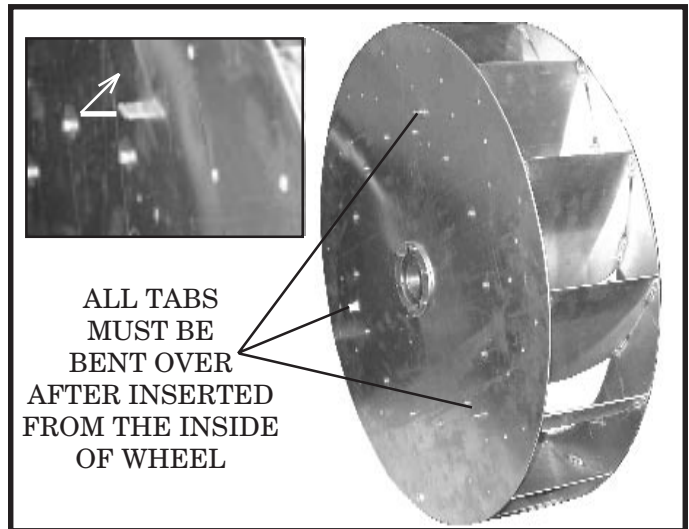
Air Adjustment

In the event that reduced air volume is required, an air volume band can be installed within the blower wheel to reduce the amount of air delivery. If the unit is factory equipped with the air band but additional air delivery is needed, the band can be removed from the wheel.

The air band is sized according to the air delivery specifications and can be ordered from the factory for field installation.

The related photos of the 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 venturi.

The band is 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 to be 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 occur during the installation.



STARTUP continued

Axial Flow Fans

Multi-Wing Z Series Fans Blade Pitch Angle Setting Instructions

Before You Begin:

To maintain balance of fan:

- Mark the hub castings across a joint, so the fan hub 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 are replaced into their original position.

If possible, note the location of the pitch setting pin in the blade socket, and whether pin is located in the Hub or Retainer half of the fan.

STEP 1 - Determine Boss Location Code: "A" or "B"

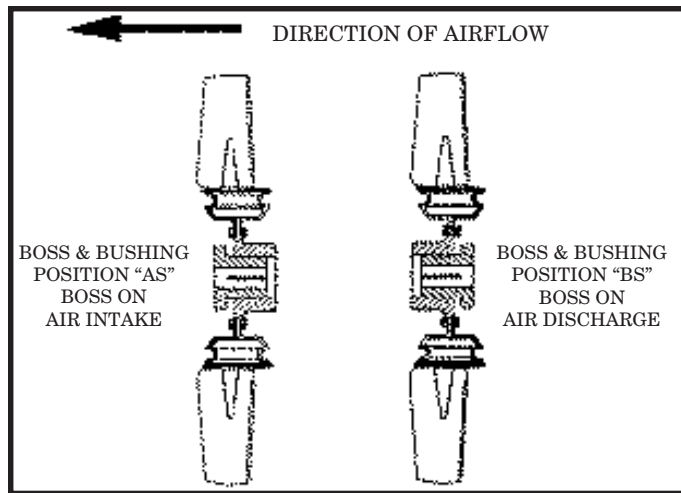
The boss is the center section of the hub through which the fan is mounted to the shaft, and typically contains either setscrews or a center-tapered hole where the bushing inserts.

Select boss location A or B:

A is the boss on air inlet, including AS configurations.

B is the boss on air discharge, including BS.

For flange mounted fans, use boss location A for R rotation fans, and boss location B for L rotation fans.



STEP 2 - Find Blade Pitch Angle:

(20, 25, 27.5, 30, 32.5, 35, 37.5, 40, 45 or 50)

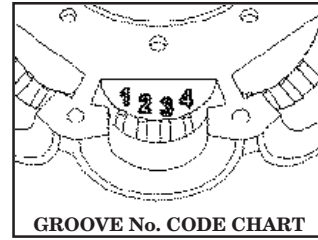
- Carefully disassemble fan on flat surface and note in which groove the pin is located. Refer to groove number code diagram.
- Using diagrams in step 5, determine if the pin was in the hub (HUB) or retainer side (RET) of fan.
- Using table in step 4, find the possible blade pitch.
- Using table in step 3, select your blade angle based on whether your pin was in the HUB or RET.

STEP 3 - Determine Hub/Retainer Code: "HUB" or "RET"

Type	Rotation	Boss Pos.	Blade Pitch Angle - Degrees									
			20°	25	27.5	30	32.5	35	37.5	40	45	50
5Z	R or L	A	---	RET	---	RET	RET	RET	HUB	HUB	HUB	HUB
		B	---	HUB	---	HUB	HUB	HUB	RET	RET	RET	RET

STEP 4 - Determine Groove Number: 1 or 2 or 3 or 4

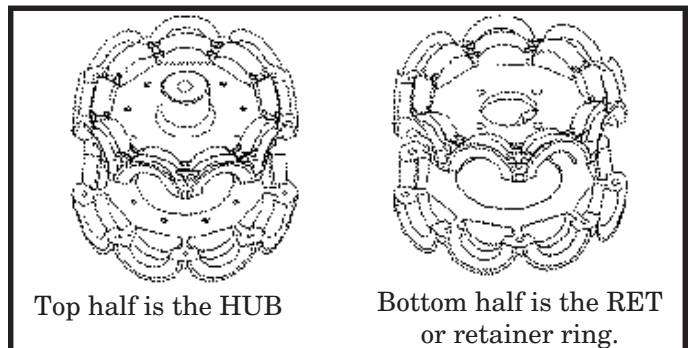
Type	Rotation	Blade Pitch Angle - Degrees									
		20°	25	27.5	30	32.5	35	37.5	40	45	50
5Z	R	---	4	---	3	2	1	4	3	2	1
	L	---	1	---	2	3	4	1	2	3	4



STEP 5 - Final Assembly

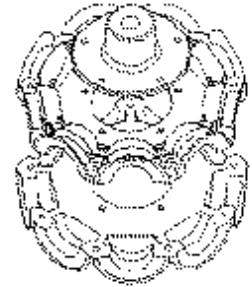
Definition of HUB and RET for purposes of instructions.

For 2-piece hubset:



For 3-piece hubset:

Top two pieces together are considered the HUB and bottom piece is considered the RET of retainer ring.



Using the HUB or RET code found in Step 3:

If code is HUB, place the hub down on work surface first (one or two pieces, depending on above).

If code is RET, place one retainer ring only down on the work surface first. (A weighted coffee can could be used to elevate the fan from the work surface).

Using the groove number, place the locking pin in the groove number that was found in Step 4.

Insert Blades:

- Place the blade over the pin in the hub/retainer blade socket, so that the pin also fits into the appropriate pitch angle groove in the blade.
- Repeat for all blades.
- Assemble hubset together, aligning the match marks that were made.
- Replace any balancing weight to its original position.
- To finish, tighten the bolts in a cross pattern to 5 to 6 foot-pounds of torque.

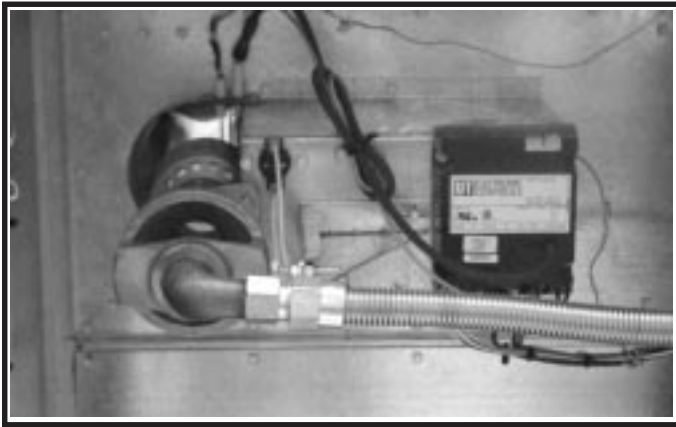
PERIODIC INSPECTIONS

GAS HEATING UNITS

1. The flow of combustion and ventilating air shall not be blocked or otherwise obstructed in any way. The indoor blower, evaporator coil and filters should be inspected monthly.

At least once each year, a qualified serviceman should check out all of the items listed under the servicing and trouble shooting and maintenance section of this manual.

2. If the 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. High temperature silicone sealant must be used to ensure a good seal.



3. GAS BURNERS THE BURNERS SHOULD NEVER REQUIRE CLEANING.

If cleaning becomes necessary, it indicates faulty operation of the unit. The cleaning should only be done by a qualified service agency and only after consultation with an AAON Service Representative.

It is recommended that if the gas burners require cleaning, call an AAON Service Engineer at (918) 583-2266.

4. HEAT EXCHANGER

The necessity for cleaning the exchanger could indicate faulty operation and should only be checked by a qualified service agency and only after they have discussed the problem with a Service Representative.

COOLING

1. Main Power Switches are on and power is to the unit.
2. Set thermostat in cooling mode and place the "fan" switch to on. Check blower for correct operating direction, amperage and voltage.

3. PACKAGED UNITS - Check compressor(s) operation. Check the amperage and compare to the nameplate data (check amperage load side of the compressor contactor).

4. DX COIL UNITS - If applicable check remote condenser as per the manufacturer's recommendations.

5. CHILLED WATER UNITS - Check remote chiller operations as per the manufacturers instructions. Check coolant flow valves for correct operation and settings.

HEATING • NATURAL GAS

1. Before turning on the main electrical power switch, be sure that all gas supply lines have been purged of air.

2. Turn gas valve to "ON" position.

3. Turn main electrical power switch to "ON" and set the thermostat to call for heat. The vent motor should operate. The control will automatically supply energy to the spark gap and the gas valve after the thermostat contact closes.

4. The 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 in 3 tries, the ignition system will lockout.)

5. Adjust thermostat to a low temperature setting to open contacts. The main gas flames should be extinguished.

NOTE: The evaporator blower is controlled by the ignition system. In the fan "Auto" mode the blower comes on 45 seconds after flame is proved and goes off 120 seconds after the thermostat opens.

WARNING

Once each 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.

PERIODIC INSPECTIONS Continued

HEATING • ELECTRIC

1. Set thermostat in the heat mode.
2. Set thermostat to call for heat to engage all electric heat strips. Check blower for proper rotation and voltage.
3. Measure the amperage and voltage. Compare them to the nameplate data.

HEATING • STEAM OR HOT WATER

1. Set thermostat in the heat mode.
2. Observe supply blower for proper rotation and voltage.
3. Check boiler or hot water operations according to the manufacturers instructions.
4. Check control flow valves for correct operation and settings per manufacturers instructions.

NOTE:

Should any of the above functions not perform properly, the following sequence of operations are given for the various heating and cooling modes with various control systems for an additional analysis in the case of any problems.

ELECTRIC, STEAM, HOT WATER, COOLING & CHILLED WATER UNITS

1. Indoor blower, coils and filters should be inspected monthly.
2. Once each year, before unit is turned on for the heating season, a qualified serviceman should inspect the unit for proper operation.
3. Inspect all valves and steam traps in accordance with manufacturers recommendations.

WARNING: All of the items listed under the service, trouble shooting and maintenance section of this manual should be performed once a year.

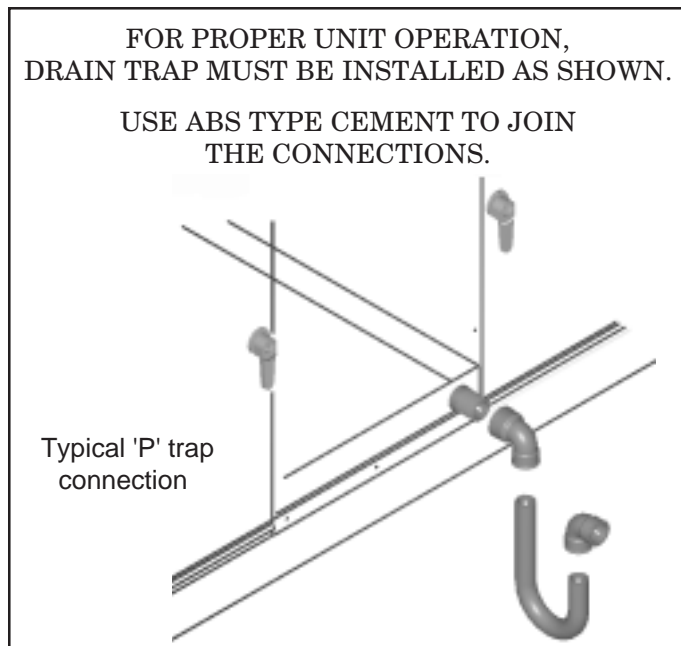
CONDENSATE PIPING

The RL equipment is furnished with 2 drain connections one on each side of the unit. All drain connections must be used and individually trapped to ensure a minimum amount of condensate will be present in the drain pans. The 'P' traps are furnished with the equipment.

Drainage of condensate directly onto the roof may be acceptable in certain areas, refer to applicable 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.

When 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.

Drain pans in any air conditioning equipment, even when they have a built-in slope to the drain, will have moisture present and will require periodic cleaning to prevent any build up of algae or bacteria. Cleaning of the drain pans will also prevent any possible plugging of the drain lines and an overflow of the pan itself. All cleaning of the drain pans and inside of the equipment should be done by qualified personnel.



NOTE: A DEEPER 'P' TRAP MAY BE NECESSARY BASED ON THE NEGATIVE PRESSURE IN THE EVAPORATIVE SECTION ON A DRAW THROUGH UNIT.



CAUTION

Before leaving installation, a complete operating cycle should be observed to verify that all components are functioning properly.

SERVICING & MAINTENANCE

GENERAL

Qualified technicians must perform routine service checks and maintenance. This includes reading and recording the condensing and suction pressures and checking for normal subcooling and superheat.

Air cooled and evaporative condenser units require different maintenance schedules/procedures. Unit specific instructions for both types are included in this manual.

COMPRESSORS

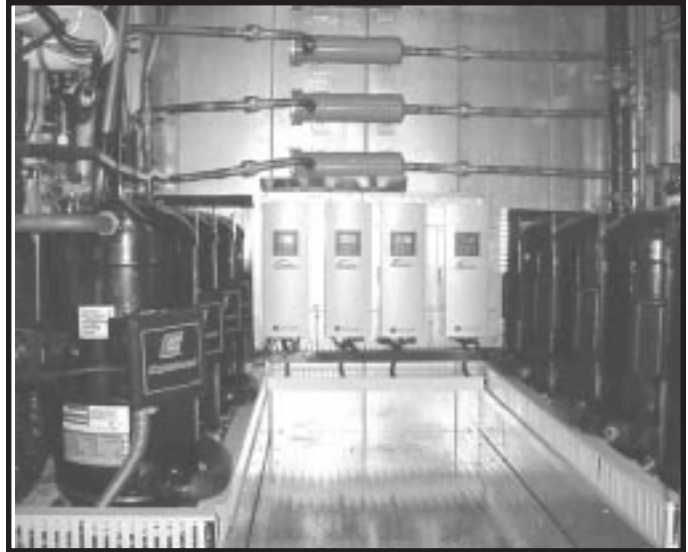
The scroll compressors are fully hermetic and require no maintenance except keeping the shell clean.

REFRIGERANT FILTER DRIERS

Each refrigerant circuit contains a replaceable core filter drier. Replacement is recommended when there is excessive pressure drop across the assembly or moisture is indicated in a liquid line sight glass.

CIRCUIT LOADING	MAX. PRESSURE DROP
100%	10 psig
50%	5 psig

The filter driers are provided with pressure taps and shutoff valves for isolation when changing the core. For safety purposes a service manifold must be attached prior to filter maintenance.



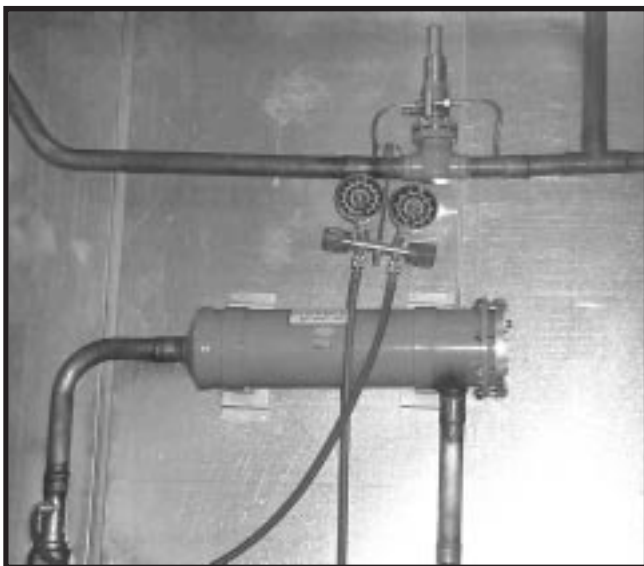
TYPICAL SCROLL COMPRESSOR COMPARTMENT

! **WARNING**

Prior to filter core service, a service manifold **MUST BE** attached to in and out pressure connections to assure no pressure exist during filter maintenance. Non-compliance could result in injury or violation of EPA regulations

! **IMPORTANT**

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.



REPLACEABLE CORE FILTER / DRIER

REFRIGERANT CHARGE

All AAON 'RL' units are fully charged at the factory with the refrigerant listed on the rating plate.

If additional refrigerant charging should become necessary the it should be done at constant load condition. Depending on the outdoor temperature, the refrigerant liquid subcooling should fall between 6 and 20°F. Subcooling temperatures will be higher if the load exceeds 75%.

! **CAUTION**

Refrigerant overcharging leads to excess refrigerant in condenser coils resulting in elevated compressor discharge pressure. **DO NOT OVERCHARGE !**

SERVICING & MAINTENANCE continued

LUBRICATION

All original motors and bearings are furnished with an original factory charge of lubrication. Certain applications require bearings be re-lubricated periodically. The schedule will depend on the operating duty, temperature variations, or 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 - ALVANIA EP2
CHEVRON OIL - SRI No. 2
TEXACO INC. - PREMIUM RB2
MOBIL MOBILOX EP2

SERVICE

If the unit will not operate correctly and a service company is required, only a company with service technicians qualified and experienced in both gas and electric heating as well as air conditioning and refrigerant chillers be permitted to service the systems in order to keep warranties in effect. If assistance is required, the service technician must contact AAON.

NOTE: SERVICE TECHNICIAN MUST PROVIDE THE MODEL AND SERIAL NUMBER OF THE UNIT IN ALL CORRESPONDENCE WITH AAON.

ROOFTOP UNIT REPLACEMENT PARTS

Replacement parts for AAON equipment may be obtained from AAON. When ordering parts, always reference the unit model number, serial number and part number.

AAON, Inc.

Customer Service Department

2425 South Yukon Ave • Tulsa, OK 74107

Phone: 918-583-2266 • Fax: 918-382-6364

ALWAYS USE AAON SPECIFIED PARTS



IMPORTANT

**IT IS IMPORTANT TO KEEP COILS, BLOWERS
AND FILTERS CLEAN
TO ENSURE PROPER UNIT OPERATION**



WARNING

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

COMMON CAUSES OF REDUCED AIR FLOW

A. DIRTY FILTERS - Filters must be inspected and replaced on a regular basis. It is strongly recommended that the media be replaced monthly. Clean filters are your best insurance against premature system breakdown.

Do not permit the unit to be operated unless the filters are in place. Operation of the unit without filters will result in a clogged evaporator coil - a very expensive service job to correct.

B. OBSTRUCTION TO AIR FLOW - Supply and return air grilles must be kept clear so air can be freely discharged and drawn from the system.

CLEANING

Inspect unit interior at the beginning of each heating and cooling season and as operating conditions require.

COILS

Evaporator coil(s) should be inspected and cleaned annually to ensure there is no obstruction to air flow.

Condenser coil(s) should be inspected monthly. Clean condenser coils annually and as required by location or outdoor air conditions.

CONDENSATE DRAIN

Check and clean each year at start of cooling season.

BLOWER

Inspect blower and blower section to keep free of dust or debris. **TURN OFF POWER BEFORE ATTEMPTING TO CLEAN BLOWER WHEEL.**

FILTER REPLACEMENT

TURN POWER OFF TO UNIT BEFORE ATTEMPTING TO OPEN ACCESS DOOR TO REPLACE FILTERS. The bank of filters are located in the walk-in filtering section of the unit and are accessed through the filter section door.

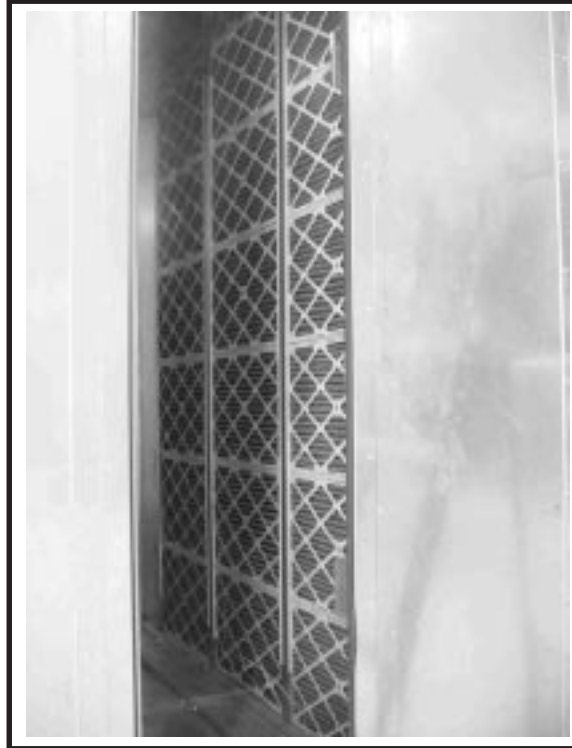
Filters should be checked and inspected every 30 days and replaced or cleaned as necessary.

Replace or clean old or dirty filters with the same size filters as indicated on the filters.

FILTER INSTALLATION / REPLACEMENT

Open filter access door. Slide filters towards you and inspect. Replace old filters with the size indicated on each filter or as shown in the filter chart below. Be sure arrow points towards the blower.
(Filters should be checked every 30 days and replaced or cleaned as necessary).

IT IS IMPORTANT TO KEEP COILS, BLOWER AND FILTERS CLEAN !



NOTE: CHART REFLECTS STANDARD FACTORY SUPPLIED FILTERS AND SIZES.
CONTACT FACTORY FOR SPECIAL OPTIONAL FILTER PACKAGES.

FILTERS

CAB. Width	CAB.	UNIT SIZE	16" x 25" x 2" Pleated 30% (Qty)	16" x 25" x 4" Pleated 30% (Qty)	BOX A CARTRIDGE 12" DEEP 65%-85%-95%	BOX B 24" x 24" x 12" CARTRIDGE 65%-85%-95%	BOX C 24" x 24" x 12" CARTRIDGE 65%-85%-95%	BOX A 24" x 24" x 12" BAG 85%-95%	BOX B 24" x 24" x 12" BAG 85%-95%	BOX C 24" x 24" x 12" BAG 85%-95%
100" WIDE	A	45	18	18	(12) 24" x 24" (4) 24" x 20"	20	N/A	12	16	N/A
		60								
		70								
	B	75	24	24						
		95								
	C	100	36	36						
110										
125										
135										
142" WIDE	D	134	48	48	(15) 24" x 24" (5) 24" x 20"	25	30	15	20	25
		155								
		170								
	E	190	60	60						
		210								
		230								

FILTERS SHOULD BE REPLACED EVERY 30 DAYS OR AS REQUIRED.

EVAPORATIVE CONDENSER SECTION • OPERATION & MAINTENANCE

INFORMATION & MAINTENANCE

Evaporative cooling equipment rejects heat by evaporating a portion of the recirculated water spray and discharging it from the unit with the hot, saturated air. As the spray water evaporates, it leaves behind the mineral content and impurities of the supply water. If these residuals are not purged from the water distribution system, they will become concentrated and lead to scaling, corrosion, sludge build-up and biological fouling.

A water treatment monitoring and control system has been furnished with this unit. Be sure to read the complete manual that has been furnished. All water treatment is a combination of bleed water and chemical treatment for proper control of the residuals and to prevent any biological contamination.



WARNING

Batch-loading chemicals into the unit IS NOT PERMITTED. The control system must regulate the chemical feed.

GENERAL INFORMATION

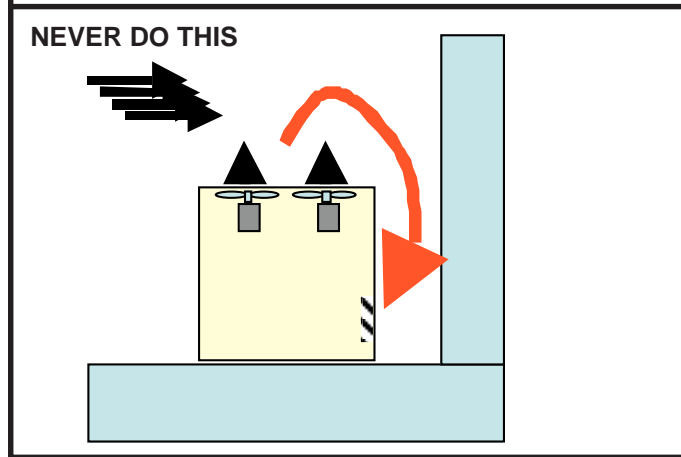
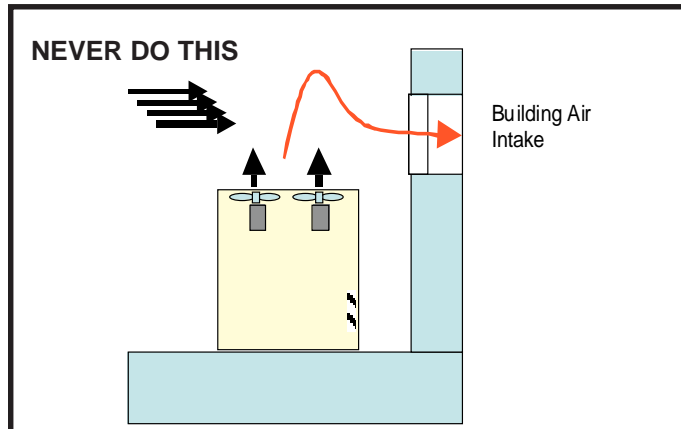
Severe Service: The following recommended maintenance procedures are basic requirements for normal operating environments. For severe operating conditions, the frequency of inspection and service should be increased. Air containing industrial and chemical fumes, salt, dust, or other airborne contaminants and particulates will be absorbed by the recirculating water system and may form solutions and deposits harmful to the products and personnel.

Safety: The recirculating water system contains chemical additives for water quality control and biological contaminants removed from the air by the washing action of the water. Personnel exposed to the saturated effluent, drift, or direct contact should use proper precaution. Proper location of the evaporative condenser requires good judgment to prevent the air discharge from entering fresh air intakes or avoiding allowing contaminated building exhaust from entering the condenser.

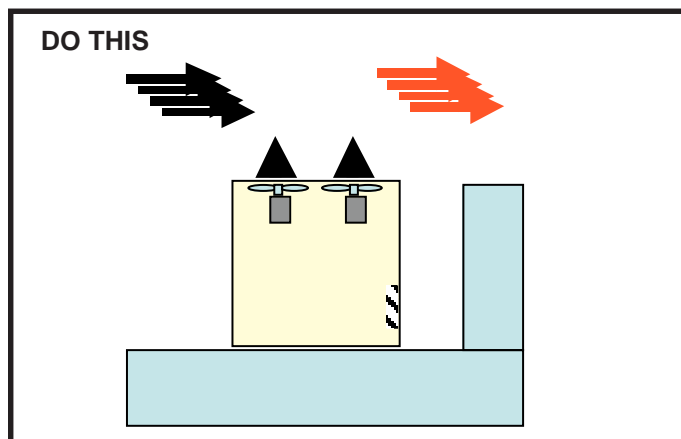


WARNING

EVAPORATIVE CONDENSER CLEANING
The evaporative condenser must be thoroughly cleaned on a regular basis to minimize the growth of bacteria, including Legionella Pneumophila, to avoid the risk of sickness or death. Service personnel must wear proper personal protective equipment.
DO NOT ATTEMPT ANY SERVICE UNLESS THE FAN MOTOR IS LOCKED OUT.



Follow local and national codes in siting the evaporative condenser but as minimum the evaporative condenser sump must be a minimum of 15 feet from the nearest intake.



WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit to OFF at disconnect switch(es). Unit may have multiple power supplies.

EVAP. CONDENSER SECTION - cont.

Performance: Improper location of the evaporative condenser may seriously degrade the capacity of the equipment. Make sure the equipment is located such that discharge air from the condenser does not enter the condenser air inlet.

Warranties - Please refer to the limitation of warranties in effect at the time of purchase.

Condenser Tube Inspection - The coil is leak tested at 350 P.S.I.G. before shipment. AAON will not be responsible for loss of refrigerant. It is the responsibility of the installer to verify that the system is sealed before charging with refrigerant. If the unit is operated during low ambient temperature conditions, freeze protection for the recirculating water system must be provided.

Freeze Protection: In order to prevent water temperatures from dropping below 50°F, this unit is equipped with a VFD on the fan motors when the refrigeration system is operating.

Recirculating Water System: Electric sump heaters are available to keep the sump water from freezing when the refrigeration system is not operating. An electric resistance heater is supplied in the vestibule when sump heaters are selected.

The condenser should not be operated with the fan on and the pump cycled on and off to maintain head pressure control under any conditions. The unit is equipped with a water temperature controller which varies fan speed to maintain sump water temperature. This unit is not equipped with a compressor discharge pressure controller for fan speed modulation and therefore can not be operated without water flow.

PRE START-UP: *Do not start the evaporative condenser or compressors without installation of proper water treatment chemicals. Contact your local water treatment expert for correct selection of water treatment chemical, adjustment of chemical feed and bleed rates.*

Cleanliness: Dirt and debris may accumulate in the sump during shipping and storage. The sump should be cleaned prior to start-up to prevent clogging the water distribution system. Any surfaces that show contamination should be cleaned ONLY with a commercial stainless steel cleaner to restore the initial appearance. The inlet screens should be inspected for foreign material.

Pump Operation: Before initial start of the pump, check as follows:

1. Be sure that pump operates in the direction indicated by the arrow on the pump casing. Check rotation each time motor leads have been disconnected.
2. Check all connections of motor and starting device with wiring diagram. Check voltage, phase and frequency of line circuit with motor name plate.
3. Check suction and discharge piping and pressure gauges for proper operation.
4. Turn rotating element by hand to assure that it rotates freely.

Running - Periodically inspect pump while running, but especially after initial start-up and after repairs.

1. Check pump and piping for leaks. Repair immediately.
2. Record pressure gauge readings for future reference.
3. Record voltage, amperage per phase, and kW.

Fan Motors: AAON Evaporative Condensers are equipped with direct drive fan motor(s). Check fan is tightly mounted to the motor shaft and the motor mounting bolts are aligned and secure.

Water Make-up Valve: Adjust the float level during the initial fill so the valve is completely closed when the water level is 1/2" below overflow level. Make-up water supply pressure should be maintained between 15 and 60 psig for proper operation of the valve. The valve assembly should be inspected monthly and adjusted as required. Replace the valve seat if leakage occurs when the valve is in the closed position.

MAINTENANCE RECOMMENDATIONS

Pump Maintenance:

Cleaning - Remove oil, dust, water, and chemicals from exterior of motor and pump. Keep motor air inlet and outlet open. Blow out interior of open motors with clean compressed air at low pressure.

Labeled Motors - It is imperative for repair of a motor with Underwriters' Laboratories label that original clearances be held; that all plugs, screws, other hardware be fastened securely, and that parts replacements be exact duplicates or approved equals. Violation of any of the above invalidates Underwriters' Label.

Fan Motor Maintenance: Same as pump maintenance.

Access Doors: If scale deposits or water is found around the access doors, adjust door for tightness. Adjust as necessary until leaking stops when door is closed.

Bearings - Lubrication: Every 6 months or after a prolonged shut down. Use waterproof, lithium based grease. Below 32°F - Esso Exxon or Beacon 325. Above 32°F - Mobil Mobilox EP2, Shell Alvania EP2 or Texaco RB2.

Recommended Monthly Inspection

1. Clean sump section interior. Dirt and other impurities which have accumulated in the sump should be removed from the sump area. Shut off water to float valve and open the drain connection for flushing of the sump.
2. Clean sump suction strainer.
3. Check water operating level. Adjust float as required.
4. Inspect fan motor(s) and water circulation pump(s) and lubricate per the lubrication nameplate or manufacture’s recommendations.
5. Inspect axial fans and eliminators removing any debris which may have accumulated during operation.
6. Inspect the water distribution system to insure that nozzles and spray orifices are functioning correctly. The inspection should be made with the circulation pump on and fans off.

Mist Eliminators

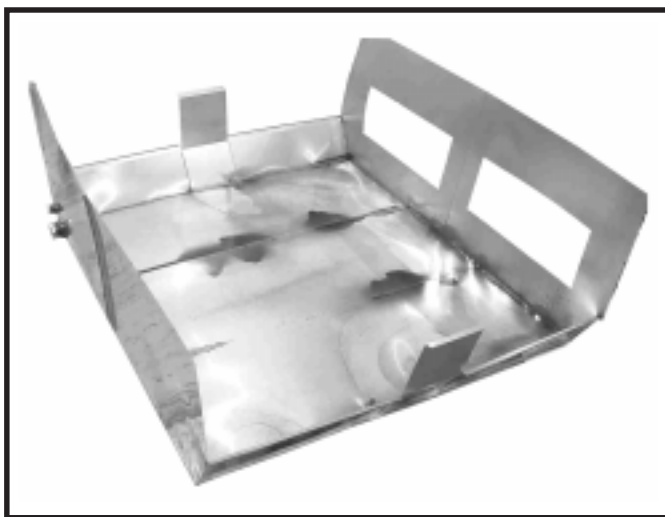
The mist eliminators must be correctly positioned when they are replaced during cleaning or service.

Air Inlet

Inspect the air inlet louvers and mist eliminators on a monthly basis to remove any paper, leaves or other debris that may block the airflow.

Stainless Steel Base Pan

The base pan under the tube bundles is stainless steel and may sometimes become tarnished due to contamination. These surfaces should be inspected yearly to ensure they remain clean of any contamination that may result in damage. Any surfaces that show contamination should be cleaned ONLY with a commercial stainless steel cleaner to restore the initial appearance.



STAINLESS STEEL SUMP
PRIOR TO UNIT INSTALLATION

Propeller Fans and Motors

The fans are directly mounted on the motor shafts and require minimal maintenance except to assure they are clear of dirt or debris that would impede the airflow.

Recommended Annual Inspection:

In addition to the above maintenance activities, a general inspection of the unit surface should be completed at least once a year. Surface corrosion in spot areas should be wire brushed and cleaned thoroughly. These locations may then be resurfaced with rust inhibitive paint. Remove spray header and flush out.

WATER QUALITY

Recirculating Water Quality Guidelines

PH	6.5 to 9.0
Hardness as CaCO ₃	500 PPM Max
Alkalinity as CaCO ₃	500 PPM Max
Total Dissolved Solids	2000 PPM Max
Chlorides As NaCl	1500 PPM Max
Sulfates	750 PPM Max

Cycles of concentration (the ratio of dissolved solids in recirculated water to dissolved solids in make-up), should be determined and monitored frequently by a competent water treatment expert.

To limit cycles of concentration to maintain the above guideline, it is necessary to “bleed” a certain portion of the recirculated water. This is achieved automatically with a solenoid valve actuated by a conductivity meter set at the desired conductivity corresponding to the desired cycles of concentration. It should be noted that these are guidelines and even though these individual values are met, under certain conditions the water quality can be aggressive. For example, water with very low alkalinity and levels of chlorides and sulfates approaching maximum recommended levels can be corrosive.

Bleed: All AAON evaporative condensers are furnished with a bleed system fitting and valve to continuously remove a small portion of the recirculated water to keep the water quality within the above listed parameters. This device is located on the discharge side of the pump. It is important to note since “bleed” rate is a function of evaporation rate (i.e., amount of heat rejected), if the bleed setting is manual based on design heat load, too much water will be removed when the heat load is less than design.

The AAON evaporative condenser is equipped with a desuperheater. The desuperheater coil is located above the eliminators. Approximately 22% of the total heat of rejection is accomplished with the desuperheater. Water usage of the AAON evaporative condenser is approximately 22% less than evaporative condensers not equipped with a desuperheater.

EVAP. CONDENSER SECTION - cont.

One method of calculating evaporation and bleed in gallons per minute (gpm) is shown below:

$$\text{Evaporation Rate} = \frac{\text{Total Heat of Rejection Via Evaporation}}{(1050 * 500)}$$

$$\text{Bleed Rate} = \frac{\text{Evaporation Rate}}{(\text{Cycles of Concentration} - 1)}$$

Example:

A unit has 100 ton cooling capacity with a compressor EER = 15.

$$\begin{aligned} \text{Total Heat of Rejection} &= \text{Tons} \times 12000 \times (1 + 3.413/\text{EER}) \text{ Btu/hr} \\ &= 100 \times 12000 \times (1 + 3.413/15) = 1,473,040 \text{ Btu/hr} \end{aligned}$$

$$\begin{aligned} \text{Total Heat of Rejection Via Evaporation} &= \text{Total Heat of Rejection} \times (1 - .22) \\ &= 1,473,040 \times (1 - .22) = 1,148,971 \text{ Btu/hr} \end{aligned}$$

$$\begin{aligned} \text{Evaporation Rate} &= \frac{1,148,971 \text{ (Btu/hr)}}{525,000 \text{ (Btu/hr/gpm)}} = 2.19 \text{ gpm} \end{aligned}$$

Assuming 4 cycles of concentration:

$$\text{Bleed Rate} = \frac{2.19}{(4 - 1)} = .73 \text{ gpm}$$

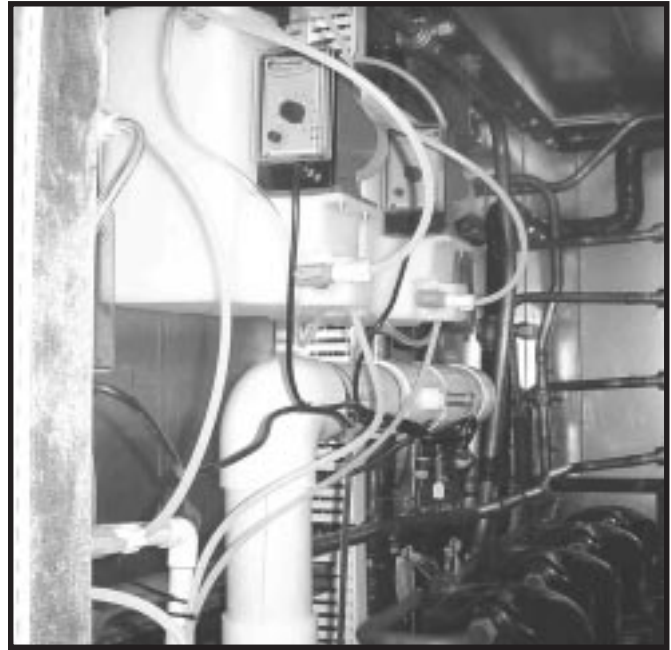
The above water bleed system is a good means of control for many forms of scale build up or corrosion. Some system conditions, however, may be much more severe requiring more extensive forms of water treatment. It is important that operating and maintenance personnel be aware of this problem and knows when to recommend water treatment.

Following are important signs to look for when inspecting a given unit:

1. Scale formation on the heat exchanger surfaces with resulting decreased operating efficiency of equipment.
2. Accelerated corrosion or rusting of the metal surfaces, resulting in coil or casing failure.
3. Slime and algae formation on the metal surfaces, tending to block circulation piping and the water distribution system.

Following are guidelines to be used in water treatment:

1. Any water treatment must be compatible with stainless steel and copper.
2. The water pH should be maintained between 6.5 and 9.0 at all times.
3. Batch feed process should never be used.
4. Acid treatment not recommended due to corrosive effect on materials.
5. Do not use hydrochloric acid (HCl- muratic acid)
6. Avoid any introduction of chlorides into the condenser.



EVAPORATIVE CONDENSING
CHEMICAL DISPENSING SYSTEM

Mechanical Cleaning:

Do not attempt to mechanically clean the copper tubing in the evaporative condenser. Do not use wire brushes or any other mechanical device on the copper tubing. Severe damage may result. Contact your water treatment expert for recommendations on chemical cleaning procedures.

PARTS

Contact your local AAON Representative for factory authorized parts. Be sure to include the Serial Number from the product nameplate when ordering or requesting quotations.

AIR COOLED CONDENSER SECTION

The air cooled condenser section rejects heat by passing outdoor air over the fin tube coils for cooling of the hot refrigerant gas from the compressors. The heated air will discharge from the top of the section through the propeller fans.

The condenser coils should be inspected yearly to ensure unrestricted airflow. If the installation has a large amount of airborne dust or other material, the condenser coils should be cleaned with a water spray in a direction opposite to that of the airflow. Care should be taken to prevent bending of the aluminum fins on the copper tubes.

TROUBLE	POSSIBLE CAUSE
ELECTRIC HEATING	
SYSTEM OFF	<ol style="list-style-type: none"> 1. Check power at line side of contactor(s). 2. Thermostat not set for heating.
EVAPORATOR MOTOR WILL NOT RUN	<ol style="list-style-type: none"> 1. Overload relay tripped. 2. Heater Relay not energized. 3. Blower Contactor not energized. 4. Capacitor shorted or open (PSC motors only).
BLOWER DOESN'T DELIVER AIR	<ol style="list-style-type: none"> 1. Blower running backwards. 2. Dirty air filters. 3. Dirty coils. 4. Duct obstruction.
BLOWER COMES ON, BUT LITTLE OR NO HEAT	<ol style="list-style-type: none"> 1. One or more heater contactors are open. 2. Limit switches are open. 3. Heater relay open. 4. Heat strips burned out.
GAS HEATING	
SYSTEM OFF	<ol style="list-style-type: none"> 1. Check power and gas supply. 2. Check thermostat switches and settings. 3. Check 24 volt power to ignition control.
BURNER WON'T COME ON	<ol style="list-style-type: none"> 1. Check for power at main gas valve. 2. Defective gas valve. 3. Loose or broken connection to gas valve. 4. Check limit controls for open. 5. Check continuity of differential pressure switch with motor turning. If open, replace differential pressure switch. 6. Defective ignition control.
COMBUSTION AIR BLOWER WON'T RUN	<ol style="list-style-type: none"> 1. Thermostat not calling for heat. 2. Relay not closing. (No power to motor) 3. Motor stuck or winding open. 4. Internal motor overload open.
BURNER GOES "OFF" ON HIGH LIMIT	<ol style="list-style-type: none"> 1. Unit blower not coming on. (Check fan control) 2. Blower motor running backward. 3. Filters dirty. 4. Ducts obstructed or dampers closed. 5. Manifold gas pressure too high.
IGNITION ON, BURNER WON'T LIGHT	<ol style="list-style-type: none"> 1. Hand valve "off" (turn to on)(main gas valve). 2. Gas off or very low pressure. 3. Check for power at main gas valve. 4. Check continuity of differential pressure switch with motor turning. If open, replace differential pressure switch. 5. Sparker sensor out of adjustment. 6. Main orifice blocked.
SUPPLY FAN BLOWER WON'T RUN	<ol style="list-style-type: none"> 1. Defective Ignition Control. 2. See cooling trouble shooting page.

SERVICING Continued

TROUBLE	POSSIBLE CAUSE
STEAM AND HOT WATER HEATING	
SYSTEM OFF	<ol style="list-style-type: none"> 1. Check power at line side of contactor(s). 2. Thermostat not set for heating.
BLOWER MOTOR WILL NOT RUN	<ol style="list-style-type: none"> 1. Overload relay tripped. 2. Heater Relay not energized. 3. Blower Contactor not energized.
BLOWER DOESN'T DELIVER AIR	<ol style="list-style-type: none"> 1. Blower running backwards. 2. Dirty air filters. 3. Dirty coils. 4. Duct obstruction.
BLOWER COMES ON, BUT LITTLE OR NO HEAT	<ol style="list-style-type: none"> 1. Check steam traps, valves, and steam or hot water supply in accordance with manufactures instructions. 2. Faulty thermostat.
COOLING PACKAGE and UNITS with REMOTE CONDENSERS	
SYSTEM OFF	<ol style="list-style-type: none"> 1. Check power at lineside of contactor(s). 2. Thermostat not set for cooling. 3. High pressure control tripped. 4. Low pressure switch open (loss of charge).
CONDENSER FAN WILL NOT RUN	<ol style="list-style-type: none"> 1. Overload thermal protector open in motor. 2. Motor run capacitor open or shorted. 3. Motor failed. 4. Fan or shaft stuck.
EVAPORATOR BLOWER WILL NOT RUN	<ol style="list-style-type: none"> 1. Overload thermal protector open in motor. 2. Relay not closing. 3. Motor failed. 4. Capacitor shorted or open (PSC motors only). 5. Stuck shaft or blower wheel.
COMPRESSOR SHORT CYCLES	<ol style="list-style-type: none"> 1. Check for low refrigeration charge. 2. Compressor overload setting. 3. Ambient temperature too low. 4. Filters dirty or air flow restricted. 5. Evaporator blower not running.
FAN MOTOR RUNS HOT AND CUTS OUT	<ol style="list-style-type: none"> 1. Line voltage too high.
COMPRESSOR WILL NOT START	<ol style="list-style-type: none"> 1. Line voltage too low. 2. Limit switches are open. 3. Overload or pressure control tripped.
BLOWER DOES NOT DELIVER AIR	<ol style="list-style-type: none"> 1. Blower running backwards. 2. Dirty filters. 3. Duct obstruction.

**REFER TO MFG'S
INSTRUCTIONS
IF REMOTE
CONDENSER**

**REFER TO MFG'S
INSTRUCTIONS
IF REMOTE
CONDENSER**

**REFER TO MFG'S
INSTRUCTIONS
IF REMOTE
CONDENSER**

SERVICING Continued

TROUBLE	POSSIBLE CAUSE
COOLING - CHILLED WATER	
SYSTEM OFF	<ol style="list-style-type: none">1. Check power at line side of contactor(s).2. Thermostat not set for cooling.
EVAPORATOR BLOWER WILL NOT RUN	<ol style="list-style-type: none">1. Overload thermal protector open in motor.2. Contactor not closing.3. Motor failed.
FAN MOTOR RUNS HOT AND CUTS OUT	<ol style="list-style-type: none">1. Line voltage too high.
BLOWER DOES NOT DELIVER AIR	<ol style="list-style-type: none">1. Blower running backwards.2. Dirty air filters.3. Duct obstruction.
BLOWER COMES ON, BUT LITTLE OR NO COOLING	<ol style="list-style-type: none">1. Check supply water and temperature.2. Check water control valves operation.3. Check water temperature rise entering and leaving unit to determine if adequate water is flowing.

ROOFTOP UNIT REPLACEMENT PARTS

Replacement parts for AAON equipment may be obtained from AAON. When ordering parts, always reference the unit model number, serial number and part number.

AAON, Inc.

Customer Service Department

2425 South Yukon Ave • Tulsa, Oklahoma 74107

Phone: 918-583-2266 • Fax: 918-382-6364

ALWAYS USE AAON SPECIFIED PARTS

SEQUENCE OF OPERATIONS

GENERAL INFORMATION

HEATING

1. Natural Gas

When the thermostat calls for heating, W1 makes R to the heat relay (HR) all N.O. (Normally open) contacts close and all N.C. (normally closed) contacts open. The combustion motor starts and as the pressure decreases in the flue outlet box the ignition control is energized. The control sends 24 VAC to the main gas valve and high voltage to the ignitor. If a burner flame has been detected after 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 locks out the system.

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 air fan housing.

2. LP (Propane) Gas

The sequence for LP Gas is the same as above but upon non-proof of burner the gas train will enter a 100% lockout condition.

3. Electric

When the thermostat calls for heat 'W1' makes 'R' to the heat relay 'HR'. All N.O. contacts close, and all N.C. contacts open. The heat relay makes 'R' to the first stage of electric heat.

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

If additional heating is required a second set of elements can be turned on by 'W2'.

OPTIONAL - When available the electric heat can be sequenced to provide a constant discharge air temperature.

4. Steam or Hot Water

This option adds a steam coil down stream of the cooling coil (if supplied). Connections and controls are provided by others.

COOLING

1. Packaged Units

When the thermostat calls for cooling from the space, 'Y1' makes 'R' to 'CC1' through the LPS (low pressure switch), HPS (high pressure switch) and optional GOT (guarantee off timer).

If additional cooling is required 'CC2' and 'CC4' are made through their respective pressure switches and timers.

2. DX Only - Coil Units

When the thermostat calls for cooling from the space, the condensing unit is energized (refer to manufacturers instructions for sequence of operation). The evaporator blower contactor is energized simultaneously with the condensing section.

3. Chilled Water Coil Units

The blower contactor is energized to provide supply air on a signal from the space thermostat. All other controls are by others.

OPTIONAL ECONOMIZER

When cooling is called for and the unit has the economizer option installed, temperature switch ECS (or Enthalpy) allows the economizer operation when the outside air reaches the required setpoint. (Some options use dry bulb sensing and some options use enthalpy sensing to determine the outside air (O.A.) condition).

When the economizer is in operation 'Y1' controls the opening and closing of the dampers, 'Y2' is then able to control the compressors which 'Y1' normally controls. A modulating economizer is also available. The operation is the same as the standard economizer except that the motor modulates the damper position to maintain a preset mixed air temperature.

SEQUENCE OF OPERATIONS Continued

VAV (Variable Air Volume) SYSTEMS

When a call for cooling is received, the controller board stages on compressors to maintain a field set supply air temperature. As different zones become satisfied their VAV boxes will close. (Boxes and controls are supplied and installed by others). This in turn causes the supply duct pressure to rise. The VAV controller board senses this increase in pressure and modulates the supply fan speed to maintain the required field set supply air pressure setpoint.

Normally VAV units are cooling only units. There are certain applications where electric or gas heat is used to provide morning warmup. When gas or electric heat is used for morning warmup the airflow will not be allowed to vary. The fan speed control will be disabled until a call for cooling is received, then the heating system will be locked out and VAV will be enabled.

POWER EXHAUST OPTIONS

When space over pressurization occurs, due to economizer operation, a power exhaust will be utilized to provide relief. Two types of power exhaust control are available.

A. Three position economizer, an On/Off power exhaust will be utilized to exhaust when economizer is called for.

The end switch located on the economizer O. A. Damper section is field adjustable to allow for differences in building design. The switch engages and disengages the power exhaust motor(s) through a contactor. The end switch is in the 24 VAC circuit.

B. Full modulating economizer, a full modulating power exhaust will control the amount of actual exhausted air by means of a building sensing pressure control which opens or closes according to desired pressure in the space.

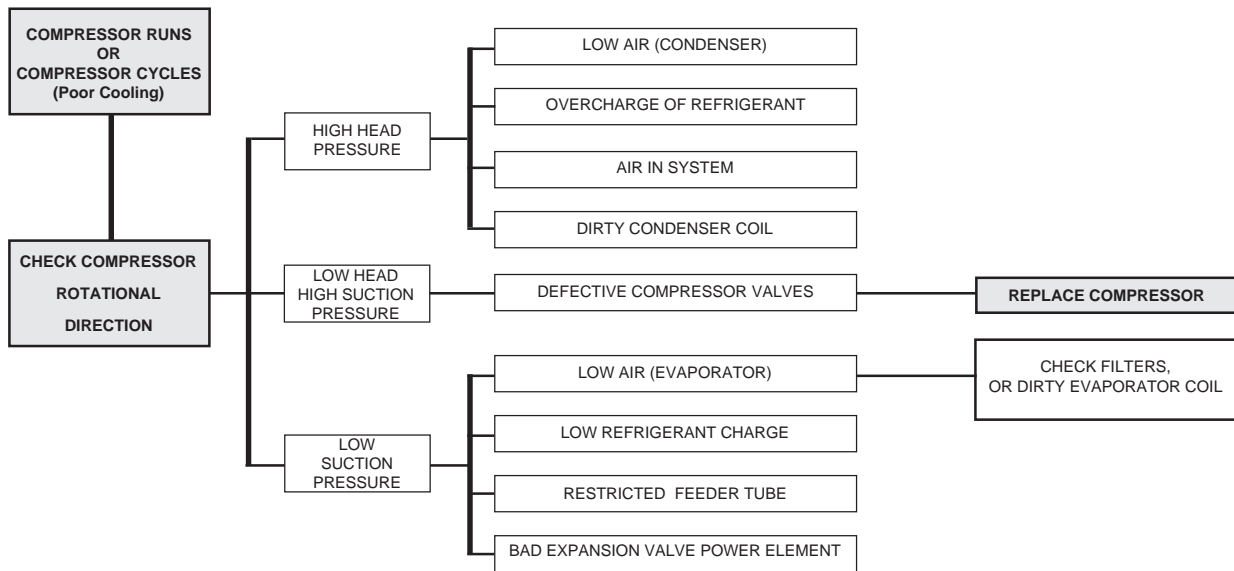
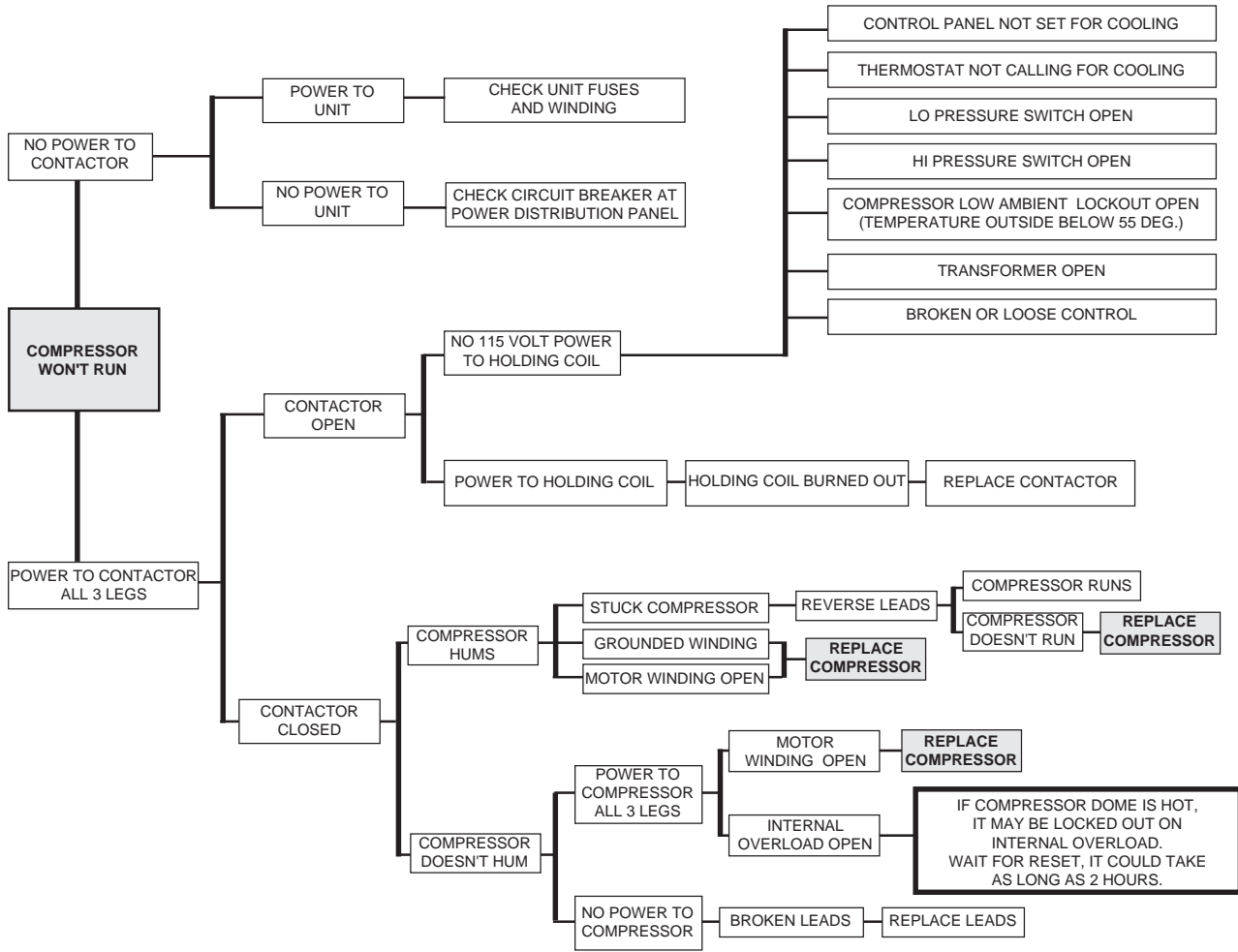
POWER EXHAUST w/ 3 POSITION ECON.

In the unit "OFF" or in the minimum economizer position, the power exhaust fan is off. When the unit goes to 100% outside air operation, the power exhaust fan motor starts and operates until the unit is shut off or the economizer goes back to minimum position.

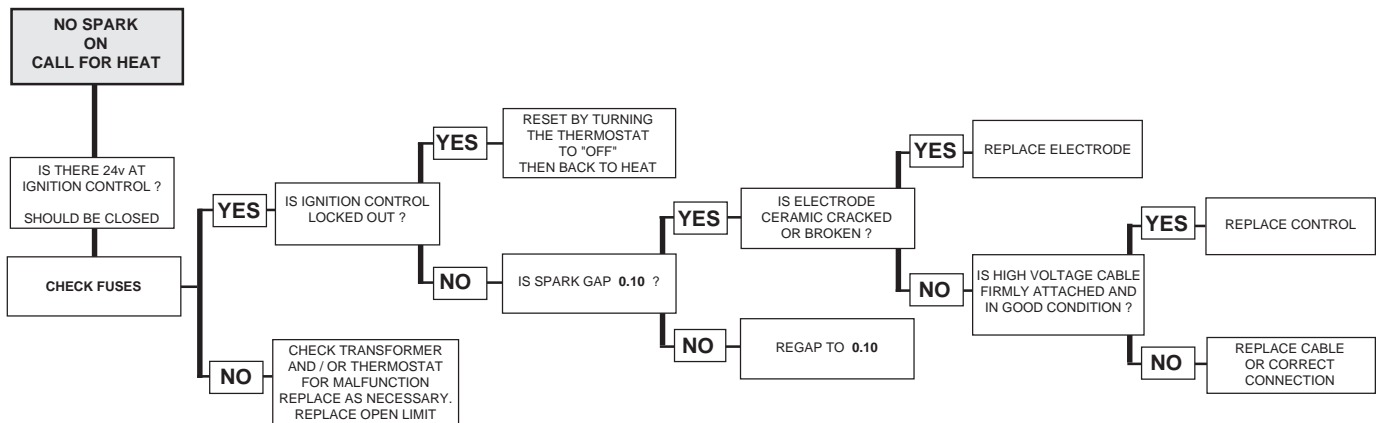
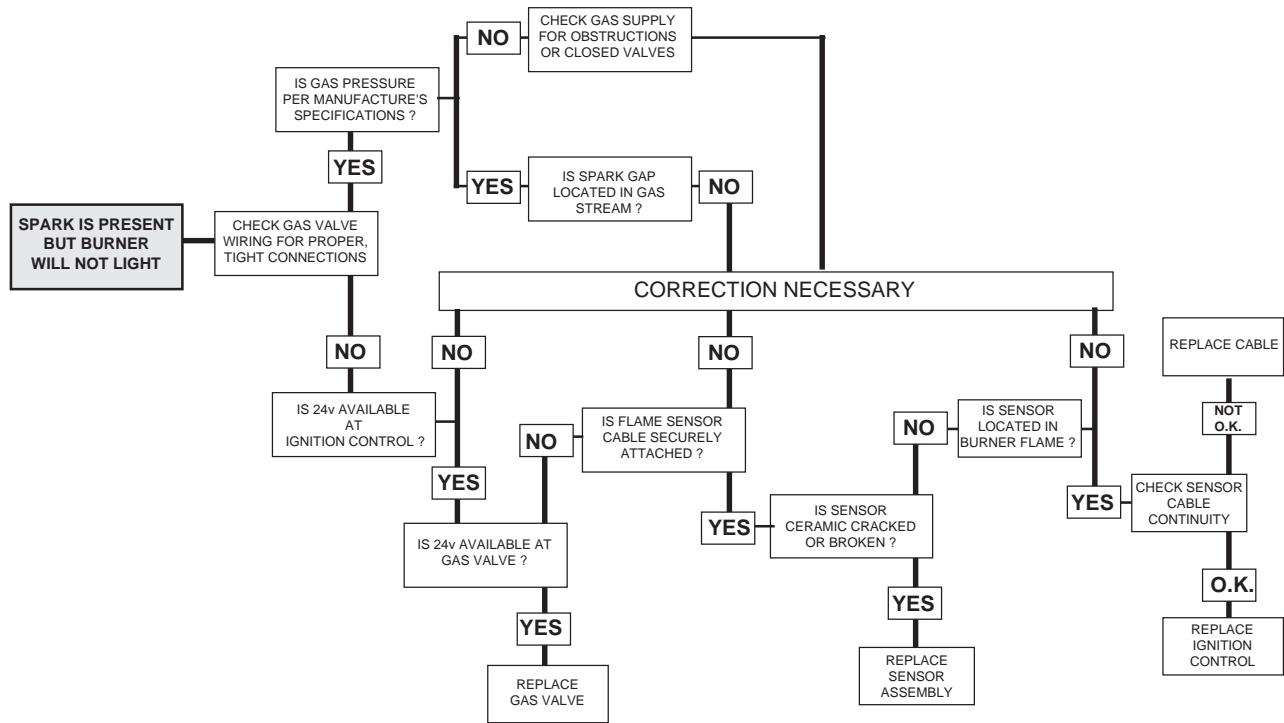
POWER EXHAUST w/ FULL MODULATING ECON.
In the unit "OFF" or in the minimum economizer position, the power exhaust is off. As the economizer begins to modulate open, an end switch (adjustable) closes which starts the power exhaust fan motor. The power exhaust operates until the economizer modulates below the end switch setting or the unit is shut off.

POWER EXHAUST w/ FULL MODULATING ECON.
WITH BUILDING PRESSURE CONTROL
In the unit "OFF" or in the minimum economizer position the power exhaust is off. As the economizer begins to modulate open, an end switch (adjustable) closes which starts the power exhaust fan motor. The amount of exhaust air is controlled by a set of dampers in response to the unit mounted building static pressure controller. The power exhaust operates until the economizer modulates below the end switch setting or the unit is shut off. (NOTE: Static pressure sensing tubing is field supplied and installed).

COMPRESSOR CHECKOUT PROCEDURE



IGNITION CONTROL CHECKOUT PROCEDURE



DATE: _____

JOB NAME: _____

ADDRESS: _____ MODEL No: _____

CITY, STATE: _____ SERIAL No: _____

START-UP CONTRACTOR: _____ TAG: _____

UNIT CONFIGURATION

 AIR COOLED
 EVAP. COOLED NO WATER LEAKS CONDENSER SAFETY CHECK
START-UP CHECK LIST • GENERAL CHECKS

 Inspect Unit For Damage: _____ Inspect Economizer Damper Assembly: _____
 Check All Fans For Free Movement: _____ Verify Voltage: _____
 Verify All Copper Tubing Is Isolated So It Doesn't Rub: _____ Verify Transformer Tap On 208/230v Equip.: _____
 Check & Tighten All Electrical Terminals: _____ Tighten All Set Screws On Fans: _____

Notes: _____

S/A BLOWER ASSEMBLY

 ALIGNMENT CHECK ROTATION NAMEPLATE AMPS _____

MOTOR MAKE & AMPS				3 Ø				BAND SIZE _____			
1								VFD DESIGN FREQUENCY _____			
2								VAV CONTROLS _____			
3								SPRINGS OPERATING CORRECTLY <input type="checkbox"/>			
4											

COOLING TEST

 TANDEM COMPS. INDEPENDENT CIRCUITED COMPS. AMBIENT TEMP. _____ °F

COMP. No. & AMPS				Crankcase Heater Amps	Head Pressure PSIG	Suction Pressure PSIG	High Pressure Switch	COMP. No. & AMPS				Crankcase Heater Amps	Head Pressure PSIG	Suction Pressure PSIG	High Pressure Switch
3 Ø								3 Ø							
L1	L2	L3						L1	L2	L3					
1								5							
2								6							
3								7							
4								8							

CONDENSER FAN ASSEMBLY

 ALIGNMENT CHECK ROTATION NAMEPLATE AMPS _____

MOTOR MAKE & AMPS				3 Ø				MOTOR MAKE & AMPS				3 Ø			
1								4							
2								5							
3								6							

CONDENSER PUMP

 CHECK ROTATION

COND. PUMP (1) - AMPS				3 Ø			
1							

HEATWHEEL ASSEMBLY

 CORRECT ROTATION DIRECTION WHEEL SPINS FREELY FLA _____

MOTOR MAKE & AMPS				3 Ø				MOTOR MAKE & AMPS				3 Ø			
1								2							

DATE: _____

JOB NAME: _____

MODEL No: _____

SERIAL No: _____

POWER EXHAUST / RETURN ASSEMBLY

 ALIGNMENT

 CHECK ROTATION

NAMEPLATE AMPS _____

MOTOR MAKE & AMPS			3 Ø	MOTOR MAKE & AMPS			3 Ø
1				2			

ECONOMIZER ASSEMBLY

 OPERATION CHECK

INDICATE ECONOMIZER TYPE: _____

ECON. MOTOR TYPE: _____

ECON. CHANGEOVER TYPE & OPERATION: _____

GEARS CHECK: _____

CHECK ALL ECON. WIRING: _____

GAS HEATING TEST

 NATURAL GAS

 LP GAS

STAGES OF HEAT _____

 PURGE AIR FROM LINES

 VERIFY PILOT SPARK

VERIFY INLET GAS PRESSURE: (refer to data plate)	WC	MANIFOLD LEAKAGE	<input type="checkbox"/>
MANIFOLD PRESSURE: SINGLE STAGE	WC	BURNER LIGHTS	<input type="checkbox"/>
1st STAGE LOW FIRE	WC	FLAME CORRECT	<input type="checkbox"/>
2nd STAGE HIGH FIRE	WC	MAIN LIMIT	<input type="checkbox"/>
		AUX. LIMIT	<input type="checkbox"/>
		FAN ON / OFF	<input type="checkbox"/>
		ROLLOUT SW.	<input type="checkbox"/>

ELECTRIC HEATING TEST

STAGES OF HEAT _____

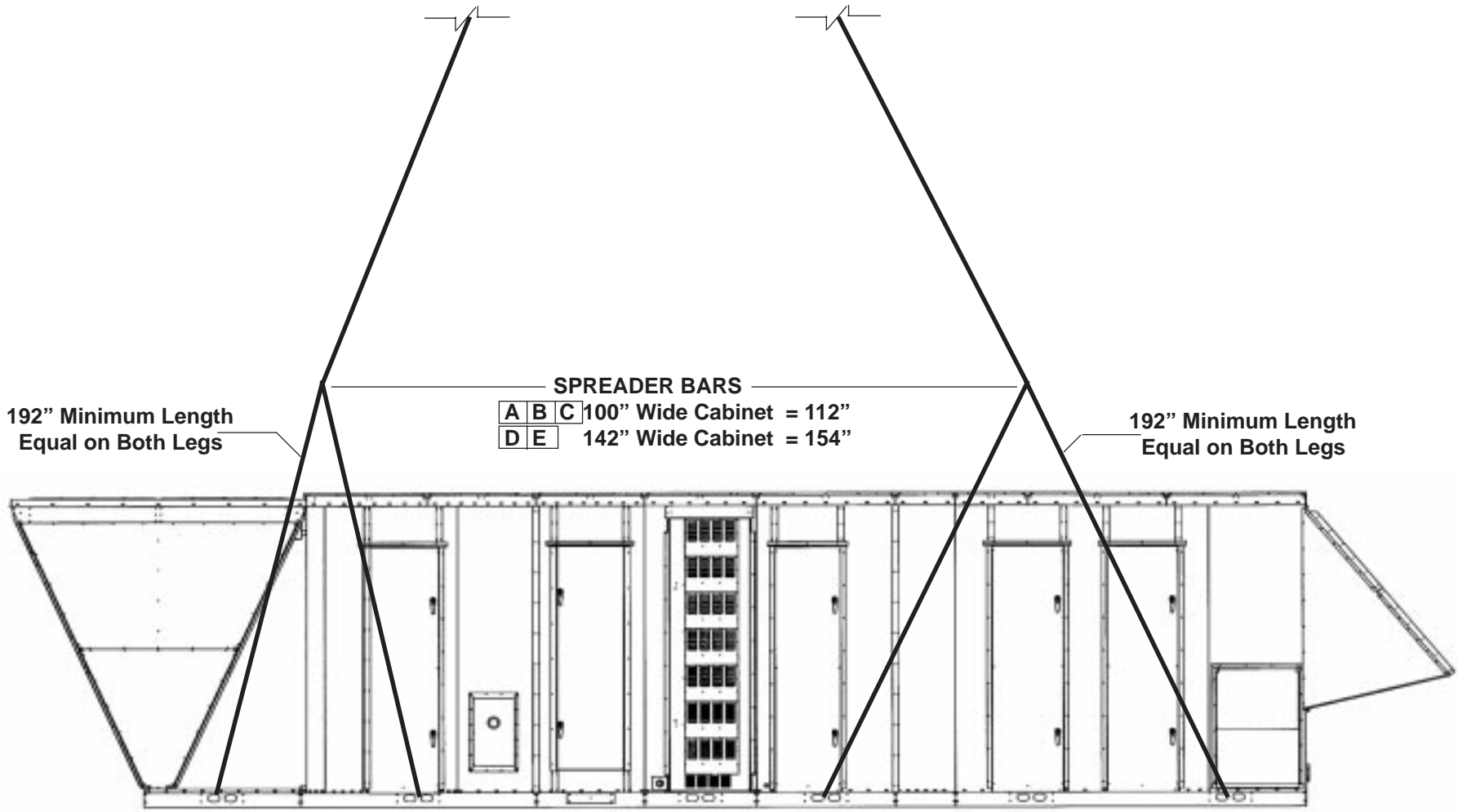
HEATER NUMBER & AMPS

1			8				LIMIT LOCKOUT	<input type="checkbox"/>
2			9				AUX. LIMIT LOCKOUT	<input type="checkbox"/>
3			10				DOOR INTERLOCK	<input type="checkbox"/>
4			11					
5			12					
6			13					
7			14					

ADDITION NOTES • CONTROLS • OPTIONS

START-UP TECHNICIAN: _____

START-UP VERIFIED BY: _____



General Configuration
Lift Slot Locations Are Unit Specific

NOTE: UNIT MUST BE RIGGED AT ALL MARKED LIFTING POINTS.

RL UNIT LIFTING DETAIL
 Drawing N.T.S

RL SERIES



INSTALLATION, SERVICE & OWNERS INFORMATION MANUAL

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Tulsa, Oklahoma 74107

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