



**BALTIMORE  
AIRCOIL COMPANY**



**Vertex™ Evaporative Condenser**

# **Vertex™ Evaporative Condenser**

**RIGGING & ASSEMBLY INSTRUCTIONS**



**Vertex™ Evaporative Condensers should be rigged and assembled as outlined in this bulletin.**

These procedures should be thoroughly reviewed prior to the actual rigging and assembly of the equipment to acquaint all personnel with procedures to be followed and to assure that all necessary equipment will be available beforehand.



Be sure to have a copy of the certified drawing available for reference. If you do not have a copy of this drawing, or if you need additional information about this unit, contact your local BAC Representative whose name and telephone number are on a label adjacent to the access door. The model number and serial number of the unit are also located in this area.



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# Introduction

**WARNING:** In the event of extended lifts or where hazards exist, the lifting devices should be used in conjunction with safety slings placed under the unit.



## Safety

Adequate precautions appropriate for the installation and location of these products should be taken to safeguard the equipment and the premises from damage, and the public from possible injury. **The procedures listed in this manual must be thoroughly reviewed prior to rigging and assembly. Read all warnings, cautions and notes detailed in the margins.**

When the fan speed of the unit is to be changed from the factory set speed, including the use of a variable speed device, steps must be taken to avoid operating at or near the fan's "critical speed" which could result in fan failure and possible injury or damage. Refer to "Fan Control" in the *Vertex™ Operation & Maintenance Manual* on [www.BaltimoreAircoil.com](http://www.BaltimoreAircoil.com).

## Shipping

BAC Vertex™ Evaporative Condensers are factory assembled to ensure uniform quality with minimum field assembly. As standard, models ship in two sections per cell (lower and upper). Contact your local BAC Representative for more information. For the dimensions and weights of a specific unit or section, refer to the submittal drawings.



**WARNING:** Only personnel qualified to do so should undertake the installation, operation, maintenance, and repair of this equipment. Proper care, procedures, and tools must be used in handling, lifting, installing, operating, maintaining, and repairing this equipment to prevent personal injury and/or property damage.

## Pre-Rigging Checks

When the unit is delivered to the jobsite, it should be checked thoroughly to ensure all required items have been received and are free of any shipping damage prior to signing the bill of lading.

**The following parts should be inspected (if applicable for the unit's configuration):**

- Sheaves, Belts, and Bearings
- Bearing Supports
- Fan Motor(s)
- Fan Guard(s)
- Fan(s) and Fan Shaft(s)
- Float Valve Assembly(s)
- Water Distribution System
- Coil Surface
- Cold Water Basin Accessories
- Interior Surfaces
- Exterior Surfaces
- Spray Water Pumps
- Mating Surfaces Between Sections/ Modules
- Miscellaneous Items: All bolts, nuts, washers, and sealer tape required to assemble sections or component parts are furnished by BAC and shipped with the unit. A checklist inside the envelope marked "Customer Information Packet" indicates what miscellaneous parts are included with the shipment and where they are packed. This envelope will be attached to the side of the unit or located in a box inside the unit.



## Introduction

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## Unit Weights

Before rigging any unit, the weight of each section should be verified from the unit submittal drawing. Unit print weights include the final assembled unit with all accessories. Accessory weights (found on the respective drawing) can be deducted from the total weight.

## Anchoring

Seven-eighths inch (7/8") diameter holes are provided in the bottom flange of the basin section for bolting the unit to the support beams. Refer to the suggested support drawing included in the submittal for location and quantity of the mounting holes. **The unit must be level for proper operation.** Anchor bolts must be provided by others. The IBC rating is only certified with standard anchorage locations. Using alternate anchorage locations or alternate steel supports will void any IBC wind or seismic ratings. Contact your local BAC Representative for details.

## Cold Weather Operation

These products must be protected by mechanical and operational methods against damage and/or reduced effectiveness due to possible freeze-up. Refer to "Cold Weather Operation" in the Vertex™ Operation & Maintenance Manual on [www.BaltimoreAircoil.com](http://www.BaltimoreAircoil.com), or contact your local BAC Representative for recommended protection alternatives.

## Location

All evaporative cooling equipment must be located to ensure an adequate supply of fresh air to the fans. When units are located adjacent to walls or in enclosures, care must be taken to ensure the warm, saturated, discharge air is not deflected and redirected back to the air intakes. Each unit must be located and positioned to prevent the introduction of discharge air into the ventilation systems of the building on which the unit is located and of adjacent buildings. For detailed recommendations on BAC equipment layout, see our website at [www.BaltimoreAircoil.com](http://www.BaltimoreAircoil.com) or contact your local Representative.

## Warranties

Please refer to the Limitation of Warranties (located in the submittal package) applicable to and in effect at the time of the sale/purchase of these products.

## Unit Operation

Prior to start-up and unit operation, refer to the *Vertex™ Operation & Maintenance Manual* shipped with the unit and also available at [www.BaltimoreAircoil.com](http://www.BaltimoreAircoil.com).



**WARNING:** The unit must be properly anchored before operation begins.



**WARNING:** Before an actual lift is undertaken, ensure no water, snow, ice, or debris has collected in the basin or elsewhere in the unit. Such accumulations will add substantially to the equipment's lifting weight.



**NOTICE:** Each unit must be located and positioned to prevent the introduction of discharge air into the ventilation systems of the building on which the unit is located and of adjacent buildings.

# 2

## VERTEX™ EVAPORATIVE CONDENSER

# Rigging & Assembly

**NOTE:** For weight information, refer to the submittal drawing package.



### Rigging

Refer to **Table 1** for the recommended vertical dimension “H” from the lifting device to the spreader bar. In the event of extended lifts or where hazards exist, the lifting devices should be used in conjunction with safety slings placed under the unit.

**NOTE:** Any motors or accessories shipped in the cold water basin must be removed prior to installing the upper (mechanical and coil casing) section.



**WARNING:** Single piece lift is ONLY possible when total unit shipping weight is under 35,000 lbs. Please refer to the shipping weight shown on the Unit Print from submittal package. Single piece lifting must be done using lifting ears on the base of the upper casing section (See **Figure 1**).



Model Number	Number of Basin Sections	Number of Casing Sections	Basin Section			Casing Section or Single Piece Lift	
			Spreader Bar Length (L)	Minimum Height (H)	Center of Gravity from Air Inlet Face	Spreader Bar Length (L)	Minimum Height (H)
VRC-xxxxA-1012N-xx	1	1	10'	13'-8"	4'-2"	10'	9'-2"
VRC-xxxxA-1018N-xx	1	1	10'	13'-8"	4'-2"	10'	13'-8"
VRC-xxxxA-1024N-xx	2	2	10'	13'-8"	4'-2"	10'	9'-2"
VRC-xxxxA-2012N-xx	2	2	10'	13'-8"	4'-2"	10'	9'-2"
VRC-xxxxA-1036N-xx	2	2	10'	13'-8"	4'-2"	10'	13'-8"
VRC-xxxxA-2018N-xx	2	2	10'	13'-8"	4'-2"	10'	13'-8"
VRC-xxxxA-1212N-xx	1	1	12'	13'-8"	5'	12'	9'-2"
VRC-xxxxA-1218N-xx	1	1	12'	13'-8"	5'	12'	13'-8"
VRC-xxxxA-1224N-xx	2	2	12'	13'-8"	5'	12'	9'-2"
VRC-xxxxA-2412N-xx	2	2	12'	13'-8"	5'	12'	9'-2"
VRC-xxxxA-1236N-xx	2	2	12'	13'-8"	5'	12'	13'-8"
VRC-xxxxA-2418N-xx	2	2	12'	13'-8"	5'	12'	13'-8"

Table 1. Recommended Vertical Dimension and Spreader Bar Length

Most single cell Vertex™ Evaporative Condenser products are designed to be lifted in one assembled piece as shown in **Figure 1**. Verify the total unit shipping weight is below 35,000 lbs before performing a single-piece lift. A two-piece lift is shown in **Figure 2**.

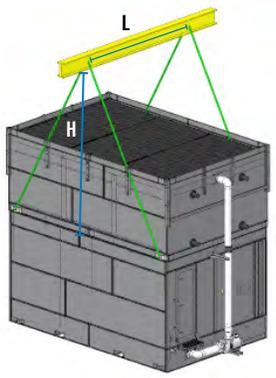


Figure 1. Single-Piece Lift

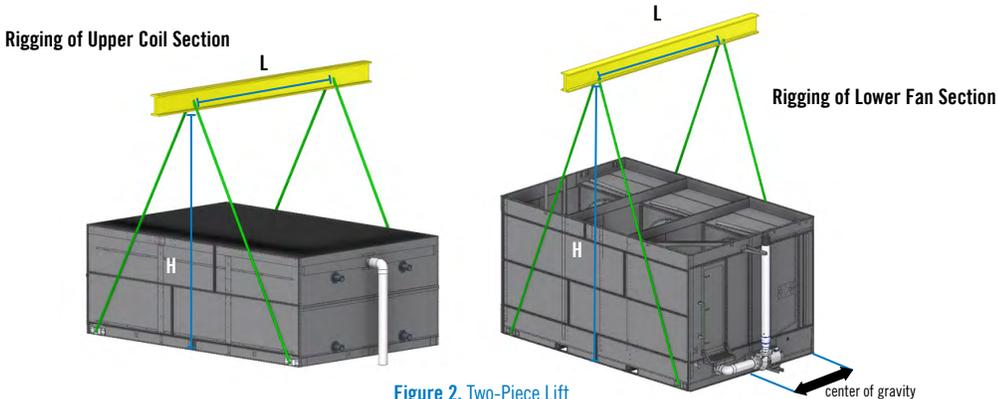


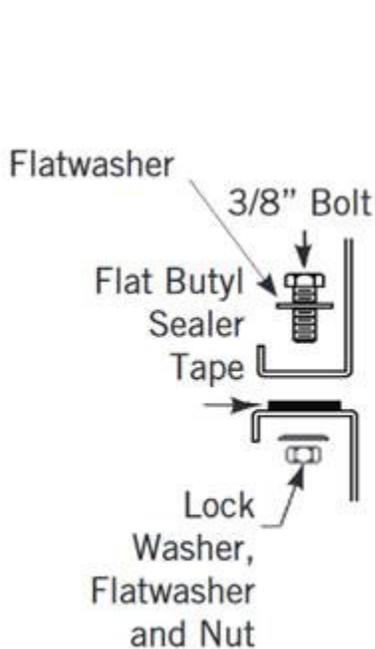
Figure 2. Two-Piece Lift

## Section Assembly

1. Remove any motors or accessories shipped in the cold water basin. Rig the basin section. The rigging hook must be placed above the section's center of gravity as detailed in **Figures 1 and 2**.
2. Wipe down the flanges with acetone to remove dirt or moisture which may have accumulated during shipment and storage.
3. Install sealer tape on the mating flange of the bottom section to ensure an airtight seal between the top and bottom section. Install flat butyl sealer tape (BAC part #554000) supplied with the unit, on the mating flanges of the lower section in a continuous line. At each corner, allow 1" overlap. See **Figure 3**.
4. Lower the flexible connection on the pump discharge piping below the elevation of the lower section before rigging the coil casing section.
5. Lower the upper section (coil casing and mechanical) until it is hovering 2-6" above the lower section.
6. Insert drift pins per **Figure 5**. Start at the corner hole and skip every 3 or 4 holes along the length of the unit, inserting drift pins to align the coil casing section and the lower section holes. Repeat this process on the other side.
7. Fasten the hardware between the coil casing and lower section per **Figure 4**. **Lower the coil casing section the rest of the way onto the lower section, keeping mounting holes aligned.**
8. Secure the hose connecting the sections of the pump discharge pipe with the hose clamps provided.
9. On units with more than one casing, install the remaining casings using the same procedure as the first. When installing two or more casings, on the basin section, sealer tape must be applied to both cross flanges (see **Figure 3**).
10. On units operating with a remote sump tank, install a bleed line with valve between the system circulating pump discharge riser and a convenient drain. Locate the bleed line in a portion of the riser piping that drains when the pump is off. Units that are furnished with a factory-installed circulating pump include a bleed line with valve.



**CAUTION:** Before proceeding, bolt the basin sections securely to the supporting steel.



**Figure 4.** Fastening of Upper and Lower Sections



**Figure 3.** Sealer Tape Application



**Figure 5.** Section Alignment Using Drift Pins

## Wiring the Factory Terminal Box (EC Fan System Only)

**WARNING:** When connecting power to the unit, do not penetrate the top of the control panel. Doing so may allow moisture to enter the panel. All cable and conduit should be supported separately from the unit. Do not penetrate the unit for supports or other connections.



**NOTE:** Any motors or accessories shipped in the cold water basin must be removed prior to installing the upper (mechanical and coil casing) section.



### Electrical Power Quality

This unit requires clean electrical power to operate properly. Voltage and frequency should be within 10% of the designed voltage for the unit. Failure to provide this power may damage the unit. The EC fan motors contain built-in protection circuits that will shut down the fan if there is a power quality issue. If the fans go into protection mode, the unit must be shut down and restarted to return to normal operation.

### Power Connections

The Vertex™ Condenser requires a 3 phase 60Hz power source (50Hz also available). The voltages available are 200 to 240V and 380V to 480V. Please ensure that the correct voltage is supplied to the unit. If unsure, check your unit's submittal to verify that the provided power matches your unit. On the factory terminal box, remove the NEMA plug located on the side of the panel near the disconnect switch. This will maintain the panel's NEMA 4 rating and prevent water ingress to the unit.

### Controls Connections

The controls wiring should be provided in a separate conduit from any power wiring. BAC recommends penetrating the control panel from the bottom or side panel observing standards. It is also recommended to use shielded wire to avoid interference.

To control the Vertex™ Evaporative Condenser fan speed, a control signal of 4-20mA is used. The signal commands the fans off at 4mA and full speed at 20mA. The 4-20mA should be wired as outlined in the wiring diagram in the submittal package. Control wiring can be routed into the terminal box through the NEMA plug located on the bottom of the panel.

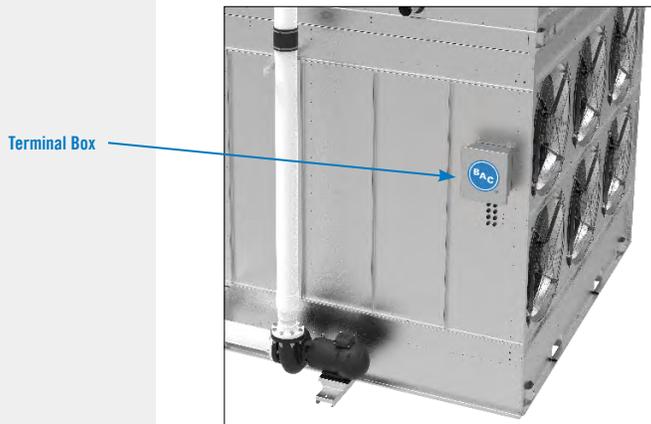


Figure 6a. Terminal Box Location

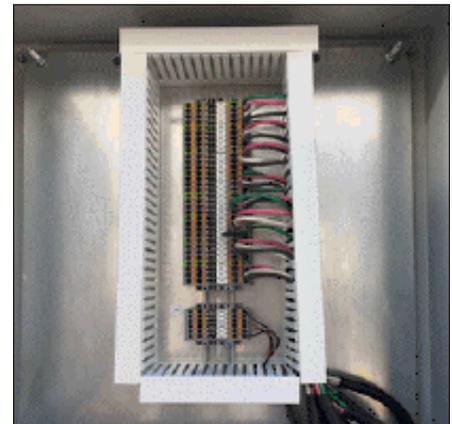


Figure 6b. Terminal Box

# Optional Accessory Installation



## Bottom Water Outlet (Optional)

1. The bottom connection seal, **Figure 7**, is typical for all bottom remote sump outlets. Flange mounting hardware and gasket to be supplied by others.
2. Bottom connection seal kit(s) ship in plastic tubs.

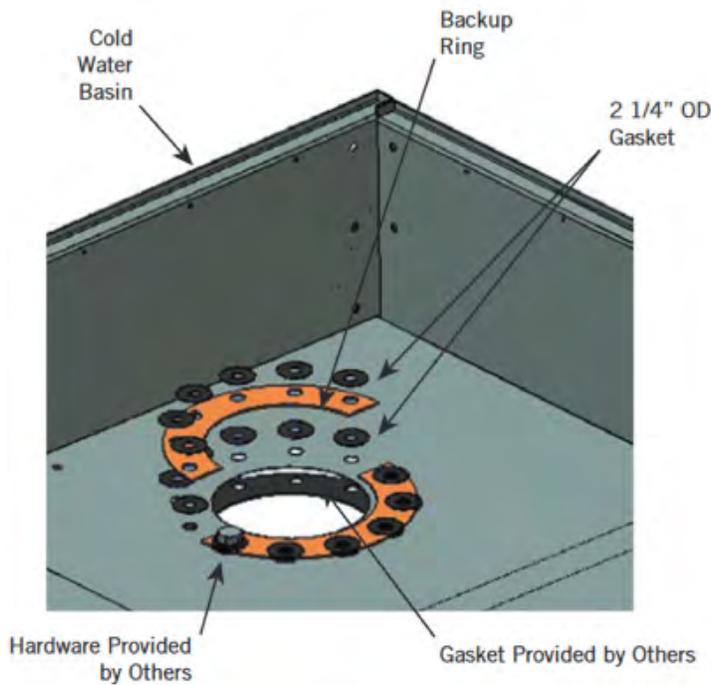


Figure 7. Bottom Water Outlet

## Offset Access Platform, Perimeter Guardrail and Ladder

**NOTE:** For platform and ladder options ordered but not listed, refer to the customer information packet supplied on the unit.



1. Lift the platform by fastening the lifting device to the top guard rail so it does not slide while lifting. Lift the platform so that the support gussets align with the mounting brackets on the unit. See **Figure 8**.
2. Fasten the platform gussets to the mounting brackets using the supplied hardware as shown in **Figure 8, Detail A**.
3. Loosely fasten the lower and intermediate appropriate ladder brackets and diagonal braces to the factory installed ladder brackets as shown in **Figure 8, Detail B** and **Figure 9, Detail A**. Check your submittal for the ladder orientation ordered.

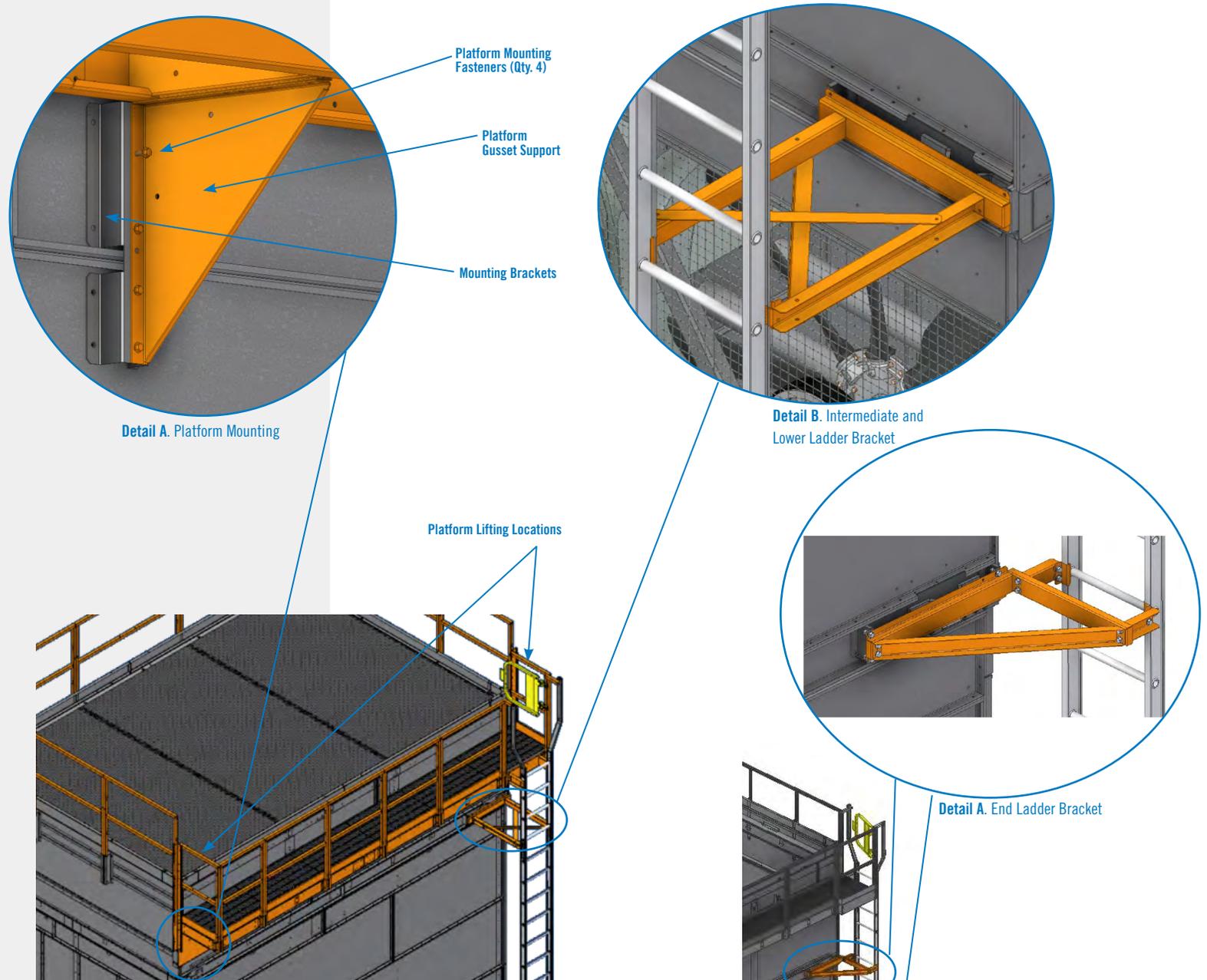


Figure 8. Platform Installation and Air-Intake Face (Face D) Ladder Installation

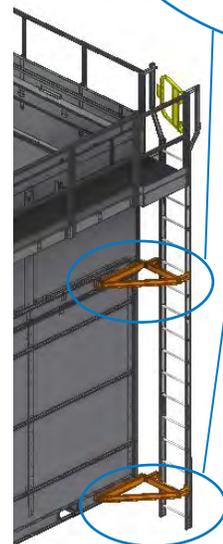


Figure 9. End Ladder Installation



Attach the ladder to the platform and fasten the lower and intermediate brackets to the ladder side rails as shown in **Figure 8, Detail B** and **Figure 9, Detail A**.

4. Tighten all ladder bracket fasteners.
5. Cut the ladder to length required and fasten the ladder foot to the landing surface (anchorage hardware provided by others).
6. Using the supplied hardware, install the perimeter guardrails at the bracket points as shown in **Figure 10, Detail A and Detail B**.
7. At the point where two vertical support meet, install the factory supplied fastener through each support as shown in **Figure 10, Detail C**.

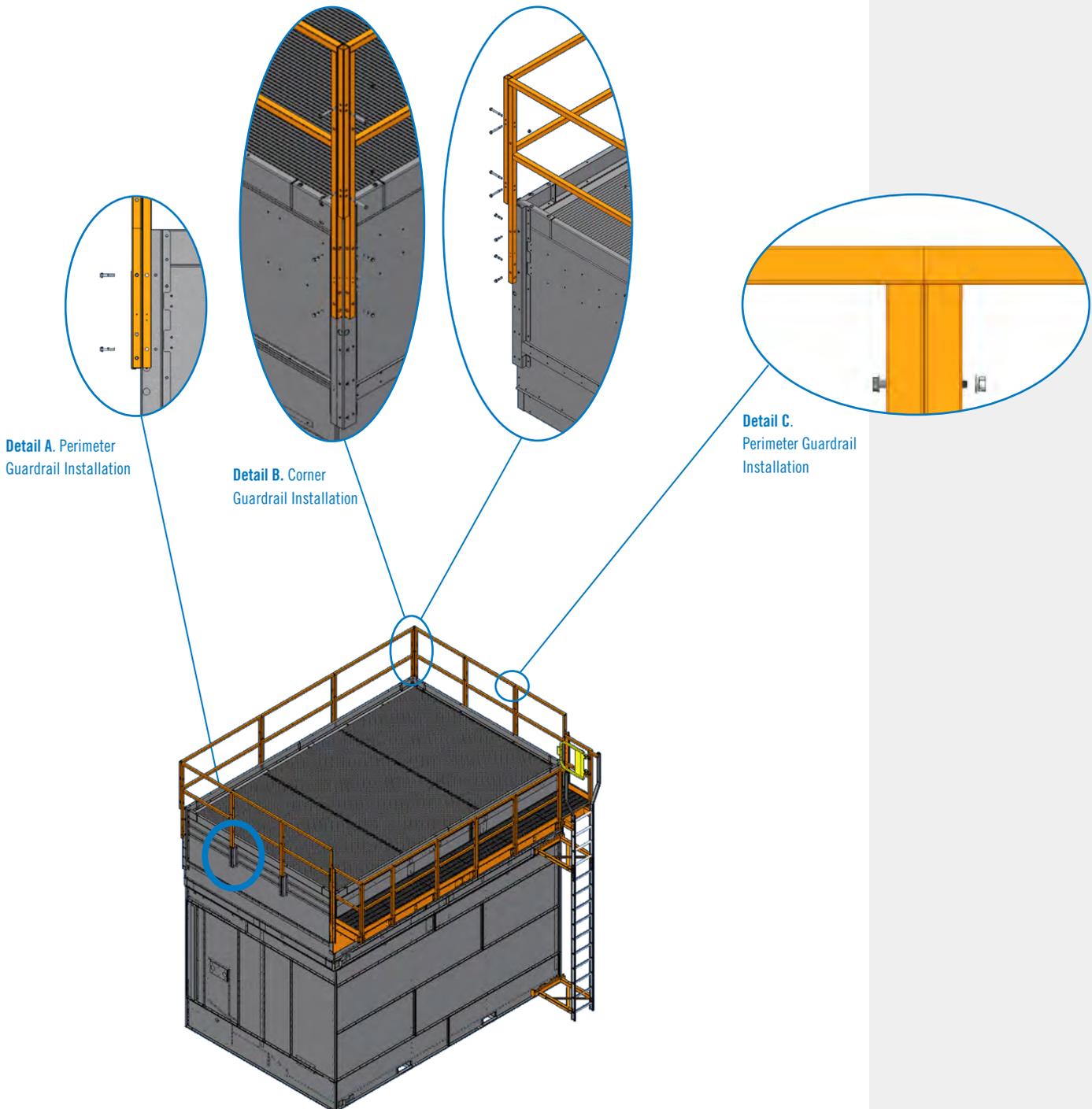


Figure 10. Perimeter Guardrail Installation

## Offset Access Platform, Perimeter Guardrail and Ladder—18 ft Units

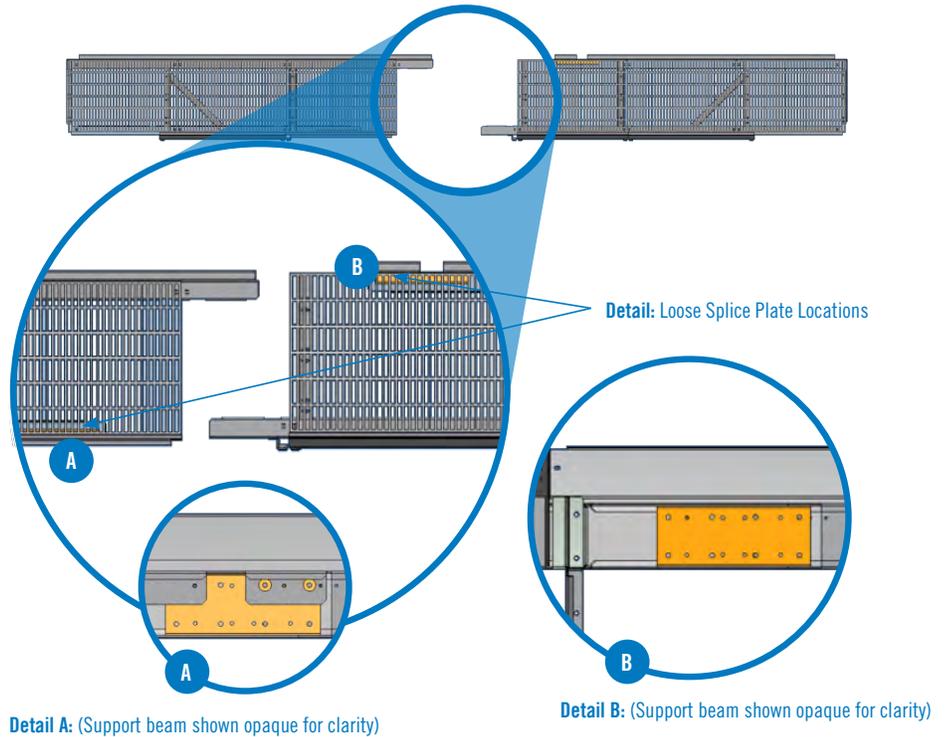
**NOTE:** The following instructions are for units with 18 ft side length (Models VRC-xxxx-xx18-xx)

**NOTE:** For platform and ladder options ordered but not listed, refer to the customer information packet supplied on the unit.



1. Platforms will be shipped in two sections, each roughly 10 ft in length, which should be joined prior to lifting and installing on the unit.
  - a. First, unbolt the splice plates from both sides of the platform, but DO NOT remove the plates from the support beam channel. Slide the loose plates to the locations shown in **Figure 11, Detail A and B.**

Figure 11. Two Platform Sections



- b. Begin joining the platform sections by offsetting the sections from each other as shown in **Figure 12.**

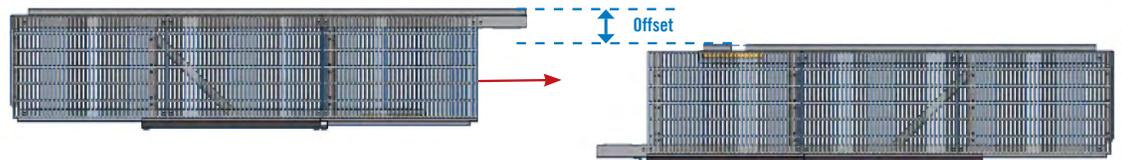


Figure 12.

- c. Slide the platforms until the crossmember cutout is aligned with the crossmember of the second section. Then slide the two sections together until the support beams are aligned, and the crossmember is seated into the cutout. See **Figure 13.**

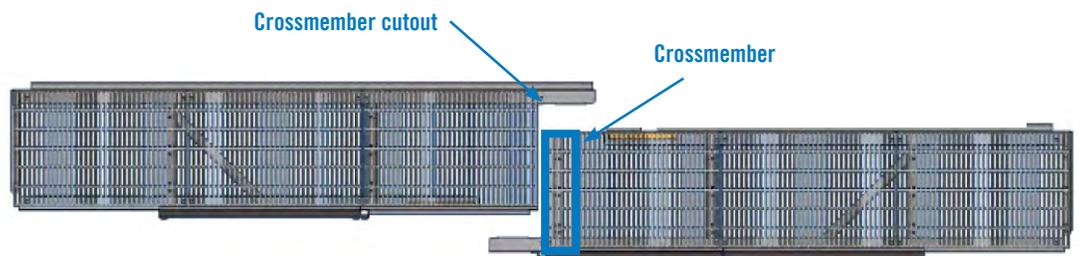


Figure 13.

- d. Slide the two splice plates into mounting positions. Secure with provided hardware. See **Figures 14, 15** and **16**.

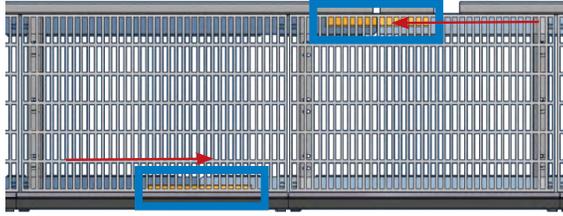


Figure 14. Move splice plates into positions shown

- e. Secure crossbeam on inside of platform with provided hardware.

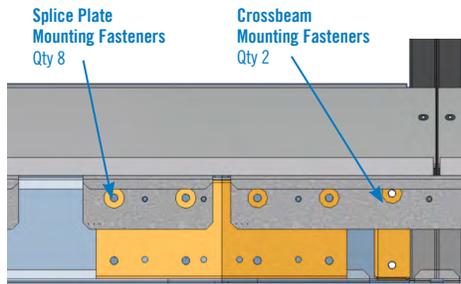


Figure 15. Inside beam splice plate and crossbeam mounting fastener locations

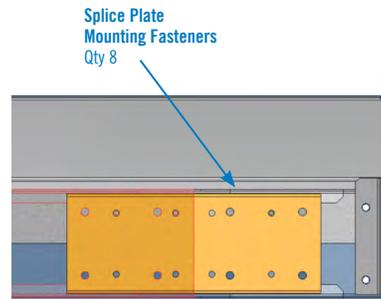


Figure 16. Outside beam splice plate mounting fastener locations

2. Lift the platform by fastening the lifting device to the top guard rail so it does not slide while lifting. Lift the platform so that the support gussets align with the mounting brackets on the unit. See **Figure 8**.
3. Fasten the platform gussets to the mounting brackets using the supplied hardware as shown in **Figure 8, Detail A**.
4. Install A-frame handrail section and secure with supplied hardware. See **Figure 17** and **Detail A**.

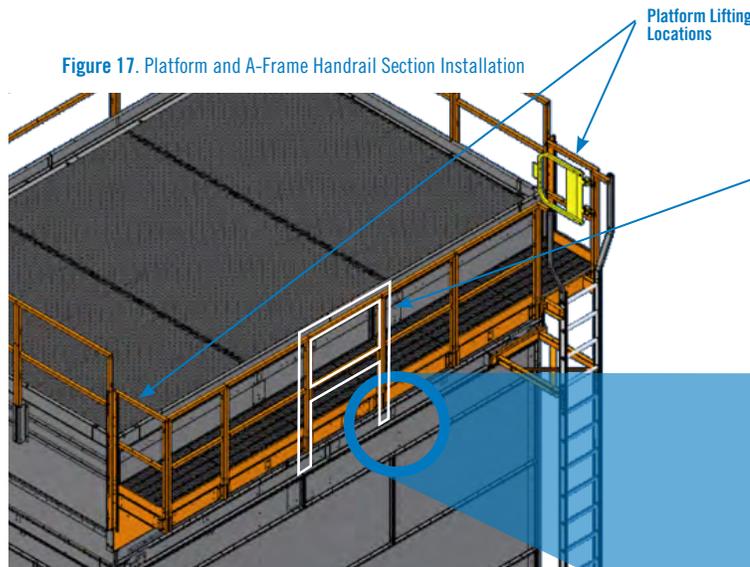


Figure 17. Platform and A-Frame Handrail Section Installation



Figure 18. Field-installed A-Frame handrail section

Detail A. Fastening A-Frame handrail section.

**NOTE:** For platform and ladder options ordered but not listed, refer to the customer information packet supplied on the unit.



5. Loosely fasten the lower and intermediate ladder brackets and diagonal braces to the factory installed ladder brackets on the unit, as shown in **Figure 8, Detail B** and **Figure 9, Detail A**. Check your submittal for the ladder orientation ordered.
6. Assemble ladder sections together using supplied hardware. The shorter ladder section will be installed towards the top of the unit. See **Figure 19**.

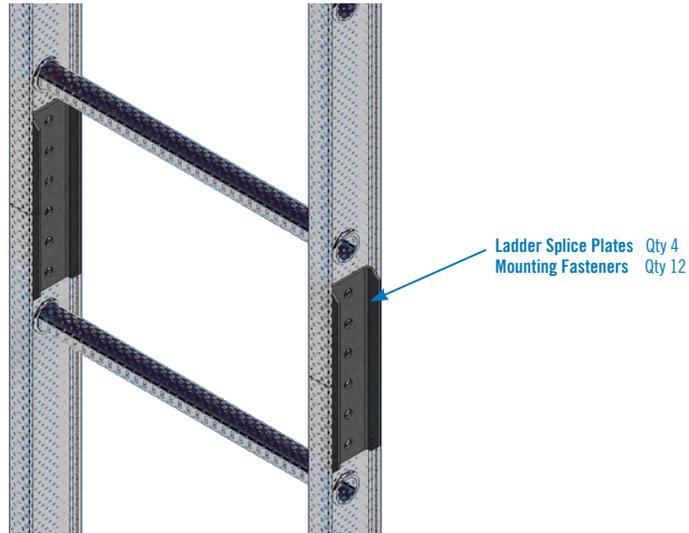


Figure 19.



7. Attach the ladder to the platform and fasten the lower and intermediate brackets to the ladder side rails as shown in **Figure 8, Detail B** and **Figure 9, Detail A**.
8. If the ladder was supplied with a safety cage, assemble the bottom flared section to the upper safety cage section. Secure with supplied hardware. See **Figure 20**.

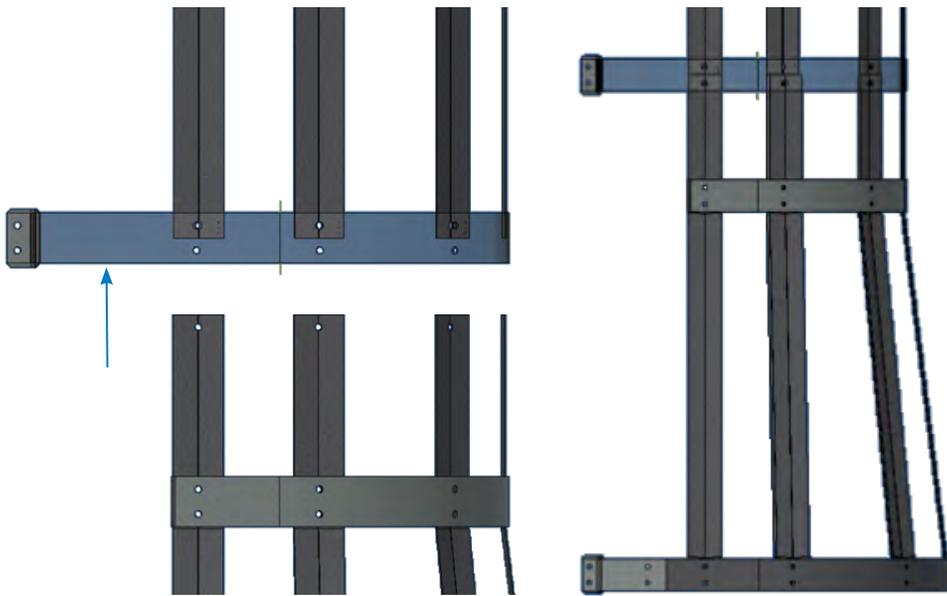


Figure 20.

## Ladder Safety Cage (Optional)

1. If the safety cage is shipped in multiple pieces, reassemble the safety cage.
2. Bolt the safety cage to the ladder using flatwashers and locknuts. Orient all fasteners with bolt heads inside safety cage. See **Figure 21, Detail A through D** and refer to **Table 2** for the quantity of bolting locations for different safety cage heights.

**NOTE:** Safety gates are provided for all handrail openings, and all components are designed to meet OSHA requirements.

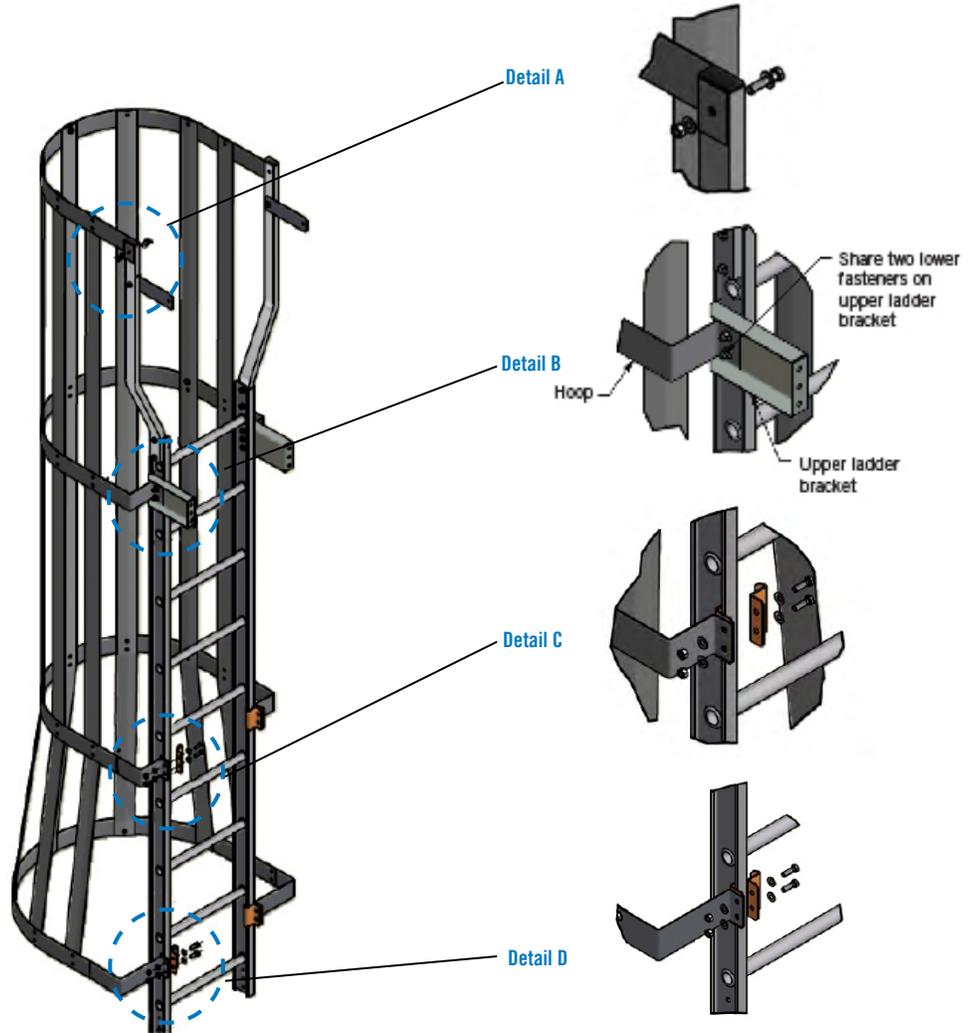


Figure 21. Safety Cage

Cage Height (ft)	Bolting Location				Cage Height (ft)	Bolting Location				Cage Height (ft)	Bolting Location			
	A	B	C	D		A	B	C	D		A	B	C	D
4	1	–	–	1	12	1	1	2	1	20	1	1	4	1
5	1	1	–	1	13	1	1	2	1	21	1	1	4	1
6	1	1	–	1	14	1	1	2	1	22	1	1	4	1
7	1	1	–	1	15	1	1	2	1	23	1	1	4	1
8	1	1	–	1	16	1	1	2	1	24	1	1	4	1
9	1	1	1	1	17	1	1	3	1	25	1	1	5	1
10	1	1	1	1	18	1	1	3	1	27	1	1	5	1
11	1	1	1	1	19	1	1	3	1					

Table 2. Ladder Safety Cage Bolting Location and Quantities

## Automatic Bearing Greasers (Optional for BALTIDRIVE® Power Train Units Only)

1. Verify the mounting brackets are factory installed.
2. Fill the extended lube lines with BAC compatible water resistant grease using a manual grease gun. See the “Fan Shaft Bearings” section of the *Vertex™ Evaporative Condenser Operation & Maintenance Manual* available on [www.BaltimoreAircoil.com](http://www.BaltimoreAircoil.com).
3. Thread automatic bearing greasers into 3/8" x 1/4" adapters on mounting brackets.
4. For programming, operation, and troubleshooting of the greaser, consult the user manual shipped with the greaser. This manual is also available through your local BAC Representative.

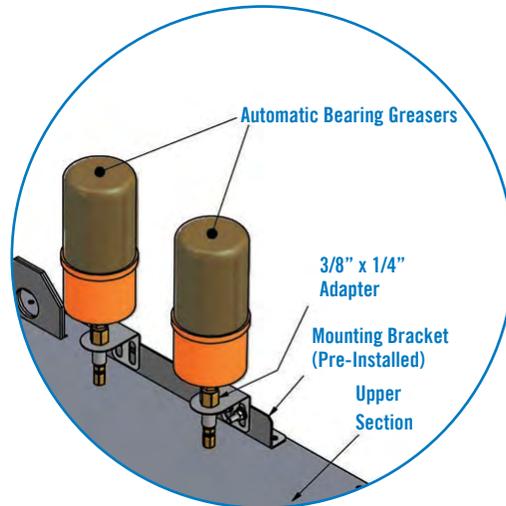


Figure 22. Automatic Bearing Greasers



#### NOTES:

1. The heater control panel should be within sight of the heater if a disconnect switch option is selected.
2. Maintain a water level at least 2" over the heaters by ensuring proper operation of make-up water level control. Low water may lead to over temperature conditions near the heater.
3. All power wiring should have a temperature rating of 167°F (75°C), and be rated for the number of wires in the conduit.
4. The wiring should be sized for the quantity of incoming wires in the conduit and the amperage of the branch circuit protective device as directed by the NEC/CEC, or any other local directives.
5. If non-metallic conduit is used, provide a circuit grounding conductor that meets NEC/CEC requirements. Ground lugs are provided in the heater control panel.



## Heater Control Panel (Optional)

1. Carefully plan the location of the control panel. Measure the factory supplied probe cord length. Do not attempt to change the cord length.
2. After selecting the installation site, mount the control panel with four 5/16" (field supplied) bolts through the mounting feet on the enclosure.
3. The main incoming power hub and the main power termination points are sized for wires based on the total nameplate kW and voltage. The actual load for a particular installation may be less. Either compute the actual load on the heater control panel (the total kW of all the heaters connected to it) or use the nameplate rating to determine the wire size required. The field supplied branch circuit disconnect switch and the branch circuit protective devices (fusing or circuit breaker) should be sized per NEC or local code requirements.
4. Connect the incoming power wire conduit to the incoming power hub provided on the control panel. Make sure the connection is water tight and secure. Pull the incoming power wire into the control panel enclosure and make connections per the control panel-wiring diagram.
5. Connect the heater power wire conduit(s) to the heater power wire hub(s) provided on the control panel. Make sure the connection is watertight and secure. Pull the heater power wire into the control panel enclosure and make the connections per the control panel wiring diagram. Conduit connections to multiple heaters should run until the conduit terminates at the last heater. Jumpering from one heater to the next is not recommended.
6. If the heater has a thermal cutoff, wire the cutoff back to the terminal block in the panel per the wiring diagram. This is a Class 1 circuit and can be in the same conduit as the power wiring. If there are two or more heaters, connect the cutoffs in series as shown in the wiring diagram.
7. If alternative conduit hubs are drilled, or if supplied hubs are not used, replace the plastic protective caps inside the hubs with steel plugs.
8. If leakage or condensation is likely to occur in the conduit runs leading to the control panel, install a drain in the bottom of the control panel and form a conduit loop.
9. Verify operation by following the "Stand Alone BAC Heater Control Panel" in the *Vertex™ Evaporative Condenser Operation & Maintenance Manual*.

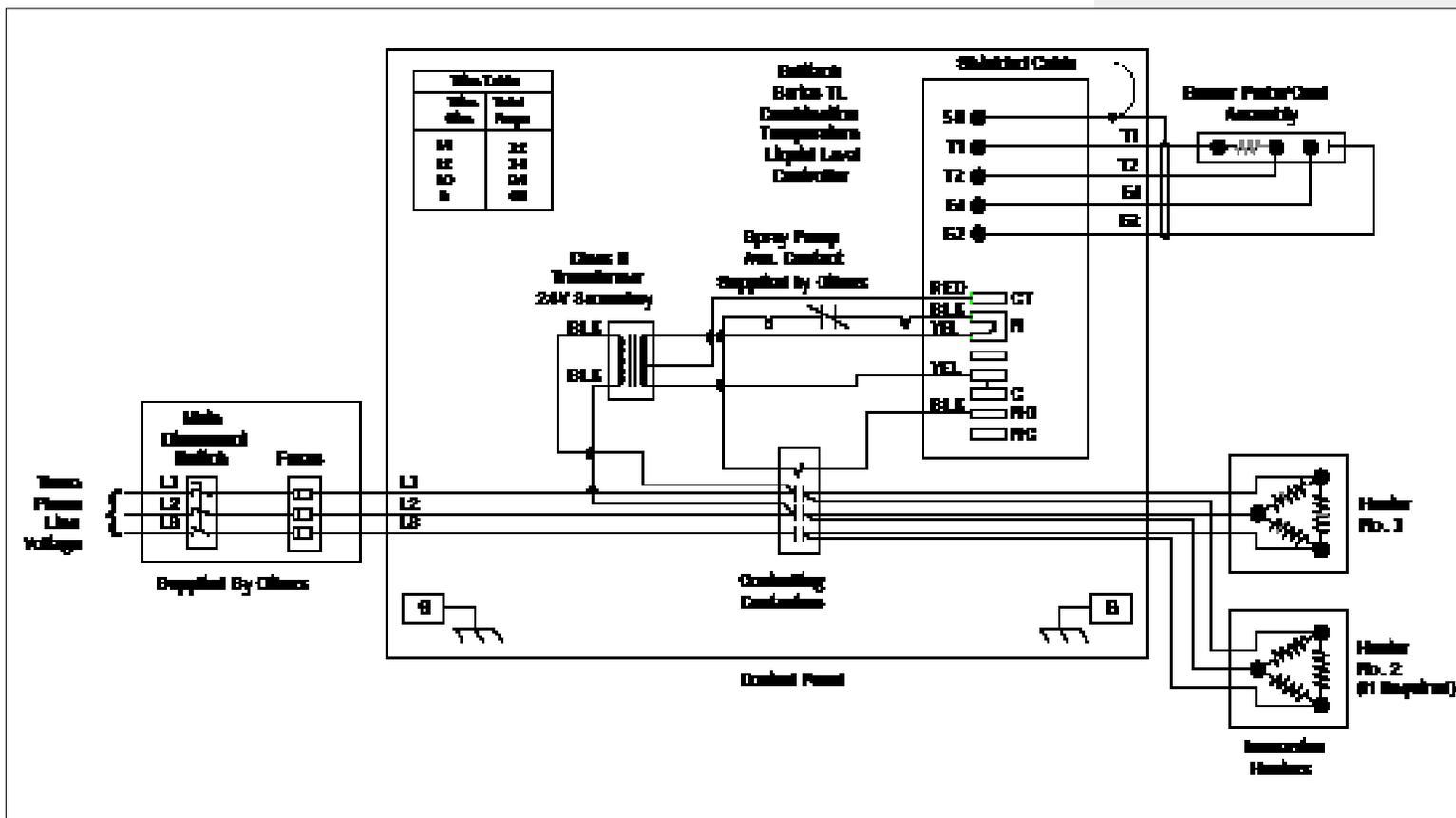


Figure 23. Example Wiring Diagram for Stand Alone BAC Heater Control Panel (Refer to Submittal Drawing for Specific Wiring Diagram)

**NOTE:** Figure 23 is superseded by any drawing supplied with the panel by the manufacturer.

COOLING TOWERS

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CLOSED CIRCUIT COOLING TOWERS

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ICE THERMAL STORAGE

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**EVAPORATIVE CONDENSERS**

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HYBRID PRODUCTS

---

PARTS & SERVICES

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**w w w . B a l t i m o r e A i r c o i l . c o m**

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