

# Holly Springs Town Hall HVAC Replacement - 2024 Update

Holly Springs Town Hall

Holly Springs, NC



2024 Update of Attic HVAC Replacement Feasibility Study

November 4, 2024

**SUMMER**  
**CONSULTANTS**  
**INCORPORATED**

4325 Lake Boone Trail  
Suite 301  
Raleigh, NC 27607

McLean | Norfolk | Philadelphia | Raleigh

Our Ref: 2334

## TABLE OF CONTENTS

Chapter 1  
EXECUTIVE SUMMARY ..... 1-1

Chapter 2  
SPLIT-SYSTEM SELECTION UPDATE ANALYSIS ..... 2-1

Appendix A  
HOLLY SPRINGS TOWN HALL HVAC REPLACEMENT MEMORANDUM ..... 3-1

Appendix B  
EQUIPMENT SELECTIONS..... 4-1

## EXECUTIVE SUMMARY

1. The Holly Springs Town Hall has two direct-expansion (DX), 20-ton, split-system HVAC units that are original to the building and are at the end of the equipment’s useful life. The Town of Holly Springs has sought the services of Summer Consultants, Inc. to update a previous study to determine the following:
  - .1 Provide recommendations on the appropriate size of a roof hatch to be installed in the roof for current needs for the HVAC unit replacement.
  - .2 Provide updates to unit selections as we approach a refrigerant changeover and phase out in the HVAC industry starting January 1, 2025.
  - .3 Review changes to unit selections and assess if there are other factors that are negatively impacted by the refrigerant changes including maximum distance in the refrigerant line lengths, performance changes or clearance changes.
2. Costs of the equipment are not being reviewed or updated as a result of this study update. It is assumed that the refrigerant changes do not impact overall cost of equipment and that equipment costs of the original study are applicable given appropriate escalation increases from the original study date.
3. The results of the review and re-selection of equipment are in Table 1 as follows:

Table 1-1 HVAC Unit Properties

Manufacturer	Indoor Unit Max Split Dimensions (LxWxH, in.)	Outdoor Unit Dimensions (LxWxH, in.)	Indoor Unit Weight (lbs.)
Carrier	28.18 x 89.0 x 56.06	86.38 x 67.88 x 50.38	730
AAON	34.25 x 69.88 x 56.38	91.0 x 63.0 x 67.25	850
Lennox	30.5 x 97.25 x 54.75	88.75 x 60.13 x 48.75	799

4. The existing opening between the double trusses is 42” limiting the total width available at the roof hatch without impacting the existing truss and reframing the truss top chords at the roof line. All 3 of the equipment selections meet the required limitations.
5. Trane was consulted as a fourth manufacturer option for the refrigerant transition. Previously, Trane was excluded due to line set limitations. The refrigerant substitution did not impact maximum line set lengths and Trane does not have a split-system product that meets the conditions of 120 linear feet of line set and 34 ft. of vertical lift.
6. Lennox will need to be consulted in early 2025 if unit is not procured prior or within 1<sup>st</sup> quarter 2025 while pre-manufactured R-410A stock is still available.
7. It is the recommendation of this review that the roof hatch be sized for the full 42” width available between the trusses and roughly 10 ft in vertical height, dependent on what is commercially available. If shipping splits are crane lifted upright the max height is 56” but

due to the pitch of the roof, the hatch should be elongated so split does not have to be pitched through the opening at an angle during the crane lift.

## SPLIT-SYSTEM SELECTION UPDATE ANALYSIS

1. The Town Hall building is roughly 28,000 SF and the HVAC systems consist of 4 split-systems at 20-tons each. The original HVAC units were installed in 2002. The basement HVAC units were replaced by Piedmont Services Group (PSG). The attic units are now well beyond their useful life and require replacement in-kind.
2. The following is the analysis of the updated selections from the original feasibility study:
  - .1 Carrier:
    - a. Indoor Unit Dimensions: 28.18" x 89.0" x 56.06"
    - b. Outdoor Unit Dimensions: 86.38" x 67.88" x 50.38"
    - c. Indoor Unit Weight: 730 lbs.
    - d. Carrier unit utilizes 454B refrigerant. Refrigerant will require refrigerant monitoring and leak detection system. Provide installation per manufacturer's instructions and ICC Code requirements surrounding A2L refrigerants. See refrigerant paragraph 3.0 below.
    - e. Condensing unit clearances are 42" between condensing units on control box side per NEC and 12" on opposite side. Total combined footprint is 19.8 feet with a courtyard area of roughly 26 feet from transformer to far wall. Clearance in 9'-9" short dimension of courtyard requires 36" on one side and 12" on another. Total area required is 9'-7.8" including clearances.
    - f. Indoor unit shipping splits fit within available truss width of 42". Contractor shall demolish, coordinate and provide new duct connections to match to new unit duct connection configurations. It is recommended units are provided with combination filter/mixing boxes.
  - .2 AAON:
    - a. Indoor Unit Dimensions: 34.25" x 69.88" x 56.38"
    - b. Outdoor Unit Dimensions: 91.0" x 63.0" x 67.25"
    - c. Indoor Unit Weight: 850 lbs.
    - d. AAON unit utilizes 454B refrigerant. Refrigerant will require refrigerant monitoring and leak detection system. Provide installation per manufacturer's instructions and ICC Code requirements surrounding A2L refrigerants. See refrigerant paragraph 3.0 below.
    - e. Condensing unit clearances per the installation and operation manual (IOM) are 30" for left side and 36" for right. This requires an equivalent courtyard width of 10'-9" for proper operation. Given the courtyard width is 9'-9", it is recommended to coordinate with the manufacturer on any derate for the loss of a cumulative 12" of condensing unit coil clearance. Additionally, coil pull clearance on one side is recommended at 54" which is not available in the courtyard.
    - f. Indoor unit shipping splits fit within available truss width of 42". Contractor shall demolish, coordinate and provide new duct connections to match to new

unit duct connection configurations. It is recommended units are provided with combination filter/mixing boxes.

- .3 Lennox:
  - a. Indoor Unit Dimensions: 30.5" x 97.25" x 54.75"
  - b. Outdoor Unit Dimensions: 88.75" x 60.13" x 48.75"
  - c. Indoor Unit Weight: 799 lbs.
  - d. Lennox intends to retain R-410A refrigerant via overstocking supply for demand into first quarter 2025. This selection would not require the including for refrigerant leak detection systems.
  - e. Condensing unit clearances have the most flexibility out of the three manufacturer selections. The long dimension requires an additional 42-48" of clearance cumulative of both sides and short dimension is 36-42" resulting in the smallest overall footprint of the units in either dimension.
  - f. Indoor unit shipping splits fit within available truss width of 42". Contractor shall demolish, coordinate and provide new duct connections to match to new unit duct connection configurations. It is recommended units are provided with combination filter/mixing boxes.
3. The 2025 sunset of refrigerant 410A is largely being replaced by refrigerant R-454B. This refrigerant is classified as an A2L refrigerant. The refrigerant is mildly flammable. In the context of this installation, leak detection/monitoring is required. The line sets are routed outside the building and will not utilize an interior shaft. Therefore, sprinklered or ventilated shafts are not a requirement of the installation of the units above. International Mechanical Code has been updated in 2023 and indicate leak monitoring requirements.
  - .1 NFPA 30 section 185.5.4 permits 30 gallons of Class IA liquids in a closed system and 10 gallons of Class I and Class II in a control area in business occupancies. The total volume is contingent on total line length at installation. Based on AAON selection that included anticipated line length, the total volume of refrigerant is 6.4 gallons and are below the limits stipulated in NFPA.
4. The widths of the above indoor units prevent proper coil pull clearance and filter access will require coordination with existing attic trusses. Filter boxes should be located such that filters can be removed from units between existing trusses. It should be noted that attic framing will have to be modified if access to coil or drain pan replacement is desired prior to complete unit replacement.
5. All other aspects of the HVAC replacement feasibility previously documented in the original 2023 memorandum are still applicable with exception to utilizing the interior roof access hatch for installing indoor units in the attic. Original memorandum is included as Appendix A.
6. Cutsheets of unit selections discussed above are provided as Appendix B.

Appendix A

TOWN OF HOLLY SPRINGS HVAC REPLACEMENT MEMORANDUM  
2023

# Holly Springs Town Hall HVAC Replacment

Holly Springs Town Hall

Holly Springs, NC



Feasibility Review of HVAC Replacement Scope for AHUs

**SUMMER**  
**CONSULTANTS**  
**INCORPORATED**

4325 Lake Boone Trail  
Suite 301  
Raleigh, NC 27607

McLean | Norfolk | Philadelphia | Raleigh

Our Ref: 2334

## TABLE OF CONTENTS

Chapter 1	
EXECUTIVE SUMMARY .....	1-1
Chapter 2	
PROJECT DESCRIPTION.....	2-1
Chapter 3	
OPTIONS ANALYSIS .....	3-1
Chapter 4	
SUMMATION.....	4-1
Appendix A	
EQUIPMENT SELECTIONS.....	A

## EXECUTIVE SUMMARY

1. The Holly Springs Town Hall has two direct-expansion (DX), 20-ton, split-system HVAC units that are original to the building and are at the end of the equipment's useful life. The Town of Holly Springs has sought the services of Summer Consultants, Inc. to determine what viable options are available for replacement of the HVAC units and to offer recommendations on the optimal scope that 1) is feasible to construct given the building constraints, 2) mitigates negative impacts to the building aesthetic, functionality, and downtime, and 3) provide preliminary assessment of the cost impacts of the various options.
2. Three HVAC systems were reviewed as potential options for the HVAC replacement.
  - .1 Option 1: A replace-in-kind of the two existing 20-ton DX split-system HVAC units. The existing models are Trane TWE indoor unit and TTA outdoor unit. This scenario represents the lowest cost option as it seeks to utilize conventional DX equipment and minimal system changes as this would be a replace in-kind approach. The single difficulty in this option is accessibility of getting the equipment in and out of the attic. The only option for equipment of this size would be to remove a portion of the roof. This option was initially deemed not viable as the installation was not in conformance with the modern day equivalent of the existing Trane equipment as the distance between system components were further than specified installation parameters.
  - .2 Option 2: Provision of a variable refrigerant flow condensing unit. Holly Springs was provided an alternative equipment proposal in September of 2021 utilizing this condensing unit to overcome the distance between the indoor evaporator and the outdoor condensing unit. This equipment is more sophisticated and is usually applied to systems that have multiple evaporators and more complex refrigerant piping distributions. In this case, the equipment would be used to facilitate a longer refrigerant piping line length.
  - .3 Option 3: Provision of a 40-ton air cooled chiller and hydronic loop to provide chilled water to the location in the attic. Chilled water systems have some advantages that would be of benefit given the constraints surrounding this building. Chillers have no distance limitations and would nullify the chief concern governing the first two scenarios. Chilled water indoor units are "built-up" systems and are usually shipped and assembled for each component, most being designed to fit through a standard doorway. This would allow the indoor units to be selected such that no roof, attic, or door demolition would be needed. Lastly, air cooled chillers have better efficiency and are more reliable when operating with variable air volume systems. The trade-off is first costs would be higher for equipment and the locating and installation of supporting hydronic pumping system.
3. Based on review of previous proposals, assessments, existing building design drawings, reaching out to various manufacturers, and site observations at the building, it has been determined that Option 1 does have viable installation options and is the most economical option to move forward with. There are manufacturers that guarantee and warranty installations of their equipment within the requirements needed for this application.

## PROJECT DESCRIPTION

1. The Town Hall building is roughly 28,000 SF and the HVAC systems consist of 4 split-systems at 20-tons each. The original HVAC units were installed in 2002. The basement HVAC units, were replaced by Piedmont Services Group (PSG) and then PSG submitted a proposal to replace the attic area HVAC units in 2019. The original proposal was based on a replace-in-kind scope and came to \$126,707.
2. Between April 2021 and September 2021, it was determined that the distance between indoor unit and outdoor units were prohibitive for the installation of new Trane equipment. The scope and proposals were revised to provide a VRF outdoor unit (condensing unit) and new refrigerant piping between system components. The new scope was solicited and the revised proposals resulted in a low bid of \$311,626.
3. Due to the sizable increase in costs, the project was put on hold. This was in anticipation that COVID was having negative impacts on pricing and the Town budget was also negatively impacted and waiting until conditions improved in the market would alleviate both the cost and the availability of funds.
4. Currently, the 2 original HVAC units are functional and are not in immediate need of replacement. However, they are beyond their life expectancy and there is the need for replacement to avoid outages to the building and adversely affecting Town Hall business operations.
5. The main concern for the replacement, as identified above, is the inability to re-use the current locations of the system equipment without resorting to more highly specialized VRF equipment that comes with significant pricing increases.
6. Other relevant existing conditions are the access to the attic and the size of the existing courtyard.
  - .1 The attic has no clear access to move in and out a piece of packaged equipment of comparable size to the existing equipment. There is a 3'x5' access hatch to the attic from the building interior. Alternatively, to the access hatch, there is spacing between two roof framing members that has 43" inside clear but would require demolition of portions of the roof and crane lifting for removal of the existing and installation of the new equipment.
  - .2 The courtyard that houses the condensing units has a short dimension of 9'-9" so there are some constraints this poses on new equipment to ensure they fit within the confines of the courtyard and are installed with proper clearance requirements.

## OPTIONS ANALYSIS

1. The following is a review of the potential HVAC systems that can be offered as a solution that is, first and foremost, constructable and can optimize both function and budget for the scope of the work moving forward.
2. OPTION 1 – Replace-In-Kind (Conventional Packaged DX Equipment)
  - .1 This option is prioritized in determining its viability as it is the least costed and least impactful to the existing system and its configuration. This option involves looking for an industry comparable unit to the existing TWE240 and TTA240 Trane equipment to do a one-for-one replacement of the equipment.
  - .2 Trane was consulted to determine the extent of review of the existing conditions that was conducted previously and if the equipment limitations have improved since September of 2021. It was confirmed that the packaged products that meet the tonnage requirements of the existing equipment would NOT meet installation specifications. See Figure 1 and Figure 2 for straight run distance from the unit locations to the courtyard below. Roughly 35 ft is required in vertical lift and an additional 70-80 ft. in horizontal run is needed for the overall refrigerant line set length. Fittings and offsets would need to be factored in to determine total effective length.

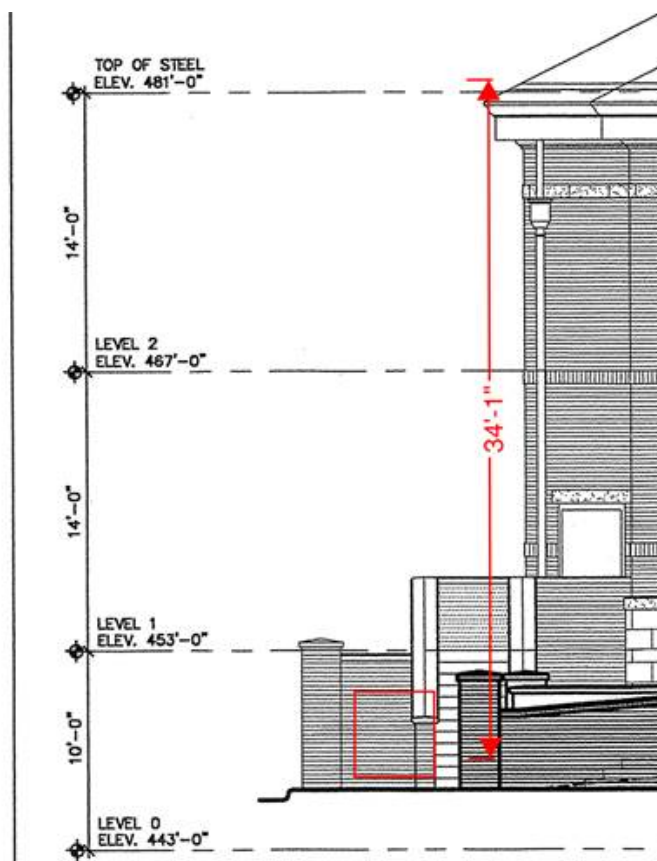


Figure 1: Vertical Lift Requirement

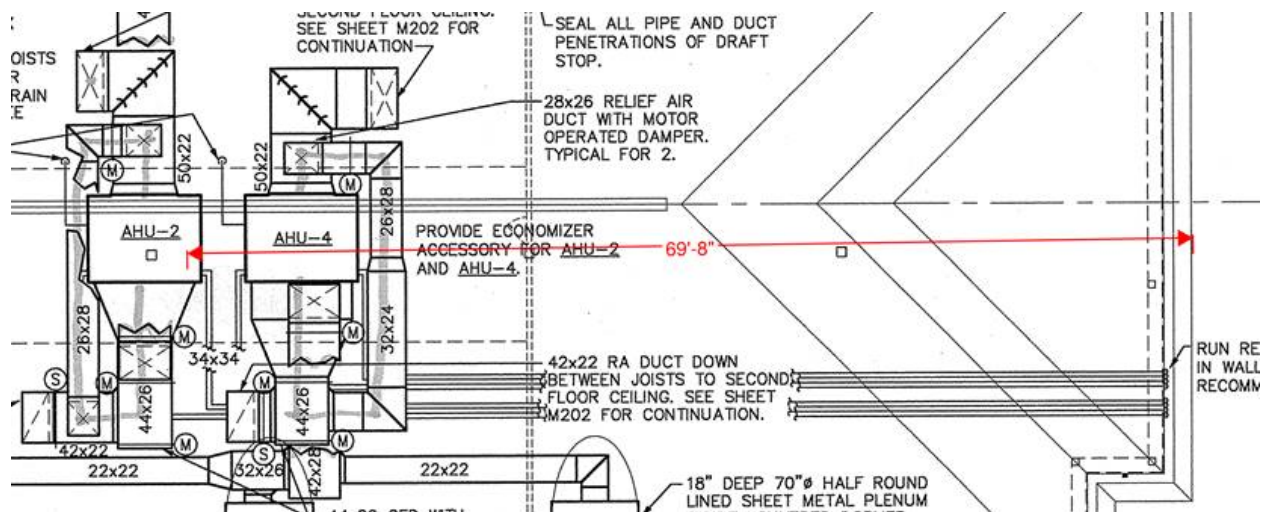


Figure 3: Horizontal Distance Requirement for Refrigerant

- .3 Below, in Figure 3, is the operable range of the Trane equipment. As noted by the point identified, even without including fitting losses or offsets the installation is outside of allowable parameters.

**Allowable elevation difference: TTA or TWA below indoor unit**

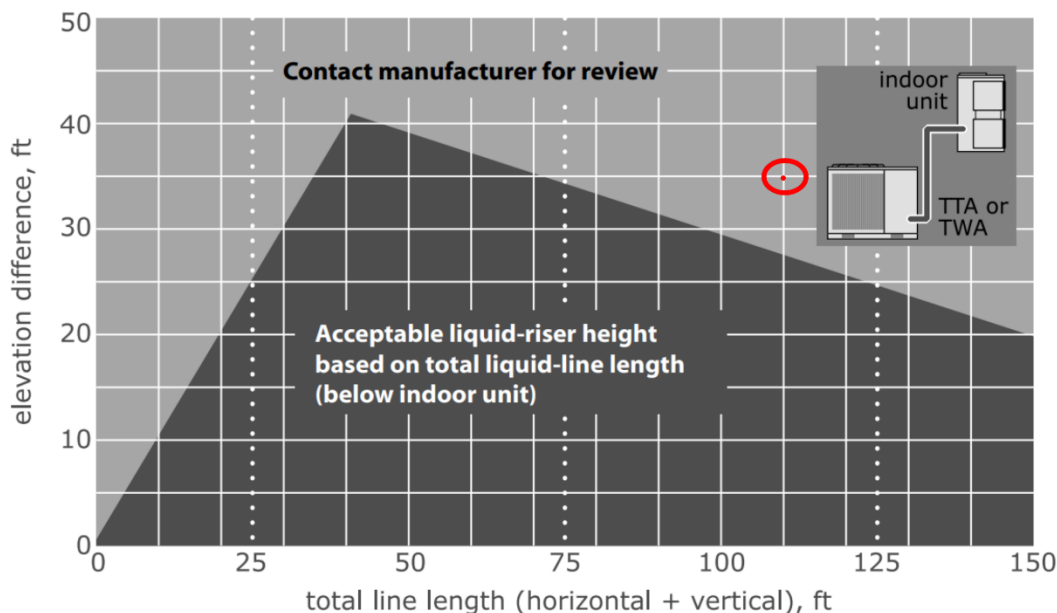


Figure 2: Trane Condensing Unit Allowable Lift

- .4 Summer Consultants reached out to other manufacturers in the industry and was able to acquire valid selections that had greater tolerance for longer refrigerant line sets utilizing conventional packaged and packaged/semi-modular equipment.
- .5 Valid Selection #1: Lennox AHU Model EL240XA, CU Model EL240XC
  - a. Refrigerant Line Length: The condensing unit supports up to a 200 ft. total equivalent length and up to a 60 ft. vertical lift.

- b. Outdoor Dimensions: The condensing units have adequate dimensions that fit in the available courtyard.
  - c. Indoor Dimensions: The indoor unit is wider than the existing units and the egress around the unit will be reduced. The existing attic platform is 12'-1" wide. The unit width is 8'-1.25" wide with an additional 8'-6" recommended service clearance primarily for the access and removal of the unit drain pan. The roof rafters beyond the extents of the platform are roughly 2'-0" apart so are spaced too tightly to properly remove the drain pan.
  - d. Staging: Staging is a reference to the equipment compressors and their ability to change the cooling output relative to the demand needed. As an example, a unit with 4 stages would be able to modulate output incrementally to every 25% of its total capacity. A system's ability to stage itself to best match the needed cooling provides for better temperature and humidity control. This system is capable of 3 stages of capacity control.
  - e. Additional Observations: One discrepancy for this system selection is the maximum available airflow, in cubic feet per minute (CFM), for this unit is 8,600. The existing units are rated for 9,600 CFM. This is an 11% reduction in airflow from what is currently available. Given these units are on variable volume systems, this system selection is acceptable if the system controls or trended data can determine if the existing units do not utilize more than 89% of the available airflow capacity during summer months.
  - f. Equipment Budget Cost Quote
    - Manufacturer has provided a budget price of \$96,824 in total for both units. This comes to a cost of \$2,420/ton.
- .6 Valid Selection #2: Carrier Corporation AHU Model 40RUA, CU Model 38AUDU25
- a. Refrigerant Line Length: The condensing unit supports up to 200 linear ft. and 300 ft. total equivalent length if using a 3/4" liquid line size. For this application, utilizing a 5/8" liquid line provides up to 187' total length and 104' of vertical lift capacity for the condensing unit.
  - b. Outdoor Dimensions: The condensing units have adequate dimensions that fit in the available courtyard.
  - c. Indoor Dimensions: Carrier put forward 3 options for indoor units, all meeting the original 2002 design schedule. The available indoor units are as follows:
    - Packaged unit Model 40RUA, 2'-4" L x 7'-5" W x 4'-8" H.
    - Semi-packaged/modular unit Model 39LD, with detachable filter/mixing box. Filter box 2'-11.5" L x 5'-5.5" W x 3'-8" H, main unit 3'-5" L x 5'-5.5" W x 7'-3" H.
    - Modular unit Model 39MN, overall dimensions 7'-2" L x 6'-8" W x 7'-10" H, with largest shipping split at 3'-2" L x 6'-7" W x 5'-0".
  - d. Relative to the above selections, the 40RUA model has dimensions that can be transported through the attic hatch and not involve roof demolition. It is also the closest representative style unit as the existing equipment. The modular unit has betterments including R13 casing construction and ECM motor but would need more significant duct modification and is just outside of dimensions that would not require some form of demolition at either the attic

- hatch or roofline to install. The platform is 3” short of Model 40RUA total recommended side clearance.
  - e. Staging: This system is capable of 3 stages of capacity control.
  - f. Equipment Budget Cost Quote
  - g. Manufacturer has provided a budget price of \$61,400 in total for both units. This comes to a cost of \$1,535/ton.
- .7 Valid Selection #3: AAON AHU Model V3-ERB, CU Model CFA-020
- a. Refrigerant Line Length: The condensing unit supports the existing installation. Max capacity is not known but the selection provided assumes 130’ total length and 12 elbows. Per manufacturer representative, there is additional ability for additional line length.
  - b. Outdoor Dimensions: The condensing units have adequate dimensions that fit in the available courtyard.
  - c. Indoor Dimensions: Unit comes in 3 shipping splits if specified. Overall dimensions 4’-8” L x 4’-8.5” W x 8’-8.75” H. Largest shipping split is 2’-10” L x 4’-8.5” W x 5’-4.25” H.
  - d. Staging: This system is capable of 4 stages of capacity control.
  - e. Equipment Budget Cost Quote
    - Manufacturer has provided a budget price of \$39,500 for each unit. This comes to a cost of \$1,975/ton.
3. OPTION 2 – VRF Condensing Unit
- .1 This option was included as it was deemed the only viable alternative prior to further investigation. The VRF system is a condensing unit that includes a premium cost because it is designed for applications and refrigerant systems that are more complex and usually involved distributing refrigerant to multiple air handler or terminal unit coils.
  - .2 The positive to this system is the condensing units of both 20 tons can be combined into a single 40 ton condensing unit and VRF compressors are well suited for variable load and can match existing load demand on the connected air handlers.
  - .3 However, this comes at a significant cost premium. Budget pricing from the vendor for this condensing unit is \$120,000 not including provision of the indoor units. This puts this option in excess of \$3,000/ton making it more expensive than any previous split system pairing mentioned in OPTION 1. This additional expense is not recommended since the building will not be taking advantage of any of the higher level functions associated with this equipment.
4. OPTION 3 – Hydronic System with Air Cooled Chiller
- .1 Why Chilled Water?
    - a. Chilled water cooling systems are routinely employed in buildings and with airside systems that are large enough that they utilize variable air volume systems. This is because conventional packaged systems do not handle varying load and varying airflow as well as chilled water systems. A chilled water system provides a valve on the air handler coil that can modulate to give the

coil exactly the right amount of cooling needed at all times. As mentioned in earlier paragraphs, the refrigerant coils and packaged unit compressors have stages where compressors will engage giving stepped proportions of its full capacity. If the demand doesn't well align with the compressors you can short cycle compressors on and off lowering life expectancy. Another adverse potential is to lose dehumidification control at low demand because that short cycling prevents the cooling coil from getting to a low enough temperature to start to condense water and remove it from the airstream. Conversely, if compressors are on and the airflow is reduced, it can deliver too much cooling to the coil and start to freeze the condensed water that develops on the coil.

- b. Therefore, chilled water systems avoid any over or underserving connected systems and are much more flexible at loads throughout their range.
- c. The existing system seeks to overcome these problems by incorporating an external bypass duct configuration. This is an approach to retain full airflow through the unit in a variable airflow system to prevent coil freezing when the staging of the compressors is mismatched to the current demand.

## .2 Chilled Water Viability

- a. As part of this review of options, 40 ton air cooled chillers were identified as potential substitute for the condensing units. The existing courtyard at 9'-9" wide did not have adequate space to allow the installation of a conventional air cooled chiller. The only chiller that was found that could fit was a modular air cooled chiller. Modular chillers fall in the same category as VRF in that they are typically selected for niche applications and come with a cost premium. The cost of a modular chiller will be \$3,000/ton, same as the VRF condensing unit option.
- b. The installation of a standard industry air-cooled chiller would involve modification of the existing courtyard and precipitate modification to the adjacent drive lane and parking lot. This represents a substantial cost burden to this approach and is not recommended for further consideration.

## .3 Chilled Water Cost Comparison

- a. Modular chillers are the only chiller type conducive to the existing conditions. This chiller would run \$120,000. Each built-up AHU would be in the realm of \$15,000 to \$20,000. The chilled water distribution loop would require piping, insulation, pumps, chasework to establish a route to the attic, air separator, expansion tank, chemical treatment and miscellaneous valves, gauges, and controls that would place the additional associated work in excess of \$100,000 in addition to the equipment.
- b. Considering the costs above and that there are viable options per OPTION 1, we have better alternatives than having to resort to this approach.

## SUMMATION

1. The recommendation is to provide a replace-in-kind unit of the options identified in the previous section. The Table below identifies the three equipment selections, with costs highest to lowest.

<b>Proposed Equipment (Manu./Model)</b>	<b>Budget Cost (\$)</b>
Lennox EL240XA/EL240XC	\$96,824
AAON V3-ERB/CFA-020	\$79,000
Carrier 40RUA/38AUDU25	\$61,400

2. It is recommended to pursue either AAON or Carrier based on costs above. The AAON unit has additional features that justify the additional costs to the units including double wall casing and additional staging.
3. Reviewing the low bid price in 2021 of \$311,000 from Modern Mechanical, while not itemized, a few assumptions can be made.
  - .1 The costs included \$120,000 in equipment costs for the Mitsubishi Unit. If we utilize Carrier pricing for this equipment, we can reduce the raw cost of the equipment by \$59,000. Assuming the fee included 10% profit and sales tax, we can assume a total reduction greater than \$65,000.
  - .2 The original bid price did not include roof patching but did include crane lift. This two items are in conflict unless a roofing repair price was to be put forward at a later date to supplement the original bid. The selections above eliminate the need to demolish the roof or utilize a crane lift as there are options for utilizing the elevator and all shipping splits can fit through a standard 3'x7' door and the 3'x5' attic access. We have not sought a quote for crane lift rental costs but will assume \$10,000 for the costs of roof demolition and crane rental.
  - .3 The bid price includes running a new line set up the exterior of the building with cover and paint. We concur with this approach. The existing R-22 line set utilizes a much lower system pressure and the piping would likely be inadequate for the new R-410a refrigerant.
  - .4 Inflation has been running high the last few years and online estimates of the inflation year over year since September 2021 varies. For the sake of this exercise, we will assume an 7% inflation for each of the last 2 years.
4. Incorporating the above, the revised total based on the previous bid, would be:
  - .1 Cost reductions: \$311,000 - \$65,000 - \$10,000 = \$236,000
  - .2 Inflation mark-up: \$236,000 x (1.07)<sup>2</sup> = \$270,000
  - .3 Please note that we are not estimators and this is only a revised expectation based on the information above. It is strongly recommended that the Town of Holly Springs revise the original scope of work provided by McKim and Creed to include the equipment options identified above and seek updated bid pricing from local contractors for establishing a budget. The labor market is strained and there is more work available than can be executed by the current labor pool. Therefore,

costs will be at a premium. Additionally, conditions today are different than in 2021 when the original bid was issued that is serving as the basis of the assumptions above.

Appendix B  
EQUIPMENT SELECTIONS

## Table Of Contents

Project: Summer 20T Splits  
Prepared By:

06/15/2023  
11:17AM

<b>ACCU-AHU-1-4</b> .....	<b>2</b>
Unit Report.....	3
Performance Summary.....	5
Certified Drawing.....	10
Guide Specifications.....	14

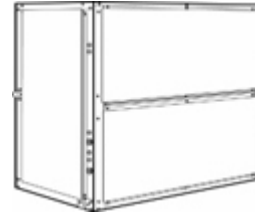
**ACCU-AHU-1-4**

**Submittal Cover Sheet  
Unit Report  
Performance Summary Report  
Certified Drawings  
Guide Specifications**

## Unit Report For ACCU-AHU-1-4

Project: Summer 20T Splits  
Prepared By:

06/15/2023  
11:17AM



### Outdoor Unit Parameters

Unit Quantity:.....1  
 Unit Model:.....38AUD  
 Unit Size:.....20 Tons  
 Voltage:.....460-3-60 V-Ph-Hz  
 Condenser Coil:**Al/Cu with Louvered Hail Guard**  
 No. of DX Circuits:.....2  
 No. of Stages:.....Three Stage

### Indoor Unit Parameters

Unit Model:.....40RUA  
 Unit Size:.....20 Tons  
 No. of Coils:.....2  
 Voltage:.....460-3-60 V-Ph-Hz

### System Parameter

System Quantity:.....4  
 Refrigerant Type:.....PURON  
 Compressor Quantity:.....2  
 Compressor Type:.....Scroll  
 Std. Capacity Steps:.....33,83, 100  
 No. of Outdoor fans:.....4

### Outdoor Unit Dimensions and Weight

Unit Length:.....7' 2.1"  
 Unit Width:.....5' 7.1"  
 Unit Height:.....4' 2.4"  
 Unit Weight:.....978 lb

### Indoor Unit Dimensions and Weight

Unit Length:.....7' 5.0"  
 Unit Width:.....2' 4.2"  
 Unit Height:.....4' 8.1"  
 Unit Weight:.....730 lb

### Accessories and Installed Options

Low ambient FIOP operation down to -20 F.

### Warranty Information Outdoor (Note: for US & Canada only)

First Year - Parts Only (Standard)

### Warranty Information Indoor (Note: for US & Canada only)

First Year - Parts Only (Standard)  
 Start-up, First Unit for Indoor Unit  
 Start-up, First Unit for Indoor Unit

**NOTE: Please see Warranty Catalog 808-218 for explanation of policies and ordering methods.**

### Ordering Information

Part Number	Description	Quantity
<b>Base Unit - Outdoor</b>		
38AUDU25A0M6-0A2C0		4
	Base Unit	
	Al/Cu with Louvered Hail Guard Condensing Coil	4
	Dual Circuit Three Cooling Stages w/ Low Ambient Refrigerant Options	4
	Service Options - Powered Convenience Outlet	4
	Electrical Options - Non-Fused Disconnect	4

## Unit Report For ACCU-AHU-1-4

Project: Summer 20T Splits  
Prepared By:

06/15/2023  
11:17AM

	Packaging Options - Standard	4
	Standard Electrical Mechanical Controls	4
	Refrig Circ/Compressor Staging - Dual Circuits/ Three Stage	4
<b>Accessories</b>		
33CONNECTSTAT43	Carrier Connect™ Wi-Fi® 7-day programmable/non-prog for Outdoor Unit	4
<b>Base Unit - Indoor</b>		
40RUAA25T3A6-UA0A0		4
	Base Unit	
	Alt High Static, High Effy Motor/High Drive	4
	Cabinet Paint - None	4
	2-Speed Fan Controller (VFD)	4
	Electromechanical Unit Control Board	4
<b>Accessories</b>		
CAECOMZR010A01	Economizer - temperature dry bulb controlled - Ultra LOW LEAK for Indoor Unit	4
--HH--57AC-078	Accusensor II Economizer Differential Enthalpy Control Upgrade for Indoor Unit	4
--HH--57AC-081	Enthalpy Control for W7220 Controller for Indoor Unit	4
CRDISKIT001A00	2 Speed VFD display kit for Indoor Unit	4

The 38AUZ/AUD are furnished with filter drier which is factory provided (field installed). Additional filter driers can be purchased separately through RCD (Replacement Components Division). See the Product Library for Replacement Filter Drier Information for more information.

## Performance Summary For ACCU-AHU-1-4

Project: Summer 20T Splits  
Prepared By:

06/15/2023  
11:17AM

**System:**..... **38AUD\_25/40RUA\_25**  
**No. of Circuits:**..... **Dual Circuit**  
**System Quantity:**..... **4**  
**Altitude:**..... **0.0** ft  
**EER @ ARI Conditions:**..... **10.6**  
**IEER:**..... **13.5**  
**Suction Line Loss:**..... **1.4** °F  
 Condensing unit is rated in accordance with ARI 365.

**This system has a combined part load efficiency (IEER) that meets or exceeds the US DOE 2023 minimum cooling efficiency standards.**

### Typical Liquid and Suction Line Sizing

Pipe Length	Liquid Line Size	Suction Line Size
0 - 25	3/8	1 1/8
26 - 50	1/2	1 1/8
51 - 75	5/8	1 1/8
76 - 100	5/8	1 1/8
101 - 125	5/8	1 1/8
126 - 150	5/8	1 3/8
151 - 175	5/8	1 3/8
176 - 200	3/4	1 3/8

Refer to the 38AU installation instructions for installation specific line sizing guidance

### Outdoor Unit Parameters

Unit Quantity:..... **1**  
 PartNumber:..... **38AUDU25A0M6-0A2C0**  
 Unit Model:..... **38AUD**  
 Unit Size:..... **20 Tons**  
 Condenser Coil:..... **Al/Cu with Louvered Hail Guard**  
 No. of DX Circuits:..... **2**  
 Voltage:..... **460-3-60** V-Ph-Hz  
 Clg Ent Air DB:..... **95.0** °F

### Outdoor Electrical Data

Unit Voltage:..... **460-3-60** V-Ph-Hz  
 Unit MCA:..... **38.6** Amps  
 Unit MOCP:..... **50.0** Amps  
 Total Compressor Power of Unit:..... **NA**  
 Voltage Range Min:..... **414** V  
 Voltage Range Max:..... **506** V  
 Compressor RLA:..... **14.8/14.7**  
 Compressor LRA:..... **130/130**  
 Compressor Quantity:..... **2**  
 Fan Motors Qty:..... **4**  
 Fan Motor FLA:..... **0.8** Amps

Notice: Outdoor unit elect. data is based on 460-3-60  
 Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage  
 \*with Convenience Outlet Option:

### Indoor Unit Parameters

PartNumber:..... **40RUAA25T3A6-UA0A0**  
 Unit Model:..... **40RUA**  
 Unit Size:..... **20 Tons**  
 Coil Rows:..... **4**  
 No. of Splits:..... **2**  
 Voltage:..... **460-3-60** V-Ph-Hz  
 Actual Airflow:..... **9600.0** CFM

## Performance Summary For ACCU-AHU-1-4

Project: Summer 20T Splits  
Prepared By:

06/15/2023  
11:17AM

Standard Airflow:.....	<b>9600.0</b>	CFM
Total Clg Cap.(Gross):.....	<b>259.3</b>	MBH
Sensible Clg Cap.(Gross):.....	<b>206.0</b>	MBH
Ent Air DB:.....	<b>80.0</b>	°F
Ent Air WB:.....	<b>67.0</b>	°F
Ent Enthalpy:.....	<b>31.44</b>	BTU/lb
Lvg Air DB:.....	<b>60.1</b>	°F
Lvg Air WB:.....	<b>58.6</b>	°F
Lvg Enthalpy:.....	<b>25.44</b>	BTU/lb
Coil Bypass Factor:.....	<b>NA</b>	

### Indoor Supply Fan

Indoor Unit External Static:.....	<b>0.75</b>	in wg
Economizer Loss:.....	<b>0.26</b>	in wg
Grille Loss:.....	<b>0.00</b>	in wg
Plenum Loss:.....	<b>0.00</b>	in wg
Acc. Heating Loss:.....	<b>0.00</b>	in wg
Total Ext Static:.....	<b>1.01</b>	in wg
Fan Speed:.....	<b>1032</b>	RPM
Fan Power:.....	<b>7.07</b>	BHP
Fan Motor Max:.....	<b>7.50</b>	BHP
Fan Motor FLA:.....	<b>15.0</b>	Amps

Alternate Motor and High Static Drive Required.  
Selected High Static Drive Range: 1014 - 1200 RPM

### Indoor Electrical Data

Unit Voltage:.....	<b>460-3-60</b>	V-Ph-Hz
Unit MCA:.....	<b>19.0</b>	Amps
Unit MOCP:.....	<b>30.0</b>	Amps

Notice: Indoor unit elect. data is based on 460-3-60

### Acoustics

Sound Power Levels, db re 10E-12 Watts

### FIOPS and Accessories Information

FIOPS	Quantity
Accessories	Quantity
Carrier Connect™ Wi-Fi® 7-day programmable/non-prog for Outdoor Unit	4

A-Weighted	Outdoor Unit (dB)	Indoor Unit (dB,Ducted)
Total Level	83.4	96.4
63Hz	38.6	76.4
125Hz	52.8	82.5
250Hz	62.8	86.0
500Hz	79.6	92.4
1000Hz	79.0	89.6
2000Hz	75.4	88.8
4000Hz	70.0	84.6
8000Hz	60.7	NA
Sound Message	Sound for AUD_25	Sound for RUA_25

### Acoustic Notes:

1. 38AUZ/D/Q units sound ratings are in accordance with AHRI 270-2008 - Sound Rating of Outdoor Unitary Equipment.
2. 40RF/40RU units sound ratings are in accordance with AHSRAE 1987 HVAC Systems and Applications handbook.
3. The acoustic center of the unit is located at the geometric center of the unit.

## Performance Summary For ACCU-AHU-1-4

Project: Summer 20T Splits  
Prepared By:

06/15/2023  
11:17AM

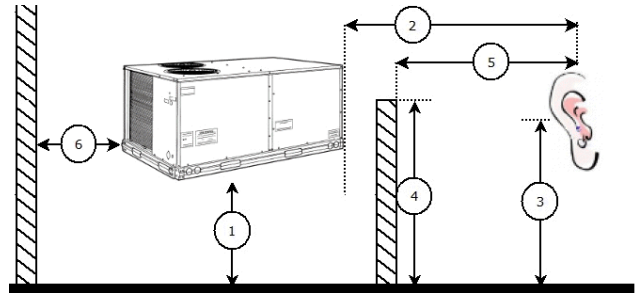
## Performance Summary For ACCU-AHU-1-4

Project: Summer 20T Splits  
Prepared By:

06/15/2023  
11:17AM

### Advanced Acoustics Parameters

- 1. Unit height above ground:..... **1.0** ft
- 2. Horizontal distance from unit to receiver:..... **20.0** ft
- 3. Receiver height above ground:..... **5.7** ft
- 4. Height of obstruction:..... **0.0** ft
- 5. Horizontal dist. from obstruction to receiver:..... **0.0** ft
- 6. Horizontal dist. from unit to obstruction:..... **0.0** ft



### Detailed Acoustics Information

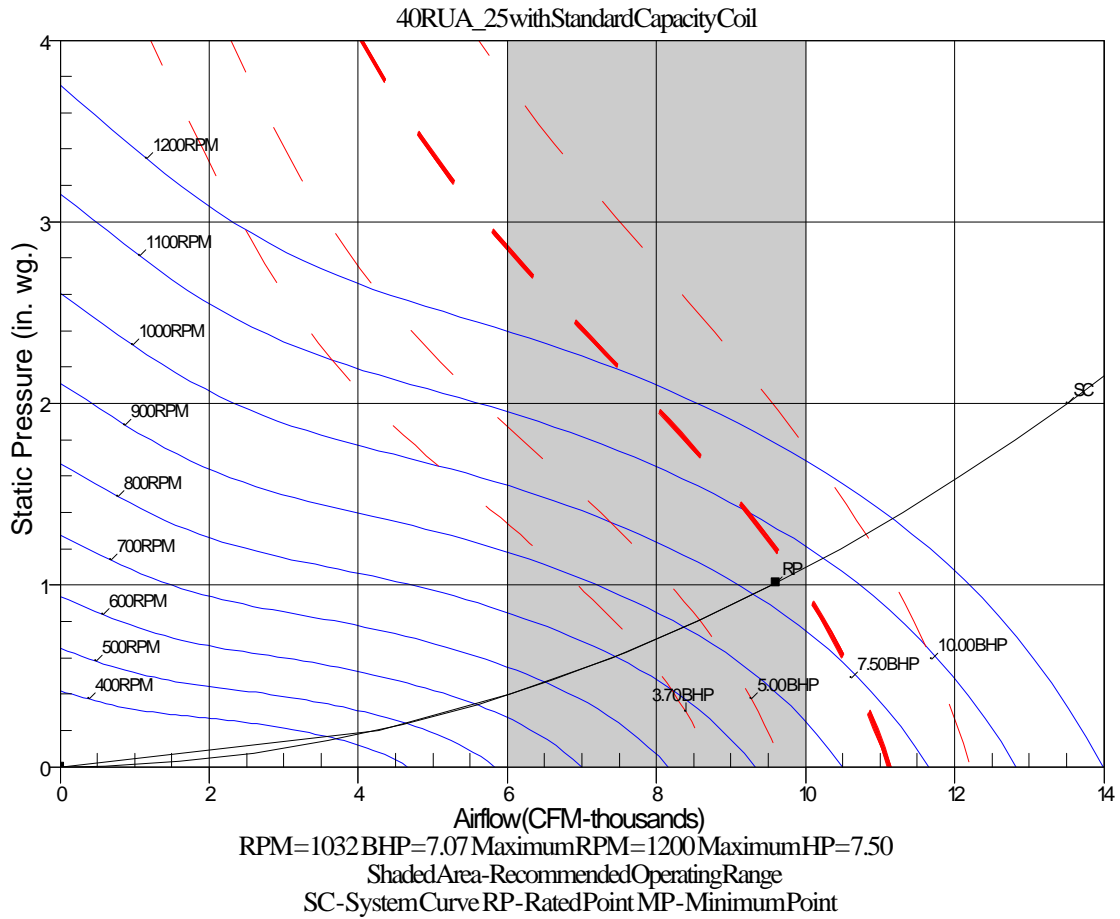
Octave Band Center Frequency, Hz	31	63	125	250	500	1k	2k	4k	8k	Overall
Sound Power Levels at Unit's Acoustic Center (L <sub>w</sub> ), dB	85	65	69	71	83	79	74	69	62	88
A-Wgtd Sound Power Levels at Unit's Acoustic Center (L <sub>wA</sub> ), dBA	46	39	53	63	80	79	75	70	61	83
Sound Press. Levels at Dist. Specified above (L <sub>p</sub> ), dB	61	40	44	47	58	54	50	44	37	64
A-Wgtd Sound Press. Levels at Dist. Specified above (L <sub>pA</sub> ), dBA	21	14	28	38	55	54	51	45	36	59

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.

# Performance Summary For ACCU-AHU-1-4

Project: Summer 20T Splits  
Prepared By:

06/15/2023  
11:17AM



# Certified Drawing for ACCU-AHU-1-4

Project: Summer 20T Splits  
Prepared By:

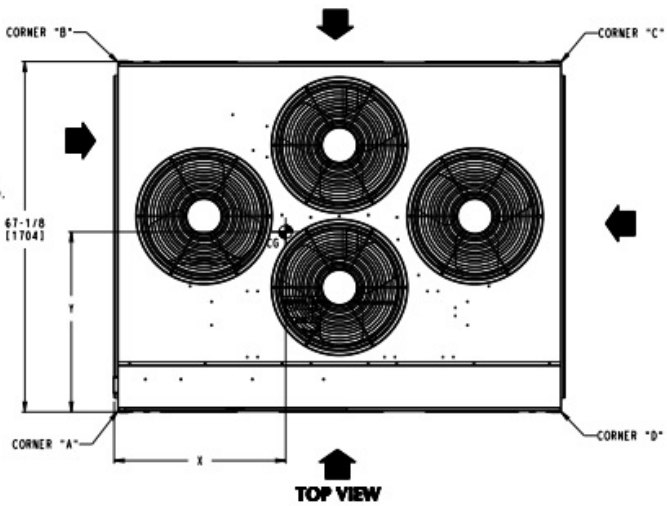
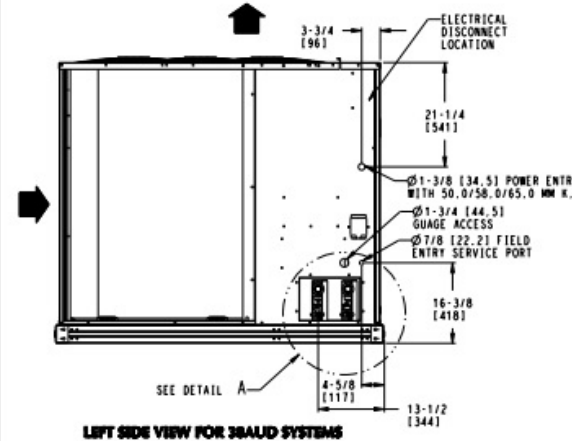
06/15/2023  
11:17AM

UNIT	ELECTRICAL CHARACTERISTICS	STD. UNIT WT.		CORNER A		CORNER B		CORNER C		CORNER D		CENTER OF GRAVITY			UNIT HEIGHT			
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z	H			
38AU225 (RTPF)	208/230-3-60,460-3-60,575-3-60	978	444	360	163	188	85	147	67	283	128	38	1965.21	23	1584.21	17	1431.81	50-3/8 (1279.21)
38AU225 (RTPF)	208/230-3-60,460-3-60,575-3-60	978	444	360	163	188	85	147	67	283	128	38	1965.21	23	1584.21	17	1431.81	50-3/8 (1279.21)
38AU228 (RTPF)	208/230-3-60,460-3-60,575-3-60	978	444	327	148	210	95	173	78	269	122	39	1990.61	26.25	1466.81	17	1431.81	50-3/8 (1279.21)

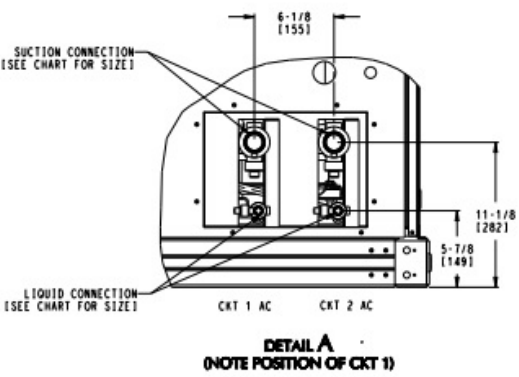
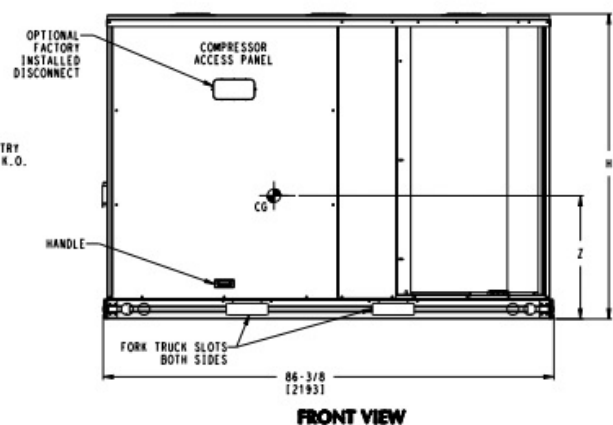
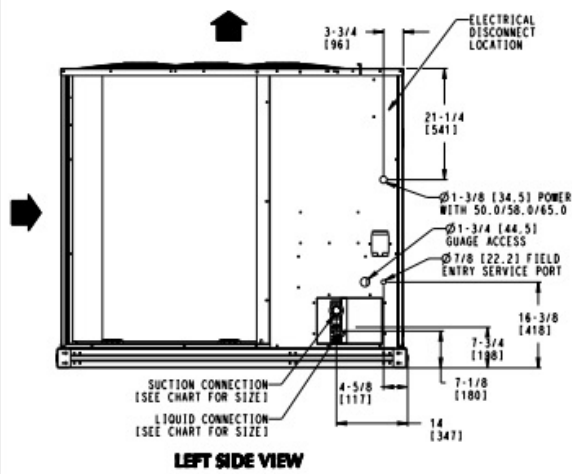
**Carrier** THIS DOCUMENT IS THE PROPERTY OF CARRIER CORPORATION AND IS DELIVERED UPON THE EXPRESS CONDITION THAT THE CONTENTS WILL NOT BE DISCLOSED OR USED WITHOUT CARRIER CORPORATION'S WRITTEN CONSENT. SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.

- NOTES:**
- MINIMUM CLEARANCE (LOCAL CODES OR JURISDICTION MAY PREVAIL):
    - BOTTOM TO COMBUSTIBLE SURFACES: 0 INCHES.
    - OUTDOOR COIL, FOR PROPER AIR FLOW: 36 INCHES ONE SIDE, 12 INCHES THE OTHER, THE SIDE GETTING THE GREATER CLEARANCE IS OPTIONAL.
    - OVERHEAD: 60 INCHES, TO ASSURE PROPER OUTDOOR FAN OPERATION.
    - BETWEEN UNITS: CONTROL BOX SIDE, 42 INCHES PER NEC.
    - BETWEEN UNIT AND UNGROUNDED SURFACES: CONTROL BOX SIDE - 36 INCHES PER NEC.
    - BETWEEN UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES: CONTROL BOX SIDE, 42 INCHES PER NEC.
  - WITH EXCEPTION OF THE CLEARANCE FOR THE OUTDOOR COIL AS STATED IN NOTE 1B, A REMOVABLE FENCE OR BARRICADE REQUIRES NO CLEARANCE.
  - UNITS MAY BE INSTALLED ON COMBUSTIBLE FLOORS MADE FROM WOOD OR CLASS A, B OR C ROOF COVERING MATERIAL.

UNIT	SUCTION	LIQUID	QTY
38AU225	1-5/8 (41.3)	5/8 (15.9)	1 EA
38AU225	1-3/8 (34.9)	1/2 (12.7)	2 EA



CG CENTER OF GRAVITY  
 → DIRECTION OF AIR FLOW  
 DIMENSIONS IN 1 ARE IN MM



DATE 9/1/22	SUPERCEDES 11/17/10	38AUZ , 38AUD CONDENSING UNIT	38AU500370	F
----------------	------------------------	-------------------------------	------------	---

# Certified Drawing for ACCU-AHU-1-4

Project: Summer 20T Splits  
Prepared By:

06/15/2023  
11:17AM

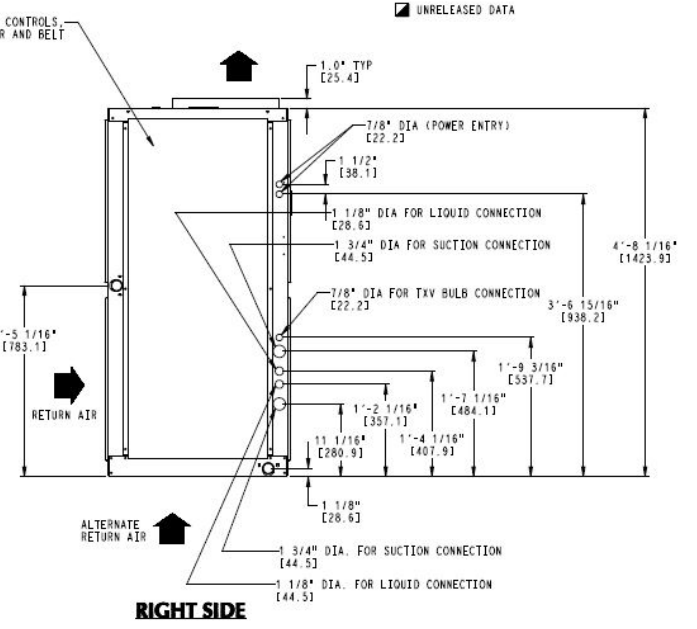
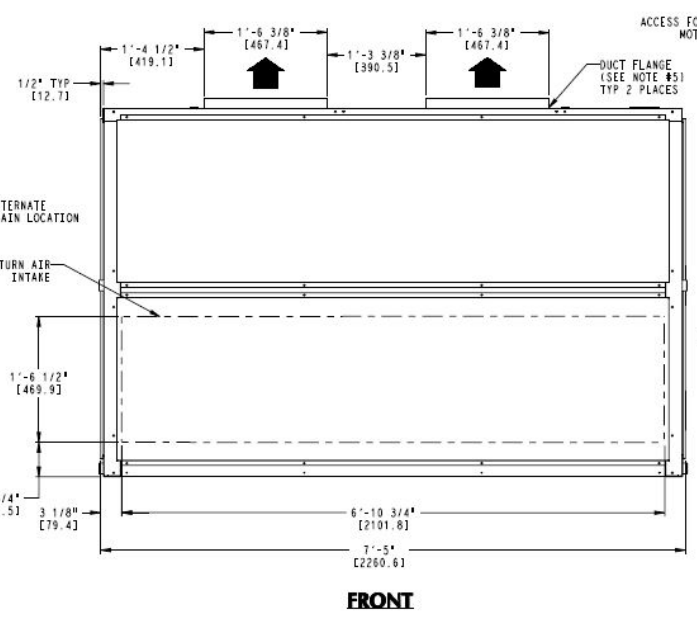
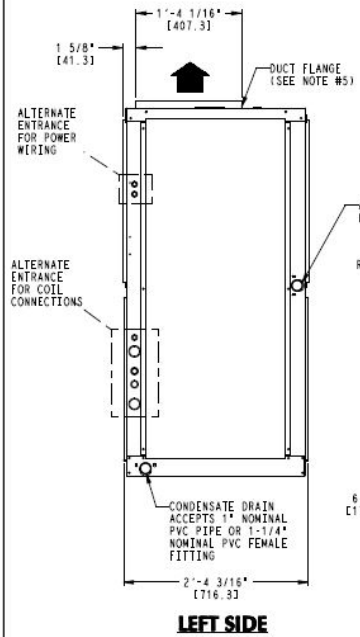
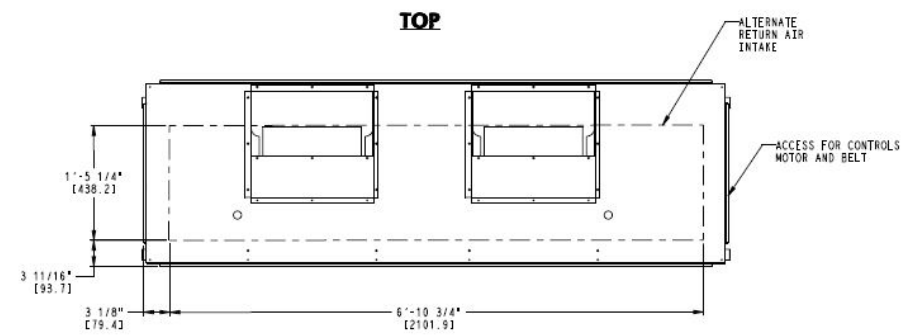
UNIT	UNIT WEIGHT (W/TXV)
40RUA-14	695 lbs [315 kg]
40RUA-16	713 lbs [323 kg]
40RUA-25	730 lbs [331 kg]
40RUU-16	713 lbs [323 kg]
40RUU-25	720 lbs [327 kg]
40RUS-14	661 lbs [300 kg]
40RUS-16	677 lbs [307 kg]
40RUS-25	683 lbs [310 kg]

**Carrier** THIS DOCUMENT IS THE PROPERTY OF CARRIER CORPORATION AND IS DELIVERED UPON THE EXPRESS CONDITION THAT THE CONTENTS WILL NOT BE DISCLOSED OR USED WITHOUT CARRIER CORPORATION'S WRITTEN CONSENT. SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PAST PERFORMANCE OR ACCEPTANCE OF CONTRACT.

- NOTES:**
1. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
  2. DIRECTIONS OF AIRFLOW.
  3. RECOMMENDED CLEARANCE:  
 REAR: 2 ft 6 in. [762 mm]  
 FRONT: 2 ft 6 in. [762 mm]  
 RIGHT SIDE: 2 ft 6 in. [762 mm]  
 LEFT SIDE: 2 ft 6 in. [762 mm]  
 LOCAL CODES OR JURISDICTION MAY PREVAIL.
  4. LIQUID PIPING NOT SUPPLIED BY CARRIER.
  5. DUCT FLANGE IS FACTORY SUPPLIED AND FIELD INSTALLED.

ACCESSORY	SEE DRAWING
DISCHARGE PLENUM	40RNS00997
ECONOMIZER	40RNS01000
STEAM COIL	40RNS01000
HOT WATER COIL	40RNS01000
RETURN AIR GRILLE	40RNS00997
OVERHEAD SUSPENSION	40RNS00997
SUBBASE	40RNS00997
ELECTRIC HEAT	40RNS01002

UNRELEASED DATA




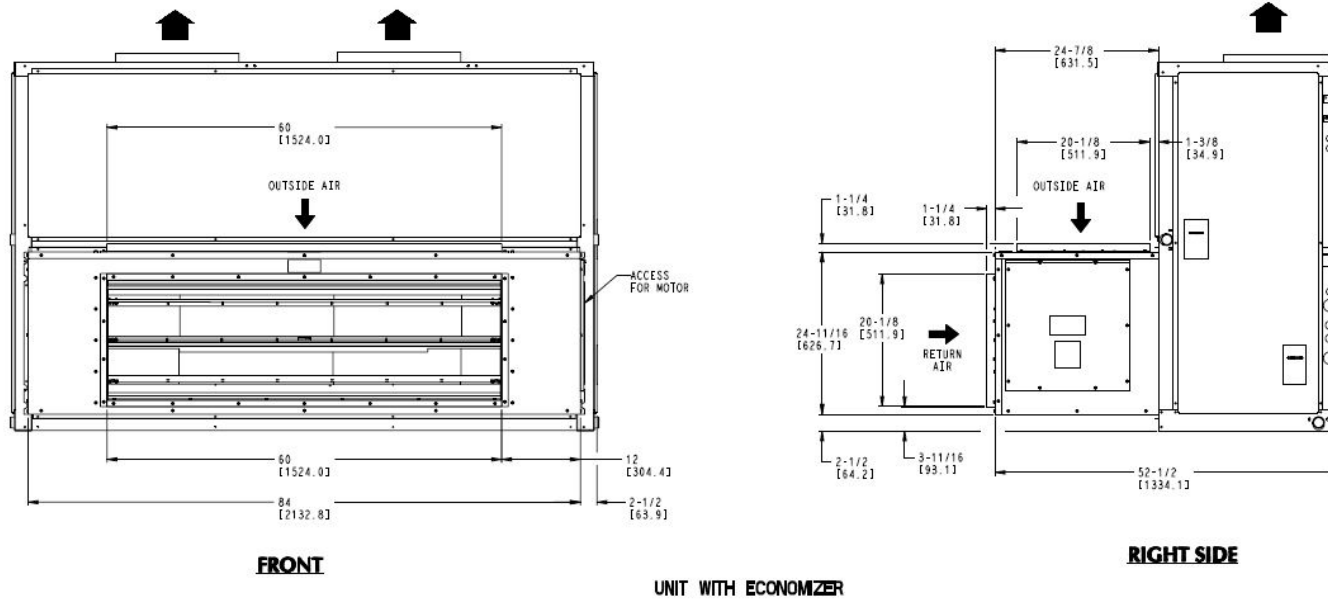
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	FAN COIL UNITS	40RU500028	REV
U.S. ECCN:NSR	1 OF 2	05/27/21	01/23/12	40RU A / O / S - 14 / 16 / 25		G

# Certified Drawing for ACCU-AHU-1-4

Project: Summer 20T Splits  
Prepared By:

06/15/2023  
11:17AM

 THIS DOCUMENT IS THE PROPERTY OF CARRIER CORPORATION AND IS DELIVERED UPON THE EXPRESS CONDITION THAT THE CONTENTS WILL NOT BE DISCLOSED OR USED WITHOUT CARRIER CORPORATION'S WRITTEN CONSENT. SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.



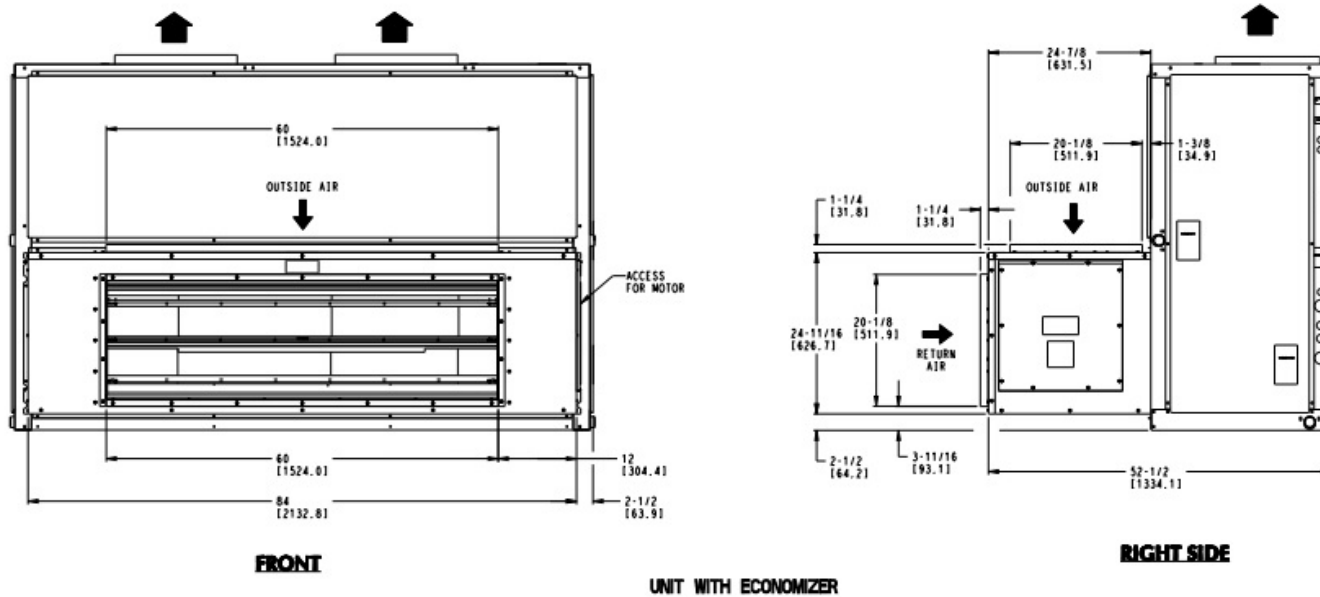
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	FAN COIL UNITS	40RU500028	REV
U. S. ECCN: NSR	2 OF 2	05/27/21	01/23/12	40RU A / O / S - 14 / 16 / 25		G

# Certified Drawing for ACCU-AHU-1-4

Project: Summer 20T Splits  
Prepared By:

06/15/2023  
11:17AM

	THIS DOCUMENT IS THE PROPERTY OF CARRIER CORPORATION AND IS DELIVERED UPON THE EXPRESS CONDITION THAT THE CONTENTS WILL NOT BE DISCLOSED OR USED WITHOUT CARRIER CORPORATION'S WRITTEN CONSENT.	SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.
---	---	---



ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	FAN COIL UNITS	40RU500028	REV
U.S. ECCN:NSR	2 OF 2	05/27/21	01/23/12	40RU A / Q / S - 14 / 16 / 25		G



## GUIDE SPECIFICATIONS – 38AUDU25A0M6-0A2C0

### Commercial Air-Cooled Condensing Units HVAC Guide Specifications

**Size: 25**

#### **Part 1: General**

##### SYSTEM DESCRIPTION

- 1.01. Outdoor-mounted, air-cooled condensing unit suitable for on-the-ground or rooftop installation. Unit shall consist of a hermetic scroll air-conditioning compressor(s) assembly, an air-cooled coil, propeller-type condenser fans, and a control box. Unit shall discharge supply air upward as shown on contract drawings. Unit shall be used in a refrigeration circuit matched with a packaged air-handling unit.

##### QUALITY ASSURANCE

- 1.01. Unit shall be rated in accordance with AHRI Standard 360.
- 1.02. Unit construction shall comply with ANSI/ASHRAE 15 safety code latest revision and comply with NEC.
- 1.03. Unit shall be constructed in accordance with UL 1995 standard and shall carry the UL and UL, Canada label.
- 1.04. Unit cabinet shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
- 1.05. Air-cooled condenser coils for hermetic scroll compressor units (38AUZ) and 38AUD shall be leak tested at 150 psig, and pressure tested at 650 psig.
- 1.06. Unit shall be manufactured in a facility registered to ISO 9001:2000 manufacturing quality standard.

##### DELIVERY, STORAGE, AND HANDLING

- 1.01. Unit shall be shipped as single package only, and shall be stored and handled according to unit manufacturer's recommendations.

##### WARRANTY (FOR INCLUSION BY SPECIFYING ENGINEER.)

#### **Part 2: Products**

##### EQUIPMENT

- 2.01. General:
  - A. Factory-assembled, single piece, air-cooled condensing unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, compressor, holding charge, and special features required prior to field start-up.
- 2.02. Unit Cabinet:
  - A. Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a prepainted baked enamel finish.
  - B. A heavy-gauge roll-formed perimeter base rail with forklift slots and lifting holes shall be provided to facilitate rigging.
- 2.03. Condenser Fans:
  - A. Condenser fans shall be direct driven, propeller type, discharging air vertically upward.
  - B. Fan blades shall be balanced.
  - C. Condenser fan discharge openings shall be equipped with PVC-coated steel wire safety guards.
  - D. Condenser fan and motor shaft shall be corrosion resistant.
- 2.04. Compressor:
  - A. Compressor shall be of the hermetic scroll type.

## Guide Specification for ACCU-AHU-1-4

Project: Summer 20T Splits  
Prepared By:

06/15/2023  
11:17AM

- B. Compressor shall be mounted on rubber grommets.
  - C. Compressors shall include overload protection.
  - D. Compressors shall be equipped with a crankcase heater.
  - E. Compressor shall be equipped with internal high pressure and high temperature protection.
  - F. 38AUZ\*16 and 25 sizes shall use two scroll compressors manifold together.
- 2.05. Condenser Coils:
- A. Standard Aluminum fin - Copper Tube Coils:
    - 1. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
    - 2. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1775 psig.
    - 3. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
- 2.06. Refrigeration Components:
- A. Refrigeration circuit components shall include liquid line service valve, suction line service valve, a full charge of compressor oil, and a partial holding charge of refrigerant.
- 2.07. Controls and Safeties:
- A. Minimum control functions shall include:
    - 1. Control wire terminal blocks.
    - 2. Compressor lockout on auto-reset safety until reset from thermostat.
    - 3. Each unit shall utilize the Comfort Alertt Diagnostic Board that provides:
      - a. System Pressure Trip fault code indication
      - b. Short Cycling fault code indication
      - c. Locked Rotor fault code indication
      - d. Open Circuit fault code indication
      - e. Reverse Phase 3 fault code indication
      - f. Welded Contactor fault code indication
      - g. Low Voltage fault code indication
      - h. Anti-short cycle protection
      - i. Phase reversal protection
  - B. Minimum safety devices which are equipped with automatic reset (after resetting first at thermostat), shall include:
    - 1. High discharge pressure cutout.
    - 2. Low pressure cutout.
- 2.08. Operating Characteristics:
- A. The capacity of the condensing unit shall meet or exceed \_\_\_\_\_ Btuh at a suction temperature of \_\_\_\_\_ F. The power consumption at full load shall not exceed \_\_\_\_\_ kW.
  - B. The combination of the condensing unit and the evaporator or fan coil unit shall have a total net cooling capacity of \_\_\_\_\_ Btuh or greater at conditions of \_\_\_\_\_ cfm entering-air temperature at the evaporator at \_\_\_\_\_ F wet bulb and \_\_\_\_\_ F dry bulb, and air entering the condensing unit at \_\_\_\_\_ F.
  - C. The system shall have an EER of \_\_\_\_\_ Btuh/Watt or greater at standard AHRI conditions.
  - D. Standard unit shall be capable to operate up to 125\_F (52\_C) and down to 40\_F (4\_C)
- 2.09. Electrical Requirements:
- A. Nominal unit electrical characteristics shall be \_\_\_\_\_ v, 3-ph, 60 Hz. The unit shall be capable of satisfactory operation within voltage limits of \_\_\_\_\_ v to \_\_\_\_\_ v.
  - B. Unit electrical power shall be single-point connection.
  - C. Unit control circuit shall contain a 24-v transformer for unit control.
- 2.10. Special Features:
- A. Unit-Mounted, Non-Fused Disconnect Switch:

## Guide Specification for ACCU-AHU-1-4

Project: Summer 20T Splits  
Prepared By:

06/15/2023  
11:17AM

1. Switch shall be factory-installed and internally mounted. NEC and UL-approved non-fused switch shall provide unit power shutoff. Switch shall be accessible from outside the unit and shall provide power off lockout capability. Non-fused disconnect switch cannot be used when unit MOCP electrical rating exceeds 80 amps.
- B. Convenience Outlet:
  1. Powered convenience outlet.
    - a. Outlet shall be powered from main line power to the rooftop unit.
    - b. Outlet shall be powered from line side or load side of disconnect by installing contractor, as required by code. If outlet is powered from load side of disconnect, unit electrical ratings shall be UL certified and rated for additional outlet amperage.
    - c. Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle.
    - d. Outlet shall include 15 amp GFI receptacles with independent fuse protection.
    - e. Voltage required to operate convenience outlet shall be provided by a factory-installed step-down transformer.
    - f. Outlet shall be accessible from outside the unit.
    - g. Outlet shall include a field-installed "Wet in Use" cover.
- C. Thermostat Controls:
  1. Programmable multi-stage thermostat shall have 7-day clock, holiday scheduling, large backlit display, remote sensor capability, and Title 24 compliance.
  2. Commercial Electronic Thermostat shall have 7-day time clock, auto-changeover, multi-stage capability, and large LCD (liquid crystal display) temperature display.
- D. Louvered hail Guard Package:
  1. Louvered hail guard package shall protect coils against damage from hail and other flying debris.



## GUIDE SPECIFICATIONS – 40RUA25T3A6-UA0A0

### Commercial Packaged Air-Handling Unit HVAC Guide Specifications

Size: 25

#### Part 1: GENERAL

##### SYSTEM DESCRIPTION

- 1.01. Indoor, packaged air-handling unit for use in commercial split systems. Unit shall have a multi-position design and shall be capable of horizontal or vertical installation on a floor or in a ceiling, with or without ductwork. (Only vertical units are to be applied without ductwork.)
- 1.02. Unit with direct-expansion coil shall be used in a refrigerant circuit with a matching air-cooled condensing unit. Unit with chilled water coil shall be used in a chilled water circuit.

##### QUALITY ASSURANCE

- 1.01. Coils shall be designed and tested in accordance with ASHRAE 15 Safety Code for Mechanical Refrigeration (U.S.A.), latest edition.
- 1.02. Unit shall be constructed in accordance with ETL (U.S.A.) and ETL, Canada, standards and shall carry the ETL and ETL, Canada, labels.
- 1.03. Unit insulation and adhesive shall comply with NFPA-90A (U.S.A.) requirements for flame spread and smoke generation.

## Guide Specification for ACCU-AHU-1-4

Project: Summer 20T Splits  
Prepared By:

06/15/2023  
11:17AM

Insulation shall contain an EPA-registered immobilized antimicrobial agent to effectively resist the growth of bacteria and fungi as proven by tests in accordance with ASTM standards G21 and 22 (U.S.A.).

1.04. Unit shall be manufactured in a facility registered to the ISO 9001:2000 manufacturing quality standard.

1.05. Direct-expansion and chilled water coils shall be burst and leak tested at 435 psi (2999 kPa).

### DELIVERY AND STORAGE

1.01. Units shall be stored and handled per manufacturer's recommendations.

### Part 2: Products

#### EQUIPMENT

2.01. Indoor mounted, draw-thru, packaged air-handling unit that can be used in a suspended horizontal configuration or a vertical configuration. Unit shall consist of forward-curved belt-driven centrifugal fan(s), motor and drive assembly, pre-wired fan motor contactor, factory-installed refrigerant metering devices (direct-expansion coil units), cooling coil, 2-in. (51-mm) disposable air filters, and condensate drain pans for vertical or horizontal configurations.

2.02. Base Unit:

- A. Cabinet shall be constructed of mill-galvanized steel.
- B. Cabinet panels shall be fully insulated with 1/2-in. (12.7-mm) fire-retardant material. Insulation shall contain an EPA-registered immobilized antimicrobial agent to effectively resist the growth of bacteria and fungi as proven by tests in accordance with ASTM standards G21 and 22 (U.S.A.).
- C. Unit shall contain non-corroding condensate drain pans for both vertical and horizontal applications. Drain pans shall have connections on right and left sides of unit to facilitate field connection. Drain pans shall have the ability to be sloped toward the right or left side of the unit to prevent standing water from accumulating in pans.
- D. Unit shall have factory-supplied 2-in. (51 mm) throwaway-type filters installed upstream from the cooling coil. Filter access shall be from either the right or left side of the unit.

2.03. Coils:

- A. DX coil is 4-row and consists of copper tubes with sine-wave aluminum fins bonded to the tubes by mechanical expansion. Suction and liquid line connections or supply and discharge connections shall be made on the same side of the coil.
  - 1. Direct-expansion coils shall feature factory installed thermostatic expansion valves (TXVs) for refrigerant control. The TXVs shall be Puron®R-410A compatible and capable of external adjustment. Direct-expansion heat pump coils shall have a factory-installed bypass line and check valve assembly around the TXVs to allow liquid flow from the coil to the outdoor unit during the heating mode. Coil tubing shall be internally rifled to maximize heat transfer.
  - 2. Chilled water coils shall be rated for an operating pressure of not less than 300 psig (2069 kPag).

2.04. Operating Characteristics:

- A. Unit shall be capable of providing \_\_\_\_ cfm (L/s) airflow at an external static pressure of \_\_\_\_ in. wg (kPag).

2.05. Motor:

- A. Fan motor of the size and electrical characteristics specified on the equipment schedule shall be factory supplied and installed.
- B. Motors rated at 1.3 through 3.7 hp (0.97 through 2.76 kW) shall have internal thermal overload protection. Motors rated at 5 hp (3.73 kW) shall be protected by a circuit breaker.
- C. Evaporator-fan motor shall have permanently lubricated, sealed bearings and inherent automatic-reset thermal overload protection or manual reset calibrated circuit breakers. Evaporator motors are designed specifically for Carrier and do not have conventional horsepower (hp) ratings listed on the motor nameplate. Motors are designed and qualified in the "air-over" location downstream of the cooling coil and carry a maximum continuous bhp rating that is the maximum application bhp rating for the motor; no "safety factors" above that rating may be applied.
- D. All evaporator-fan motors 5 hp and larger shall meet the minimum efficiency requirements as established by the Energy Policy Act of 1992 (EPACT), effective October 24, 1997.

2.06. Special Features:

- A. Staged Air Volume System (SAV) for 2-stage cooling models only:
  - 1. Evaporator fan motor:
    - a. Shall have permanently lubricated bearings.

## Guide Specification for ACCU-AHU-1-4

Project: Summer 20T Splits  
Prepared By:

06/15/2023  
11:17AM

- b. Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating.
  - c. Shall be Variable Frequency duty and 2-speed control.
  - d. Shall contain motor shaft grounding ring to prevent electrical bearing fluting damage by safely diverting harmful shaft voltages and bearing currents to ground.
- B. Variable Frequency Drive (VFD). Only available on 2-speed indoor fan motor option (SAV):
1. Shall be installed inside the unit cabinet, mounted, wired and tested.
  2. Shall contain Electromagnetic Interference (EMI) frequency protection.
  3. Insulated Gate Bi-Polar Transistors (IGBT) used to produce the output pulse width modulated (PWM) waveform, allowing for quiet motor operation.
  4. Self-diagnostics with fault and power code LED indicator. Field accessory Display Kit available for further diagnostics and special setup applications.
  5. RS485 capability standard.
  6. Electronic thermal overload protection.
  7. 5% swinging chokes for harmonic reduction and improved power factor.
  8. All printed circuit boards shall be conformal coated.
- C. Alternate Motor and Drive:
1. An alternate motor and/or medium-static or high-static drive shall be available to meet the airflow and external static pressure requirements specified on the equipment schedule.
- D. Thermostat Controls:
1. TEMP System programmable communicating multi-stage thermostat with fan switch, time clock, LCD display, °F/°C capability, and CCN (Carrier Comfort Network™) compatibility.
  2. Commercial Electronic Thermostat with 7-day time clock, auto-changeover, multi-stage capability, and large LCD temperature display.
- E. Display Kit for Variable Frequency Drive
1. Kit allows the ability to access the VFD controller programs to provide special setup capabilities and diagnostics.
  2. Kit contains display module, mounting bracket and communication cable.
  3. Display Kit can be permanently installed in the unit or used on any SAV system VFD controller as needed.



# Split System Rating

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266  
Ecat Version: 353.0

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

V3-ERB-3-0-462C-000:F34C-B0H-000-B00-C0A0020-00-DB000FD00

**Air Handling Unit Tag: Split AHU #1**

CFA-020-C-A-3-JA00M:0-A0-B0-00-000-0-A000-0000C00-0A0000B

**Condensing Unit Tag: Split CU #1**

\*\*\*Refer to the IOM for more information about A2L safety requirements

### Job Information

Job Name: Holly Springs (Summer)  
Job Number: Job 43  
Site Altitude: 0 ft  
Refrigerant: R-454B  
Indoor Coil Volume\*\*\*: 1 @ 1475.0 in<sup>3</sup> Ea.  
A/H System Volumes\*\*\* (in<sup>3</sup>): 737.5 / 737.5  
C/U Design System Charge\*\*\* (oz): 217 / 217

### Static Pressure

External: 0.90 in. w.g.  
Cooling Coil: 0.76 in. w.g.  
Filters Clean: 0.30 in. w.g.  
Dirt Allowance: 0.35 in. w.g.

### Cooling Section

	Gross	Net
Total Capacity:	251.7 MBH	231.7 MBH
Sensible Capacity:	218.1 MBH	198.1 MBH
Latent Capacity:	33.6 MBH	
Mixed Air Temp (DB/WB):	77.9 °F / 65.0 °F	
Entering Air Temp (DB/WB):	77.9 °F / 65.0 °F	
Lv Air Temp (Coil) (DB/WB):	56.8 °F / 56.2 °F	
Lv Air Temp (Unit) (DB/WB):	58.6 °F / 56.9 °F	

Supply Air Fan: 2 x RN185 @ 3.66 BHP Ea.  
SA Fan RPM / Width: 2243 RPM / 4.140 in  
SA Fan FEL: 0.95

Evaporator Suction Temp: 51.4 °F

### Rating Information

Listing Model: CF-020-3-C-FA0C-00-21-000-A  
Listing Model 2: H3/V3-3-E-00BC-V0-00-A

Cooling Capacity: 222.0 MBH  
Cooling EER: 11.47 BTU/h-W  
Cooling IEER: 14.5 BTU/h-W

Application EER @ Op. Conditions: 9.7 BTU/h-W

### Electrical Data

#### AH Electrical Data

Rating: 460V/3Ø/60Hz  
Unit FLA: 10  
SCCR: 5 KAIC

Minimum Circuit Amp: 12  
Maximum Overcurrent: 15

#### CU Electrical Data

Rating: 460V/3Ø/60Hz  
Unit FLA: 35  
SCCR: 5 KAIC

Minimum Circuit Amp: 39  
Maximum Overcurrent: 50

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	2		460	3			14.0
Condenser Fan:	2	1.00	460	3	1140	3.6	
Supply Fan:	2	5.00	460	3	1760	5.2	



# 18.5" STAR Plenum

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266  
Ecat Version: 353.0

## JOB INFORMATION:

**Job Name:** Holly Springs (Summer)  
**Job Tag:** Split AHU #1  
**Date:** 10/22/2024 12:00:00 AM

## WHEEL SPECIFICATION:

**Max RPM:** 3000  
**Diameter x Qty:** 18.5 in. x 2  
**CFM:** 4800  
**Inertia:** 3WR<sup>2</sup>

## OPERATING CONDITIONS

**Air Flow:** 4800  
**Fan Energy Index (FEI):** 0.95  
**Static Pressure:** 2.45 in. Wg  
**Relief Dampers DP:** 0 in. Wg  
**TSP:** 2.45 in. Wg  
**Site Altitude:** 0 ft  
**TSP @ Sea Level:** 2.45 in. Wg

## MOTOR SELECTION

**Rated HP / Bypass:** 5 x 2 / No  
**Frame Size:** 143T  
**Nominal RPM:** 1760  
**VAC/PH/HZ:** 460V/3Ø/60Hz  
**Enclosure Type:** TEFC  
**Max Inertial Load:** 0 WR<sup>2</sup>

## FAN PERFORMANCE:

**RPM:** 2243  
**BHP:** 3.66  
**Efficiency:** 50.65%  
**Max Duct SP with Blocked Airway:** 0 in. Wg @2243 RPM

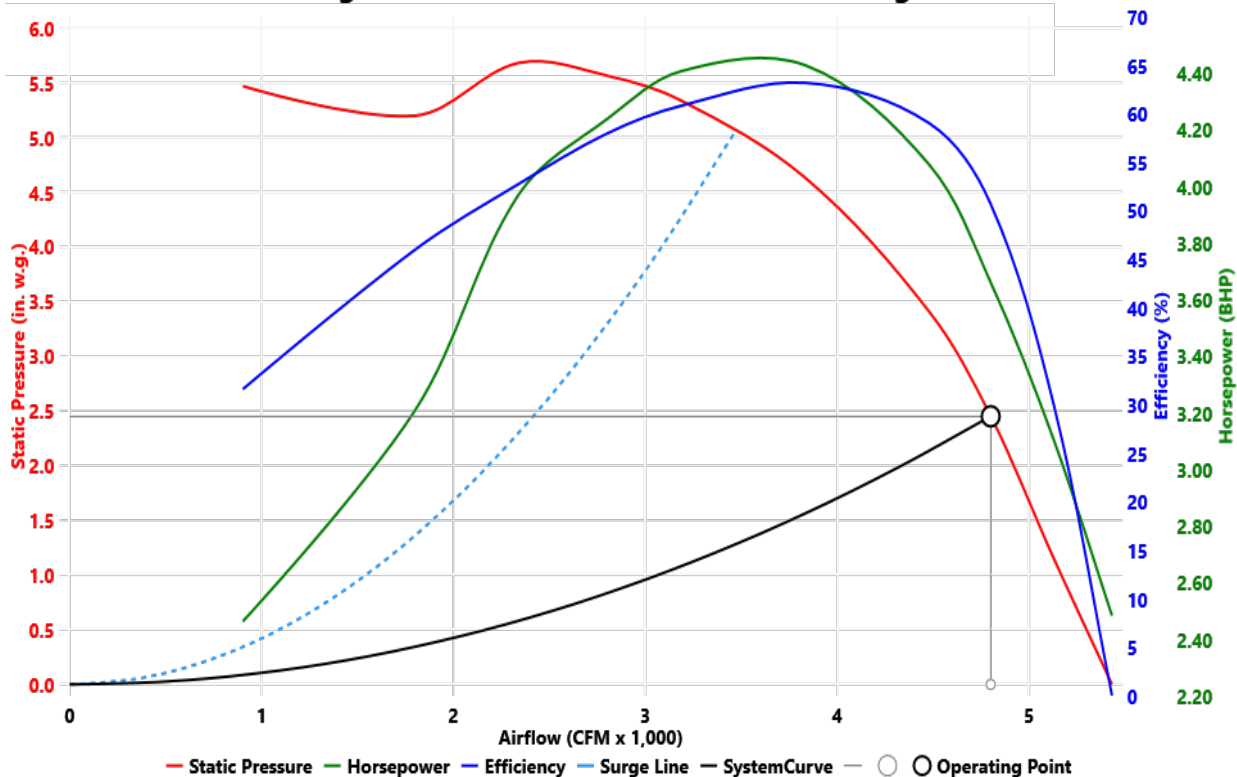
## FAN SOUND POWER (Inlet/Outlet)

Octave Band:	(Re 10 <sup>-12</sup> watts)							
	1	2	3	4	5	6	7	8
	93	93	95	95	89	86	84	79
	93	93	95	95	89	86	84	79

SOUND POWER A-Weighted: 79 dB

Max Duct SP with Blocked Airway:

**Supply Fan Model: RN185 x 2 @ 2243 RPM and 100% Width**  
**Design Conditions: 4800 CFM @ 2.45 in. w.g. SP**





# Unit Submittal

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266  
Ecat Version: 353.0

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

**V3-ERB-3-0-462C-000:F34C-B0H-000-B00-C0A0020-00-DB000FD00**

Tag: Split AHU #1

Job Name: Holly Springs (Summer)  
Job Number: Job 43

Unit Worksheet For:  
Unit Worksheet Date: 10/22/2024

	Base Option	Description
V3	Generation	Vertical Unit
E	Unit Size	Up to 10,000 cfm
R	Unit Orientation	Right Hand Connections - Top Discharge, Back Intake (Vertical)
B	Revision	Second Revision
3	Voltage	460V/3φ/60Hz
0	Corrosion Protection	None
4	Cooling Type	R-454B DX Cooling
6	Cooling Rows	6 Row Coil
2	Cooling Stages	Two Circuits - Interlaced Coil
C	Cooling FPI	12 fpi
0	Heating Type	No Heating
0	Heating Designation	No Heating
0	Heating Stages	Standard

	Feature Option	Description
F	F1A.	SA Blower Configuration
3	F1B.	SA Blower Model
4	F1C.	SA Blower Motor
C	F1D.	SA Blower Control/Control Vendor
B	F2.	Refrigeration Options
0	F3.	Special Controls
H	F4.	Additional Controls 1
0	F5A.	RA Damper Position
0	F5B.	OA Damper Position
0	F5C.	Damper Control
B	F6A.	Filter Box - Pre Filter Box
0	F6B.	Filter Box - Unit Filter
0	F6C.	Filter Box - Final Filter Box
C	F7.	Filter Options
0	F8.	Coil Coating
A	F9.	Expansion Valve
0	F10.	Expansion Valve Controls
0	F11.	External Paint
2	F12.	Tonnage
0	F13.	Energy Recovery Type
0	F14A.	Power Options
0	F14B.	Electrical Rating
D	F15.	Control Panel
B	F16.	Shipping Splits
0	F17.	Energy Recovery Cabinet
0	F18.	Preheat
0	F19.	Exhaust Fan
F	F20.	Crating
D	F21.	Additional Controls 2
0	F22.	Warranty
0	F23.	Type



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

**V3-ERB-3-0-462C-000:F34C-B0H-000-B00-C0A0020-00-DB000FD00**

Tag: Split AHU #1

Job Name: Holly Springs  
(Summer)

For:

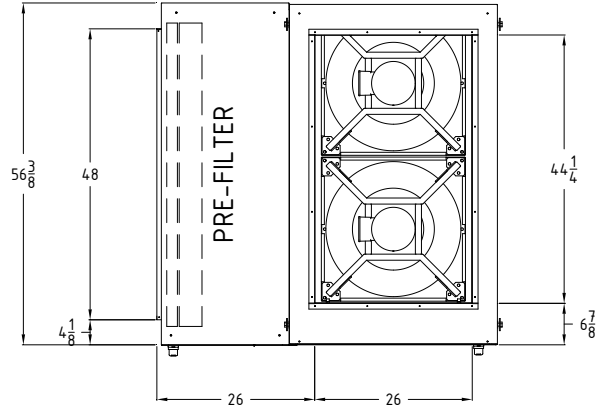
Job Number: Job 43

Date: October 22, 2024

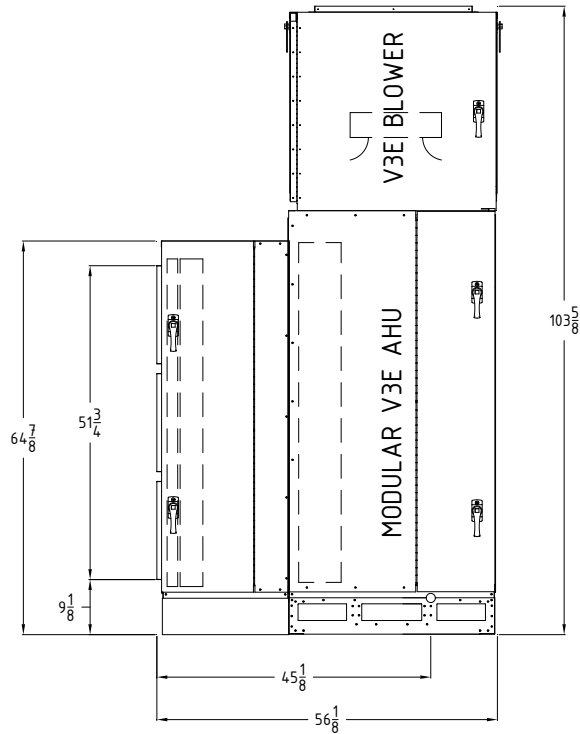
### Terminals Available/Required for Controlling the Unit

Terminals	Description
[R]	24 VAC
[C]	COMMON
[G]	FAN(S) ENABLE
[AFS1] & [AFS2]	PROOF OF AIR FLOW
[S1]	VFD FAN SIGNAL
[S2]	VFD SIGNAL COMMON
[C1] & [C2]	CLOGGED FILTER SWITCH
[BI1] & [BI2]	Remote Safety Shutdown
Supply Fan VFD Terminals	
[AC1] & [A1] or [6] & [7]	Speed Control Input (0-10VDC)
	[AC1] & [A1] terminals on Yaskawa GA500. [6] & [7] terminals on Invertek Optidrive E3.
[AC2] & [AM] or [8] & [9]	Current Feedback (0-10VDC = 0-100%)
	[AC2] & [AM] terminals on Yaskawa GA500. [8] & [9] terminals on Invertek Optidrive E3.
[C1] & [P1]	Run Status (5-48VDC, 2-50mA)
	Only available on Yaskawa GA500 VFD
[MA] & [MC]	Fault Status (NC)
	Only available on Yaskawa GA500 VFD

### PLAN VIEW



### ELEVATION VIEW

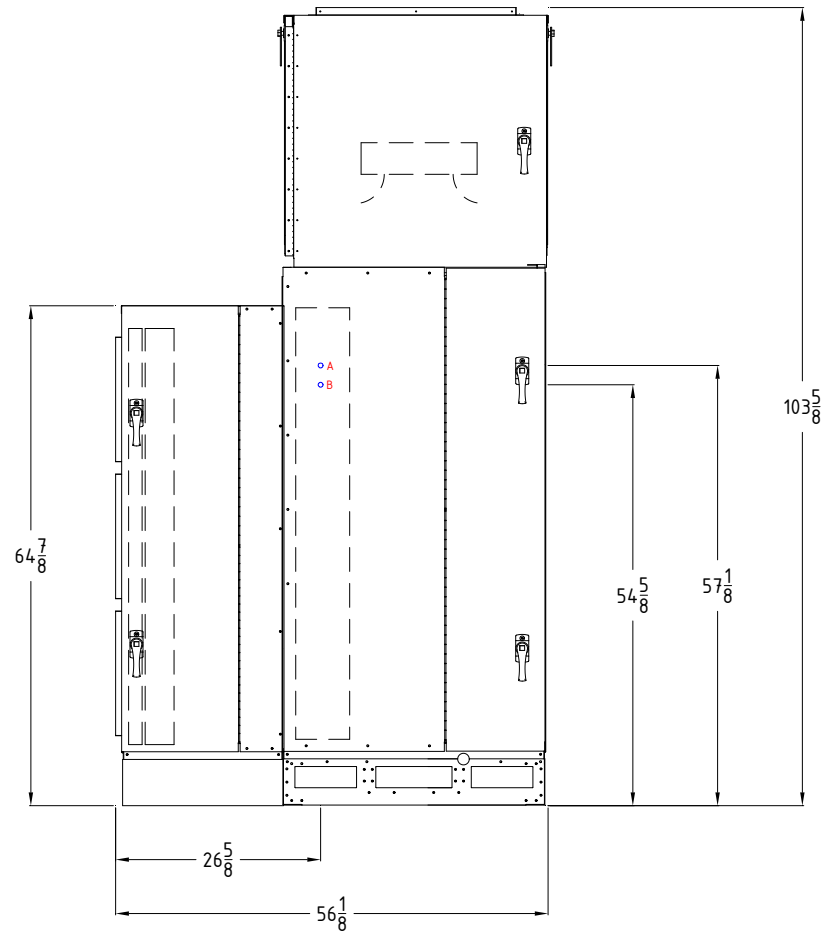


ALL DIMENSIONS IN INCHES



Job Name <b>Holly Springs (Summer)</b>	Unit Tag <b>Split AHU #1</b>
Unit Configuration <b>V3-ERB-3-0-462C-000:F34C-B0H-000-B00-COA0020-00-DB000FD00</b>	
Clearances (FRONT/BACK/LEFT/RIGHT/TOP/BOTTOM) <b>6/DUCT/6/36/DUCT/6</b>	Drawing Type <b>Unit Detail</b>
Weight (Shipping/Operating) <b>850/850 ±5% lbs</b>	Date <b>2024-10-22</b>
	Software Version <b>6.353.0</b>
	Drawing Engine Version <b>6.24.41.0</b>

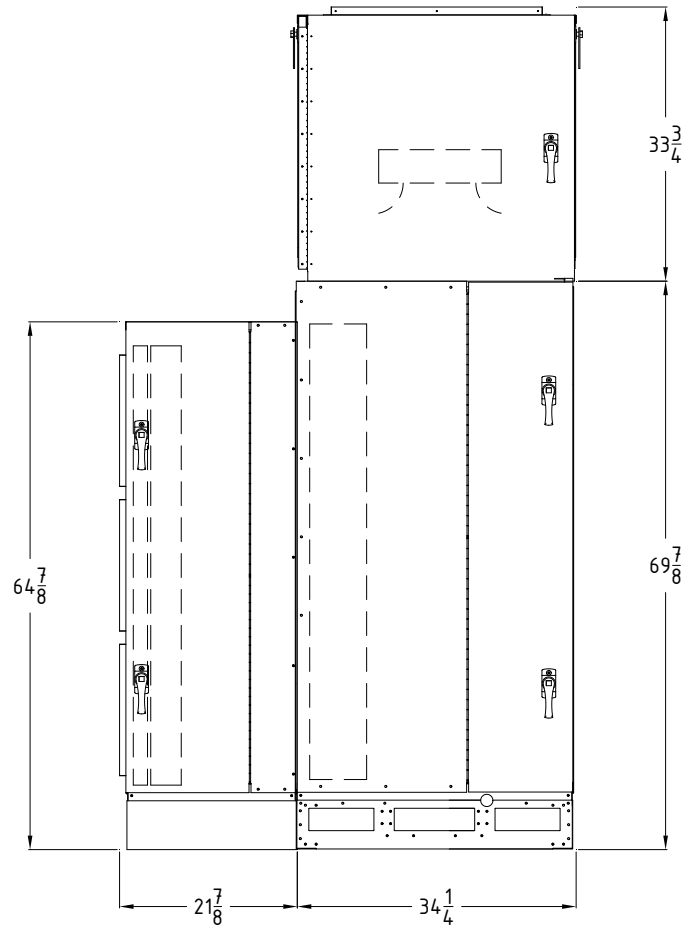
Connections				
Key	Description	∅	X	Y
A	HGBP 1	0.62	26.60	57.12
B	HGBP 2	0.62	26.60	54.62



ALL DIMENSIONS IN INCHES



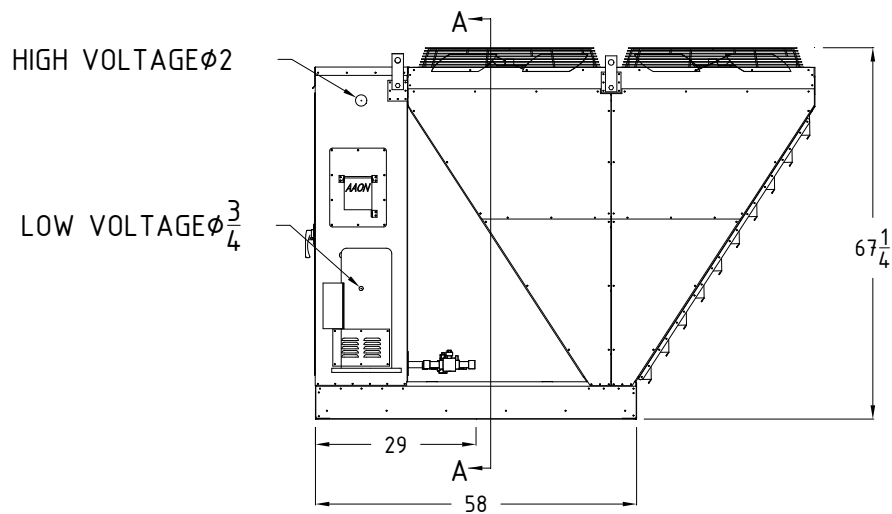
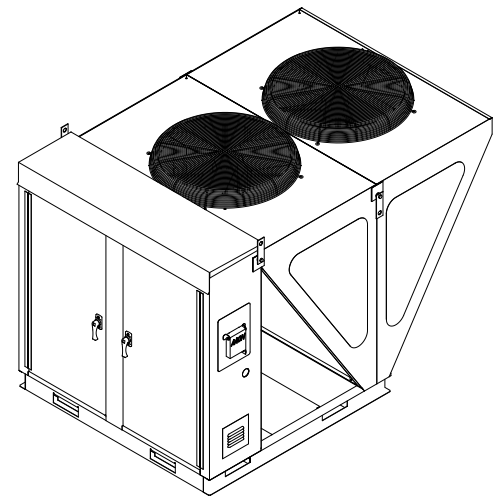
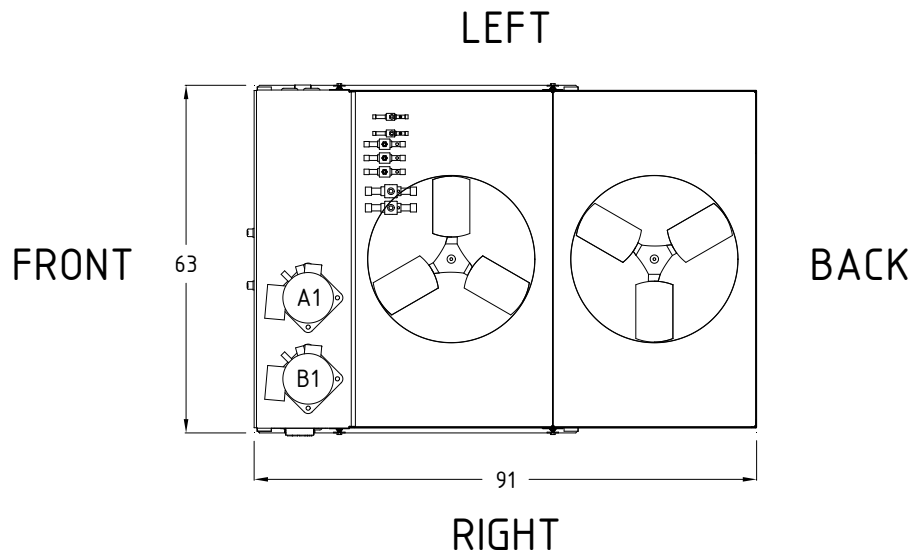
Job Name <b>Holly Springs (Summer)</b>		Unit Tag <b>Split AHU #1</b>	
Unit Configuration <b>V3-ERB-3-0-462C-000:F34C-B0H-000-B00-COA0020-00-DB00FD00</b>			
Clearances (FRONT/BACK/LEFT/RIGHT/TOP/BOTTOM) <b>6/DUCT/6/36/DUCT/6</b>		Drawing Type <b>Unit Connections</b>	
Weight (Shipping/Operating) <b>850/850 ±5% lbs</b>	Date <b>2024-10-22</b>	Software Version <b>6.353.0</b>	Drawing Engine Version <b>6.24.41.0</b>



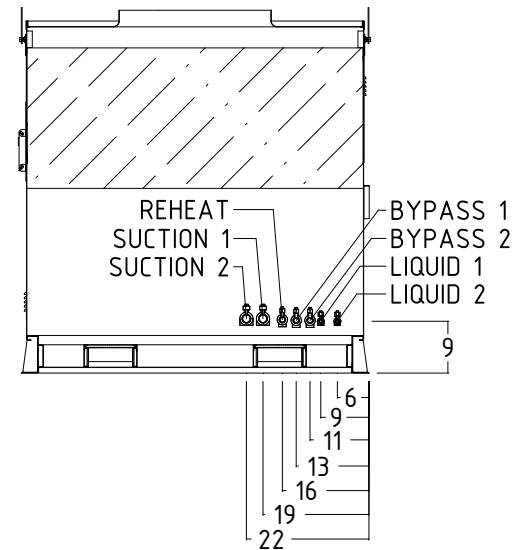
ALL DIMENSIONS IN INCHES



Job Name <b>Holly Springs (Summer)</b>		Unit Tag <b>Split AHU #1</b>	
Unit Configuration <b>V3-ERB-3-0-462C-000:F34C-B0H-000-B00-COA0020-00-DB000FD00</b>			
Clearances (FRONT/BACK/LEFT/RIGHT/TOP/BOTTOM) <b>6/DUCT/6/36/DUCT/6</b>		Drawing Type <b>Unit Dimensions Detail</b>	
Weight (Shipping/Operating) <b>850/850 ±5% lbs</b>	Date <b>2024-10-22</b>	Software Version <b>6.353.0</b>	Drawing Engine Version <b>6.24.41.0</b>



SECTION A-A



ALL DIMENSIONS IN INCHES

CONFIGURABLE OPTIONS SHOWN



Job Name <b>Holly Springs (Summer)</b>		Unit Tag <b>Split CU #1</b>	
Unit Configuration <b>CFA-020-C-A-3-JA00M:0-A0-B0-00-000-0-A000-0000C00-0A0000B</b>			
Clearances (FRONT/BACK/LEFT/RIGHT/TOP/BOTTOM) <b>36/6/30/36/OPEN/6</b>		Drawing Type <b>Unit Detail</b>	
Weight (Shipping/Operating) <b>1423/1423 ±5% lbs</b>	Date <b>2024-10-22</b>	Software Version <b>6.353.0</b>	Drawing Engine Version <b>6.24.41.0</b>



# Unit Submittal

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266  
Ecat Version: 353.0

A1 A2 A3 A4 A5 1 2A 2B 3A 3B 4 5 6A 6B 6C 7 8A 8B 8C 8D 9 10 11 12 13 14 15 16 17 18 19 20 21 22

**CFA-020-C-A-3-JA00M:0-A0-B0-00-000-0-A000-0000C00-0A0000B**

Tag: Split CU #1

Job Name: Holly Springs (Summer)  
Job Number: Job 43

Unit Worksheet For:  
Unit Worksheet Date: 10/22/2024

	Base Option	Description
CF	Generation	CF - Condensing Unit
A	Major Rev	Major Revision
020	Unit Size	Twenty
C	Series	C Cabinet
A	Revision	Minor Revision
3	Voltage	460V/3φ/60Hz
J	Compressor Style	R-454B Scroll Two-Step Capacity Comp
A	Condenser Style	Air-Cooled Microchannel Condenser
0	Configuration	Standard
0	Coating	Standard
M	Staging	2 Two-Step Refrig Systems

	Feature Option	Description
0	F1. Unit Orientation	Vertical Condenser Discharge with End Control Panel
A	F2A. Refrigeration Control	5 Minute Compressor Off Timer & 20 Second Compressor Stage Delay
0	F2B. Blank	Standard
B	F3A. Refrigeration Options	HGB Lead + HGB Lag
0	F3B. Blank	Standard
0	F4. Refrigeration Accessories	Standard
0	F5. Blank	Standard
0	F6A. Unit Disconnect Type	Standard Single Point Power Block
0	F6B. Disconnect Size	None
0	F6C. Blank	Standard
0	F7. Accessories	Standard
A	F8A. Control Sequence	Terminal block for Thermostat w/ Isolation Relays
0	F8B. Control suppliers	Standard Terminal Block
0	F8C. Control Supplier Options	Standard
0	F8D. BMS Connection and Diagnostics	Standard
0	F9. Blank	Standard
0	F10. Blank	Standard
0	F11. Maintenance Accessories	Standard
0	F12. Code Options	Standard ETL U.S.A. Listing
C	F13. Air Cooled Condenser Accessories	ECM Condenser Fan / Head Pressure Control
0	F14. Blank	Standard
0	F15. Blank	Standard
0	F16. Electrical Options	Standard
A	F17. Shipping Options	Crating
0	F18. Blank	Standard
0	F19. Blank	Standard
0	F20. Cabinet Material	Standard - Galvanized Steel Cabinet
0	F21. Warranty	Standard Warranty
B	F22. Paint and SPAs	Premium AAON Gray Paint Exterior



# Terminals

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266  
Ecat Version: 353.0

A1
A2
A3
A4
A5
1
2A
2B
3A
3B
4
5
6A
6B
6C
7
8A
8B
8C
8D
9
10
11
12
13
14
15
16
17
18
19
20
21
22

**CFA-020-C-A-3-JA00M:0-A0-B0-00-000-0-A000-0000C00-0A0000B**

Tag: Split CU #1

Job Name: Holly Springs  
(Summer)

For:

Job Number: Job 43

Date: October 22, 2024

### Terminals Available/Required for Controlling the Unit

Terminals	Description
[C]	Common
[R]	24VAC Control Voltage
[Y1]	Cooling Stage Enable + Isolation Relay
[Y2]	Cooling Stage Enable + Isolation Relay
[Y3]	Cooling Stage Enable + Isolation Relay
[Y4]	Cooling Stage Enable + Isolation Relay



# Project Submittal

**Project Name:** Holly Springs Town Hall  
**Project Number:** 455799  
**Project Altitude:** 500  
**Project Location:**  
Raleigh, North Carolina US

**Date:** 6/13/2023  
**Quote:** 348704  
**Roof Top Units:** 0  
**Split Systems:** 4

**Customer:** Zone Comm Charlotte

## Table of Contents

Tag	Qty	Model	Description
<u>AHU/CU- 1,2</u>	2	24B32	EL240XCSDT1G AC/20TON/460-3
	2	24A63	EL240XASD-1G AHU/20T/460-3/STD
<u>AHU/CU- 3,4</u>	2	24B32	EL240XCSDT1G AC/20TON/460-3
	2	24A63	EL240XASD-1G AHU/20T/460-3/STD

Revit® Building Information Modeling (BIM) - [Click here](#)

AutoCAD® Templates - [Click here](#)



# Project Submittal

**Tag:** AHU/CU- 1,2  
**Condenser:** EL240XCSDT-460-3  
**Air Handler:** EL240XASD-STD-460

## UNIT OVERVIEW AHRI Reference - 210666010

Voltage	IEER EER	Tons	Gross Cooling Ttl/Sens (MBH)	Net Cooling Ttl/Sens (MBH)	Supply Air Flow (cfm)	ESP/TSP (in.WC)	EAT DB/WB (°F)	LAT DB/WB (°F)
480 Volt 3 Phase / 60Hz	14.2 11	20.0	251.3 / 200.7	232.6 / 182.0	8,600	1.0 / 1.5	80.0 / 67.0	57.4 / 57.3

## COOLING

Cooling Performance				Temperatures (DB/WB °F)			
Gross Cooling (Ttl/Sens)		251.3 / 200.7 MBH		Ambient		95.0	
Net Cooling (Ttl/Sens)		232.6 / 182.0 MBH		Entering		80.0 67.0	
Coil Moisture Removal		47.67 lb/hr		Leaving – (Coil)		57.4 57.3	
				Leaving – (Unit)		59.6 58.1	

ARI Performance		Compressors		Refrigerant		Condensate Drain	
ARI Cooling	228.0 MBH	Cooling Stages	Three	Type	R-410A	Qty	1
		Compressor Qty	2	Cond Suction Line	(2) 1 1/8	Size	1 in.
				Cond Liquid Line	(2) 5/8	Pipe Thread	npt
				Coil Suction Line	(2) 1-1/8		
				Coil Liquid Line	(2) 5/8		

## HEATING

Heating Performance	Temperatures (DB/WB °F)

## VENTILATION

Air Flow (cfm)		Supply Fan		Air Resistance (in.WC)	
Supply	8,600	Nominal Power	7.50 hp	Total	1.48
Outdoor	1,500	Required Power	6.61 hp	Ext Supply	1.00
		Drive Type	Multi-Stage Air Volume	Wet Coil	0.31
		Required RPM	1,075 rpm	Economizer	0.17
		RPM Range	810 - 1,036 rpm		
		Orientation	Upflow/Horizontal		

## ELECTRICAL

Condenser		Air Handler	
Voltage	480 Volt 3 Phase / 60Hz	Voltage	480 Volt 3 Phase / 60Hz
MCA	39 amp	MCA (Ckt 1/2/3)	14 / 0 / 0 amp
MOCP	50 amp	MOCP (Ckt 1/2/3)	20 / 0 / 0 amp
Condenser Oper Range-Nom Volt	+/- 10%	Supply Fan FLA	11.00 amp
Oper Range-Nom Volt	+/- 10%		

## ADDITIONAL DATA

Condenser		Air Handler	
Dimensions	88.75 in. x 60.12 in. x 48.75 in.	Dimensions	97.25 in. x 30.50 in. x 54.75 in.
Total Weight	864 lb	Total Weight	799 lb



# Project Submittal

Tag: AHU/CU- 1,2

## Field Installed Accessories

Catalog Number	Qty	Description
16F25	2	Low Ambient Control (0 Deg) Field Installed
17A12	2	Standard Economizer Field Installed
53W64	2	Single Enthalpy Control Field Installed
16B29	2	Float Switch Field Installed

## Product Features

### Cabinet

Heavy gauge galvanized steel cabinet  
Copper Tube / Aluminum Fin Coils  
Heavy gauge galvanized steel cabinet

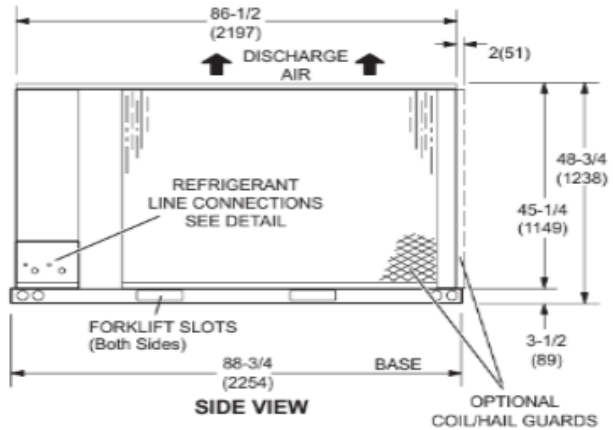
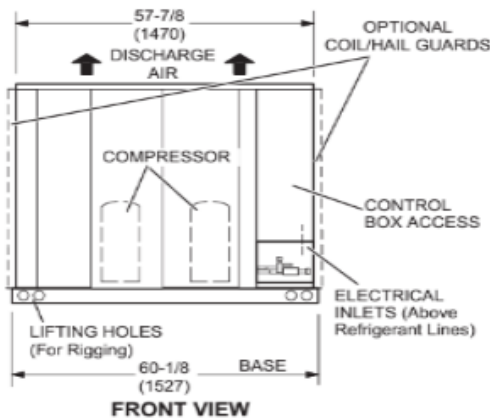
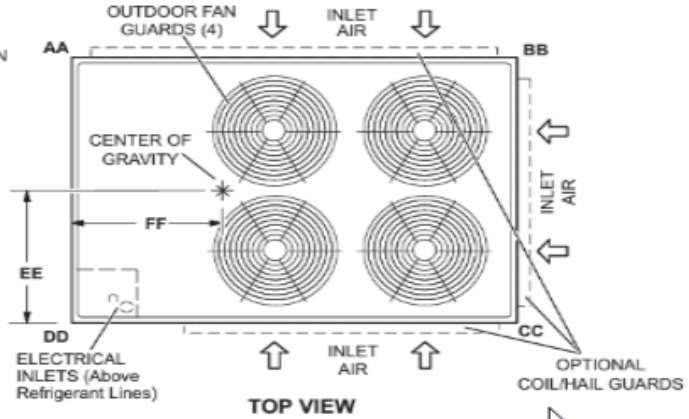
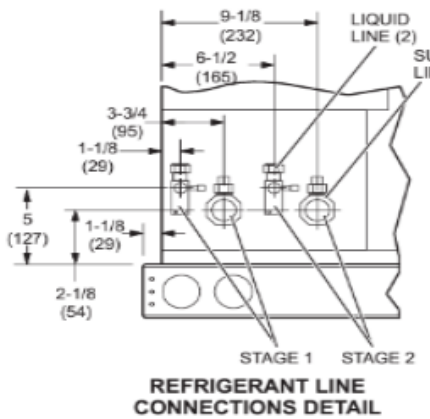
### Cooling System

Non Chlorine, Ozone Friendly Refrigerant, R410A  
Scroll Compressor  
Hi-Capacity Drier factory installed in liquid line  
Low Pressure Switch  
Twin Coils assembled in an "A" configuration  
Check and Expansion Valve is factory installed

### Warranty

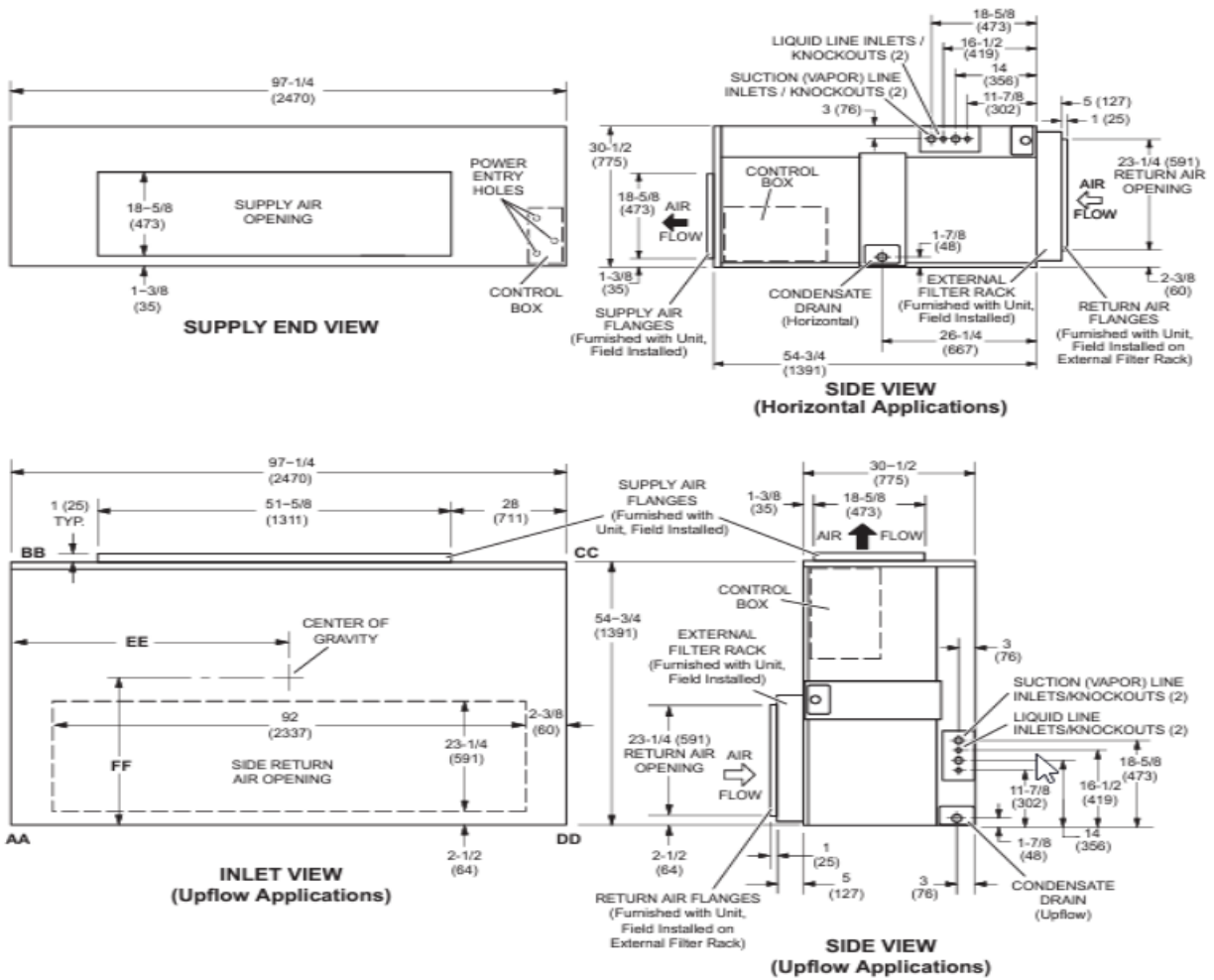
Condenser See Limited Warranty Certificate included with unit for details  
Condenser Limited compressor warranty of 5 years for Non-Residential Installations  
Condenser Limited warranty on all covered components of 1 year  
Condenser Limited warranty on all covered components of 1 year in Non-Residential Installations  
Coil See Limited Warranty Certificate included with unit for details  
Coil Limited warranty on all other covered components of 1 year (Comm Use)

DIMENSIONS		EL180XCSD   EL240XCSD										
Model No.	CORNER WEIGHTS								CENTER OF GRAVITY			
	AA		BB		CC		DD		EE		FF	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	in.	mm	in.	mm
EL180XCSD	181	82	177	81	215	98	221	100	29	737	38	965
EL240XCSD	192	87	189	86	232	105	238	108	29	737	37-1/2	953





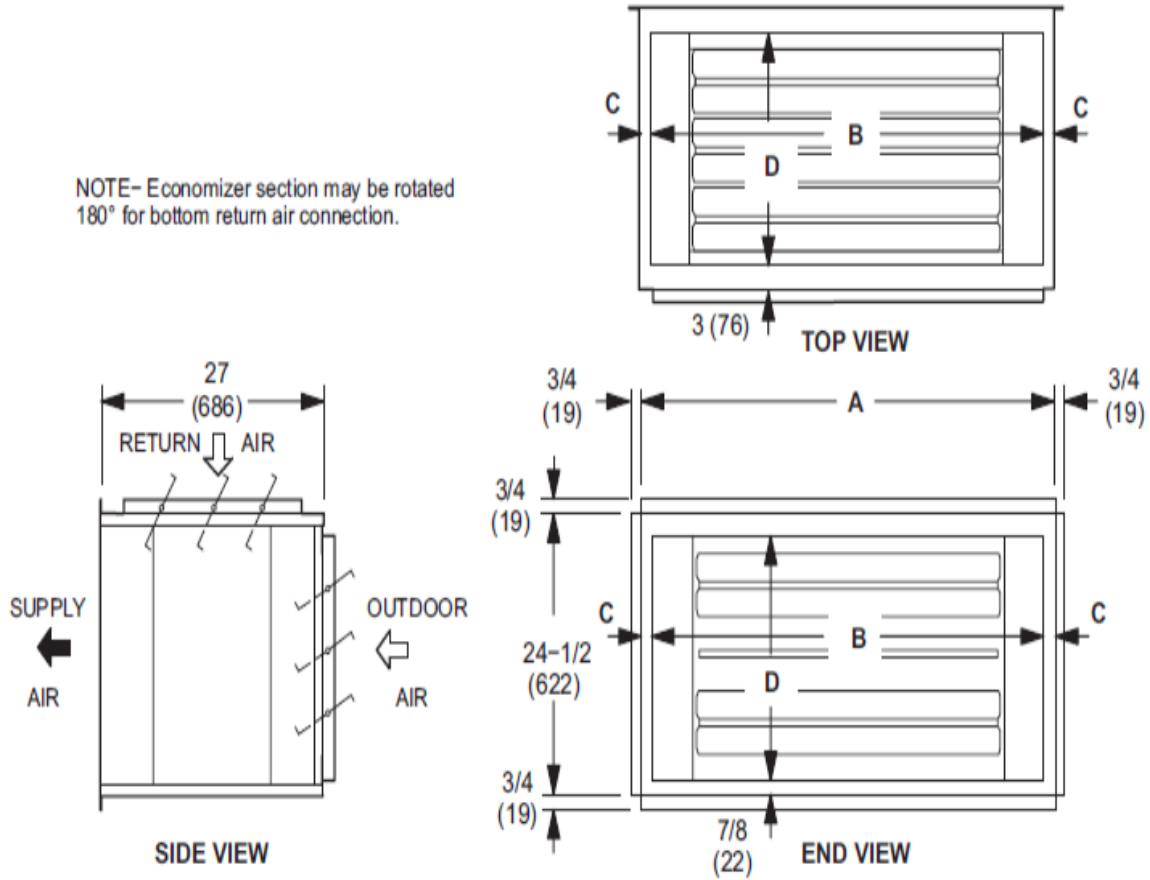
# Project Submittal



Model No.	CORNER WEIGHTS				CENTER OF GRAVITY							
	AA		BB		CC		DD		EE		FF	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	in.	mm	in.	mm
EL180XA	176	80	176	80	187	85	187	85	50.5	1283	27.5	699
EL240XA	189	86	189	86	211	96	211	96	52	1321	27.5	699

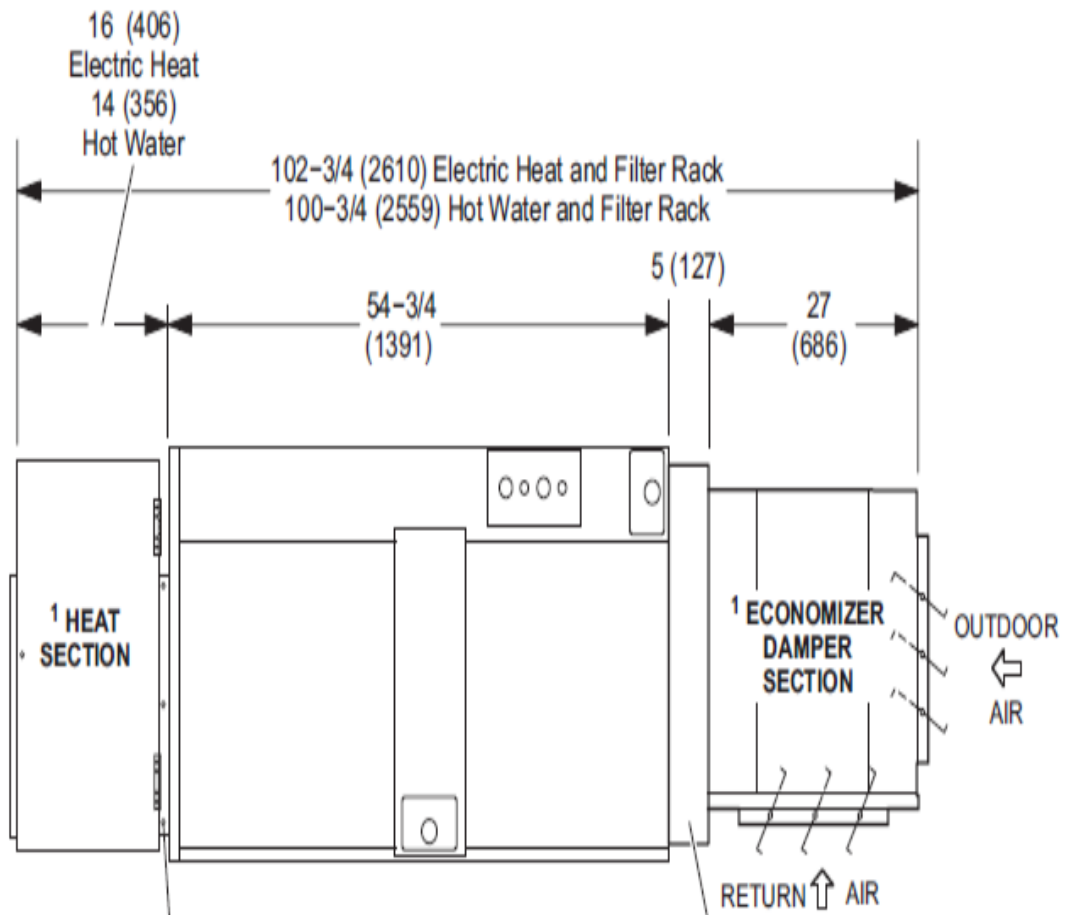
## DIMENSIONS - ACCESSORIES - INCHES (MM) - ECONOMIZER

NOTE- Economizer section may be rotated 180° for bottom return air connection.



Model No. (Air Handler Usage)	A		B		C		D	
	in.	mm	in.	mm	in.	mm	in.	mm
Standard Economizers A2ECON31L-1- (072-090)	32	813	30	762	1	25	20-1/2	521
A2ECON31M-1- (120-150)	51-1/2	1308	45	1143	3-1/4	83	20-1/2	521
A2ECON31N-1- (180-240)	72	1829	60	1524	6	152	20-1/2	521
High Performance Economizers A2ECON34L-1 (072-090)	32	813	30	762	1	25	20-1/4	514
A2ECON34M-1 (120-150)	51-1/2	1308	45	1143	3-1/4	83	20-1/4	514
A2ECON34N-1 (180-240)	72	1829	60	1524	6	152	20-1/4	514

## HORIZONTAL

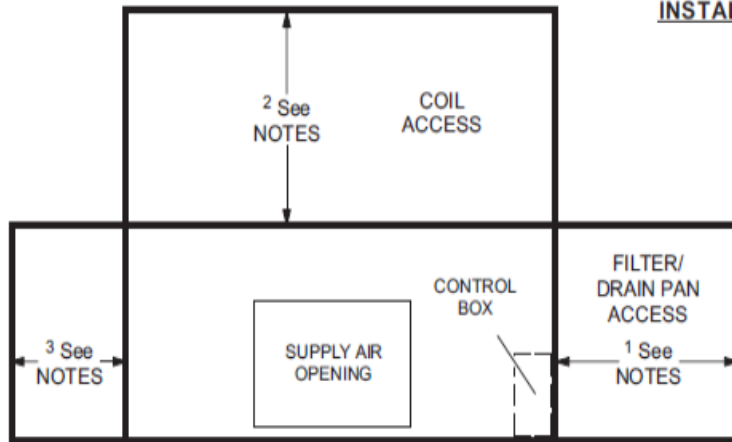


NOTE - Electric Heat flange installs inside supply air flange on air handler unit  
Hot Water Coil installs flush on air handler unit  
Mounting holes are furnished for alignment.

EXTERNAL FILTER RACK  
(Furnished with Unit,  
Field Installed)



# Project Submittal



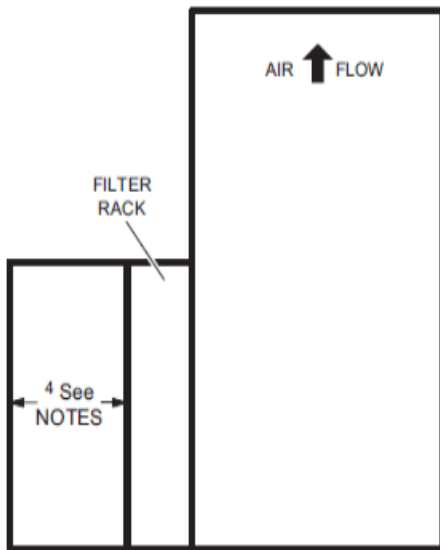
**TOP OR END VIEW**  
(Depending on Application)

**INSTALLATION CLEARANCES (WITH ELECTRIC HEAT)**

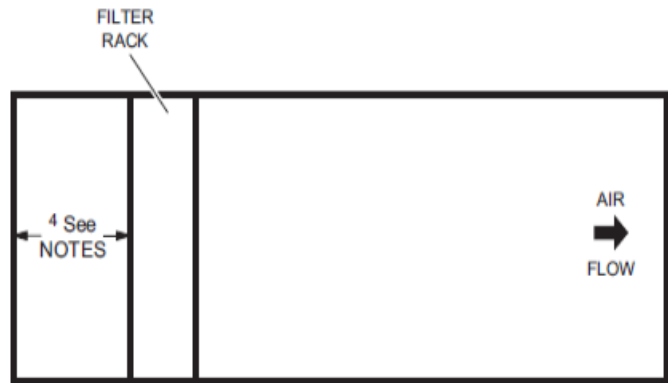
- Cabinet - 0 in. (0 mm)
- To Plenum - 0 in. (0 mm)
- To Outlet Duct within 3 feet (914 mm) - 0 in. (0 mm)

**RECOMMENDED SERVICE CLEARANCES**

- 1 Filter Removal and Routine Maintenance:**  
36 in. (914 mm)
- 1 Service Clearance for Drain Pan Removal:**  
EL072XA, EL090XA - 57 in. (1448 mm)  
EL120XA, EL150XA - 73 in. (1854 mm)  
EL180XA, EL240XA - 102 in. (2590 mm)
- 2 Coil Cleaning (Upflow):**  
All models - 36 in. (914 mm)
- 3 Alternate Coil Cleaning:**  
Provide 36 in. (914 mm) on this side if top/rear access is obstructed
- 3 Alternate Drain/Refrigerant Line Location:**  
Allow additional clearance if refrigerant or drain lines are routed from this side of cabinet.
- 4 Freestanding Operation With Filter Rack But Without Return Air Duct:**  
All models - 24 in. (610 mm)



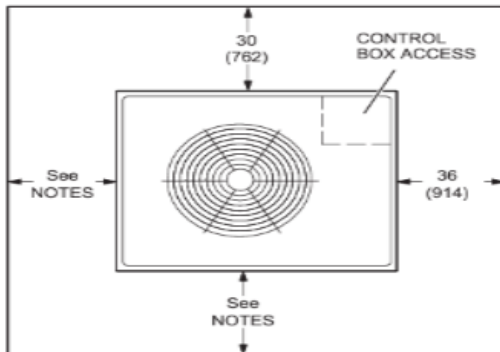
**SIDE VIEW (Upflow)**



**SIDE VIEW (Horizontal)**

## UNIT CLEARANCES

### EL072 and EL090



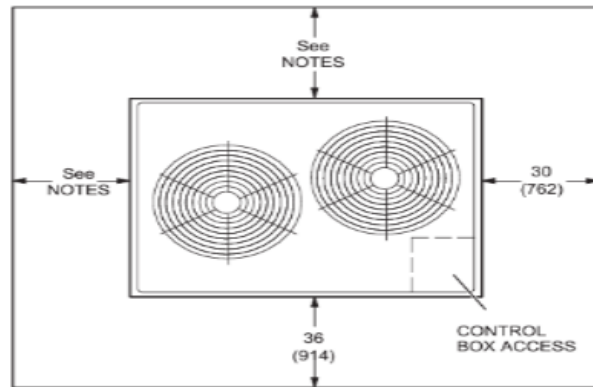
**NOTES:**

Clearance to one of the remaining two sides may be 12 in. (305 mm) and the final side may be 6 in. (152 mm).  
 A clearance of 24 in. (610 mm) must be maintained between two units.  
 48 in. (1219 mm) clearance required on top of unit.

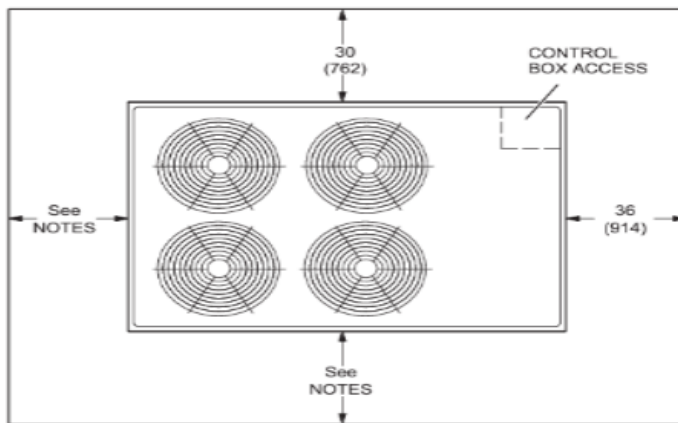
### EL120 and EL150

**NOTES:**

Clearance to one of the remaining two sides may be 12 in. (305 mm) and the final side may be 6 in. (152 mm).  
 A clearance of 24 in. (610 mm) must be maintained between two units.  
 48 in. (1219 mm) clearance required on top of unit.



### EL180 and EL240



**NOTES:**

Clearance to one of the remaining two sides may be 12 in. (305 mm) and the final side may be 6 in. (152 mm).  
 A clearance of 24 in. (610 mm) must be maintained between two units.  
 48 in. (1219 mm) clearance required on top of unit.



# Project Submittal

**Tag:** AHU/CU- 3,4  
**Condenser:** EL240XCSDT-460-3  
**Air Handler:** EL240XASD-STD-460

## UNIT OVERVIEW AHRI Reference - 210666010

Voltage	IEER EER	Tons	Gross Cooling Ttl/Sens (MBH)	Net Cooling Ttl/Sens (MBH)	Supply Air Flow (cfm)	ESP/TSP (in.WC)	EAT DB/WB (°F)	LAT DB/WB (°F)
480 Volt 3 Phase / 60Hz	14.2 11	20.0	251.3 / 200.7	232.6 / 182.0	8,600	1.0 / 1.5	80.0 / 67.0	57.4 / 57.3

## COOLING

Cooling Performance				Temperatures (DB/WB °F)			
Gross Cooling (Ttl/Sens)		251.3 / 200.7 MBH		Ambient		95.0	
Net Cooling (Ttl/Sens)		232.6 / 182.0 MBH		Entering		80.0      67.0	
Coil Moisture Removal		47.67 lb/hr		Leaving – (Coil)		57.4      57.3	
				Leaving – (Unit)		59.6      58.1	

ARI Performance		Compressors		Refrigerant		Condensate Drain	
ARI Cooling	228.0 MBH	Cooling Stages	Three	Type	R-410A	Qty	1
		Compressor Qty	2	Cond Suction Line	(2) 1 1/8	Size	1 in.
				Cond Liquid Line	(2) 5/8	Pipe Thread	npt
				Coil Suction Line	(2) 1-1/8		
				Coil Liquid Line	(2) 5/8		

## HEATING

Heating Performance	Temperatures (DB/WB °F)

## VENTILATION

Air Flow (cfm)		Supply Fan		Air Resistance (in.WC)	
Supply	8,600	Nominal Power	7.50 hp	Total	1.48
Outdoor	2,650	Required Power	6.61 hp	Ext Supply	1.00
		Drive Type	Multi-Stage Air Volume	Wet Coil	0.31
		Required RPM	1,075 rpm	Economizer	0.17
		RPM Range	810 - 1,036 rpm		
		Orientation	Upflow/Horizontal		

## ELECTRICAL

Condenser		Air Handler	
Voltage	480 Volt 3 Phase / 60Hz	Voltage	480 Volt 3 Phase / 60Hz
MCA	39 amp	MCA (Ckt 1/2/3)	14 / 0 / 0 amp
MOCP	50 amp	MOCP (Ckt 1/2/3)	20 / 0 / 0 amp
Condenser Oper Range-Nom Volt	+/- 10%	Supply Fan FLA	11.00 amp
Oper Range-Nom Volt	+/- 10%		

## ADDITIONAL DATA

Condenser		Air Handler	
Dimensions	88.75 in. x 60.12 in. x 48.75 in.	Dimensions	97.25 in. x 30.50 in. x 54.75 in.
Total Weight	864 lb	Total Weight	799 lb



# Project Submittal

Tag: AHU/CU- 3,4

## Field Installed Accessories

Catalog Number	Qty	Description
16F25	2	Low Ambient Control (0 Deg) Field Installed
17A12	2	Standard Economizer Field Installed
53W64	2	Single Enthalpy Control Field Installed
16B29	2	Float Switch Field Installed

## Product Features

### Cabinet

Heavy gauge galvanized steel cabinet  
Copper Tube / Aluminum Fin Coils  
Heavy gauge galvanized steel cabinet

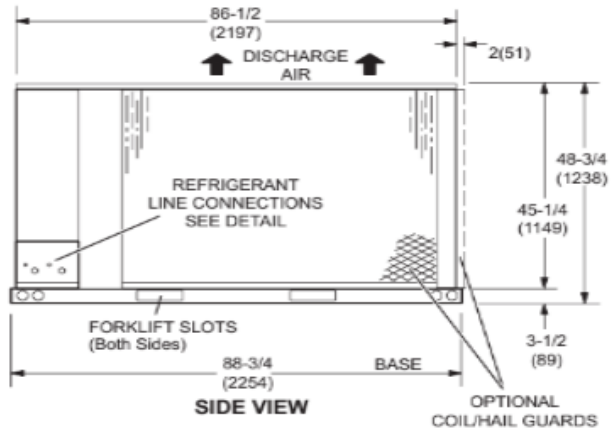
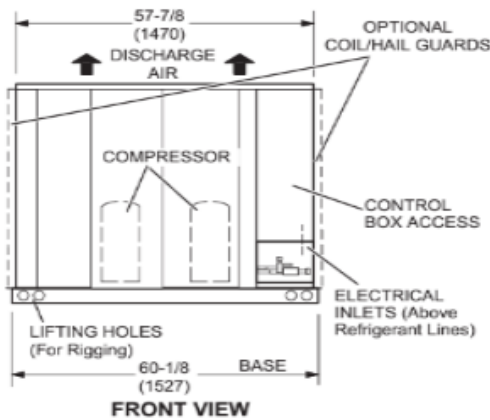
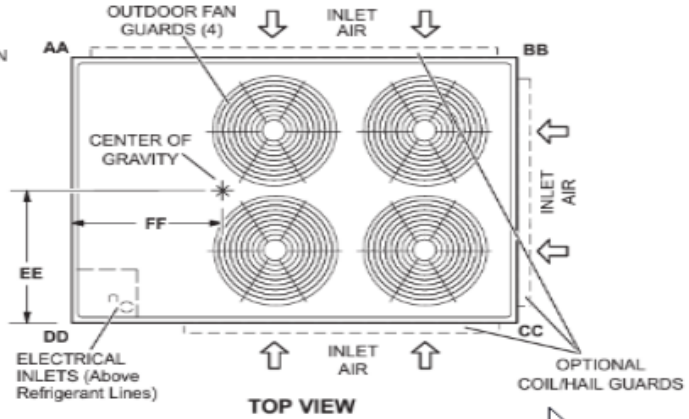
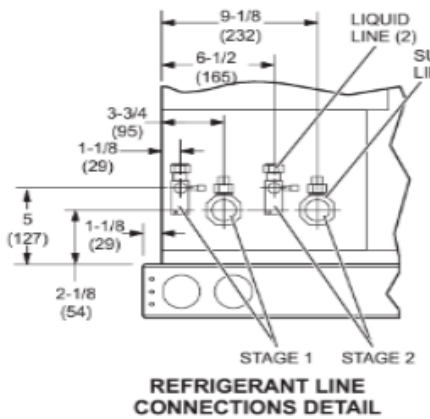
### Cooling System

Non Chlorine, Ozone Friendly Refrigerant, R410A  
Scroll Compressor  
Hi-Capacity Drier factory installed in liquid line  
Low Pressure Switch  
Twin Coils assembled in an "A" configuration  
Check and Expansion Valve is factory installed

### Warranty

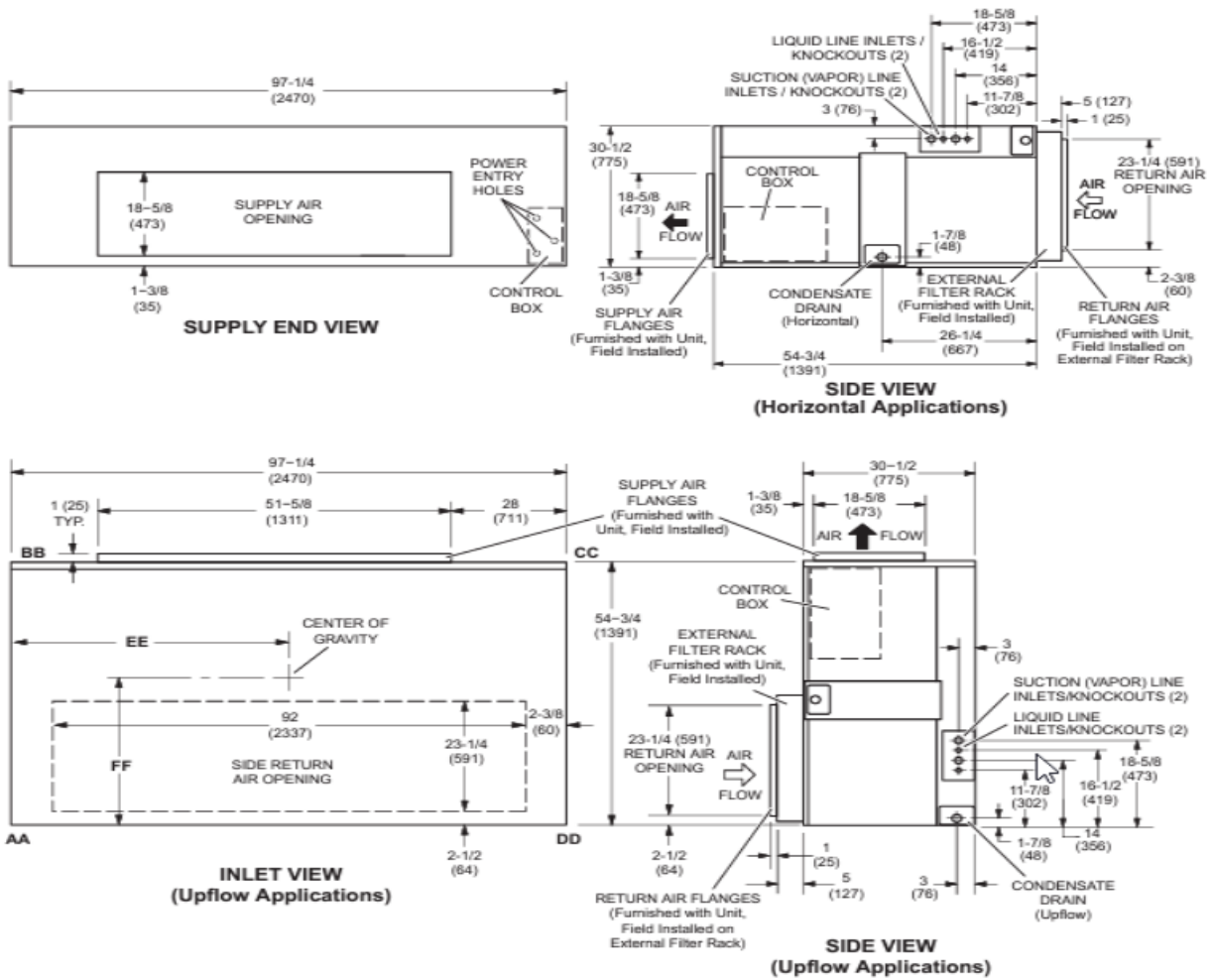
Condenser See Limited Warranty Certificate included with unit for details  
Condenser Limited compressor warranty of 5 years for Non-Residential Installations  
Condenser Limited warranty on all covered components of 1 year  
Condenser Limited warranty on all covered components of 1 year in Non-Residential Installations  
Coil See Limited Warranty Certificate included with unit for details  
Coil Limited warranty on all other covered components of 1 year (Comm Use)

DIMENSIONS		EL180XCSD   EL240XCSD										
Model No.	CORNER WEIGHTS								CENTER OF GRAVITY			
	AA		BB		CC		DD		EE		FF	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	in.	mm	in.	mm
EL180XCSD	181	82	177	81	215	98	221	100	29	737	38	965
EL240XCSD	192	87	189	86	232	105	238	108	29	737	37-1/2	953





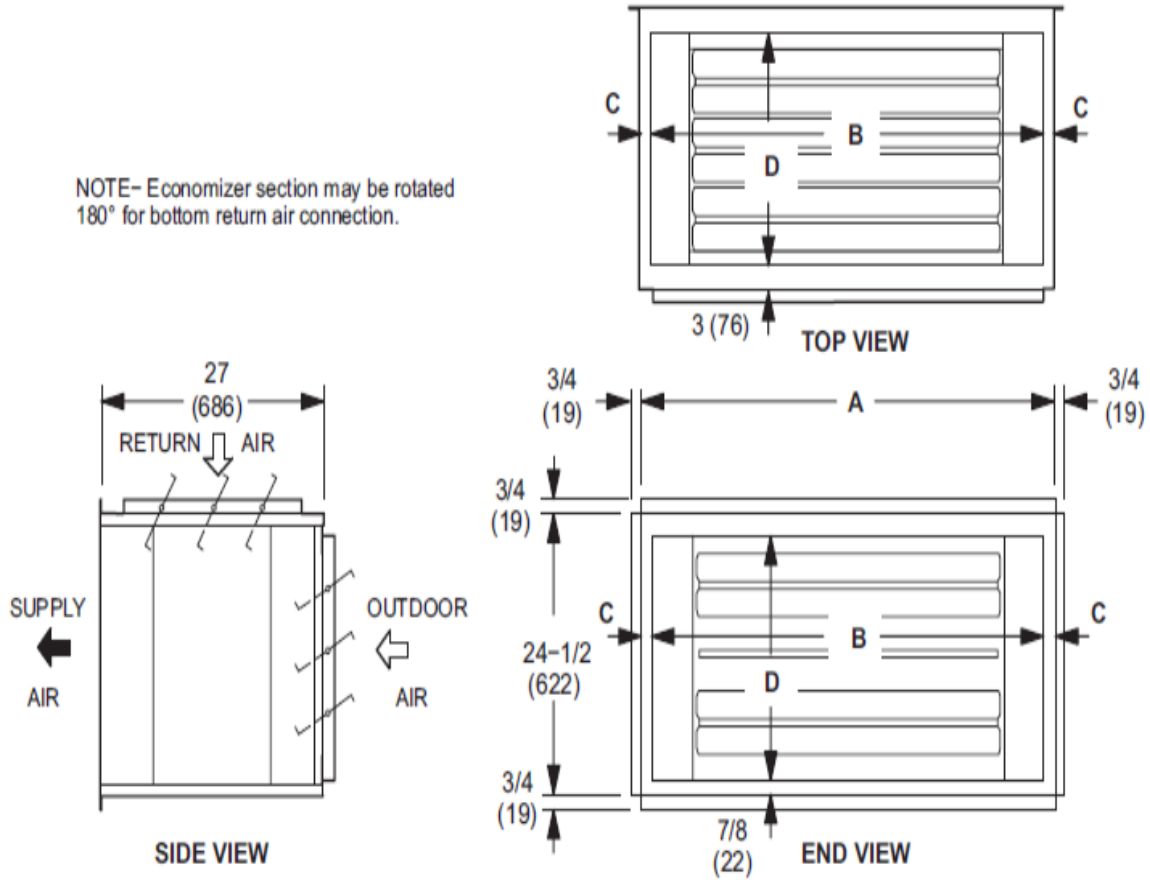
# Project Submittal



Model No.	CORNER WEIGHTS				CENTER OF GRAVITY							
	AA		BB		CC		DD		EE		FF	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	in.	mm	in.	mm
EL180XA	176	80	176	80	187	85	187	85	50.5	1283	27.5	699
EL240XA	189	86	189	86	211	96	211	96	52	1321	27.5	699

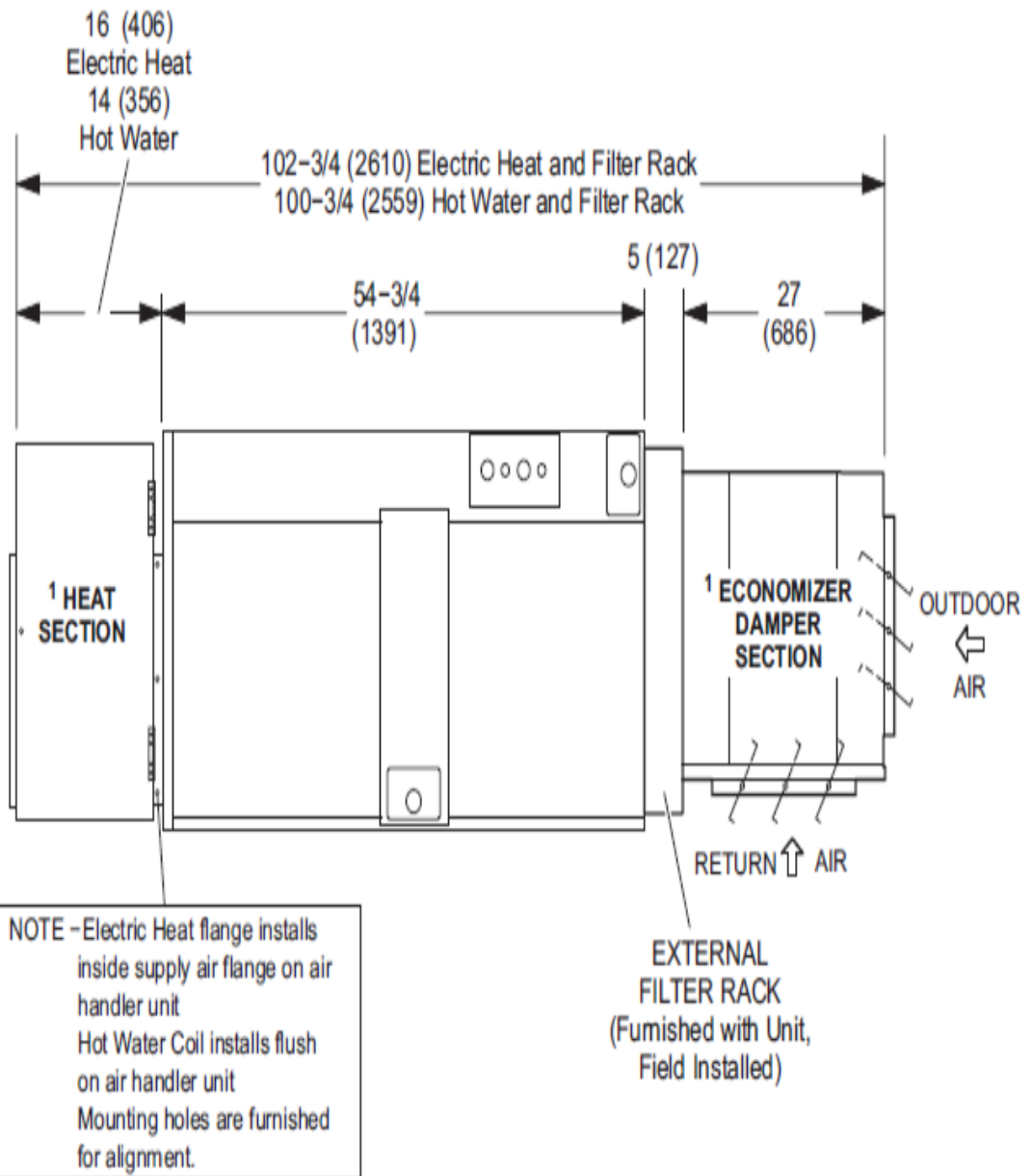
## DIMENSIONS - ACCESSORIES - INCHES (MM) - ECONOMIZER

NOTE- Economizer section may be rotated 180° for bottom return air connection.



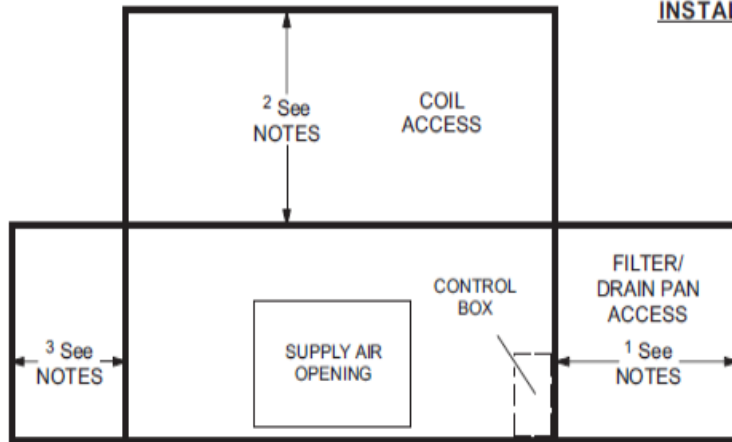
Model No. (Air Handler Usage)	A		B		C		D	
	in.	mm	in.	mm	in.	mm	in.	mm
Standard Economizers A2ECON31L-1- (072-090)	32	813	30	762	1	25	20-1/2	521
A2ECON31M-1- (120-150)	51-1/2	1308	45	1143	3-1/4	83	20-1/2	521
A2ECON31N-1- (180-240)	72	1829	60	1524	6	152	20-1/2	521
High Performance Economizers A2ECON34L-1 (072-090)	32	813	30	762	1	25	20-1/4	514
A2ECON34M-1 (120-150)	51-1/2	1308	45	1143	3-1/4	83	20-1/4	514
A2ECON34N-1 (180-240)	72	1829	60	1524	6	152	20-1/4	514

## HORIZONTAL





# Project Submittal



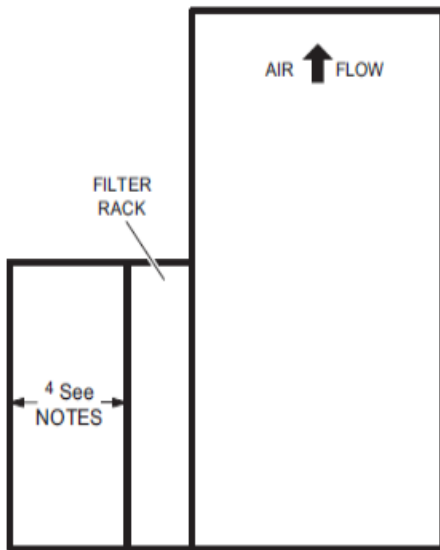
**TOP OR END VIEW**  
(Depending on Application)

**INSTALLATION CLEARANCES (WITH ELECTRIC HEAT)**

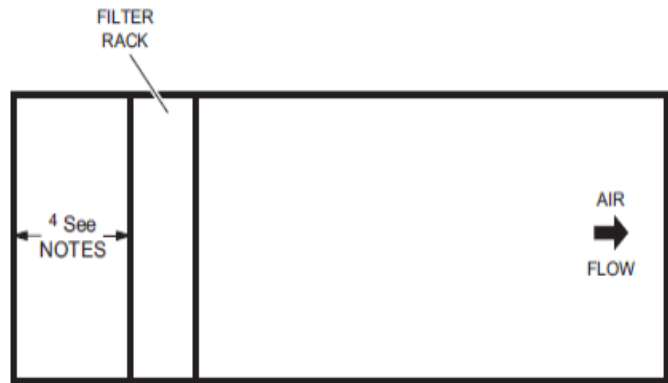
- Cabinet - 0 in. (0 mm)
- To Plenum - 0 in. (0 mm)
- To Outlet Duct within 3 feet (914 mm) - 0 in. (0 mm)

**RECOMMENDED SERVICE CLEARANCES**

- 1 Filter Removal and Routine Maintenance:**  
36 in. (914 mm)
- 1 Service Clearance for Drain Pan Removal:**  
EL072XA, EL090XA - 57 in. (1448 mm)  
EL120XA, EL150XA - 73 in. (1854 mm)  
EL180XA, EL240XA - 102 in. (2590 mm)
- 2 Coil Cleaning (Upflow):**  
All models - 36 in. (914 mm)
- 3 Alternate Coil Cleaning:**  
Provide 36 in. (914 mm) on this side if top/rear access is obstructed
- 3 Alternate Drain/Refrigerant Line Location:**  
Allow additional clearance if refrigerant or drain lines are routed from this side of cabinet.
- 4 Freestanding Operation With Filter Rack But Without Return Air Duct:**  
All models - 24 in. (610 mm)



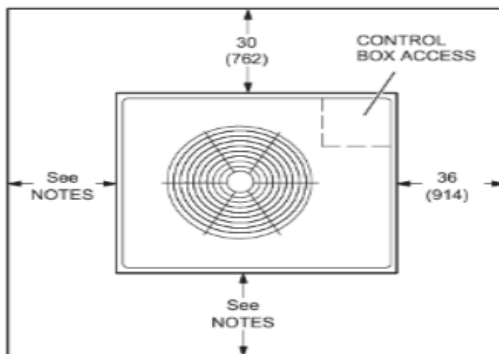
**SIDE VIEW (Upflow)**



**SIDE VIEW (Horizontal)**

## UNIT CLEARANCES

### EL072 and EL090



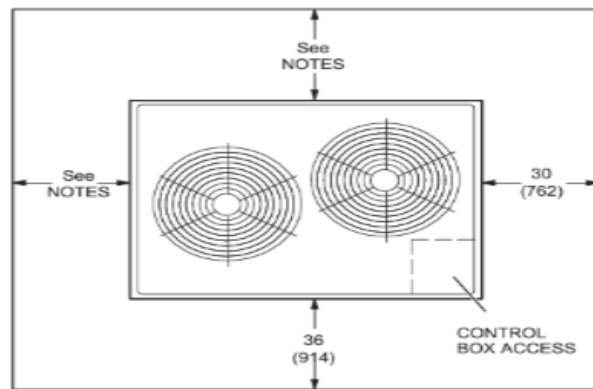
**NOTES:**

Clearance to one of the remaining two sides may be 12 in. (305 mm) and the final side may be 6 in. (152 mm).  
 A clearance of 24 in. (610 mm) must be maintained between two units.  
 48 in. (1219 mm) clearance required on top of unit.

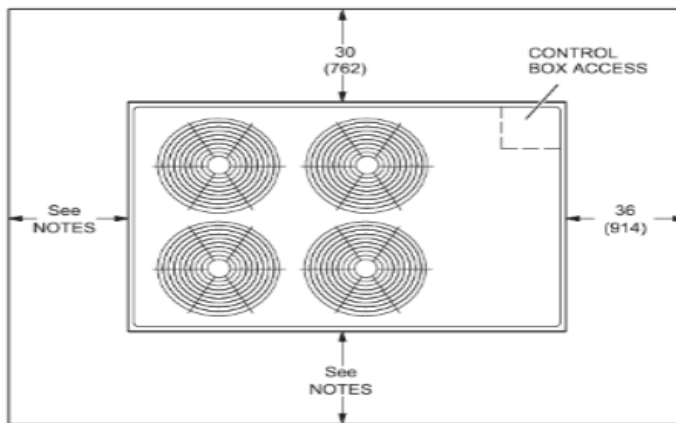
### EL120 and EL150

**NOTES:**

Clearance to one of the remaining two sides may be 12 in. (305 mm) and the final side may be 6 in. (152 mm).  
 A clearance of 24 in. (610 mm) must be maintained between two units.  
 48 in. (1219 mm) clearance required on top of unit.



### EL180 and EL240



**NOTES:**

Clearance to one of the remaining two sides may be 12 in. (305 mm) and the final side may be 6 in. (152 mm).  
 A clearance of 24 in. (610 mm) must be maintained between two units.  
 48 in. (1219 mm) clearance required on top of unit.