

ADDENDUM 1

October 1, 2021

UNIVERSITY OF NORTH CAROLINA CHARLOTTE – NC SCO ID #19-21435-03

McEnry Repairs to Electrical, Plumbing, HVAC – Mechanical Package

Engineer: CMTA, Inc. | James Currie, PE

Notice to Bidders

The bid date, time and place have not changed and are as follows:

- Bid Date: Thursday, October 7, 2021
- Bid Time: 2:00 PM
- Bid Location: Attn: Jeanine Bachtel, Facilities Management & Police Building #55 on the Campus Map 9151 Cameron Boulevard, Charlotte, NC 28223

This addendum is issued prior to receipt of bids, proposals and its contents do hereby become a part of the pricing documents for the above referenced project.

All trade contractor bidders are responsible for assuring that their subcontractors and vendors are properly apprised by the contents of this Addendum.

All information contained in this Addendum supersedes and takes precedence over any conflicting information in the original pricing documents.

All bidders must acknowledge receipt of this Addendum in the space provided on the Form of Proposal for their bid package.

General:

1. Pre-Bid Agenda (attached)
2. Pre-Bid Meeting Minutes (attached).
3. Construction parking is an important issue for the contractor to resolve and to include in their bid.

Project Manual

1. STANDARD FORM OF INFORMAL CONTRACT AND GENERAL CONDITIONS:
 - a. Item 26, page 14 "Minority Business Participation", Revise the 2nd and 3rd paragraphs as follows:

"For construction contracts with a value of less than ~~\$100,000~~ ~~\$300,000~~, the Owner has the responsibility to make a good faith effort to solicit minority bids and to attain the goal. The contractor shall include with his bid a completed Identification of HUB Certified/Minority Business Participation form. Contractor shall submit completed Appendix E MBE Documentation for Contract Payments form with final payment request.

For construction contracts with a value of ~~\$100,000~~ ~~\$300,000~~ or greater, the contractor shall comply with the document Guidelines for Recruitment and Selection of Minority Businesses for Participation in State Construction Contracts including Identification of Minority Business Participation, Affidavits A, B, C, and D, and Appendix E. These forms provided herein are hereby incorporated and made a part of this contract."

2. TABLE OF CONTENTS

a. The following specification section has been added to the Table of Contents:

DIVISION 08 – OPENINGS

Section # Section Title

08 33 00 Rolling Service Doors

3. SECTION 08 33 00 - ROLLING SERVICE DOORS

a. New specification section has been added to the project manual. (Attached)

General Items

1. Trane 550 Ton Chiller Shop Drawing (attached).
2. Chiller Plant Points List (attached).

END OF ADDENDUM 1



Consulting Engineers
8801 JM Keynes Rd, Suite 240
Charlotte, North Carolina 28262
Phone 704-376-7072

Pre-Bid Meeting Agenda
McEniry Repairs to Electrical, Plumbing, HVAC – Mechanical Package
SCO #19-21435-03
CMTA Project No. 221.013.00

Date: September 28, 2021

1. Opening Comments
 2. Introduction of Team Members
 3. Scope of Work Discussion
 - Removal and replacement of existing chiller with equipment to be arriving October 22nd.
 - Replacement of existing BAS Controls in Chiller Plant.
 - Replace 20 HP Motor on CT-1 with new VFD and integration to BAS.
 - Connection of make-up water, float control, and electric power to basin heater to CT-2.
 4. Bidding Phase Schedule
 - Bidder questions due: September 29, 2021 @5:00pm
 - Release of final addendum: September 30, 2021
 - Receipt of bids: October 7, 2021 2:00pm At Facilities Management 2nd Floor
 5. General
 - Inspections
 - Construction Administration
 - Commissioning – Designer Led
 - Addenda
 - Delivery method
 - Construction schedule
 - Construction work days / hours
 - Contractor laydown / parking / use of facilities
 - Crane / equipment staging
 - UNCC Safety Requirements – Non-Smoking Policy
 - Special inspections
 - Required bid submittals / forms
 6. Tour / Questions
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CMTA
8801 J.M. Keynes Drive
Suite 240
Charlotte, NC 28262

Pre-Bid Meeting Minutes

Date: September 28, 2021

Meeting Date: September 28, 2021

Project No.: 221.013.00

Project Name: UNCC - McEniry
Repairs to Electrical, Plumbing, HVAC
Mechanical Package
SCO #19-21435-03

Minutes:

- 1) Please find agenda and attendee list attached to these minutes.
- 2) This was a non-mandatory pre-bid meeting.
- 3) General scope was discussed, in addition to what is listed on agenda the following are part of the scope:
 - a. Replacement of the roll up door. Specification attached. Contact information for basis of design included.
 - b. Disconnect of power from the existing chiller to be provided as part of this scope of work.
 - c. All electrical work (less chiller disconnect) is part of separate contract to run concurrently to this.
- 4) Trane Chiller anticipated to be shipped on 10-22-2021. The option of redirect is possible following confirmed delivery date and this contract.
- 5) The bid date will be pushed to 10-12-2021 to permit HUB affidavit information and 10 day period per UNCC.
 - a. Include affidavit A or B with others provided post bid per requirements.
 - b. No bid or performance bond are required.
- 6) Building automation system replacement is listed as an Owner preferred alternate by:
 - a. Schneider Electric
 - b. Platinum Energy Solutions
- 7) All chiller plant controls (i.e., towers, VFDs, pumps and chillers) and hot water pumps controls are to be replaced. A points list will be included.
- 8) Removal of chiller is part of project demolition – UNCC indicates no refrigerant is left in the old machine.

- 9) Parking to be provided with up to 2 permits per company with parking in Lot 6. Parking at loading dock is to be limited to prime only when working.
- 10) Contractor is reminded that an insulation allowance is listed in documents and should be carried, the insulation to be replaced will be reviewed in the field. Any replacement costs should be presented in compliance with contract change required change order and markups.
- 11) Crane and rigging is to be coordinated with UNCC and notice provided prior to beginning work. Pre-construction meeting will include this.
- 12) A pre-construction meeting will be scheduled between this apparent low bidder and the separate electrical package prime contractor.
- 13) The goal is to have work completed within 30 days from NTP. Final startup and commissioning is dependent upon electrical connections.
- 14) The plant must remain operational throughout the construction, controls must remain in service.

Addendum Items:

- 1) Refer to revised invitation to bid and bid forms for updated bid dates and times.
- 2) See attached specification for roll up door. Field verify dimensions and contact manufacturer for turn-key price install.
- 3) Attached is the Owner purchased Trane chiller to be installed in the building.
- 4) Attached is the existing McEnry plant JACE points list.

General Comments:

- 1) BAS contractor to include raising of conduit and wiring adjacent to door an additional 12" (tight to duct) temporarily to permit installation.
- 2) MC to provide drain down of chilled water, condenser water and replacement of existing 4 butterfly valves at chiller.

END OF MEETING MINUTES

STATE OF NORTH CAROLINA STANDARD FORM OF INFORMAL CONTRACT AND GENERAL CONDITIONS

FOR

UNC Charlotte
Repairs to Electrical, Plumbing HVAC – McEniry (Mechanical Package)
McEniry Hall
SCO ID# 19-21435-03

SCOPE OF WORK

1. Installation of Owner Purchased Chiller and removal of old.
2. Replacement of BAS Controls in Chiller Plant.
3. Replacement of 20HP motor on CT-1 new VFD install, and integration to BAS.
4. Connection of make-up water, float control, and basin heater to CT-2.

NOTICE TO BIDDERS

Sealed bid for this work will be received by:

Jeanine Bachtel
UNC Charlotte – FMPPS Building, Building #55
2nd Floor, Conference Room 206
9151 Cameron Boulevard
Charlotte, NC 28223
Phone: 704-687-0515

up to **2:30 PM**, on **Tuesday, October 12, 2021** and immediately thereafter publicly opened and read aloud. Complete plans and specification and contract documents can be obtained from

CMTA, Inc.
8801 J.M. Keynes Drive, Suite 240
Charlotte, North Carolina 28262
704.376.7072

Contractors are hereby notified that they must have proper license under the State laws governing their respective trades and that North Carolina General Statute 87 will be observed in receiving and awarding contracts. General Contractors must have general license classification for buildings.

No bid may be withdrawn after the opening of bids for a period of 30 days. The Owner reserves the right to reject any or all bids and waive informalities. Bids shall be made only on the BID/ACCEPTANCE form provided herein with all blank spaces for bids properly filled in and all signatures properly executed.

Please note on the envelope – **Bid : Attn:** Jeanine Bachtel

Repairs to Electrical, Plumbing HVAC – McEniry (Mechanical Package)
Bid Date
Contractor
License Number

A mandatory pre-bid meeting is scheduled for **Tuesday, September 28, 2021** at **2:00 pm**, **at the FM Building, Room 208**, located at **9151 Cameron Boulevard, Charlotte, NC 28223**.. A link to our campus map is here (<http://facilities.uncc.edu/maps>) Due to the Covid Pandemic, it shall be limited to one (1) representative from the contractor. A mask must be worn at all times, while maintaining social distancing.

BID/ACCEPTANCE FORM

for

University of North Carolina Charlotte
Repairs to Electrical, Plumbing HVAC – McEniry (Mechanical Package)
McEniry Hall
SCO ID# 19-21435-03

We are in receipt of Addendum _____1_____2 _____3 _____4

The undersigned, as bidder, proposes and agrees if this bid is accepted to contract with the State of North Carolina through the University of North Carolina Charlotte for the furnishing of all materials, equipment, and labor necessary to complete the construction of the work described in these documents in full and complete accordance with plans, specifications, and contract documents, and to the full and entire satisfaction of the State of North Carolina and the University of North Carolina Charlotte for the sum of:

BASE BID: _____ **Dollars \$** _____

Alternate #	Add/Deduct	Alternate bid price	Accepted (<i>OWNER INITIALS ON EACH LINE INDICATES ACCEPTANCE OF ALTERNATE</i>)
1A			
1B			

Respectively submitted this _____ day of _____ 20____

(Contractor's Name)

Federal ID#: _____

By: _____

Witness: _____

Title: _____

(Owner, partner, corp. Pres. Or Vice President)

Address: _____

(Proprietorship or Partnership)

Attest: *(corporation)*

Email Address: _____

(Corporate Seal)

By: _____ License #: _____

Title: _____

(Corporation, Secretary./Ass't Secretary.)

ACCEPTED by the STATE OF NORTH CAROLINA
through the

University of North Carolina Charlotte

Total amount of accepted by the owner, included base bid and bid alternates: _____

BY: _____ TITLE: _____

Date: _____

GENERAL CONDITIONS

1. GENERAL

It is understood and agreed that by submitting a bid that the Contractor has examined these contract documents, drawings and specifications and has visited the site of the Work, and has satisfied himself relative to the Work to be performed.

2. DEFINITIONS

Owner: "Owner" shall mean, The State of North Carolina through the University of North Carolina Charlotte.

Contractor: "Contractor" shall mean the entity that will provide the services for the Owner.

Designer: The **designer(s)** are those referred to within this contract, or their authorized representatives. The Designer(s), as referred to herein, shall mean architect and/or engineer responsible for preparing the project plans and specifications. They will be referred to hereinafter as if each were of the singular number, masculine gender.

Contract Documents: "Contract Documents" shall consist of the Notice to Bidders; General Conditions of the Contract; special conditions if applicable; Supplementary General Conditions; the drawing and specifications, including all bulletins, addenda or other modifications of the drawings and specifications incorporated into the documents prior to their execution; the bid; the contract; the performance bond if applicable; and insurance certificates. All of these items together form the contract.

INTENT AND EXECUTION OF DOCUMENTS

The drawings and specifications are complementary, one to the other. That which is shown on the drawings or called for in the specifications shall be as binding as if it were both called for and shown. The intent of the drawings and specifications is to establish the scope of all labor, materials, transportation, equipment, and any and all other things necessary to provide a complete job. In case of discrepancy or disagreement in the Contract Documents, the order of precedence shall be: Form of Contract, specifications, large-scale detail drawings, small-scale drawings.

In such cases where the nature of the work requires clarification by the Designer/ Owner, the Designer/ Owner shall furnish such clarification. Clarifications and drawings shall be consistent with the intent of the Contract Documents, and shall become a part thereof.

4. AS-BUILT MARKED-UP CONSTRUCTION DOCUMENTS

Contractor shall provide one complete set of legible "as-built" marked-up construction drawings and specifications recording any and all changes made to the original design during the course of construction. In the event no changes occurred, submit construction drawings and specifications set with notation "No Changes." The Designer/Owner must receive "As-built" marked-up construction drawings and specifications before the final pay request can be processed.

5. SUBMITTAL DATA

The Contractor awarded the contract shall submit all specified submittals to the Owner/Designer. A minimum number of copies as specified by the owner, of all required submittal data pertaining to construction, performance and general dimensional criteria of the components listed in the technical specifications shall be submitted. No material or equipment shall be ordered or installed prior to written approval of the submittals by the Designer/Owner. Failure to provide submittal data for review on equipment listed in the technical specifications will result in removal of equipment by the Contractor at his expense if the equipment is not in compliance with the specifications.

6. SUBSTITUTIONS

In accordance with the provisions of G.S. 133-3, material, product, or equipment substitutions proposed by the bidders to those specified herein can only be considered during the bidding phase until five (5) days prior to the receipt of bids or by the date specified in the pre bid conference, when submitted to the Designer with sufficient data to confirm material, product, or equipment equality. Proposed substitutions submitted after this time will be considered only as potential change order.

Submittals for proposed substitutions shall include the following information:

- a. Name, address, and telephone number of manufacturer and supplier as appropriate.
- b. Trade name, model or catalog designation.
- c. Product data including performance and test data, reference standards, and technical descriptions of material, product, or equipment. Include color samples and samples of available finishes as appropriate.
- d. Detailed comparison with specified products including performance capabilities, warranties, and test results.
- e. Other pertinent data including data requested by the Designer to confirm product equality.

If a proposed material, product, or equipment substitution is deemed equal by the Designer to those specified, all bidders of record will be notified by Addendum.

7. WORKING DRAWINGS AND SPECIFICATIONS AT THE JOB SITE

The contractor shall maintain, in readable condition at his job site one complete set of working drawings and specifications for his work including all shop drawings. Such drawings and specifications shall be available for use by the owner, designer or his authorized representative.

The contractor shall maintain at the job site, a day-to-day record of work-in-place that is at variance with the contract documents. Such variations shall be fully noted on project drawings by the contractor and submitted to the designer upon project completion and no later than 30 days after acceptance of the project.

8. MATERIALS, EQUIPMENT, EMPLOYEES

- a. The contractor shall, unless otherwise specified, supply and pay for all labor, transportation, materials, tools, apparatus, lights, power, fuel, heat, sanitary facilities, water, scaffolding and incidentals necessary for the completion of his work, and shall install, maintain and remove all equipment of the construction, other utensils or things, and be responsible for the safe, proper and lawful construction, maintenance and use of same, and shall construct in the best and most workmanlike manner, a complete job and everything incidental thereto, as shown on the plans, stated in the specifications, or reasonably implied therefrom, all in accordance with the contract documents.
- b. All materials shall be new and of quality specified, except where reclaimed material is authorized herein and approved for use. Workmanship shall at all times be of a grade accepted as the best practice of the particular trade involved, and as stipulated in written standards of recognized organizations or institutes of the respective trades except as exceeded or qualified by the specifications.
- c. Upon notice, the contractor shall furnish evidence as to quality of materials.
- d. Products are generally specified by ASTM or other reference standard and/or by manufacturer's name and model number or trade name. When specified only by reference standard, the Contractor may select any product meeting this standard, by any manufacturer. When several products or manufacturers are specified as being equally acceptable, the Contractor has the option of using any product and manufacturer combination listed. However, the contractor shall be aware that the cited examples are used only to denote the quality standard of product desired and that they do not restrict bidders to a specific brand, make, manufacturer or specific name; that they are used only to set forth

and convey to bidders the general style, type, character and quality of product desired; and that equivalent products will be acceptable. Request for substitution of materials, items, or equipment shall be submitted to the designer for approval or disapproval; the designer prior to the opening of bids shall make such approval or disapproval. Alternate materials may be requested after the award if it can clearly be demonstrated that it is an added benefit to the owner and the designer and owner approves.

- e. The designer is the judge of equality for proposed substitution of products, materials or equipment.
- f. If at any time during the construction and completion of the work covered by these contract documents, the language, conduct, or attire of any workman of the various crafts be adjudged a nuisance to the owner or designer, or if any workman be considered detrimental to the work, the contractor shall order such parties removed immediately from grounds.
- g. The Contractor shall cooperate with the designer and the owner in coordinating construction activities.
- h. The Contractor shall maintain qualified personnel and effective supervision at the site at all times during the project, and exercise the appropriate quality control program to ensure compliance with the project drawings and specifications. The designer is responsible for determining compliance with the drawings and specifications.

9. CODES, PERMITS AND INSPECTIONS

The Contractor shall obtain the required permits, if required, give all notices, and comply with all laws, ordinances, codes, rules and regulations bearing on the conduct of the work under this contract. If the Contractor observes that the drawings and specifications are at variance therewith, he shall promptly notify the Designer in writing. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, codes, rules and regulations, and without such notice to the Owner, he shall bear all cost arising there from.

All work under this contract shall conform to the current North Carolina Building Code and other state and national codes as are applicable.

Projects constructed by the State of North Carolina or by any agency or institution of the State are not subject to county or municipal building codes and may* not be subject to inspection by county or municipal authorities. Where appropriate, the Contractor shall, cooperate with the county or municipal authorities by obtaining building permits. The contractor at no cost may obtain permits to the owner.

All fire alarm work shall be in accordance with the latest State Construction Office (SCO) *Guidelines for Fire Alarm Installation* (NFPA72). Where the contract documents are in conflict with the SCO guidelines, the SCO guidelines shall govern. The Contractor shall be responsible for all the costs for the correction of the work where he installs it in conflict with the latest edition of the SCO *Guidelines for Fire Alarm Installation*.

*Inspection and certification of compliance by local authorities is necessary if an architect or engineer was not employed on the project, or if the plans and specifications were not approved and the construction inspected by the State Construction Office.

10. PROTECTION OF WORK, PROPERTY, THE PUBLIC AND SAFETY

- a. The contractors shall be jointly responsible for the entire site and the building or construction of the same and provide all the necessary protections, as required by the owner or designer, and by laws or ordinances governing such conditions. They shall be responsible for any damage to the owner's property or of that of others on the job, by them, their personnel, or their subcontractors, and shall make good such damages. They shall be responsible for and pay for any damages caused to the owner. All contractors shall have access to the project at all times, except as indicated in the Supplemental General Conditions.
- b. The contractor shall provide cover and protect all portions of the structure when the work is not in progress, provide and set all temporary roofs, covers for doorways, sash and windows, and all other

materials necessary to protect all the work on the building, whether set by him, or any of the subcontractors. Any work damaged through the lack of proper protection or from any other cause, shall be repaired or replaced without extra cost to the owner.

- c. No fires of any kind will be allowed inside or around the operations during the course of construction without special permission from the designer and owner.
- d. The contractor shall protect all trees and shrubs designated to remain in the vicinity of the operations by building substantial boxes around it. He shall barricade all walks, roads, etc., as directed by the designer to keep the public away from the construction. All trenches, excavations or other hazards in the vicinity of the work shall be well barricaded and properly lighted at night.
- e. The contractor shall provide all necessary safety measures for the protection of all persons on the job, including the requirements of the A.G.C. *Accident Prevention Manual in Construction*, as amended, and shall fully comply with all state laws or regulations and North Carolina State Building Code requirements to prevent accident or injury to persons on or about the location of the work. He shall clearly mark or post signs warning of hazards existing, and shall barricade excavations, elevator shafts, stairwells and similar hazards. He shall protect against damage or injury resulting from falling materials and he shall maintain all protective devices and signs throughout the progress of the work.
- f. The contractor shall adhere to the rules, regulations and interpretations of the North Carolina Department of Labor relating to Occupational Safety and Health Standards for the Construction Industry (Title 29, Code of Federal Regulations, Part 1926, published in Volume 39, Number 122, Part II, June 24, 1974, *Federal Register*), and revisions thereto as adopted by General Statutes of North Carolina 95-126 through 155.
- i. In the event of emergency affecting the safety of life, the protection of work, or the safety of adjoining properties, the contractor is hereby authorized to act at his own discretion, without further authorization from anyone, to prevent such threatened injury or damage. Any compensation claimed by the contractor on account of such action shall be determined as provided for under Article 13(b).
- j. Any and all costs associated with correcting damage caused to adjacent properties of the construction site or staging area shall be borne by the contractor. These costs shall include but not be limited to flooding, mud, sand, stone, debris, and discharging of waste products.

11. SUBCONTRACTS AND SUBCONTRACTORS

The Contractor is and remains fully responsible for his own acts or omissions as well as those of any subcontractor or of any employee of either. The Contractor agrees that no contractual relationship exists between the subcontractor and the Owner in regard to the contract, and that the subcontractor acts on this work as an agent or employee of the Contractor.

12. CONTRACTOR-SUBCONTRACTOR RELATIONSHIPS

The Contractor agrees that the terms of these Contract Documents shall apply equally to each Subcontractor as to the Contractor, and the Contractor agrees to take such action as may be necessary to bind each Subcontractor to these terms. The Contractor further agrees to conform to the Code of Ethical Conduct as adopted by the Associated General Contractors of America, Inc., with respect to Contractor-Subcontractor relationships. The Owner reserves the right to limit the amount of portions of work to be subcontracted as hereinafter specified.

13. CHANGES IN THE WORK AND CLAIMS FOR EXTRA COST

- a. The owner may have changes made in the work covered by the contract. These changes will not invalidate and will not relieve or release the contractor from any guarantee given by him pertinent to the contract provisions. These changes will not affect the validity of the guarantee bond and will not relieve the surety or sureties of said bond. All extra work shall be executed under conditions of the original contract.
- b. Except in an emergency endangering life or property, no change shall be made by the contractor except upon receipt of approved_change order from the designer, countersigned by the owner

authorizing such change. No claim for adjustments of the contract price shall be valid unless this procedure is followed. Should a claim for extra compensation by the contractor be denied by the designer or the owner, the contractor may pursue his claim in accordance with G.S. 143-135.3.

In the event of emergency endangering life or property, the contractor may be directed to proceed on a time and material basis whereupon the contractor shall proceed and keep accurately on such form as specified by the designer or owner, a correct account of costs together with all proper invoices, payrolls and supporting data. Upon completion of the work the change order will be prepared as outlined under either Method "c(1)" or Method "c(2)" or both.

- c. In determining the values of changes, either additive or deductive, contractors are restricted to the use of the following methods:
1. Where the extra work involved is covered by unit prices quoted in the proposal, or subsequently agreed to by the Contractor, Designer, Owner and State Construction Office the value of the change shall be computed by application of unit prices based on quantities, estimated or actual as agreed of the items involved, except in such cases where a quantity exceeds the estimated quantity allowance in the contract by one hundred percent (100%) or more. In such cases, either party may elect to proceed under subparagraph c (2) herein. If neither party elects to proceed under c (2), then unit prices shall apply.
 2. The contracting parties shall negotiate and agree upon the equitable value of the change prior to issuance of the change order, and the change order shall stipulate the corresponding lump sum adjustment to the contract price.
- d. Under Paragraph "b" and Methods "c(2)" above, the allowances for overhead and profit combined shall be as follows: all contractors (the single contracting entity (prime), his subcontractors (1st tier subs), or their sub-subcontractors (2nd tier subs, 3rd tier subs, etc.) shall be allowed a maximum of 10% on work they each self-perform; the prime contractor shall be allowed a maximum of 5% on contracted work of his 1st tier sub; 1st tier, 2nd tier, 3rd tier, etc. contractors shall be allowed a maximum of 2.5% on the contracted work of their subs. ; Under Method "c(1)", no additional allowances shall be made for overhead and profit. In the case of deductible change orders, under Method "c(2)" and Paragraph (b) above, the contractor shall include no less than five percent (5%) profit, but no allowances for overhead.
- e. The term "net cost" as used herein shall mean the difference between all proper cost additions and deductions. The "cost" as used herein shall be limited to the following:
1. The actual costs of materials and supplies incorporated or consumed as part of the work;
 2. The actual costs of labor expended on the project site; labor expended in coordination, change order negotiation, record document maintenance, shop drawing revision or other tasks necessary to the administration of the project are considered overhead whether they take place in an office or on the project site.
 3. The actual costs of labor burden, limited to the costs of social security (FICA) and Medicare/Medicaid taxes; unemployment insurance costs; health/dental/vision insurance premiums; paid employee leave for holidays, vacation, sick leave, and/or petty leave, not to exceed a total of 30 days per year; retirement contributions; worker's compensation insurance premiums; and the costs of general liability insurance when premiums are computed based on payroll amounts; the total of which shall not exceed thirty percent (30%) of the actual costs of labor;
 4. The actual costs of rental for tools, excluding hand tools; equipment; machinery; and temporary facilities required for the work;
 5. The actual costs of premiums for bonds, insurance, permit fees and sales or use taxes related to the work.

Overtime and extra pay for holidays and weekends may be a cost item only to the extent approved by the owner.

- f. Should concealed conditions be encountered in the performance of the work below grade, or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the contract documents, the contract sum and time for completion may be equitably adjusted by change order upon claim by either party made within thirty (30) days after the condition has been identified. The cost of such change shall be arrived at by one of the foregoing methods. All change orders shall be supported by a unit cost breakdown showing method of arriving at net cost as defined above.
- g. Change orders shall be submitted by the contractor in writing to the owner/designer for review and approval. The contractor will provide such proposal and supporting_data in suitable format. The designer shall verify correctness. Delay in the processing of the change order due to lack of proper submittal by the contractor of all required supporting data shall not constitute grounds for a time extension or basis of a claim. Within fourteen (14) days after receipt of the contractor's accepted proposal including all supporting documentation required by the designer, the designer shall prepare the change order and forward to the contractor for his signature or otherwise respond, in writing, to the contractor's proposal. Within seven (7) days after receipt of the change order executed_by the contractor, the designer shall, certify the change order by his signature, and forward the change order and all supporting data to the owner for the owner's signature. The owner shall execute the change order, within seven (7) days of receipt.

At the time of signing a change order, the contractor shall be required to certify as follows:

"I certify that my bonding company will be notified forthwith that my contract has been changed by the amount of this change order, and that a copy of the approved change order will be mailed upon receipt by me to my surety."

- h. A change order, when issued, shall be full compensation, or credit, for the work included, omitted or substituted. It shall show on its face the adjustment in time for completion of the project as a result of the change in the work.
- i. If, during the progress of the work, the owner requests a change order and the contractor's terms are unacceptable, the owner, may require the contractor to perform such work on a time and material basis whereupon the contractor shall proceed and keep accurately on such form as specified by the Designer or owner, a correct account of cost together with all proper invoices, payrolls and supporting data. Upon completion of the work a change order will be prepared with allowances for overhead and profit per paragraph d. above and "net cost" and "cost" per paragraph e. above. Without prejudice, nothing in this paragraph shall preclude the owner from performing or to have performed that portion of the work requested in the change order.

14. ANNULMENT OF CONTRACT

If the contractor fails to begin the work under the contract within the time specified, or the progress of the work is not maintained on schedule, or the work is not completed within the time specified, or fails to perform the work with sufficient workmen and equipment or with sufficient materials to ensure the prompt completion of said work, or shall perform the work unsuitably or shall discontinue the prosecution of the work, or if the contractor shall become insolvent or be declared bankrupt or commit any act of bankruptcy or insolvency, or allow any final judgment to stand against him unsatisfied for a period of forty-eight (48) hours, or shall make an assignment for the benefit of creditors, or for any other cause whatsoever shall not carry on the work in an acceptable manner, the owner may give notice in writing, sent by certified mail, return receipt requested, to the contractor and his surety (if applicable) of such delay, neglect or default, specifying the same, and if the contractor within a period of seven (7) days after such notice shall not proceed in accordance therewith, then the owner shall, declare this contract in default, and, thereupon, the surety shall promptly take over the work and complete the performance of this contract in the manner and within the time frame specified. In the event the contractor, or the surety (if applicable) shall fail to take over the work to be done under this contract within seven (7) days after being so notified and notify the owner in writing, sent by certified mail, return receipt requested, that he is taking the same over and stating that he will diligently pursue and complete the same, the owner shall have full power and authority, without violating the contract, to take the prosecution of the work out of the hands of said contractor, to appropriate or use any or all

contract materials and equipment on the grounds as may be suitable and acceptable and may enter into an agreement, either by public letting or negotiation, for the completion of said contract according to the terms and provisions thereof or use such other methods as in his opinion shall be required for the completion of said contract in an acceptable manner. All costs and charges incurred by the owner, together with the costs of completing the work under contract, shall be deducted from any monies due or which may become due said contractor and surety (if applicable). In case the expense so incurred by the owner shall be less than the sum which would have been payable under the contract, if it had been completed by said contractor, then the said contractor and surety (if applicable) shall be entitled to receive the difference, but in case such expense shall exceed the sum which would have been payable under the contract, then the contractor and the surety (if applicable) shall be liable and shall pay to the owner the amount of said excess.

15. TERMINATION FOR CONVENIENCE

- a. Owner may at any time and for any reason terminate Contractor's services and work at Owner's convenience, after notification to the contractor in writing via certified mail. Upon receipt of such notice, Contractor shall, unless the notice directs otherwise, immediately discontinue the work and placing of orders for materials, facilities and supplies in connection with the performance of this Agreement.
- b. Upon such termination, Contractor shall be entitled to payment only as follows: (1) the actual cost of the work completed in conformity with this Agreement; plus, (2) such other costs actually incurred by Contractor as approved by Owner; (3) plus ten percent (10%) of the cost of the balance of the work to be completed for overhead and profit. There shall be deducted from such sums as provided in this subparagraph the amount of any payments made to Contractor prior to the date of the termination of this Agreement. Contractor shall not be entitled to any claim or claim of lien against Owner for any additional compensation or damages in the event of such termination and payment.

16. OWNER'S RIGHT TO DO WORK

If, during the progress of the work or during the period of guarantee, the contractor fails to prosecute the work properly or to perform any provision of the contract, the owner, after seven (7) days' written notice sent by certified mail, return receipt requested, to the contractor from the designer, may perform or have performed that portion of the work. The cost of the work may be deducted from any amounts due or to become due to the contractor, such action and cost of same having been first approved by the designer. Should the cost of such action of the owner exceed the amount due or to become due the contractor, then the contractor or his surety, or both, shall be liable for and shall pay to the owner the amount of said excess.

17. REQUESTS FOR PAYMENT

Contractor shall refer to the Supplemental General Conditions for specific directions on payment schedule, procedures and the name and address where to send applications for payments for this project. It is imperative that invoices be sent only to the above address in order to assure proper and timely delivery and handling.

The Designer/Owner will process all Contractor pay requests as the project progresses. The Contractor shall receive payment within thirty (30) consecutive days after Designer/Owner's approval of each pay request. Payment will only be made for work performed as determined by the Designer/Owner.

Retainage:

- a. Retainage withheld will not exceed 5% at any time.
- b. The same terms apply to general contractor and subcontractors alike.
- c. Following 50% completion of the project no further retainage will be withheld if the contractor/subcontractor has performed their work satisfactorily.
- d. Exceptions:
 1. Owner/Contractor can reinstate retainage if the contractor/subcontractor does not continue to perform satisfactorily.

2. Following 50% completion of the project, the owner is authorized to withhold additional retainage from a subsequent periodic payment if the amount of retainage withheld falls below 2.5%.

Final payment will be made within forty-five (45) consecutive days after acceptance of the work, receipt of marked-up "as-built" drawings and specifications and the submission both of notarized Contractor's affidavit and final pay request. All pay requests shall be submitted to the Designer/Owner for approval.

THE CONTRACTOR'S FINAL PAYMENT AFFIDAVIT SHALL STATE: "THIS IS TO CERTIFY THAT ALL COSTS OF MATERIALS, EQUIPMENT, LABOR, SUBCONTRACTED WORK, AND ALL ELSE ENTERING INTO THE ACCOMPLISHMENT OF THIS CONTRACT, INCLUDING PAYROLLS, HAVE BEEN PAID IN FULL."

18. PAYMENTS WITHHELD

The designer with the approval of the Owner may withhold payment for the following reasons:

- a. Faulty work not corrected.
- b. The unpaid balance on the contract is insufficient to complete the work in the judgment of the designer.
- c. To provide for sufficient contract balance to cover liquidated damages that will be assessed.
- d. The secretary of the Department of Administration may authorize the withholding of payment for the following reasons:
 - i. Claims filed against the contractor or evidence that a claim will be filed.
 - ii. Evidence that subcontractors have not been paid.

When grounds for withholding payments have been removed, payment will be released. Delay of payment due the contractor without cause will make owner liable for payment of interest to the contractor as provided in G.S. 143-134.1. As provided in G.S. 143-134.1(e), the owner shall not be liable for interest on payments withheld by the owner for unsatisfactory job progress, defective construction not remedied, disputed work, or third-party claims filed against the owner or reasonable evidence that a third-party claim will be filed.

19. MINIMUM INSURANCE REQUIREMENTS

The work under this contract shall not commence until the contractor has obtained all required insurance and verifying certificates of insurance have been approved in writing by the owner. These certificates shall document that coverages afforded under the policies will not be cancelled, reduced in amount or coverages eliminated until at least thirty (30) days after mailing written notice, by certified mail, return receipt requested, to the insured and the owner of such alteration or cancellation. If endorsements are needed to comply with the notification or other requirements of this article copies of the endorsements shall be submitted with the certificates.

a. Worker's Compensation and Employer's Liability

The contractor shall provide and maintain, until final acceptance, workmen's compensation insurance, as required by law, as well as employer's liability coverage with minimum limits of \$100,000.

b. Public Liability and Property Damage

The contractor shall provide and maintain, until final acceptance, comprehensive general liability insurance, including coverage for premises operations, independent contractors, completed operations, products and contractual exposures, as shall protect such contractors from claims arising out of any bodily injury, including accidental death, as well as from claims for property

damages which may arise from operations under this contract, whether such operations be by the contractor or by any subcontractor, or by anyone directly or indirectly employed by either of them and the minimum limits of such insurance shall be as follows:

Bodily Injury: \$500,000 per occurrence
Property Damage: \$100,000 per occurrence / \$300,000 aggregate

In lieu of limits listed above, a \$500,000 combined single limit shall satisfy both conditions.

Such coverage for completed operations must be maintained for at least two (2) years following final acceptance of the work performed under the contract.

c. **Property Insurance (Builder's Risk/Installation Floater)**

The contractor shall purchase and maintain property insurance until final acceptance, upon the entire work at the site to the full insurable value thereof. This insurance shall include the interests of the owner, the contractor, the subcontractors and sub-subcontractors in the work and shall insure against the perils of fire, wind, rain, flood, extended coverage, and vandalism and malicious mischief. If the owner is damaged by failure of the contractor to purchase or maintain such insurance, then the contractor shall bear all reasonable costs properly attributable thereto; the contractor shall effect and maintain similar property insurance on portions of the work stored off the site when request for payment per articles so includes such portions.

d. **Deductible**

Any deductible, if applicable to loss covered by insurance provided, is to be borne by the contractor.

e. **Other Insurance**

The contractor shall obtain such additional insurance as may be required by the owner or by the General Statutes of North Carolina including motor vehicle insurance, in amounts not less than the statutory limits.

f. **Proof of Carriage**

The contractor shall furnish the owner with satisfactory proof of carriage of the insurance required before written approval is granted by the owner.

20. ASSIGNMENT

No assignment of the Contractor's obligations or the Contractor's right to receive payment hereunder shall be permitted. However, upon written request approved by the Owner and solely as a convenience to the Contractor, the Owner may: (1) forward the Contractor's payment check directly to any person or entity designated by the Contractor, and (2) include any person or entity designated by Contractor as a joint payee on the Contractor's payment check. In no event shall such approval and action obligate the Owner to anyone other than the Contractor, and the Contractor shall remain responsible for fulfillment of all contract obligations.

21. CLEANING UP AND RESTORATION OF SITE

The Contractor shall keep the sites and surrounding area reasonably free from rubbish at all times and shall remove debris from the site from time to time or when directed to do so by the Owner. Before final inspection and acceptance of the project, the Contractor shall thoroughly clean the sites, and completely prepare the project and site for use by the Owner.

At the end of construction, the contractor shall oversee and implement the restoration of the construction site to its original state. Restoration includes but not limited to walks, drives, lawns, trees and shrubs, corridors, stairs and other elements shall be repaired, cleaned or otherwise restored to their original state.

22. GUARANTEE

The contractor shall unconditionally guarantee materials and workmanship against patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve (12) months following the final acceptance of the work and shall replace such defective materials or workmanship without cost to the owner.

Where items of equipment or material carry a manufacturer's warranty for any period in excess of twelve (12) months, then the manufacturer's warranty shall apply for that particular piece of equipment or material. The contractor shall replace such defective equipment or materials, without cost to the owner, within the manufacturer's warranty period.

Additionally, the owner may bring an action for latent defects caused by the negligence of the contractor, which is hidden or not readily apparent to the owner at the time of beneficial occupancy or final acceptance, whichever occurred first, in accordance with applicable law.

Guarantees for roofing workmanship and materials shall be stipulated in the specifications sections governing such roof, equipment, materials, or supplies.

23. STANDARDS

All manufactured items and/or fabricated assemblies subject to operation under pressure, operation by connection to an electric source, or operation involving a connection to a manufactured, natural, or LP gas source shall be constructed and approved in a manner acceptable to the appropriate State inspector which customarily requires the label or re-examination listing or identification marking of appropriate safety standard organization, such as the American Society of Mechanical Engineers for pressure vessels; the Underwriters Laboratories and/or National Electrical Manufacturers Association for electrically operated assemblies; or the American Gas Association for gas operated assemblies, where such approvals of listings have been established for the type of device offered and furnished. Further, all items furnished shall meet all requirements of the Occupational Safety and Health Act (OSHA), and State and federal requirements relating to clean air and water pollution.

All equipment and products must be independent third party tested and labeled (UL, FM, or CTS) before final connections to Owner services or utilities.

24. TAXES

- a. Federal excise taxes do not apply to materials entering into state work (Internal Revenue Code, Section 3442(3)).
- b. Federal transportation taxes do not apply to materials entering into state work (Internal Revenue Code, Section 3475(b) as amended).
- c. North Carolina sales tax and use tax, as required by law, do apply to materials entering into state work and such costs shall be included in the bid proposal and contract sum.
- d. Local option sales and use taxes, as required by law, do apply to materials entering into state work as applicable and such costs shall be included in the bid proposal and contract sum.
- e. **Accounting Procedures for Refund of County Sales & Use Tax**

Amount of county sales and use tax paid per contractor's statements:

Contractors performing contracts for state agencies shall give the state agency for whose project the property was purchased a signed statement containing the information listed in G.S. 105-164.14(e).

The Department of Revenue has agreed that in lieu of obtaining copies of sales receipts from contractors, an agency may obtain a certified statement as of April 1, 1991 from the contractor setting forth the date, the type of property and the cost of the property purchased from each vendor, the county in which the vendor made the sale and the amount of local sales and use taxes paid thereon. If the property was purchased out-of-state, the county in which the property was

delivered should be listed. The contractor should also be notified that the certified statement may be subject to audit.

In the event the contractors make several purchases from the same vendor, such certified statement must indicate the invoice numbers, the inclusive dates of the invoices, the total amount of the invoices, the counties, and the county sales and use taxes paid thereon.

Name of taxing county: The position of a sale is the retailer's place of business located within a taxing county where the vendor becomes contractually obligated to make the sale. Therefore, it is important that the county tax be reported for the county of sale rather than the county of use.

When property is purchased from out-of-state vendors and the county tax is charged, the county should be identified where delivery is made when reporting the county tax.

Such statement must also include the cost of any tangible personal property withdrawn from the contractor's warehouse stock and the amount of county sales or use tax paid thereon by the contractor.

Similar certified statements by his subcontractors must be obtained by the general contractor and furnished to the claimant.

Contractors are not to include any tax paid on supplies, tools and equipment which they use to perform their contracts and should include only those building materials, supplies, fixtures and equipment which actually become a part of or annexed to the building or structure.

25. EQUAL OPPORTUNITY CLAUSE

The non-discrimination clause contained in Section 202 (Federal) Executive Order 11246, as amended by Executive Order 11375, relative to equal employment opportunity for all persons without regard to race, color, religion, sex or national origin, and the implementing rules and regulations prescribed by the secretary of Labor, are incorporated herein.

The contractor(s) agree not to discriminate against any employee or applicant for employment because of physical or mental disabilities in regard to any position for which the employee or applicant is qualified. The contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified individuals with such disabilities without discrimination based upon their physical or mental disability in all employment practices.

26. MINORITY BUSINESS PARTICIPATION

GS 143-128.2 establishes a ten percent (10%) goal for participation by minority business in total value of work for each State building project.

For construction contracts with a value of less than ~~\$100,000~~ ~~\$300,000~~, the Owner has the responsibility to make a good faith effort to solicit minority bids and to attain the goal. The contractor shall include with his bid a completed Identification of HUB Certified/Minority Business Participation form. Contractor shall submit completed Appendix E MBE Documentation for Contract Payments form with final payment request.

For construction contracts with a value of ~~\$100,000~~ ~~\$300,000~~ or greater, the contractor shall comply with the document *Guidelines for Recruitment and Selection of Minority Businesses for Participation in State Construction Contracts* including Identification of Minority Business Participation, Affidavits A, B, C, and D, and Appendix E. These forms provided herein are hereby incorporated and made a part of this contract.

27. ACCESS TO PERSONS AND RECORDS

The State Auditor shall have access to persons and records as a result of all contracts or grants entered into by the Owner in accordance with General Statute 147-64.7. The Owner's internal auditors shall also have the right to access and copy the Contractor's records relating to the Contract and Project during the term of the Contract and within two years following the completion of the Project/close-out of the Contract to verify accounts, accuracy, information, calculations and/or data affecting and/or relating to Contractor's requests for payment, requests for

change orders, change orders, claims for extra work, requests for time extensions and related claims for delay/extended general conditions costs, claims for lost productivity, claims for lost efficiency, claims for idle equipment or labor, claims for price/cost escalation, pass-through claims of subcontractors and/or suppliers, and/or any other type of claim for payment or damages from Owner and/or its project representatives.

28. GOVERNING LAWS

This contract is made under and shall be governed by and construed in accordance with the laws of the State of North Carolina. The Contractor shall comply with all applicable federal, State and local laws, statutes, ordinances and regulations including, but not limited to, the Omnibus Transportation Act of 1991 and its implementing regulations.

29. CONTRACTOR EVALUATION

The contractor's overall work performance on the project shall be fairly evaluated in accordance with the State Building Commission policy and procedures, for determining qualifications to bid on future State projects. In addition to final evaluation, an interim evaluation may be prepared during the progress of project. The owner may request the contractor's comments to evaluate the designer.

SUPPLEMENTARY GENERAL CONDITIONS

TIME OF COMPLETION

The Contractor shall commence work to be performed under this Contract on a date to be specified in written order from the Designer/Owner and shall fully complete all work hereunder within (120) consecutive calendar days from the Notice to Proceed. For each day in excess of the above number of days, the Contractor shall pay the Owner the amount of One Thousand Dollars (\$ 1,000.00) as liquidated damages reasonably estimated in advance to cover the losses to be incurred by the Owner should the Contractor fail to complete the Work within the time specified.

If the Contractor is delayed at anytime in the progress of his work by any act or negligence of the Owner, his employees or his separate contractor, by changes ordered in the work; by abnormal weather conditions; by any causes beyond the Contractor's control or by other causes deemed justifiable by Owner, then the contract time may be reasonably extended in a written order from the Owner upon written request from the contractor within ten days following the cause for delay. Time extensions for weather delays, acts of God, labor disputes, fire, delays in transportation, unavoidable casualties or other delays which are beyond the control of the Owner do not entitle the Contractor to compensable damages for delays. Any contractor claim for compensable damages for delays is limited to delays caused solely by the owner or its agents.

CONSTRUCTION SCHEDULE:

120 days from the Notice to Proceed.

PAYMENTS

Payments will be on a monthly basis.

ROOFING GUARANTEE

Not applicable.

UTILITIES

The Owner will provide water and power. Contractor will be responsible for transferring both to the job site. Contractor will provide portable toilet facilities for all construction employees.

SECURITY

Contractor will be responsible for keeping construction personnel apart from students and staff at all times.

USE OF SITE

Work hours are not limited. Work outside of 7am - 5pm must include notification of the campus Police office

ALTERNATE BIDS

Should be used to control project costs. Base bid 90% of budget with add alternates to 110% of budget makes contract award possible without negotiation.

UNIT PRICES

For unknown conditions or amounts of work. Always provide and estimated amount for inclusion in the Base Bid then a unit price to adjust the actual amount up or down.

NO SMOKING POLICY

Smoking is not allowed inside any structure on campus or near any entrance to any structure.

SUSTAINABILITY

Contractor shall become familiar and comply with all Sustainability and Recycling policies on campus.

FIRE ALARM WORK

Contractor for fire alarms shall be approved by Design and Construction Services Department prior to beginning work.

PERFORMANCE AND PAYMENT BONDS Not Required**MINORITY BUSINESS PARTICIPATION**

See Item 26 in General Conditions.

SITE LOGISTICS PLAN

A site logistics plan will be required of the winning bidder that shall include the following:

- How materials delivery will be handled
- Where employees will park
- How students and staff will be protected when work is underway
- Where portable toilets will be located
- Where project signs will be located
- Other issues that may be required.

SECTION 08 33 00 - ROLLING SERVICE DOORS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Demolition and replacement of manual overhead rolling doors with hollow metal pass door.

1.2 SYSTEM DESCRIPTION

- A. Design Requirements:
1. Wind Loading: N/A
 2. Cycle Life:
 - a. Design doors of standard construction for normal use of up to 20 cycles per day maximum, and an overall maximum of 50,000 operating cycles for the life of the door
 3. Safety:
 - a. Chain operated doors shall be designed so that the door immediately stops upward or downward travel and is maintained in a stationary position when the hand chain is released by user.

1.3 SUBMITTALS

- A. Reference Section 01 33 00 Submittal Procedures; submit the following items:
1. Product Data
 2. Shop Drawings: Include special conditions not detailed in Product Data. Show interface with adjacent work.
 3. Quality Assurance/Control Submittals:
 - a. Provide manufacturer ISO 9001:2015 registration
 - b. Provide manufacturer and installer qualifications - see below
 - c. Provide manufacturer's installation instructions
 4. Closeout Submittals:
 - a. Operation and Maintenance Manual
 - b. Certificate stating that installed materials comply with this specification

1.4 QUALITY ASSURANCE

- A. Qualifications:
1. Manufacturer Qualifications: ISO 9001:2015 registered and a minimum of five years experience in producing doors of the type specified
 2. Installer Qualifications: Manufacturer's approval

1.5 DELIVERY STORAGE AND HANDLING

- A. Follow manufacturer's instructions and Division 1 requirements where applicable.

1.6 WARRANTY

- A. Standard Warranty: Two years from date of shipment against defects in material and workmanship
- B. Maintenance: Submit for owner's consideration and acceptance of a maintenance service agreement for installed products

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Manufacturer:

1. Cornell: 24 Elmwood Avenue, Meghan Joseph (727) 318-0929
2. Cookson
3. Clopay Building Products
4. Overhead Door

2.2 PRODUCT INFORMATION

A. Basis of Design Model: ESD10

2.3 MATERIALS

A. Curtain:

1. Fabrication:

a. Slat Material: No. 6F, (Listed Exterior/Interior):

- 1) Galvanized Steel: Manufacturer recommended gauge based on performance requirements. Minimum exterior 18 Ga., Grade 40, ASTM A 653 galvanized steel zinc coating.

c. Total Slat Thickness: 15/16 inch (24 mm)

2. Interior/Exterior Slat Finish:

a. Coating System (Color Selected by Architect):

- 1) ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation for chemical bonding, gray baked-on base coat and gray baked-on polyester finish coat
- 2) Zirconium treatment followed by baked-on polyester powder coat, with color as selected by Architect from manufacturer's standard color range, over 180 colors minimum 2.5 mils (0.065 mm) cured film thickness; ASTM D-3363 pencil hardness: H or better

B. Endlocks: Fabricate interlocking sections with high strength galvanized cast iron endlocks on alternate slats each secured with two ¼" (6.35 mm) rivets.

C. Bottom Bar

1. Configuration:

- a. Structural steel angles.

2. Finish:

- a. Interior/Exterior: Match slats

D. Guides:

1. Fabrication:

- a. Minimum 3/16 inch (4.76 mm) structural steel angles. Provide windlock bars of same material when windlocks are required to meet specified wind load. Top of inner and outer guide angles to be flared outwards to form bellmouth for smooth entry of curtain into guides. Provide removable guide stoppers to prevent over travel of curtain and bottom bar. Top 16 ½" (419.10 mm) of coil side guide angles to be removable for ease of curtain installation and as needed for future curtain service.

2. Finish:

- a. Coating System (Color Selected by Architect): Zirconium treatment followed by baked-on polyester powder coat, color as selected by Architect from manufacturer's standard color range, over 180 color; minimum 2.5 mils (0.065 mm) cured film thickness; ASTM D-3363 pencil hardness: H or better

- E. Counterbalance Shaft Assembly:
 - 1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width
 - 2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs (110 N). Provide wheel for applying and adjusting spring torque.

- F. Brackets:

Fabricate from minimum 3/16 inch (5 mm) steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures

 - 1. Finish:
 - a. Coating System (Color Selected by Architect): Zirconium treatment followed by baked-on polyester powder coat, [color as selected by Architect from manufacturer's standard color range, over 180 colors] [custom color as selected by Architect]; minimum 2.5 mils (0.065 mm) cured film thickness; ASTM D-3363 pencil hardness: H or better

- G. Hood:

Minimum 24 gauge galvanized steel with reinforced top and bottom edges. Provide minimum 1/4 inch (6.35 mm) steel intermediate support brackets as required to prevent excessive sag.

 - 1. Finish: To Match slats

**

2.4 OPERATION

- A. Manual Chain Hoist: Provide chain hoist operator with endless steel chain, chain pocket wheel and guard, geared reduction unit, and chain keeper secured to guide. Chain hoist to include integral brake mechanism that will immediately stop upward or downward travel and maintain the door in a stationary position when the hand chain is released by the user.

2.5 ACCESSORIES

- A. Locking:
 - 1. Master keyable cylinder operable from coil side of opening, options for all types of operation.
 - a. Final cylinder shall be provided and keyed by Owner

- C. Pass Doors: Provide hollow metal pass door and hinged frame available within a curtain. Also known as wicket door or man door.
 - 1. Hardware for Pass Door and Frame:
 - a. Door and Frame hinges and frame cane bolt by overhead door manufacturer/supplier. All other hardware to be provided by installer unless noted otherwise and as follows:
 - i. Exit Device: 22-NL-CYL; SP28 Finish; Von Duprin
 - ii. Surface Closer: LCN1450 EDA; 689; LCN
 - iii. Cylinder: Provided by Owner

PART 3 EXECUTION

3.1 DEMOLITION AND DISPOSAL

- A. Remove and dispose of all components of existing overhead door and integral pass door including all existing guides, hardware etc.

3.2 EXAMINATION

- A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings

- B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates
- C. Commencement of work by installer is acceptance of substrate

3.3 INSTALLATION

- A. General: Install door and operating equipment with necessary hardware, anchors, inserts, hangers and supports
- B. Follow manufacturer's installation instructions

3.4 ADJUSTING

- A. Following completion of installation, including related work by others, lubricate, test, and adjust doors for ease of operation, free from warp, twist, or distortion

3.5 CLEANING

- A. Clean surfaces soiled by work as recommended by manufacturer
- B. Remove surplus materials and debris from the site

3.6 DEMONSTRATION

- A. Demonstrate proper operation to Owner's Representative
- B. Instruct Owner's Representative in maintenance procedures

END OF SECTION 083300



Submittal

Prepared For:
CMTA

Date: July 28, 2021

Job Name:
UNCC McEniry 550 Ton Chiller

Trane U.S. Inc. is pleased to provide the following submittal for your review and approval.

Product Summary

Qty Product

- 1 Centrifugal Water Chiller
- 1 Extended SU

Notes:

1. Please verify correct connections side and hinged waterbox side on the condenser.

Erica Powell, Account Manager
Trane U.S. Inc.
4501 South Tryon Street
Charlotte, NC 28217
E-mail: Erica.Powell@tranetechnologies.com
Office Phone: (704) 525-9600
Fax: (704) 525-8582

The attached information describes the equipment we propose to furnish for this project, and is submitted for your approval.

Product performance and submittal data is valid for a period of 6 months from the date of submittal generation. If six months or more has elapsed between submittal generation and equipment release, the product performance and submittal data will need to be verified. It is the customer's responsibility to obtain such verification.

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Tag Data - Centrifugal Water Chiller (Qty: 1)

Item	Tag(s)	Qty	Description	Model Number
A1	CVHF 10 year	1	550 Ton Centrifugal Chiller (CTV)	CVHF0485

Product Data - Centrifugal Water Chiller**Item: A1 Qty: 1 Tag(s): CVHF 10 year**

Standard ship cycle CVHE, CVHF & CVHG
 North America region
 Centrifugal liquid chiller with 2 stage compressor
 Compressor size: 485 nominal tons
 Adaptiview controls
 Without enhanced electrical package
 Incoming line hertz: 60
 Compressor motor hertz: 60.
 Incoming line voltage: 460 volt
 Compressor motor voltage: 460 volt 3 phase
 Startup Included - Trane Service must start equipment for warranty to be honored
 Compressor motor power: 365 kW
 Motor frame size: 440E
 Compressor impeller cutback: 298
 Standard cooling
 Evaporator shell size: 050 long
 Evaporator bundle size: 860 nominal tons
 Evaporator tubes: 1.00 inch (25.4 mm) dia. micro intl enhanced cu low press tbg
 Evaporator tube wall: .025 inch (0.6 mm) thick
 Evaporator fluid type: Water
 Evaporator waterbox type: Non-marine
 Evaporator waterbox construction: Standard
 Evaporator water box passes: Two pass
 Evaporator waterbox pressure: 150 psig (1034 kPa)
 Evaporator waterbox connection: Victaulic
 Evap waterbox arrangement: in RH end - out RH end
 Thermal dispersion flow switch (IFM) - Field Installed (Field Installed)
 Condenser shell size: 080 long
 Condenser bundle size: 800 nominal tons
 Condenser tube: 1.00 inch (25.4 mm) internally enhanced copper
 Condenser tube wall: .028 inch (0.7 mm) thick
 Condenser shell construction: Standard
 Condenser fluid type: Water
 Without condenser variable flow
 Condenser waterbox type: non-marine
 Condenser waterbox construction: Standard
 Condenser water box passes: Two pass
 Condenser waterbox pressure: 150 psig (1034 kPa)
 Condenser waterbox connection: Victaulic
 Condenser waterbox arrangement: in RH end - out RH end
 Condenser waterbox hinge: return end only
 Standard tube sheet construction
 Thermal dispersion flow switch (IFM) - Field Installed (Field Installed)
 Orifice size: 790 nominal tons
 Agency listing: U.L. listed unit (United States requirement)
 Factory performance test: Standard air run and vibration test
 Selection tolerance: AHRI Standard tolerance
 Mylar (plastic) logo
 Factory testable - yes
 Don't apply special ton tolerance
 Don't apply special kW/ton tolerance
 Shipping package: Domestic without skid
 Liquidated damages delivery: No
 Liquidated damages performance: NO
 Without China Energy Efficiency

With Acoustics
 Unit option: Insulation package
 Certified
 Complies with ASHRAE 90.1 - 2007
 Complies with ASHRAE 90.1 - 2007 Addendum M
 Complies with ASHRAE 90.1 - 2010
 Complies with ASHRAE 90.1 - 2013
 Operating Status
 Complies with ASHRAE 90.1 - 2016
 Generic BAS
 BACnet
 With enhanced protection
 R514 Refrigerant
 Accessory line item 1
 Accessory line item 2
 Accessory line item 3
 Trane Supplied Refrigerant
 Refrigerant Cooled AFD
 Unit mounted refrigerant cooled adaptive frequency drive
 Adaptive frequency drive maximum RLA: 608 amps
 Starter power connection: Circuit breaker
 Standard enclosure - Nema 1
 10 Year Parts - Whole Unit with LV AFD
 10 Year Labor Warranty Whole Unit with Trane Supplied Starter
 10 Year refrigerant quality warranty

Performance Data - Centrifugal Chiller (CTV)

Tags	CVHF 10 year
Refrigeration capacity (tons)	550.00
Total power (kW)	320.50
Primary RLA (Incoming line) (A)	433.40
Min circuit ampacity (A)	541.00
Max overcurrent protection (A)	800.00
Compressor motor RLA (A)	450.90
Motor LRA (A)	2869.00
Actual motor voltage full load (V)	458.4
Actual motor frequency (Hz)	59.8
Refrigeration Efficiency (kW/ton)	0.5828
NPLV.IP (kW/ton)	0.3583
Entering fluid evap (F)	52.00
Leaving fluid evap (F)	42.00
Shipping weight - Charge (lb)	21342.0
Flow evap (gpm)	1313.40
Evap pressure drop at Design (ft H2O)	17.40
Evap fouling factor (hr-sq ft-deg F/ Btu)	0.000100
Evap fluid concentration (%)	0.00
Entering fluid cond (F)	85.00
Leaving fluid cond (F)	94.43
Flow cond (gpm)	1650.00
Cond pressure drop at Design (ft H2O)	13.97
Cond fouling factor (hr-sq ft-deg F/ Btu)	0.000250
Refrigerant charge (lb)	1000.0
Typical Sound Pressure at AHRI Condition (dBA)	80
Shipping weight - No Charge (lb)	20342.0
Operating weight (lb)	23774.0
Unit center of gravity X (in)	21.000
Unit center of gravity Y (in)	49.000
Unit center of gravity Z (in)	72.000

Tags	CVHF 10 year
Left Front isolator load (lb)	7075.0
Left Rear isolator load (lb)	2789.0
Right Front isolator load (lb)	9504.0
Right Rear isolator load (lb)	4405.0
Heat rejection capacity (MBh)	5.47
AFD heat rejected to ambient (MBh)	11.49
Maximum flow evap (gpm)	2426.00
Evap pressure drop max flow (ft H2O)	60.85
Min flow evap (gpm)	341.40
Evap pressure drop min flow (ft H2O)	0.84
Maximum flow cond (gpm)	2807.70
Cond pressure drop max flow (ft H2O)	35.80
Min flow cond (gpm)	765.70
Cond pressure drop min flow (ft H2O)	3.56
Compressor Weight (lb)	4628.0
Motor Weight (lb)	2339.0
Starter Weight (lb)	1680.0
Suction Elbow Weight (lb)	280.0
Economizer Weight (lb)	420.0
Evap Weight (lb)	4597.0
Evap water box weight (lb)	630.0
Cond Weight (lb)	4364.0
Cond water box weight (lb)	390.0
Miscellaneous Weight (lb)	1013.0

Product Report - Centrifugal Water Chiller
Item: A1 Qty: 1 Tag(s): CVHF 10 year

Unit Features									
Chiller Model	Refrigeration Capacity	Total Power	Fullload Eff	NPLV.IP	IPLV.IP	Refrigerant	Line Volt	Line Frequency	Starter Type
CVHF	550.0 tons	320.5 kW	0.5828 kW/ton	0.3583 kW/ton	N/A	R-514A	460. V	60. Hz	VFD

Unit Overview	
Application type	Standard cooling
Insulation	Unit insulation package
Tracer Controls	BACnet
Compressor	485
Impeller	298
Orifice	790



Selection Tolerances	
Selection Tolerance	AHRI Tolerance

Shell Information					
	Evaporator		Condenser		
	Fluid Temperature		Construction Features		
Entering	52.00 F		85.00 F	Shell Size	050L
Leaving	42.00 F		94.43 F	Bundle Size	860
	Fluid Properties		Tube Type		IMC1
Fluid Type	water		water	Tube Thickness	0.025"
Fluid Concentration	0.00 %		0.00 %	Connection Type	Victaulic connection evap.
Fouling Factor	0.000100 hr-sq ft-deg F/ Btu		0.000250 hr-sq ft-deg F/ Btu	Water box type	non-marine
	Flow Rate		Water box pressure		150 psig
Design Flow	1313 gpm		1650 gpm	Wbox Arrangement	Evap in RH end - evap out RH end
Min Flow	341.4 gpm		765.7 gpm	Flow Proving	Thermal dispersion flow switch (IFM)
Max Flow	2426 gpm		2808 gpm	Number of Passes	Two pass evap water box
	Fluid Pressure Drop		Cond in RH end - cond out RH end		Two pass cond water box
PD at Design Flow	17.4 ft H2O		14.0 ft H2O		
PD at Min Flow	0.840 ft H2O		3.56 ft H2O		
PD at Max Flow	60.9 ft H2O		35.8 ft H2O		

Unit Electrical			
Low Voltage AFD type	UM refriger-cooled AFD w/ harmonic filter	Min Circuit Ampacity	541.00 A
Low Voltage AFD connection type	Circuit breaker	Max Overcurrent Protection	800.00 A
AFD frame size	608 max RLA	Nameplate RLA	450.90 A
Low Voltage AFD enclosure type	Standard enclosure - NEMA 1	Primary RLA	433.40 A
Motor	365	Motor Locked Rotor Amps	2869.00 A
Total Power	320.5 kW		

Physical Information			
Operating Weight	23774.0 lb	Shipping Weight - No Charge	20342.0 lb
Cond Shell Construction	Standard condenser construction	Shipping Weight - Charge	21342.0 lb
Agency Listing	U.L. listed (United States requirement)	Regional Code Requirement	No Requirement
		Heat Rejection Capacity	5.47 MBh
		Refrigerant charge	1000.0 lb
		AFD Heat Rejected to ambient	11.49 MBh
		Anticipated Sound at AHRI Conditions	80 dBA

Product Report - Centrifugal Water Chiller
Item: A1 Qty: 1 Tag(s): CVHF 10 year

Information for AHRI and ASHRAE Projects

AHRI 550/590 2015 classification	Certified
ASHRAE 90.1 - 2007	Complies
ASHRAE 90.1 - 2007 Add. M	Complies
ASHRAE 90.1-2010	Complies
ASHRAE 90.1-2013	Complies
ASHRAE 90.1 - 2016	Complies

Certified in accordance with the AHRI Water-Cooled Water-Chilling and Heat Pump Water-Heating Packages Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org.



Warranty

Parts whole unit	2-10th yr Parts - Whole Unit with LV AFD	Labor 1st year	1st year labor warranty whole unit
Parts less motor and compressor	No parts less motor & cmpr warranty	Labor after 1st year	2-10th yr Labor - Whole unit w/LV AFD
Motor/compr parts warr. up to 10 years	No motor & compressor warranty	Refrigerant quality warranty 1st year	1st year refrigerant quality warranty
		Refrigerant quality warranty beyond 1st year	2nd-10th year refrigerant warranty

Information for LEED Projects

Refrigeration capacity	550.0 tons	Total power	320.5 kW
Refrigerant charge	1000.0 lb	NPLV/IP	0.3583 kW/ton

Compliant with the requirements of the LEED Energy and Atmosphere Enhanced Refrigerant Management Credit (EAc4) due to the R-514A refrigerant GWP being less than 2.

Note: Trane recognizes and respects the U.S. Green Building Council® mandate that a default 2% Refrigerant Leakage Rate (Lr) be used by all manufacturers of centrifugal chillers when calculating the Enhanced Refrigerant Management Credit because there is no industry standard. Trane has exhaustively documented a leak rate of less than 0.5% for CenTraVac™ chillers (models CVHE, CVHF, CVHG, CVHS, CVHM, CDHF, CDHG, CVHH and CDHH) and utilizes an average design refrigerant charge of less than 2 lb./ton.

The U.S. Green Building Council's LEED® green building program is the preeminent program for the design, construction, maintenance and operations of high-performance green buildings. It provides independent, third-party verification that a building project meets the highest green building and performance measures.

Trane Select Assist Version Number: 55233
 Data Generation Date: 7/21/2021

Mechanical Specifications - Centrifugal Water Chiller**Item: A1 Qty: 1 Tag(s): CVHF 10 year****Compressor-Motor**

Direct drive multiple-stage compressor, multi-stage capacity control guide vanes. Shrouded aluminum alloy impellers dynamically balanced. Motor-compressor assembly balanced to .15 in./sec (.0038m/sec) maximum vibration measured on motor and bearing housings. Refrigerant cooled, hermetically sealed, two-pole, squirrel cage induction motor. Two pressure lubricated bearings support the rotating assembly. A direct drive submerged oil pump motor, 3/4 hp (.560 kW) 115V/50/60/1 provides filtered and temperature controlled oil to compressor bearings.

Evaporator-Condenser

Shells are carbon steel plate. Evaporator includes rupture disk per BSR/ASHRAE 15 Safety Code. Carbon steel tube sheets are drilled, reamed and grooved to accommodate tubes. Tubes are individually replaceable externally finned seamless copper. Tubes are mechanically expanded into tube sheets. Eliminators are installed over entire length of the evaporator tube bundle. A multiple orifice control system maintains proper refrigerant flow. Condenser baffle prevents direct impingement of compressor discharge gas upon the tubes. Refrigerant side of the assembled unit is tested at both pressure(30.00 psi leak test) and vacuum. Water side is hydrostatically tested at one and one-half times design working pressure, but not less than 225.00 psi.

Trane reserves the right to implement chiller technology enhancements that will reduce the chiller's refrigerant charge, with no impact on chiller performance. Changes may be reflected in the chiller's nameplate refrigerant charge and the quantity of refrigerant charge shipped to the jobsite, depending upon the final date of equipment manufacture.

Water Boxes

Drains and vents - Water boxes typically have 3/4-inch NPTI vents and drain connections provided. Evaporators have 2 vents and 2 drains, condensers have 1 vent and 1 drain. If grooved connections are offered, the design is based on Style 77.

Non-marine water boxes have water connections that extend out from the end.

CondenserWater box Hinge

The water box is provided with a hinge on one or both ends of the condenser to facilitate access to and maintenance of the condenser tubes as needed without the need for separate rigging. See the dedicated drawing of the hinge(s) being supplied.

Economizer

A flash economizer with no moving parts provides power saving capability.

Purge System

The EarthWise(TM) purge includes a 1/4 hp 115V/60/1, 100V/50/1 air cooled condensing unit, purge tank, drier elements, and a 1/20 hp (.037 kW) 115V/60/1, 110V/50/1 pump-out compressor. The purge is designed with an activated carbon filtration system that includes an autoregeneration feature which results in automatic high-efficiency removal of noncondensibles from the chiller without manual carbon maintenance. The purge meets Green Seal GS-31 with a leak rate less than 1.0% of the charge per year and also meets ASHRAE 147 with a leak rate of less than one unit mass of refrigerant per unit of air.

AdaptiView Control Panel:

The Tracer(tm) AdaptiView is a microprocessor-based chiller control system that provides complete stand alone system control and monitoring for the water cooled CenTraVac (TM). It is a factory mounted package including a full complement of controls to safely and efficiently operate the CenTraVac chiller, including oil management, purge operation, interface to the starter, and comprehensive motor protection including three phase solid state motor overload. Inlet and outlet water (fluid) temperature sensors are located in the evaporator and condenser waterbox connections as standard.

The display is a touch sensitive 12 1/8" diagonal color liquid crystal display (LCD) that uses color graphics and animation to ensure ease of use. The touch sensitive interface allows the operator to view the chiller graphically and receive a status indication via subsystem animations. The operator can navigate easily between the primary chiller subsystems including: compressor, evaporator, condenser, and motor. For each subsystem, you can view status and detailed operating parameters. In addition, alarms, reports, trending, and settings can all be accessed quickly from the main screen. The display is mounted on a flexible "arm" that allows extensive height and viewing angle variations.

The panel supports an extensive list of languages including the default English. The data can be set to be viewed in inch pounds IP or metric units SI. For remote starters - Class 1 control panel voltage (30-115 V) are clearly labeled in the control panel. Class 2 input voltage (30V max) is also labeled in the control panel.

Operating Data including:

- *operating hours
- *number of starts
- *chilled water setpoint
- *evaporator and condenser water flow status
- *evaporator entering and leaving water temperatures
- *evaporator saturated refrigerant temperatures
- *evaporator approach temperature
- *evaporator refrigerant pressure
- *condenser entering and leaving water temperatures
- *condenser saturated refrigerant temperatures
- *condenser approach temperature
- *condenser refrigerant pressure
- *oil differential pressure
- *oil tank temperature
- *purge mode
- *purge average daily pump-out time
- *% RLA per phase for motor
- *RLA per phase
- *volts per phase
- *power factor
- *kw
- *kwh
- *frequency

The AdaptiView also contains the following dedicated reports:

Evaporator, Condenser, Compressor, Motor, Purge, and ASHRAE. Each report is comprised of a detailed listing of operational data relative to that chiller subsystem.

Control functions including:

- *leaving chilled water temperature
- *percent demand limit
- *chiller water reset (based on return water temperature)
- *front panel control type
- *setpoint source
- *differential to start
- *differential to stop

Status data including:

- *waiting to start
- *running
- *run limit
- *run inhibit (adaptive)
- *auto
- *free cooling (option)
- *preparing to shutdown
- *shutting down (post lube)
- *stopped

Safeties including:

Automatic safety shutdown for:

- *Low chilled water temperature,
- *low evaporator refrigerant temperature
- *high condenser refrigerant pressure
- *evaporator and condenser flow status
- *low evaporator/condenser differential refrigerant pressure
- *low oil pressure

- *oil pressure overdue
- *high or low oil temperature
- *high bearing oil temperature (requires enhanced protection option)
- *high motor current
- *high motor temperature
- *starter function faults
- *critical temperature and pressure sensor faults

The devices are of a latching trip out type requiring manual reset. Non-latching safety trip outs for operating conditions external to the chiller automatically permits unit to resume normal operation when condition is corrected.

Advanced motor protection monitors 3-phase current to provide latching trip out protection from adverse effects of phase loss, phase unbalance, phase reversal, loss of phase reversal protection, and electrical distribution faults (momentary power loss) by instantaneous trip out of motor.

Surge protection - Detects surge and limits chiller loading through inlet vane modulation. Head relief through lowering cooling tower water temperature can be requested. If not corrected within 7 minutes, chiller is shut down.

Enhanced Adaptive Control(TM) - Built in intelligence to keep the chiller on line (safely making maximum tons) while simultaneously preventing chiller damage/failure. During any chiller limiting mode of operation, the control panel enunciates the condition via a relay output.

Trending:

The controller provides 10 standard graphs for trending multiple parameters, The operator can add an additional 6 custom graphs if desired. On any one custom graph, the operator can choose to trend up to 10 unique parameters from a more comprehensive list. Two Y axes are available for any graph to facilitate readability.

Diagnostics:

AdaptiView includes comprehensive diagnostic monitoring. All active diagnostics are available, and up to 20 historic diagnostics are communicated to the operator via the 12 1/8" LCD display with graphic navigation system. Each diagnostic is time and date stamped.

Service Tool:

A PC-based service tool called Tracer TU, connected to the chiller via USB port, is available for additional cost and displays the last 100 diagnostics, indicating the time, date of occurrence, and system parameters at the time of the diagnostic. The service tool provides advanced troubleshooting and access to sophisticated configuration settings not needed during operation of the chiller.

Security:

The AdaptiView can be set to prevent unauthorized access to the chiller settings. The operator can choose to secure the operating settings with a password. Data and reports can still be accessed once the settings are locked out.

The memory for the AdaptiView is non-volatile type, so if power is lost, operating settings are retained. A life time battery is standard, which is used only to support the clock function for the chiller.

Chilled and Condenser water pump relays:

Chilled water and condenser water pump relays are provided and it is recommended that they be used for pump control.

BACnet(MSTP) Direct Points List:

The following points are available directly from the chiller. Recognize that some of these points require chiller options or configurations.

Inputs Including

- Chiller Auto/Stop
- Chiller Mode (e.g. cool)
- External Base Loading Enable/Disable (requires Extended Operation option)
- External Base Loading Setpoint (requires Extended Operation option)
- Chilled Water Setpoint
- Current Limit Setpoint
- Heating Setpoint (requires Extended Operation option)
- Wall Mounted Refrigerant Specific Monitor (requires Extended Operation option)

Clear Diagnostics

Outputs Including

Evaporator Pump relay
 Condenser Pump relay
 Chilled Water Flow Status
 Condenser Water Flow Status
 Evaporator Water Flow Rate (requires Flow Compensation option)
 Condenser Water Flow Rate (requires Flow Compensation option)
 Chiller capacity (requires Flow Compensation option)
 Leaving Chilled Water Temperature
 Entering Chilled Water Temperature
 Entering Condenser Water Temperature
 Leaving Condenser Water Temperature
 Second Condenser Entering Water Temperature (requires HR or Aux condenser bundle)
 Second Condenser Leaving Water Temperature (requires HR or Aux condenser bundle)
 Active Chilled/Hot Water Setpoint
 Active Current Limit Setpoint
 Active Base Loading Setpoint (requires Extended Operation option)
 Head Relief Request relay
 Compressor Running relay
 Chiller On/Off
 Limit Warning relay
 Maximum Capacity relay
 Alarms Description1
 Manual Reset Alarm relay
 Auto Reset Alarm relay
 Purge Alarm relay

Alarm Reset

Condenser Refrigerant Pressure
 Condenser Refrigerant Temperature
 Evaporator Refrigerant Pressure
 Evaporator Refrigerant Temperature
 Compressor Discharge Refrigerant Temperature (requires Enhanced Protection option)
 Differential refrigerant pressure (not for head pressure control)
 Operating Status (Alarm, Run Enabled, Local Control, Limited)
 Chiller Modes (i.e. Off, Starting, Running, Shutting Down)
 Base Loading Active (requires Extended Operation option)
 Hot Gas Bypass Active (requires Hot Gas Bypass option)
 Operating Mode (e.g. Cool)
 Current Per Line
 Voltage Per Phase
 Unit Power Consumption (kW)
 Motor winding temperature
 Motor power factor (uncorrected)
 Oil Temperature
 Oil Pressure Differential
 High Side Oil Pressure
 Low Side Oil Pressure
 Compressor Starts
 Compressor Run Time
 Inlet guide vane position
 Inboard bearing oil temperature (requires Enhanced Protection option)
 Outboard bearing oil temperature (requires Enhanced Protection option)
 Purge Status2
 Purge pumpout Average (24 hour)
 Purge pump-out
 Purge regeneration
 Purge carbon tank temperature
 Purge liquid temperature
 Purge suction temperature

Purge time to next purge run
Purge pump-out chiller on-7 days
Purge pump-out chiller off-7 days
Purge pump-out life
Purge regeneration life
Refrigerant Monitor
AFD output frequency
AFD transistor temperature

Hardwire BAS Interface provides:

Chilled Water Setpoint input - Provides for setpoint adjustment of control point from multiple sources
Current Limit Setpoint input - provides for setpoint adjustment of control point from multiple sources
Percent RLA Output - provides % RLA output
Condenser Pressure Output - A hardwire output signal of condenser pressure, or differential pressure between the evaporator and condenser is provided.

Enhanced Protection Option provides:

Bearing temperatures sensors installed for both bearings, displayed on unit controller
Compressor discharge refrigerant from the compressor
Actual pressure transducer in the condenser for enhanced condenser limit control

Operating Status:

The following hardwire binary outputs are available:

Compressor running relay
Alarm relay - manual reset
Alarm relay - auto reset
Limit warning relay
Purge alarm relay
Head relief request relay
Maximum capacity relay

Evaporator Proof of Flow - Thermal Dispersion

A factory provided, field installed thermal dispersion type proof of flow switch (IFM) is provided. The thermal dispersion controller is mounted in the chiller control panel, the piping probe and wiring is shipped loose for field installation in the ship with components box. Follow the installation instructions in the chiller installation manual. Reference specific IFM Installation manual (PART-SVN223*-EN) notes shipped with your rupture guard /contact local Trane sales office

Condenser Proof of Flow - Thermal Dispersion

A factory provided, field installed thermal dispersion type proof of flow switch (IFM) is provided. The thermal dispersion controller is mounted in the chiller control panel, the piping probe and wiring is shipped loose for field installation in the ship with components box. Follow the installation instructions in the chiller installation manual. Reference specific IFM Installation manual (PART-SVN223*-EN) notes shipped with your rupture guard /contact local Trane sales office

Paint

All CenTraVac(TM) painted surfaces are coated with a primer and an air-dry beige primer-finisher prior to shipment.

Isolation

All units ship with neoprene isolator pads as standard, except when spring isolators are chosen. Enough pads are provided to cover the area under the chiller supports.

Shipment

All units are of hermetic design, leak tested, charged to 5.00 psi and shipped as a single factory assembled package. Full oil charge shipped in oil sump. Refrigerant shipped to jobsite from refrigerant manufacturer. The entire chiller is shrink wrapped for protection.

Insulation

Factory applied insulation. All low temperature surfaces are covered with 3/4" Armaflex II or equal (thermal conductivity=0.28 BTU/hr-ft sq.) (1.59 W/m²-K), including the evaporator, water boxes and suction elbow. The economizer is insulated with 3/8" insulation. The chiller feet are not insulated. On units with the water box hinges

option, the hinges are not factory insulated. On units with the free cooling option, the condenser is not factory insulated.

TRANE Adaptive Frequency Drive (AFD)

The Trane AFD is a closed-loop, liquid refrigerant cooled, microprocessor based pulsed width modulation design. The AFD is both voltage and current regulated. Output power devices: IGBT transistors.

The AFD is factory mounted on the chiller and ships completely assembled, wired and tested. Patented Trane AFD control logic is specifically designed to interface with the centrifugal water chiller controls. AFD control adapts to the operating ranges and specific characteristics of the chiller, and chiller efficiency is optimized by coordinating compressor motor speed and compressor inlet guide vane position. Chilled water control and AFD control work together to maintain the chilled water setpoint, improve efficiency and avoid surge. If a surge is detected, AFD surge avoidance logic will make adjustments to move away from and avoid surge at similar conditions in the future. Use only copper conductors for terminal connections. Failure to do so may cause corrosion or overheating, and starter damage.

This unit mounted AFD is supported by three cantilevered support brackets. These support brackets are normally welded to the side of the evaporator shell and extend out the depth of the AFD. For some AFD sizes and chiller configurations, the support brackets have a bolt plate which allows the majority of the length of these support brackets to be removable.

Frame 3 (405A/608A): AFD Support brackets are welded to the evaporator shell.

Exceptions: The following compressor/shell combinations have supports with bolt plate as standard for a Frame 3 AFD:

- compressor sizes 620/760/870 on 080 evaporator with 080 condenser shells
- compressor sizes 1070/1300 on 142 evaporator with 210 condenser shells.

Frame 4 (900A/1210A): AFD Support brackets have bolt plate so most of the bracket is removable.

AFD Design Features

* NEMA 1 ventilated enclosure with a hinged, locking door is tested to a short circuit rating of 65,000 amps. It includes a padlockable door-mounted circuit breaker/shunt trip with AIC rating of 65,000 amps. The circuit breaker is interlocked with the enclosure door. The entire package is UL/CUL listed.

* Simple modular construction.

* The drive is rated for maximum 480/60/3 input power, +/-10%.

* Displacement power factor of .98 at full load, minimum of .96 at all other part loads.

* Minimum efficiency of 97% at rated load and 60 hertz.

* Full motor voltage is applied regardless of the input voltage.

* Soft-start; linear acceleration; coast to stop.

* Adjustable output frequency from 38 to 60 hertz.

* All control circuit voltages are physically and electrically isolated from power circuit voltage.

* 150% instantaneous torque available for improved surge control.

* Output line-to-line and line-to-ground short circuit protection.

* Harmonic attenuation- integrated active rectification control of the building AC power assures low line-generated harmonics back to the user's power grid. The AFD has less than or equal to 5% current total demand distortion (TDD) as measured at the AFD. This is based on an electrical system with voltage distortion less than 1.5 %.

Chiller Unit Control Features for AFD

Chiller Unit Control Features for AFD

The chiller unit control panel capabilities provide for the control/configuration interface to, and the retrieval/display of, AFD-related data. AFD standard design features controlled through AdaptiView include:

* Current limited to 100%

* Motor overload protection.

* Motor overtemperature protection.

* Phase loss, reversal, imbalance protection.

* Overvoltage/undervoltage protection.

Digitally displayed on the AdaptiView panel: output speed in hertz, input frequency, output speed in rpm, input line voltage, output voltage, input line kw, output kw, input line amps per phase, average input line amps, output/motor amps average current in % RLA, load power factor, fault, AFD transistor temperature.

Environmental Ratings:

* 32F to 104 (0C to 40) operating ambient temperature

* Altitude to 3300 feet (1000m), amperage derate of 1% per every 300 feet above 3300 feet

* Humidity, 95% non-condensing

Required Installer Responsibilities

The following are considered functions normally required of the equipment installer./n

Install unit on a foundation with flat support surfaces level within 1/16" and of sufficient length to support concentrated loading. (Spring isolators should be considered whenever chiller installation is planned for an upper story location.)

Place isolation pads or optional spring type isolators provided by the chiller manufacturer under the unit. When spring isolators are chosen, no pads are provided.

Install unit per applicable Trane Installation Manual.

Complete all water and electrical connections.

Where specified, provide and install valves in water piping upstream and downstream of the evaporator and condenser water boxes as means of isolating shells for maintenance and to balance and trim system.

Furnish and install a flow switch or equivalent device in both the chilled water and condenser water piping properly interlocked to insure that unit can operate only when water flow is established.

Furnish and install taps for thermometers and pressure gauges in water piping adjacent to inlet and outlet connections of both evaporator and condenser.

Furnish and install drain valves to each water box.

Install vent cocks on each water box.

Furnish and install strainers upstream of chiller evaporator and condenser bundles to protect tubes from potential damage caused by debris in the circulating water. Note: Failure to install strainers in all water piping entering the chiller could result in tube plugging conditions that could damage unit components. If the circulating pumps are immediately upstream of the chiller bundles, then the strainer can be installed immediately ahead of the pumps. If the circulating pumps are downstream of the chiller bundles, then the strainers should be installed immediately ahead of the chiller bundles.

Furnish sufficient refrigerant 25.0 lb per machine and dry nitrogen 50.0 lb per machine for pressure testing under manufacturer's supervision.

Start-up unit under supervision of a qualified Trane field engineer.

Where specified, insulate evaporator and any other portions of machine required to prevent sweating under normal operating conditions.

Water connection piping must not transfer forces to the chiller. Because of cumulative tolerances in manufacture and field installation, prepiping of water connections closer than 36" is not recommended. Any problems associated with prepiping of water connections closer than 36" to the chiller are the responsibility of the installing contractor.

Furnish and install vent lines for rupture disk and purge venting to atmosphere per ASHRAE 15 and unit installation manual. If RuptureGuard-Relief Valve option is ordered, remove factory rupture disk and install RuptureGuard-Relief Valve per the IOM manual. In some chiller configurations the RuptureGuard may not bolt directly to the chiller flange. Locally sourced and approved piping may be required between the chiller and the RuptureGuard.

Field Disassembly

With chillers that may require field disassembly (for example due to clearance concerns during unit installation) reference the Disassembly and Reassembly manual and your Trane Sales representative prior to the order being placed. Caution: if certain components are removed in the field, for example the economizer, the necessary components (gaskets, seals, etc.) are not provided as standard.

Leak-Tight Warranty

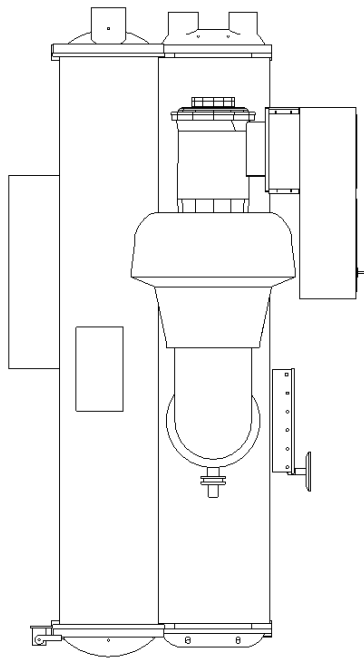
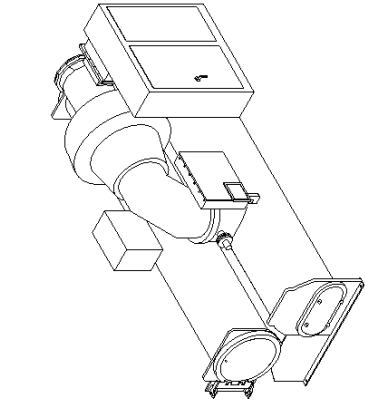
The CenTraVac chiller features a 5-year limited Leak-Tight Warranty which is valid for the lesser of 60 months from initial start-up or 66 months from date of shipment. The limited Leak-Tight Warranty covers models CVHE/F/L, CVHS,

CVHM and CDHF chillers installed in the United States or Canada. The Company's obligations and liabilities under this warranty are limited to furnishing replacement refrigerant; no other parts or labor are covered under this limited warranty. No liability whatever shall attach to the Company until appropriate actions have been taken (acceptable to Company) to eliminate the source of the leak, and then said liability shall be limited to furnishing the replacement refrigerant.

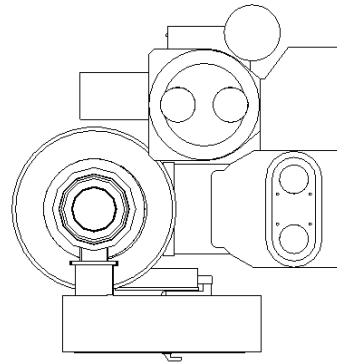
If the chiller is placed under a comprehensive Trane service and maintenance agreement (Trane Select Agreement or better) prior to the expiration of the standard Leak-Tight Warranty, the protection against refrigerant loss shall continue under the Trane Select Agreement for as long as an active Trane Select Agreement remains in effect without interruption.

If a 10-Year Parts, Labor and Refrigerant Warranty was purchased for the chiller and the chiller is placed under a Trane Select Agreement (or better) prior to the expiration of the 10-Year Parts, Labor and Refrigerant Warranty, the protection against refrigerant loss shall continue under the Trane Select Agreement for as long as an active Trane Select Agreement remains in effect without interruption.

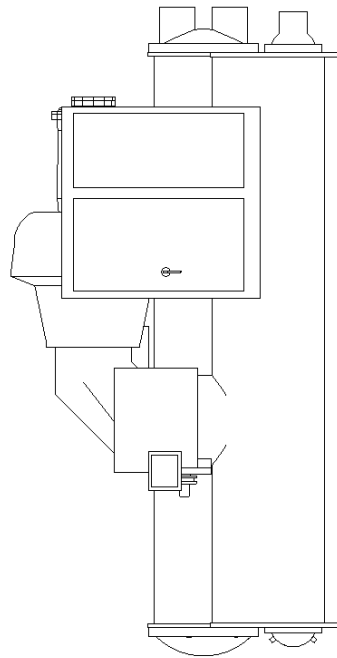
Dimensional Drawings - Centrifugal Water Chiller
Item: A1 Qty: 1 Tag(s): CVHF 10 year



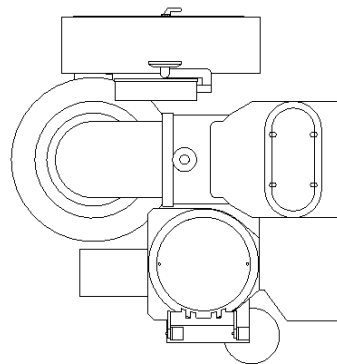
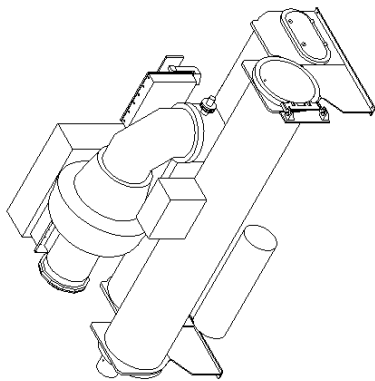
TOP VIEW



RIGHT SIDE VIEW



FRONT VIEW

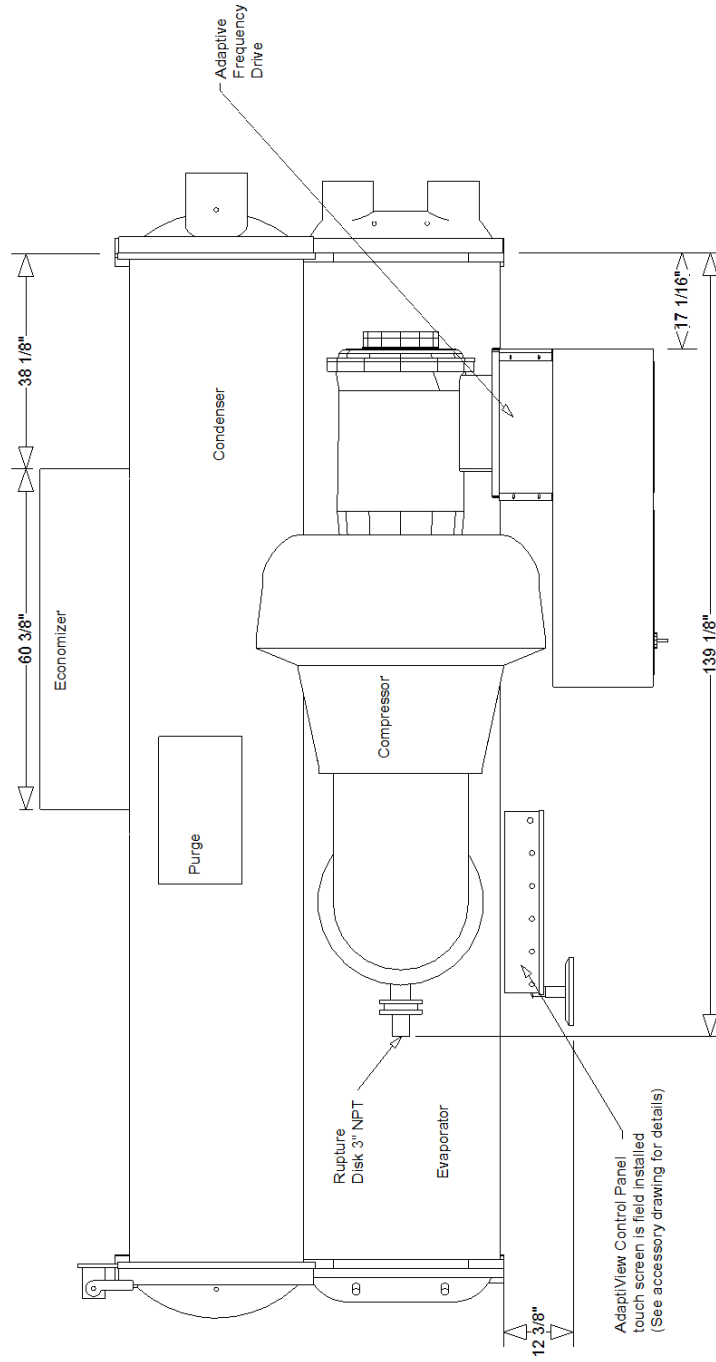


LEFT SIDE VIEW

SHELL TYPE	CONN DIA	CONN TYPE	FLOW DIRECTION
EVAPORATOR COOLING COND	8" 10"	VICTAULIC VICTAULIC	IN REAR OUT FRONT IN BOTTOM OUT TOP

CUSTOMER NOTES:
 GRAPHICS ON SUBMITTAL ARE SIMPLIFIED TO SHOW MAJOR ENVELOPE COMPONENTS.
 UNIT STRUCTURE AND SUBCOMPONENTS MAY BE REMOVED FOR CLARITY.
 UNLESS OTHERWISE SPECIFIED DIMENSIONAL TOLERANCE +/- .12".
 COOLING COND CONNS ARE STRAIGHT OUT THE END OF THE WATER BOX.
 WATER BOX DRAIN AND VENT LOCATIONS ARE SHOWN ON THE WATER BOX END PLATES.

Dimensional Drawings - Centrifugal Water Chiller
Item: A1 Qty: 1 Tag(s): CVHF 10 year



TOP VIEW

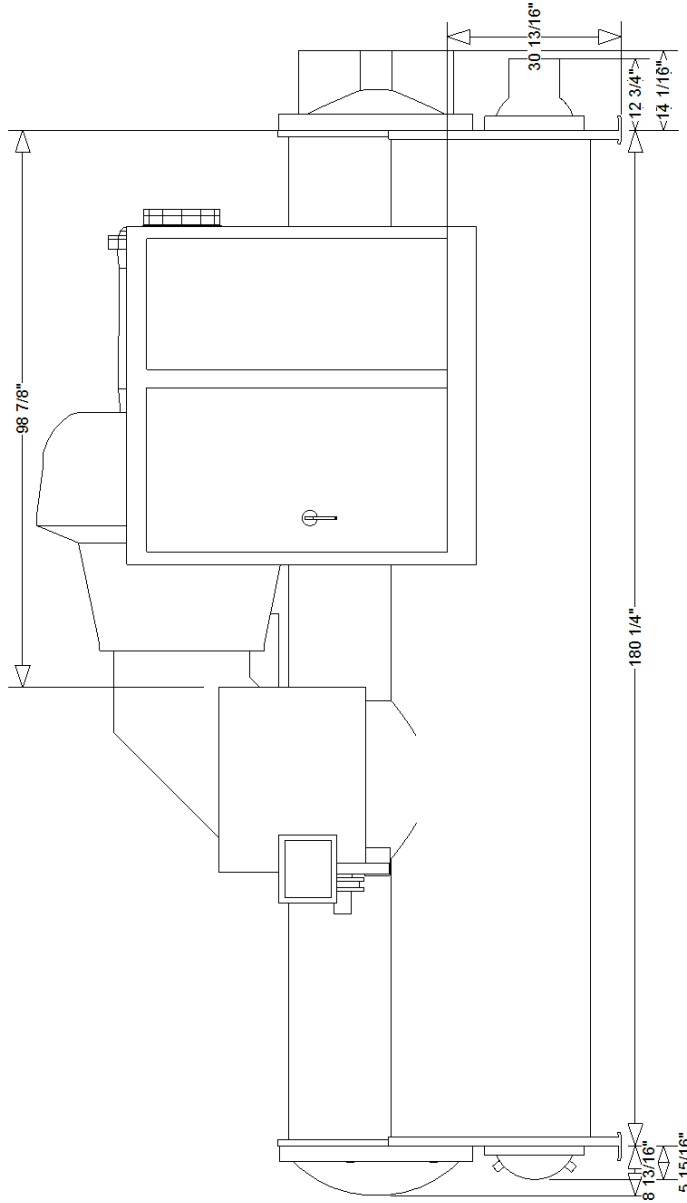
SHELL TYPE	CONN DIA	CONN TYPE	FLOW DIRECTION
EVAPORATOR COOLING COND	8" 10"	VICTAULIC VICTAULIC	IN REAR OUT FRONT IN BOTTOM OUT TOP

CVHF Compressor size: 485
 Evap shell size: 050L
 Cond shell size: 080L
 Without additional condenser

CUSTOMER NOTES:
 GRAPHICS ON SUBMITTAL ARE SIMPLIFIED TO SHOW MAJOR ENVELOPE COMPONENTS.
 UNIT STRUCTURE AND SUBCOMPONENTS MAY BE REMOVED FOR CLARITY.
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Dimensional Drawings - Centrifugal Water Chiller

Item: A1 Qty: 1 Tag(s): CVHF 10 year



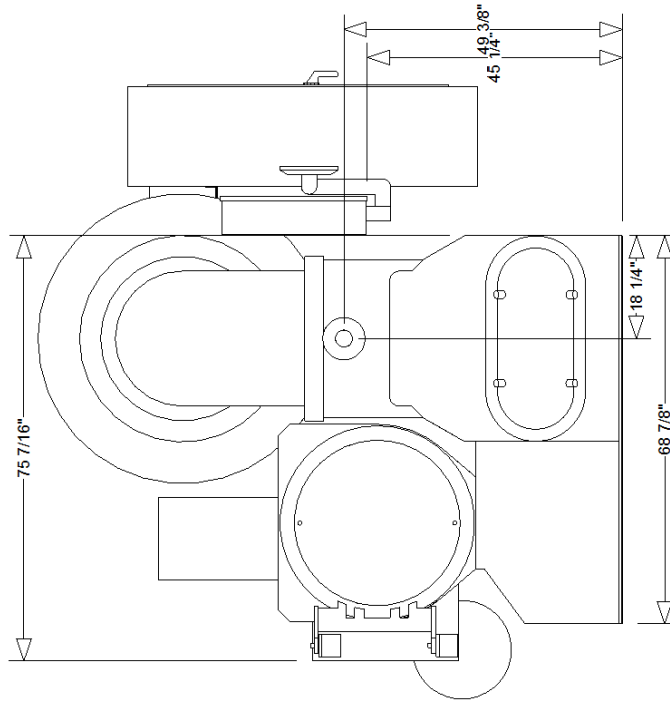
FRONT VIEW

SHELL TYPE	CONN DIA	CONN TYPE	FLOW DIRECTION
EVAPORATOR	8"	VICTAULIC	IN REAR OUT FRONT
COOLING COND	10"	VICTAULIC	IN BOTTOM OUT TOP

CVHF Compressor size: 485
 Evap shell size: 050L
 Cond shell size: 080L
 Without additional condenser

CUSTOMER NOTES:
 GRAPHICS ON SUBMITTAL ARE SIMPLIFIED TO SHOW MAJOR ENVELOPE COMPONENTS. UNIT STRUCTURE AND SUBCOMPONENTS MAY BE REMOVED FOR CLARITY.
 UNLESS OTHERWISE SPECIFIED DIMENSIONAL TOLERANCE +/-1/32".
 COOLING COND CONNS ARE STRAIGHT OUT THE END OF THE WATER BOX.
 WATER BOX DRAIN AND VENT LOCATIONS ARE SHOWN ON THE WATER BOX END PLATES.

Dimensional Drawings - Centrifugal Water Chiller
Item: A1 Qty: 1 Tag(s): CVHF 10 year



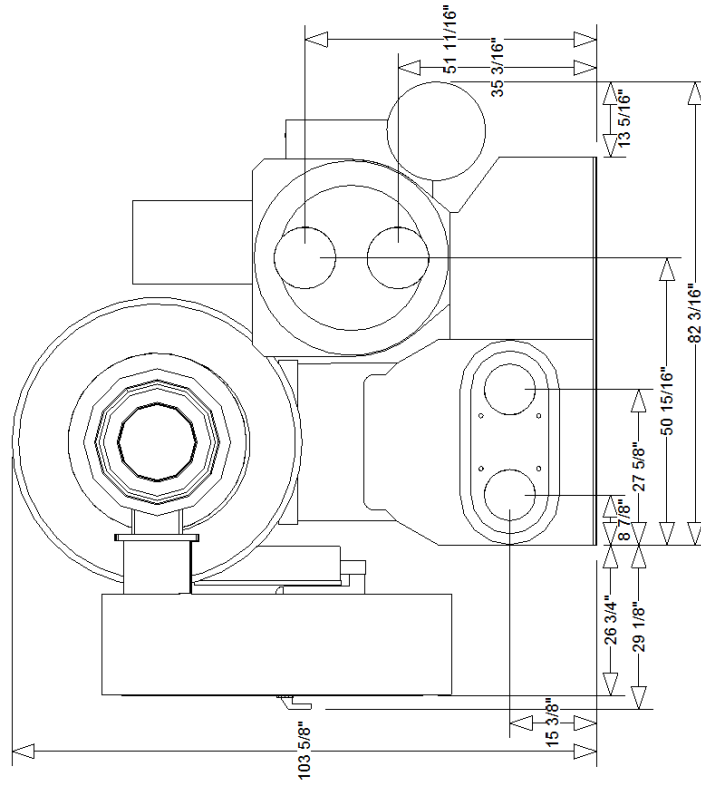
LEFT SIDE VIEW

SHELL TYPE	CONN DIA	CONN TYPE	FLOW DIRECTION
EVAPORATOR COOLING COND	8" 10"	VICTAULIC VICTAULIC	IN REAR OUT FRONT IN BOTTOM OUT TOP

CVHF Compressor size: 485
 Evap shell size: 050L
 Cond shell size: 080L
 Without additional condenser

CUSTOMER NOTES:
 GRAPHICS ON SUBMITTAL ARE SIMPLIFIED TO SHOW MAJOR ENVELOPE COMPONENTS.
 UNIT STRUCTURE AND SUBCOMPONENTS MAY BE REMOVED FOR CLARITY.
 UNLESS OTHERWISE SPECIFIED DIMENSIONAL TOLERANCE +/- .12"
 COOLING COND CONNS ARE STRAIGHT OUT THE END OF THE WATER BOX.
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Dimensional Drawings - Centrifugal Water Chiller
Item: A1 Qty: 1 Tag(s): CVHF 10 year



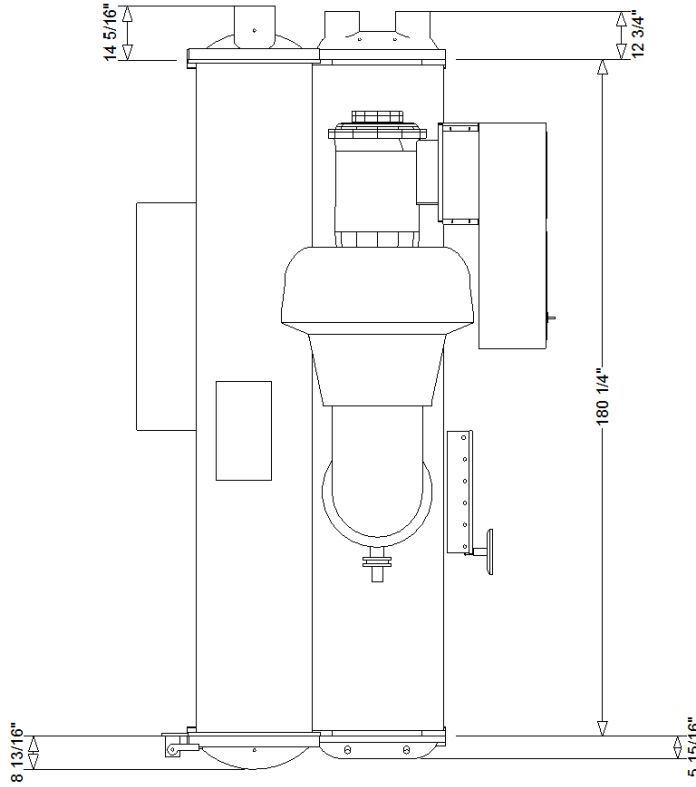
RIGHT SIDE VIEW

SHELL TYPE	CONN DIA	CONN TYPE	FLOW DIRECTION
EVAPORATOR COOLING COND	8" 10"	VICTAULIC VICTAULIC	IN REAR OUT FRONT IN BOTTOM OUT TOP

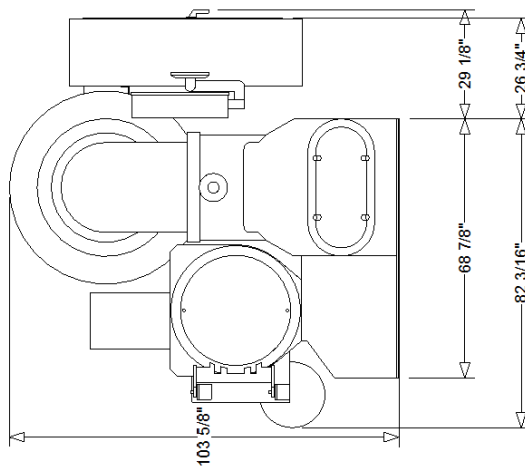
CVHF Compressor size: 485
 Evap shell size: 050L
 Cond shell size: 080L
 Without additional condenser

CUSTOMER NOTES:
 GRAPHICS ON SUBMITTAL ARE SIMPLIFIED TO SHOW MAJOR ENVELOPE COMPONENTS.
 UNIT STRUCTURE AND SUBCOMPONENTS MAY BE REMOVED FOR CLARITY.
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 WATER BOX DRAIN AND VENT LOCATIONS ARE SHOWN ON THE WATER BOX END PLATES.

Dimensional Drawings - Centrifugal Water Chiller
Item: A1 Qty: 1 Tag(s): CVHF 10 year



TOP VIEW



LEFT SIDE VIEW

SHIPPING WEIGHT **	20,342.0 lb
OPERATING WEIGHT	23,774.0 lb
COMPRESSOR SIZE	485
EVAPORATOR SIZE	050L
EVAPORATOR WATERPASS	2
EVAPORATOR WATERBOX ARRANGEMENT	RE RE
CONDENSER SIZE	080L
CONDENSER WATERPASS	2
CONDENSER WATERBOX ARRANGEMENT	RE RE

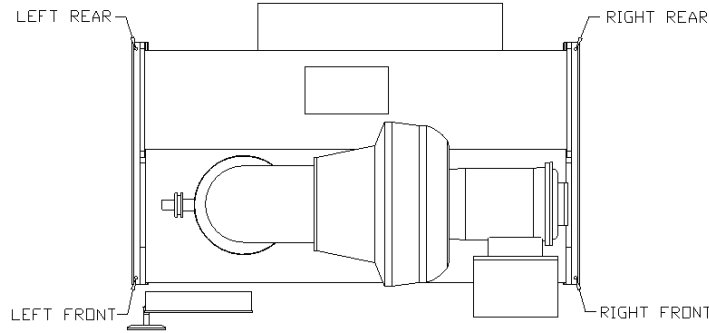
* ALL PUBLISHED WEIGHTS ACCURATE TO +/- 10 %

** SHIPPING WEIGHT INCLUDES REFRIGERANT. IF ORDERED WITHOUT, CONSULT PRODUCT SUPPORT FOR DRY SHIP WEIGHT.

Weight, Clearance & Rigging - Centrifugal Water Chiller

Item: A1 Qty: 1 Tag(s): CVHF 10 year

WEIGHTS AND CENTER OF GRAVITY



SPRING ISOLATOR SELECTION				
LOCATION	ISOLATOR LOAD*	VENDOR P/N	TRANE P/N	ISOLATOR COLOR
LEFT FRONT	7,075.0 lb			
LEFT REAR	2,789.0 lb			
RIGHT FRONT	9,504.0 lb			
RIGHT REAR	4,405.0 lb			
LEFT MIDDLE	N/A			
RIGHT MIDDLE	N/A			

COMPONENT	WEIGHT*
COMPRESSOR WEIGHT	4,628.0 lb
MOTOR WEIGHT	2,339.0 lb
STARTER WEIGHT	1,680.0 lb
SUCTION ELBOW WEIGHT	280.0 lb
ECONOMIZER WEIGHT	420.0 lb
EVAPORATOR WEIGHT	4,597.0 lb
EVAPORATOR WATERBOXES WEIGHT	630.0 lb
CONDENSER WEIGHT	4,364.0 lb
CONDENSER WATERBOXES WEIGHT	390.0 lb
HEAT RECOVERY CONDENSER WEIGHT	N/A
HEAT RECOVERY CONDENSER WATERBOXES WEIGHT	N/A
AUXILIARY CONDENSER WEIGHT	N/A
AUXILIARY CONDENSER WATERBOXES WEIGHT	N/A
MISCELLANEOUS WEIGHT	1,013.0 lb

UNIT CENTER OF GRAVITY	
CG Z (DIMENSION FROM RIGHT TO LEFT)	72.000 in
CG X (DIMENSION FROM FRONT TO REAR)	21.000 in
CG Y (HEIGHT DIMENSION FROM FLOOR)	49.000 in

RIGHT FRONT ISOLATOR MOUNTING HOLE
BOTTOM OF THIS HOLE IS 0,0,0 POINT
FOR CENTER OF GRAVITY DIMENSIONS

WEIGHTS	
SHIPPING	OPERATING
20,342.0 lb	23,774.0 lb

NAMEPLATE PRODUCT DESCRIPTION:

MODL	CVHF	VOLT	460	PTON	550.00 tons	NTON	485
EVTM	IMC1	CDTM	IECU	CPKW	365	CPIM	298
CDBS	800			EVSZ	050L	EVBS	860
				ORSZ	790	CDSZ	080L

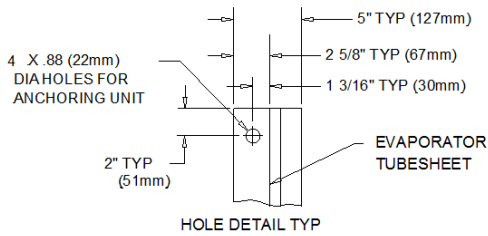
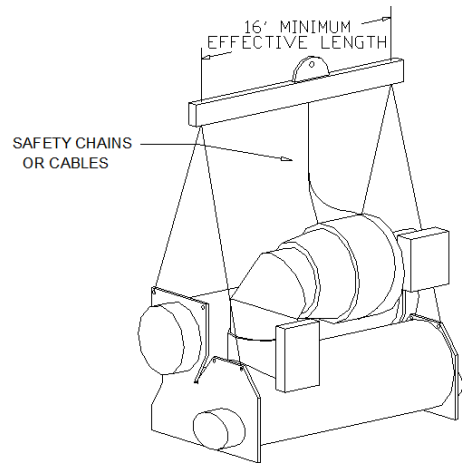
*ALL PUBLISHED WEIGHTS ACCURATE TO +/- 10 %

Weight, Clearance & Rigging - Centrifugal Water Chiller

Item: A1 Qty: 1 Tag(s): CVHF 10 year

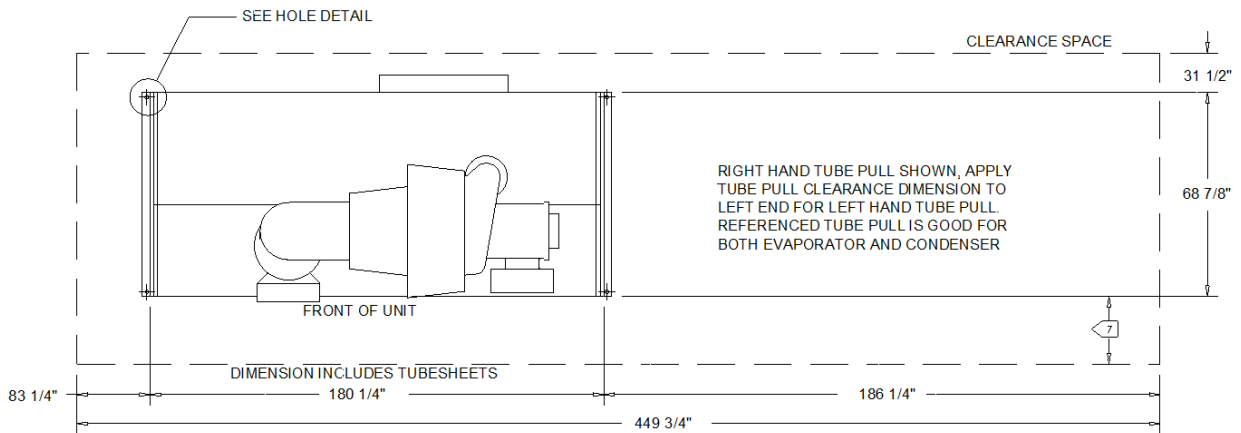
⚠ WARNING

1. HEAVY OBJECTS!
DO NOT USE CABLES (CHAINS OR SLINGS) EXCEPT AS SHOWN. EACH OF THE CABLES (CHAINS OR SLINGS) USED TO LIFT THE UNIT MUST BE CAPABLE OF SUPPORTING THE ENTIRE WEIGHT OF THE UNIT. LIFTING CABLES (CHAINS OR SLINGS) MAY NOT BE OF THE SAME LENGTH. ADJUST AS NECESSARY FOR EVEN UNIT LIFT. OTHER LIFTING ARRANGEMENTS MAY CAUSE EQUIPMENT OR PROPERTY-ONLY DAMAGE. FAILURE TO PROPERLY LIFT UNIT MAY RESULT IN DEATH OR SERIOUS INJURY. SEE DETAILS BELOW.
2. IMPROPER UNIT LIFT!
TEST LIFT UNIT APPROXIMATELY 24 INCHES TO VERIFY PROPER CENTER OF GRAVITY LIFT POINT. TO AVOID DROPPING OF UNIT, REPOSITION LIFTING POINT IF UNIT IS NOT LEVEL. FAILURE TO PROPERLY LIFT UNIT COULD RESULT IN DEATH OR SERIOUS INJURY OR POSSIBLE EQUIPMENT OR PROPERTY-ONLY DAMAGE.
3. ATTACH SAFETY CHAIN OR CABLE AS SHOWN WITHOUT TENSION, NOT AS A LIFTING CHAIN OR CABLE, BUT TO PREVENT THE UNIT FROM ROLLING.
4. DO NOT FORKLIFT THE UNIT TO MOVE OR LIFT.
5. LIFTING HOLES PROVIDED ON CHILLER TO ATTACH CABLES (CHAINS OR SLINGS).
6. 36" (900 MM) RECOMMENDED CLEARANCE ABOVE HIGHEST POINT OF COMPRESSOR.
7. FOLLOW NEC SECTION 110 AND OTHER APPLICABLE LOCAL CODES FOR CLEARANCES IN FRONT OF ELECTRICAL ENCLOSURES.
8. SPECIFIC SHIPPING AND OPERATING WEIGHTS OF THE SUBMITTED CHILLER ARE PROVIDED IF THE CENTRIFUGAL CHILLER SELECTION WAS ENTERED IN TOPSS. DETAILED LOAD POINT AND SPRING ISOLATOR APPLICATION WEIGHTS ARE AVAILABLE FROM "CENTRAVAC ISOLATOR SELECTION REPORT" AVAILABLE FROM THE REPORT GENERATOR OF THE TRANE TOPSS CHILLER SELECTION PROGRAM. CONTACT YOUR LOCAL TRANE SALES ENGINEER IF THIS DATA IS REQUIRED.



(SEE NOTE 8 ABOVE)

MAXIMUM SHIPPING	20,342.0 lb
MAXIMUM OPERATING	23,774.0 lb



Accessory - Centrifugal Water Chiller
Item: A1 Qty: 1 Tag(s): CVHF 10 year

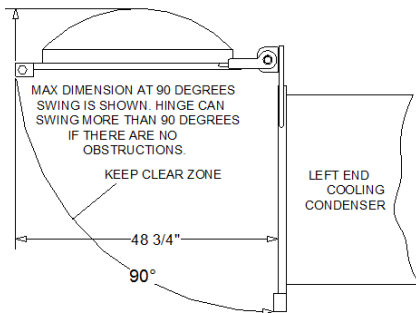
HINGE SWING DETAIL DRAWING

ALL VIEWS ON THIS PAGE ARE TOP VIEWS

DO NOT INSTALL PIPING OR ANY NON-REMOVABLE HARDWARE IN FRONT OF
HINGED WATERBOXES/COVERS OR ANY ATTACHED BRACKETS AND HINGES

LEFT END OF COOLING CONDENSER

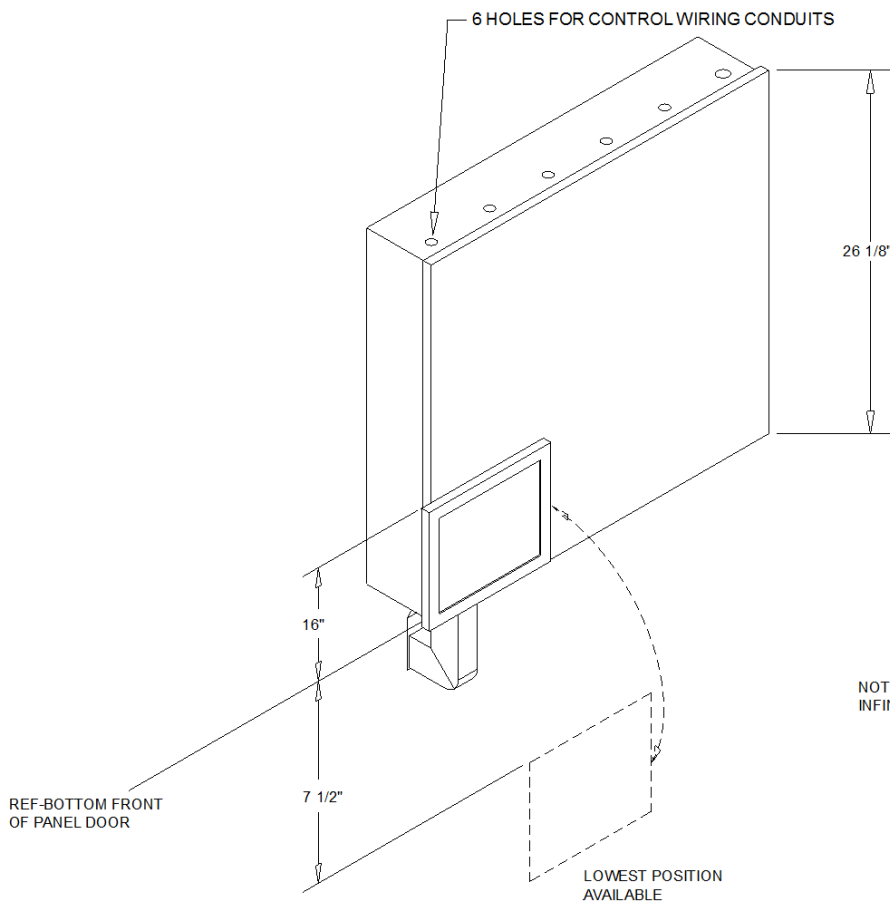
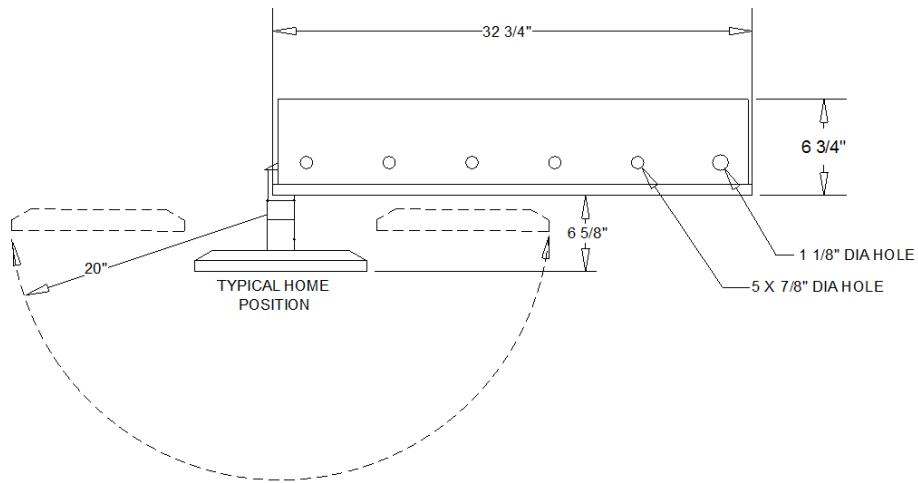
LEFT HAND 150 PSI RETURN BOX AND HINGE SWING



Accessory - Centrifugal Water Chiller
Item: A1 Qty: 1 Tag(s): CVHF 10 year

ADAPTIVIEW CONTROL PANEL

TOP VIEW



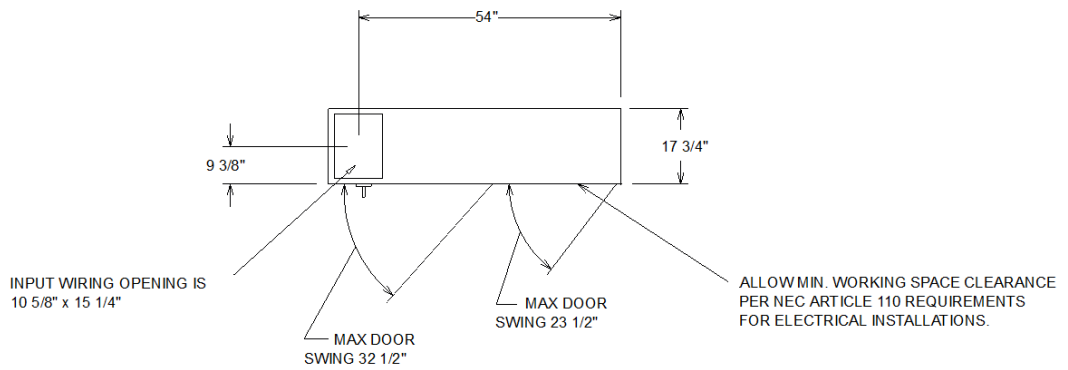
NOTE: DISPLAY CAN MOVE TO AN INFINITE NUMBER OF POSITIONS.

Accessory - Centrifugal Water Chiller
Item: A1 Qty: 1 Tag(s): CVHF 10 year

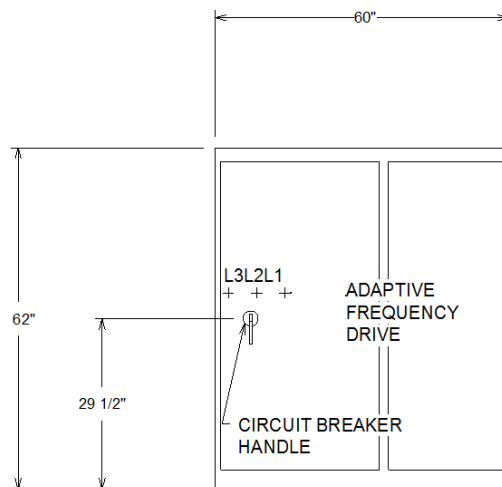
ADAPTIVE FREQUENCY DRIVE

MAX RLA	BREAKER AIC AMPS	SHORT CIRCUIT WITHSTAND RATINGS (RMS SYMETRICAL AMPS)	LINE CONNECTION LUGS ADAPTIVE FREQUENCY DRIVE	PANEL CONNECTION	INTERNAL WIRE LENGTH
608	65,000	65,000	(3) 2/0-400 MCM	CB	30

CB = CIRCUIT BREAKER



TOP VIEW



FRONT VIEW

Field Wiring - Centrifugal Water Chiller
Item: A1 Qty: 1 Tag(s): CVHF 10 year

<p>⚠ WARNING HAZARDOUS VOLTAGE! DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE. FAILURE TO DO THE ABOVE BEFORE SERVICING COULD RESULT IN DEATH OR SERIOUS INJURY.</p>	<p>⚠ AVERTISSEMENT TENSION DANGEREUSE! COUPER TOUTES LES TENSIONS ET OUVRIRE LES SECTIONNEURS A DISTANCE. PUIS SUIVRE LES PROCEDURES DE VERROUILLAGE ET DES ETIQUETES AVANT TOUTE INTERVENTION. VERIFIER QUE TOUTS LES CONDENSATEURS DES MOTEURS SONT DECHARGES. DANS LE CAS D'UNITES COMPORTANT DES ENTRAÎNEMENTS A VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DECHARGER LES CONDENSATEURS. NE PAS RESPECTER CES MESURES DE PRECAUTION PEUT ENTRAINER DES BLESSURES GRAVES POUVANT ETRE MORTELLES.</p>	<p>⚠ ADVERTENCIA ¡VOLTAJE PELIGROSO! DESCONECTE TODA LA ENERGIA ELECTRICA, INCLUIDO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEGURESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCHARGADO EL VOLTAJE ALMACEADO. PARA LAS UNIDADES CON EJE DE DIRECCION DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR. EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRA CAUSAR LA MUERTE O SERIAS LESIONES PERSONALES.</p>	<p>CAUTION USE COPPER CONDUCTORS ONLY! UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS. FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.</p>	<p>ATTENTION N'UTILISER QUE DES CONDUCTEURS EN CUIVRE! LES BORNES DE L'UNITE NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS. L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'EQUIPEMENT.</p>	<p>PRECAUCIÓN UTILICE ÚNICAMENTE CONDUCTORES DE COBRE! LAS TERMINALES DE LA UNIDAD NO ESTÁN BIEN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES. SI NO LO HACE, PUEDE CAUSAR DAÑO AL EQUIPO.</p>
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* CONNECTION DIAGRAMS ARE AVAILABLE AT THE WEBPAGE SHOWN IN THE MECHANICAL SPECIFICATIONS SECTION OF THIS SUBMITTAL.

NOTES:

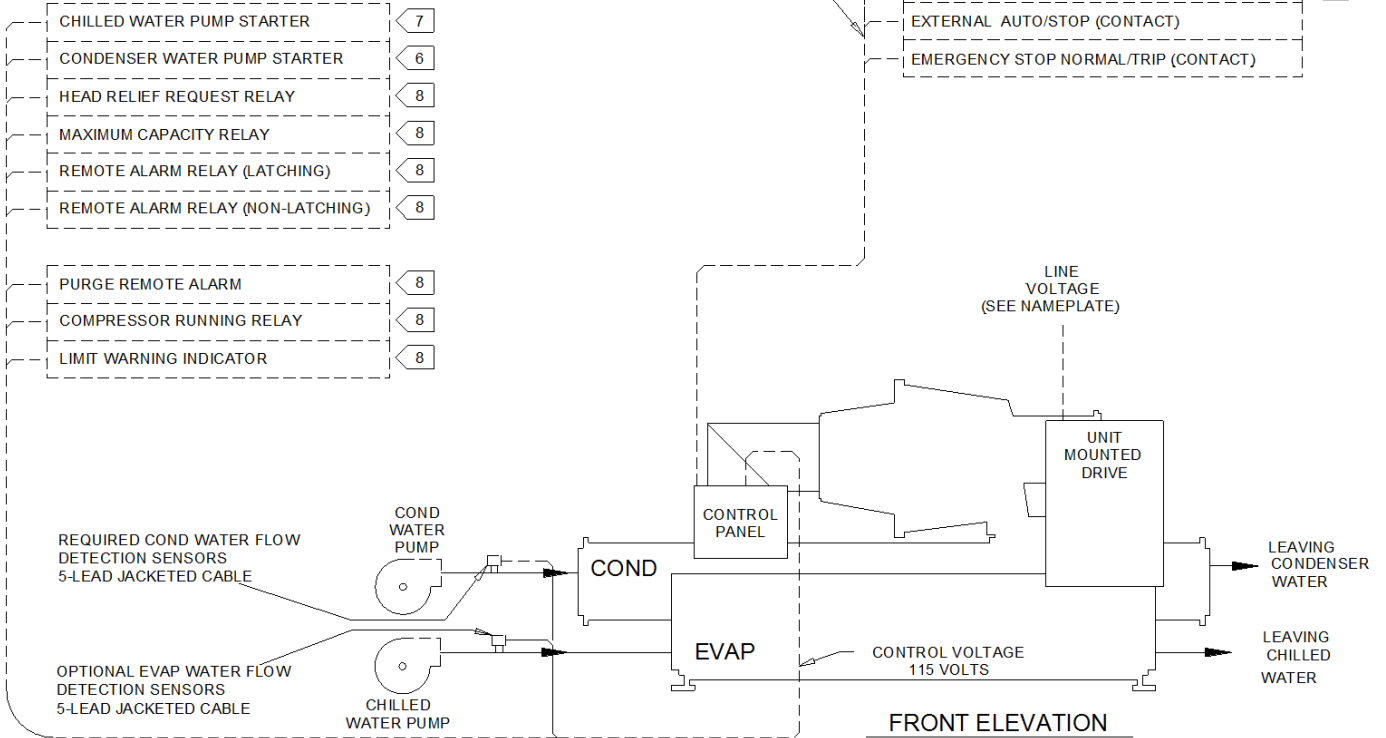
1. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS. CHECK SALES ORDER TO DETERMINE IF WIRING IS REQUIRED FOR SPECIFIC OPTIONS.
2. CAUTION - DO NOT ENERGIZE UNIT UNTIL CHECK-OUT AND START-UP PROCEDURES HAVE BEEN COMPLETED.

REQUIRED

3. ALL CUSTOMER CONTROL CIRCUIT WIRING MUST HAVE A MINIMUM RATING OF 150 VOLTS.
4. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC), STATE AND LOCAL REQUIREMENTS. OUTSIDE THE UNITED STATES, OTHER COUNTRIES APPLICABLE NATIONAL AND/OR LOCAL REQUIREMENTS SHALL APPLY.
5. EVAPORATOR AND CONDENSER FLOW SWITCHES ARE REQUIRED. THEY MUST BE INSTALLED AND WIRED TO THE TRANE PANEL BY THE INSTALLING CONTRACTOR. PURCHASE OF SWITCHES FROM TRANE IS OPTIONAL.
6. 2 WIRES, 115 VAC CIRCUIT, SEPARATE POWER SUPPLY IS REQUIRED. MINIMUM CONTACT RATING AT 115 VAC - 2.88 INDUCTIVE 1/3 H.P. (.25 kW) AT 115 VAC REQUIRED.
7. 2 WIRES, 115 VAC CIRCUIT, SEPARATE POWER SUPPLY IS REQUIRED. CONTACTS ARE N.O. CONTACT RATING - 2.88 INDUCTIVE 1/3 H.P. (.25 kW) AT 115 VAC OPTIONAL.
8. 2 OR 3 WIRES (N.O. &/OR N.C.), 115 VAC CIRCUIT, SEPARATE 115 VAC POWER SUPPLY IS REQUIRED. CONTACTS ARE NO/NC RATINGS - 2.88 INDUCTIVE 1/3 H.P. (.25 kW) AT 115 VAC.
9. 2-10V INPUT (2 WIRES)
10. 2-10V OUTPUT (2 WIRES)
12. SHIELDED PAIR, 30 VOLT OR LESS CIRCUIT. MAX LENGTH 1500 FT. BELDON TYPE 8760 RECOMMENDED. (2 WIRES)

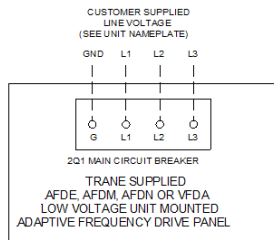
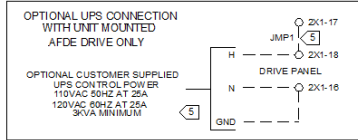
THE UNIT CONTROL PANEL (ADAPT/VIEW) SUPPLIES A CONTACT OUTPUT TO CONTROL THE CUSTOMER SUPPLIED DEVICES SHOWN BELOW. MAXIMUM FUSE SIZE PER DEVICE - 15 AMPS.

LOW VOLTAGE (30V MAX)
 DO NOT RUN WITH HIGHER VOLTAGE CIRCUITS



Field Wiring - Centrifugal Water Chiller

Item: A1 Qty: 1 Tag(s): CVHF 10 year



WARNING
HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE FAILURE TO DO THE ABOVE BEFORE SERVICING COULD RESULT IN DEATH OR SERIOUS INJURY.

AVERTISSEMENT
TENSION DANGEREUSE!
COUPER TOUTES LES TENSIONS ET OUVRIER LES SECTIONNEURS A DISTANCE, PUIS SUIVRE LES PROCEDURES DE VERROUILLAGE ET DES ETIQUETTES AVANT TOUTE INTERVENTION. VERIFIER QUE TOUTS LES CONDENSATEURS DES MOTEURS SONT DECHARGES. DANS LE CAS D'UNES COMPTANT DES ENTRAINEMENTS A VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAINEMENT POUR DECHARGER LES CONDENSATEURS. NE PAS RESPECTER CES MESURES DE PRECAUTION PEUT ENTRAINER DES BLESSURES GRAVES POUVANT ETRE MORTELLES.

ADVERTENCIA
¡VOLTAJE PELIGROSO!
DESCONECTE TODA LA ENERGIA ELÉCTRICA, INCLUIDO LAS DESCONECCIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEGURESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON EJE DE DIRECCION DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.
EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRIA CAUSAR LA MUERTE O SERIAS LESIONES PERSONALES.

CAUTION
USE COPPER CONDUCTORS ONLY!
UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.
FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

ATTENTION
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!
LES BORNES DE L'UNITE NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.
L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'EQUIPEMENT.

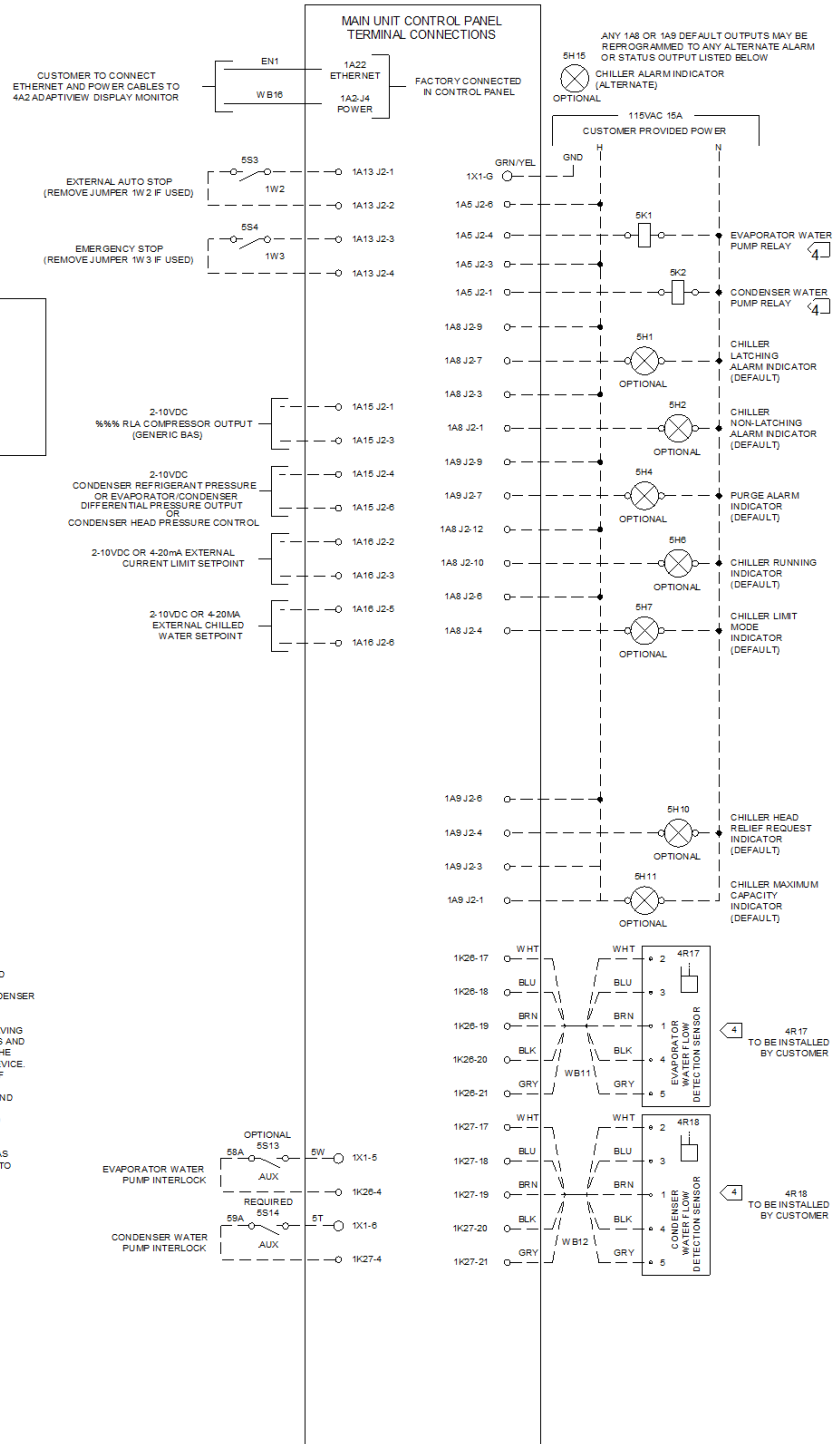
PRECAUCIÓN
UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!
LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.
SI NO LO HACE, PUEDE OCASIONAR DAÑO AL EQUIPO.

NOTES:

- DASHED LINES INDICATE FIELD WIRING BY OTHERS. WIRE NUMBERS SHOWN ARE RECOMMENDED BY TRANE. REFER TO THE AS-BUILT SCHEMATIC DIAGRAM TO DETERMINE WHICH OPTIONS ARE PRESENT ON THE UNIT.
- DO NOT ROUTE LOW VOLTAGE (30V) WITH CONTROL VOLTAGE (110-120V) AND DO NOT POWER UNIT UNTIL CHECK-OUT AND START-UP PROCEDURES HAVE BEEN COMPLETED.

1K20 EVAPORATOR AND 1K27 CONDENSER PRIMARY WATER FLOW DETECTION CONTROLLERS INSTALLED BY TRANE. CUSTOMER SUPPLIED SECONDARY EVAPORATOR AND CONDENSER WATER PROOF OF FLOW DEVICES ARE 5S13 AND 5S14. 5S13 IS RECOMMENDED BY TRANE WHEN LEAVING WATER TEMPERATURE IS 38° OR LESS AND METHOD USED IS INDEPENDENT OF THE PRIMARY WATER PROOF OF FLOW DEVICE. IF EITHER SECONDARY WATER PROOF OF FLOW DEVICES, REMOVE TRANE FACTORY WIRE SW BETW EEN 1X1-5 AND 1K26-4 AND INSTALL 5S13 AS SHOWN. AND/OR WIRE ST BETWEEN 1X1-6 AND 1K27-4 AND INSTALL 5S14 AS SHOWN. TRANE RECOMMENDS WIRING 5K1 EVAPORATOR AND 5K2 CONDENSER AS SHOWN TO ALLOW THE 1A5 MODULE TO CONTROL PROPER SEQUENCING.

5 CUSTOMER HAS THE OPTION OF PROVIDING SEPARATE 110VAC 50HZ OR 120VAC 60HZ UPS CONTROL POWER. WHEN UTILIZED, THE CUSTOMER MUST REMOVE JMP1 WIRE BEFORE THE UPS IS CONNECTED. THE CUSTOMER PROVIDED 110 OR 120VAC NEEDS TO BE GROUNDED ONLY AT 2X1-16.



WIRE NO OR DEVICE	FIELD WIRING CIRCUIT SELECTION INFORMATION
SUPPLY AND MOTOR LEADS	SEE NAMEPLATE: MINIMUM CIRCUIT AMPACITY
5S1, 5S2	CIRCUIT PROTECTED AT 20A, 115VAC 1PH, 10 AWG MAX WIRE SIZE
5S3 THRU 5S8	24VDC, 12MA RESISTIVE LOAD, 14 AWG MAX WIRE SIZE
ALL REMAINING LLD TERMINALS	CONTACT RATING: 2.88A INDUCTIVE, 1/3 HP, 0.25KW AT 115VAC, 14 AWG MAX WIRE SIZE.

* TAPPED CONTROL CONDUCTORS

DEVICE PREFIX CODE
1 = MAIN UNIT CONTROL PANEL DEVICE
2 = REMOTE MOUNTED DEVICE
4 = UNIT MOUNTED DEVICE
5 = CUSTOMER PROVIDED DEVICE

Tag Data - Extended SU (Qty: 1)

Item	Tag(s)	Qty
B1	No Tag	1

Product Data - Extended SU**Item: B1 Qty: 1 Tag(s): No Tag**

Field Installed Options - Part/Order Number Summary

This is a report to help you locate field installed options that arrive at the jobsite. This report provides part or order numbers for each field installed option, and references it to a specific product tag. It is NOT intended as a bill of material for the job.

Product Family - Centrifugal Water Chiller

Item	Tag(s)	Qty	Description	Model Number
A1	CVHF 10 year	1	550 Ton Centrifugal Chiller (CTV)	CVHF0485

Field Installed Option Description	Part/Ordering Number
Thermal dispersion flow switch (IFM) - Field Installed	
Thermal dispersion flow switch (IFM) - Field Installed	

- ▲ PCWP1-S
- ▲ PCWP2-S
- ▲ SmithLoopBTU/Energy Rate
- ▲ SmithLoopBTU/Energy Total
- ▲ SmithLoopBTU/Return Temperature
- ▲ **SmithLoopBTU/Supply Temperature**
- ▲ SmithLoopBTU/Volume Rate
- ▲ SmithLoopBTU/Volume Total
- ▲ McEniryLoopBTU/Energy Rate
- ▲ McEniryLoopBTU/Energy Total
- ▲ McEniryLoopBTU/Return Temperature
- ▲ **McEniryLoopBTU/Supply Temperature**
- ▲ McEniryLoopBTU/Volume Rate
- ▲ McEniryLoopBTU/Volume Total
- ▲ Dx9100DeviceCCHWRT
- ▲ Dx9100DeviceCTECDW_T
- ▲ Dx9100DeviceCTLCDW_T
- ▲ Dx9100DeviceSCHWDPSP
- ▲ Dx9100DeviceSCHWR_T
- ▲ Dx9100DeviceSCHWS_T
- ▲ Dx9100DeviceSSCHWRT
- ▲ Dx9100DeviceSSCHWST

- ▲ CarrierChiller1nvoEntCHWTemp
- ▲ CarrierChiller1nvoEntCNDWTemp
- ▲ CarrierChiller1nvoLvgCHWTemp
- ▲ CarrierChiller1nvoLvgCNDWTemp
- ▲ CarrierChiller2EvapPress
- ▲ CarrierChiller2OilPress
- ▲ CarrierChiller2nvoActiveSetpt
- ▲ CarrierChiller2nvoEntCHWTemp
- ▲ CarrierChiller2nvoEntCNDWTemp
- ▲ CarrierChiller2nvoLvgCHWTemp
- ▲ CarrierChiller2nvoLvgCNDWTemp
- ▲ Chiller1/CH LIQ FLOW SWITCH STAT
- ▲ Chiller1/CND FLOW SWITCH STAT
- ▲ Chiller1/COMPR MOTOR STATUS
- ▲ Chiller1/COND SATURATION TEMP
- ▲ Chiller1/CONDENSER PRESSURE
- ▲ Chiller1/DISCHARGE TEMP
- ▲ Chiller1/ENTERING CH LIQ TEMP
- ▲ Chiller1/ENTERING COND WATER TEMP
- ▲ Chiller1/EVAP REFRIGERANT TEMP
- ▲ Chiller1/EVAP SATURATION TEMP
- ▲ Chiller1/EVAPORATOR PRESSURE
- ▲ Chiller1/INPUT CURRENT PCT FLA
- ▲ Chiller1/LEAVING CH LIQ TEMP
- ▲ Chiller1/LEAVING COND WATER TEMP
- ▲ Chiller1/MOTOR CURRENT PCT FLA
- ▲ Chiller1/MOTOR HOUSING TEMP
- ▲ Chiller1/OPERATING HOURS
- ▲ Chiller1/Setpoint

- ▲ AvgTermLoad
- ▲ CHWS/CHW-DP
- ▲ CHWS/CHW-DP-1a
- ▲ CHWS/CHW-DP-2a
- ▲ CHWS/CHW-DP2
- ▲ CHWS/COMCHR-T
- ▲ CHWS/CT2L-C
- ▲ CHWS/CWR-T
- ▲ CHWS/CWS-T
- ▲ CHWS/OA-H
- ▲ CHWS/OA-T
- ▲ CHWS/SCHW-F
- ▲ CHWS/SCHW-F2
- ▲ CHWS/SCHWR-T
- ▲ CHWS/SCHWR-T2
- ▲ CHWS/SCHWS-T
- ▲ CHWS/SCHWS-T2
- ▲ CHWS/ZN-T
- ▲ CT1H-C
- ▲ CT1H-S
- ▲ CT1L-C
- ▲ CT1L-S
- ▲ CT2H-C
- ▲ CT2H-S
- ▲ CT2L-C
- ▲ CT2L-S
- ▲ **CTV-O**