



Emergency Central Plant Upgrades
ADDENDUM #3
1/15/2018

1. Please see the attached revised limits of work for the Chiller:
2. Please see the attached responses to the RFIs.



Submittal

Prepared For:
All Bidders

Date: January 04, 2018

Customer P.O. Number:
Customer Project Number:

Sold To: Owner

Job Number:
Job Name:
Tri City Medical Center Chiller Upgrade

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

Product Summary

Qty	Product
1	Centrifugal Water Chillers

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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 Chillers (Qty: 1)

Item	Tag(s)	Qty	Description	Model Number
A1	CH-3 RM-VFD	1	Centrifugal Chiller (CTV)	CVHF0760

Product Data - Centrifugal Water Chillers**Item: A1 Qty: 1 Tag(s): CH-3 RM-VFD**

Standard ship cycle CVHE, CVHF & CVHG with customer witness test
 OSHPD
 Centrifugal liquid chiller with 2 stage compressor
 Compressor size: 760 nominal tons
 Adaptiview controls
 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: 513 kW
 Motor frame size: 440E
 Compressor impeller cutback: 281
 Evaporator shell size: 080 long
 Evaporator bundle size: 740 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
 Without variable evap flow test targets
 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: Flanged
 Evaporator waterbox arrangement: in LH end - out LH end
 Thermal dispersion flow switch (IFM) - Field Installed (Fld)
 Condenser shell size: 142 long
 Condenser bundle size: 1080 nominal tons
 Condenser tube: 1.00 inch (25.4 mm) internally enhanced copper
 Condenser tube wall: .025 inch (0.6 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: Flanged
 Condenser waterbox arrangement: in LH end - out LH end
 Standard tube sheet construction
 Belzona coating on the water box and end tube sheets
 Zinc anodes
 Thermal dispersion flow switch (IFM) - Field Installed (Fld)
 Orifice size: 1185 nominal tons
 Factory Customer Witness
 Agency listing: U.L. listed unit (United States requirement)
 Factory tolerance test: Standard air run and vibration test
 Factory testable - yes
 Unit option: Insulation package
 Compressor doweling
 Green Seal certified
 Complies with ASHRAE 90.1 - 1999
 Complies with ASHRAE 90.1 - 2007
 Complies with ASHRAE 90.1 - 2007 Addendum M
 Complies with ASHRAE 90.1 - 2010
 ASHRAE 90.1-2013

Complies with ASHRAE 90.1-2013
Operating Status
Generic BAS
BACnet
Without enhanced protection
With RuptureGuard-relief valve-field install (Fld)
R123 Refrigerant
Trane Supplied Refrigerant
Remote mounted low voltage AFD
Remote mounted adaptive frequency drive
Adaptive frequency drive maximum RLA - 678 amps
Starter power connection: Circuit breaker
Standard enclosure - Nema 1
10 Year Parts - Whole Unit with LV AFD
1st Year Labor Warranty Whole Unit with Trane Supplied Starter

Trane to provide:

- **Handling of refrigerant and charging chiller**
- **Startup (mechanical)**
- **Removal & Reinstallation of Compressor/Motor and Economizer to clear doorway & Chilled/Condenser water supply pipes**
- **BACnet interface**

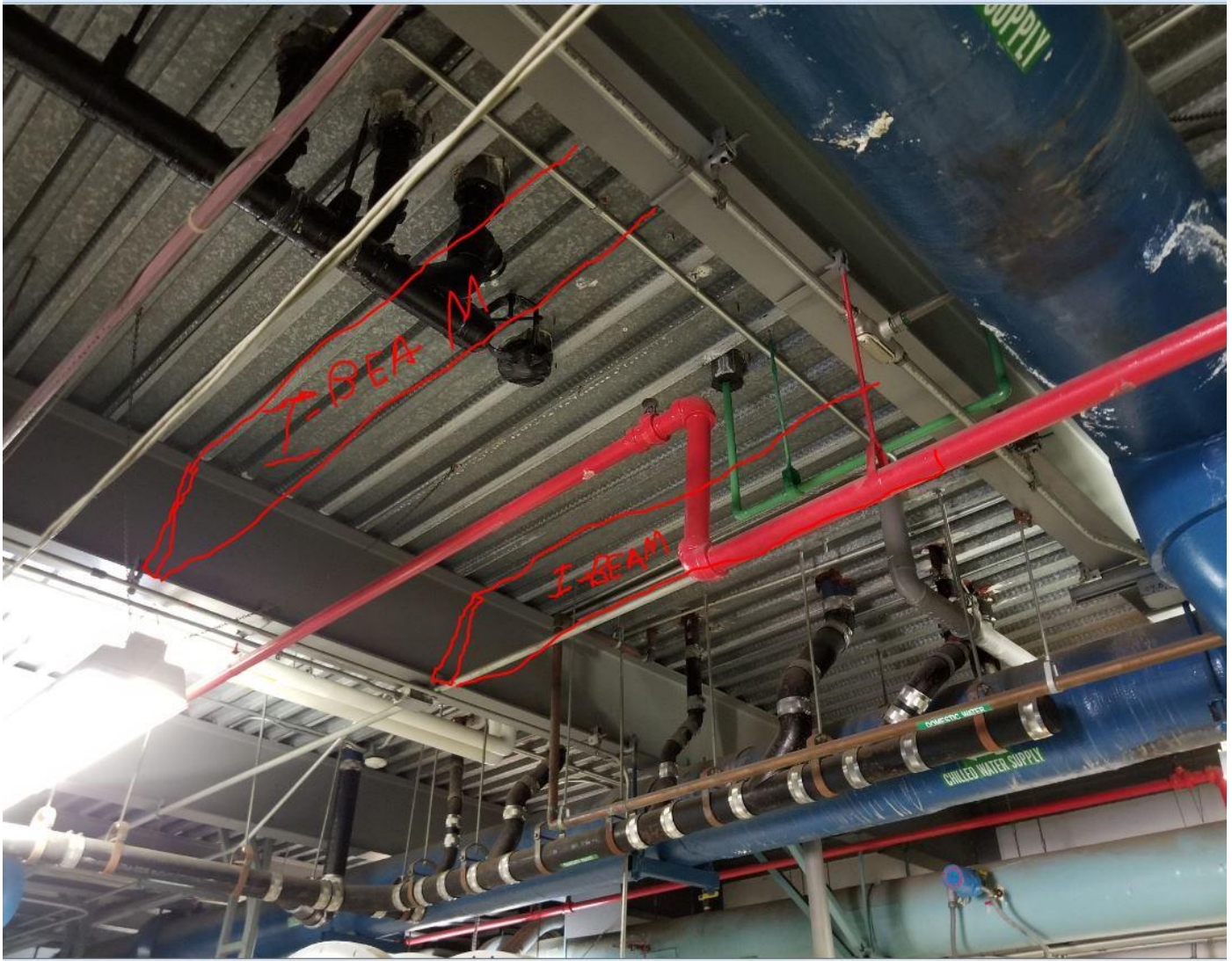
Contractor to provide:

- **NOTE: Furnish & Weld (2) I-Beams above chiller for anchor point to secure rigging straps/chains for lifting compressor/motor back onto chiller. Pics of example I-Beam location below. I Beams to be certified for lifting 10,000 lbs. SEE NEXT 2 PAGES**
- **Receiving chiller, delivering to jobsite, removing from trailer and moving chiller through plant to final location**
- **Controls commissioning**
- **Hydronic & electrical install and interconnection**
- **Installation of remote mounted drive, including all wiring, conduit, communication wire**
- **Commissioning**

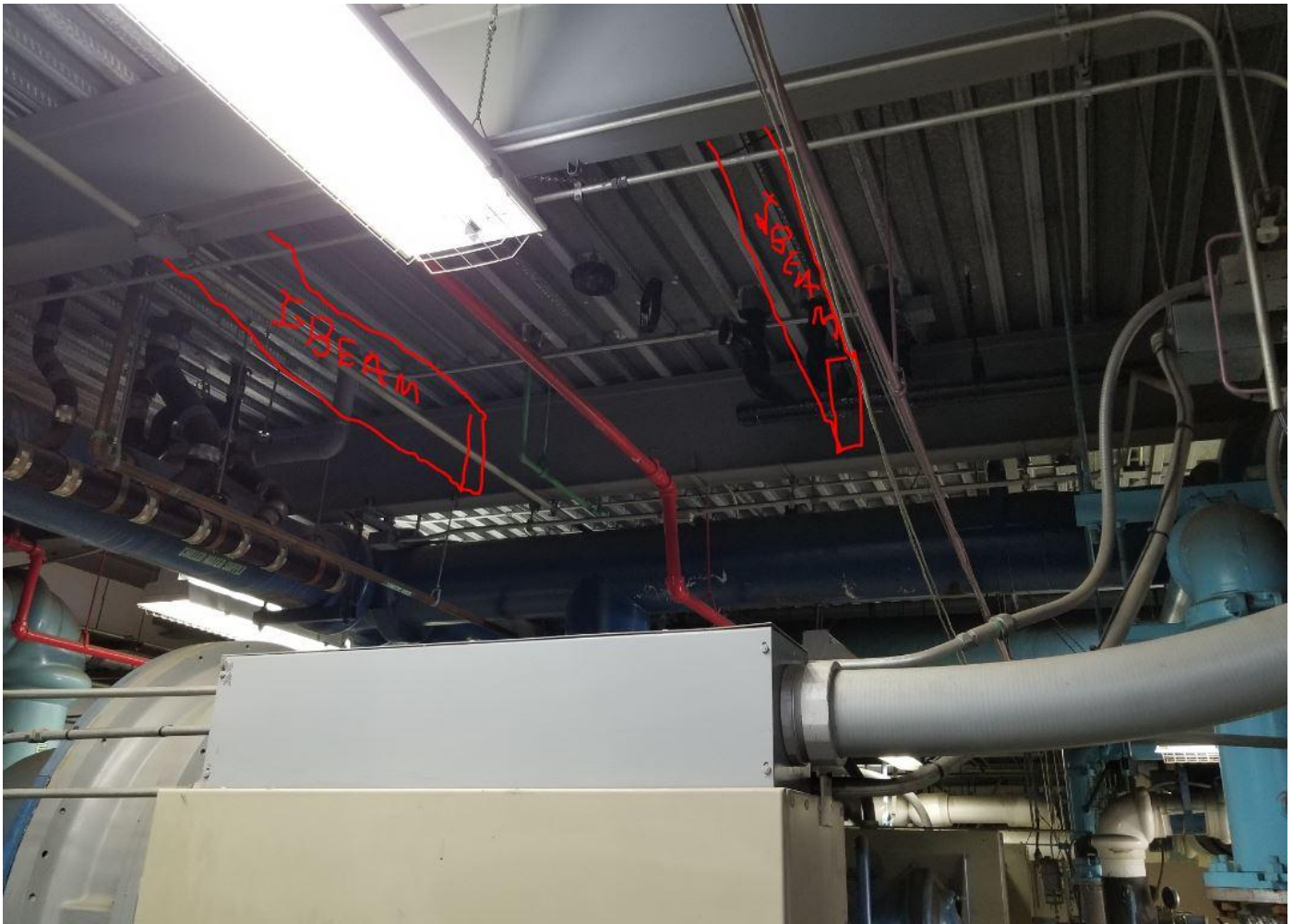
Optional ADD for Contractor:

- **Trane to receive chiller from factory, deliver chiller to jobsite, and remove from trailer. Trane to move chiller from outside plant to interior of central plant at final location. (in addition to removal and reinstall of compressor/motor & economizer.**

I-Beams needed above chiller; contractor provided and installed. Photo 1



I-Beams needed above chiller; contractor provided and installed. Photo 2



Mechanical Specifications - Centrifugal Water Chillers**Item: A1 Qty: 1 Tag(s): CH-3 RM-VFD****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.

Flanged evaporator connections are achieved by adding the Trane supplied field installed flange adapters to the standard Victaulic connections.

Flanged condenser connections are achieved by adding the Trane supplied field installed flange adapters to the standard Victaulic connections.

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

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, a 1/20 hp (.037 kW) 115V/60/1, 110V/50/1 pump-out compressor, a carbon tank, and a heater. 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 is rated in accordance with AHRI Standard 580.

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 - load
- *% RLA per phase - load
- *volts per phase- input
- *frequency command

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.

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 free cooling option, the condenser is not factory insulated.

RuptureGuard-Relief Valve-Field Install

RuptureGuard is a Trane supplied field installed refrigerant containment system that replaces a chiller's rupture disk. The system consists of a non-fragmenting rupture disk and a pressure relief valve that can be applied to all low pressure centrifugal chillers. This system functions as the chiller's primary pressure relieving device and provides a leak free seal between the chiller and atmosphere. The pressure relief valve is installed in place of the factory shipped rupture disk (which must be removed) and functions as an interim primary pressure relieving device and seal. When the chiller's internal pressure exceeds 15 psig [104 kPa], the non-fragmenting rupture disk bursts allowing the pressure to be relieved through the relief valve. After the chiller's pressure is reduced, the pressure relief valve recloses stopping the flow of refrigerant to the atmosphere. A pressure switch is included with the RuptureGuard package as standard. This switch has single pole, double throw contacts for interface to external monitoring systems. The switch has a trip setting of 11 psig, reset values of 8 psig, and is rated for 5A at 220 volts. Reference specific Rupture guard Installation manual

(CTV-SVX06*-EN) notes shipped with your rupture guard /contact local Trane sales office.

TRANE Remote Mounted (free standing) Air Cooled Adaptive Frequency Drive (AFD)

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

The AFD is remote (free standing) and ships completely assembled, wired and tested to the job site. 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.

Remote (Free Standing) AFD Design Features

* NEMA 1 ventilated enclosure with a hinged doors, is tested to a minimum short circuit rating (SCR) of 65,000 amps. The AFD includes a padlockable door-mounted circuit breaker with a minimum AIC rating of 65,000 amps. The entire package is UL/CUL listed. Other AFD features include:

- * Simple modular construction.
- * Design access from the front
- * The drive is rated for nominal chiller voltage +/-10%.
- * Displacement power factor - minimum of .96 at all loads.
- * Minimum efficiency of 97% at rated load and 60 hertz.
- * Soft-start; linear acceleration; coast to stop.
- * Adjustable 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 currents are minimized through the use of a standard DC Link reactor. The reactor will limit the total demand distortion to approximately 35%

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.

AdaptiView displays the input voltage, output or load current and the frequency command. On the AFD enclosure, there is a display that can be utilized by operators as needed and it includes a full comprehensive list of AFD parameters.

Designed for top entry line power and bottom exit load cables. The load cable connections are "bolted" type. The customer is responsible for the terminal lugs. The AFD should be located within 100 feet of the chiller (cable length not to exceed 100 feet) to insure proper operation. If the AFD is located further than 100 feet from the chiller, a field supplied filter should be installed between the chiller and AFD.

Environmental Ratings:

- * 14F to 104 (-10C to 40) operating ambient temperature
- * Altitude to 1000m, amperage derate of 4% per every 1000 meters above 1000 meters up to 3000 meters
- * Humidity, 95% non-condensing

Note to Installers: See the AFD installation, operation, and maintenance manual (AFDG-SVU01A-EN) for more detailed information on AFD installation requirements.

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 with timer 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.

Compressor Doweling

With chillers that have been ordered with Compressor Doweling, this option includes dowel pins located between the interstage casings to help facilitate disassembly and reassembly of the compressor itself. Dowel pins at the compressor connections to the evaporator and condenser shells are standard with or without this option. These dowel pins help to facilitate reassembly of the compressor onto the unit. The components (gaskets, seals, etc.) needed to reassemble the compressor onto the shells are included with this option.

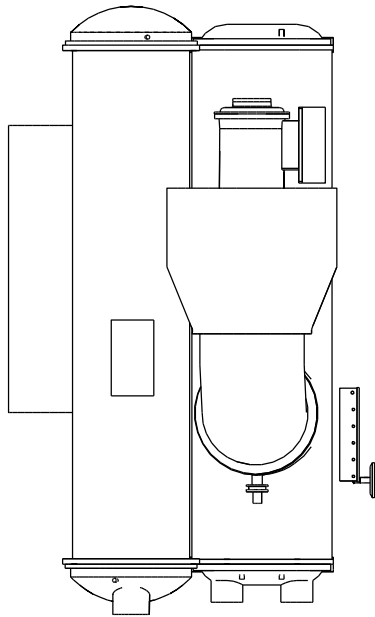
Leak-Tight Warranty

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

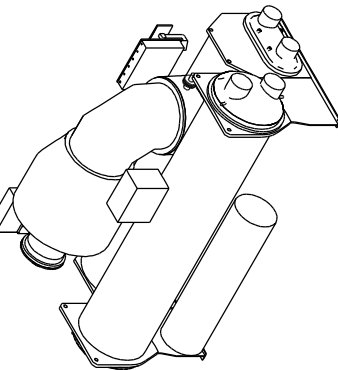
warranty are limited to furnishing replacement refrigerant; no other parts or labor are covered under this limited warranty. No liability whatever shall attach to the Company until appropriate actions have been taken (acceptable to Company) to eliminate the source of the leak, and then said liability 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.

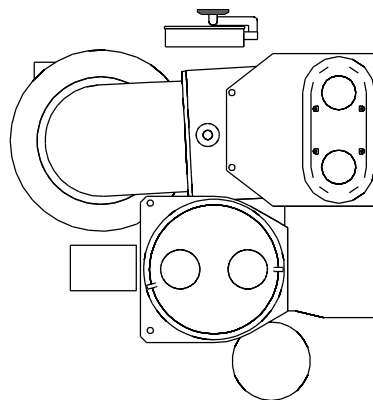
If a 10-Year Parts, Labor and Refrigerant Warranty was purchased for the chiller and the chiller is placed under a Trane Select Agreement (or better) prior to the expiration of the 10-Year Parts, Labor and Refrigerant Warranty, the protection against refrigerant loss shall continue under the Trane Select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



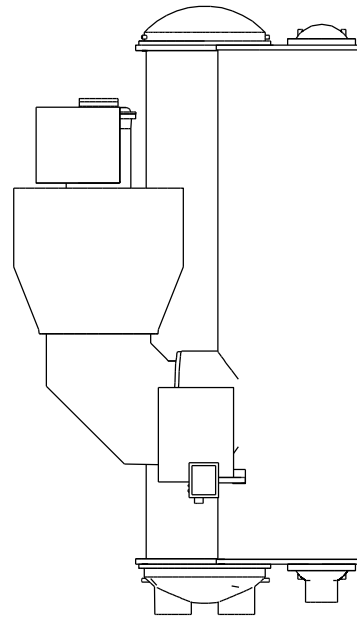
TOP VIEW



LEFT SIDE VIEW



RIGHT SIDE VIEW



FRONT VIEW

CUSTOMER NOTES:

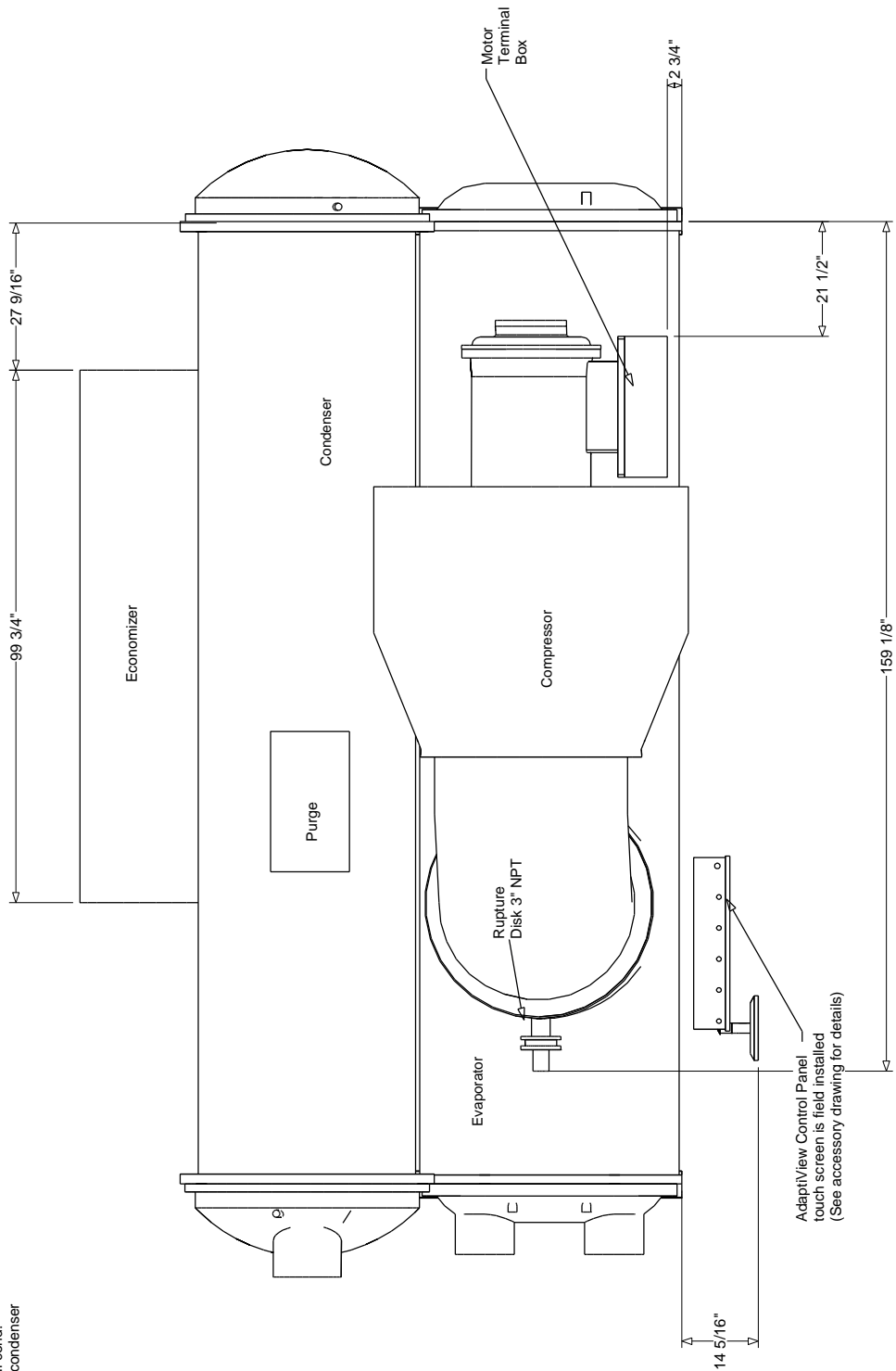
GRAPHICS ON SUBMITTAL ARE SIMPLIFIED TO SHOW MAJOR ENVELOPE COMPONENTS.
 UNIT STRUCTURE AND SUBCOMPONENTS MAY BE REMOVED FOR CLARITY.

UNLESS OTHERWISE SPECIFIED DIMENSIONAL TOLERANCE $\pm 1/2"$.
 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.
 WATER CONNECTION GROOVES ARE NOT COMPATIBLE WITH AGS FITTINGS

SHELL TYPE	CONN DIA	CONN TYPE	FLOW DIRECTION
EVAPORATOR	10"	FLANGE ADAPTER	IN REAR OUT FRONT
COOLING COND	12"	FLANGE ADAPTER	IN BOTTOM OUT TOP

Unit Dimensions - Centrifugal Water Chillers
Item: A1 Qty: 1 Tag(s): CH-3 RM-VFD

CV/HF 760 Nominal tons
800 Ton long shell evap.
1420 Ton long shell cond.
Without additional condenser



TOP VIEW

CUSTOMER NOTES:

GRAPHICS ON SUBMITTAL ARE SIMPLIFIED TO SHOW MAJOR ENVELOPE COMPONENTS. UNIT STRUCTURE AND SUBCOMPONENTS MAY BE REMOVED FOR CLARITY.

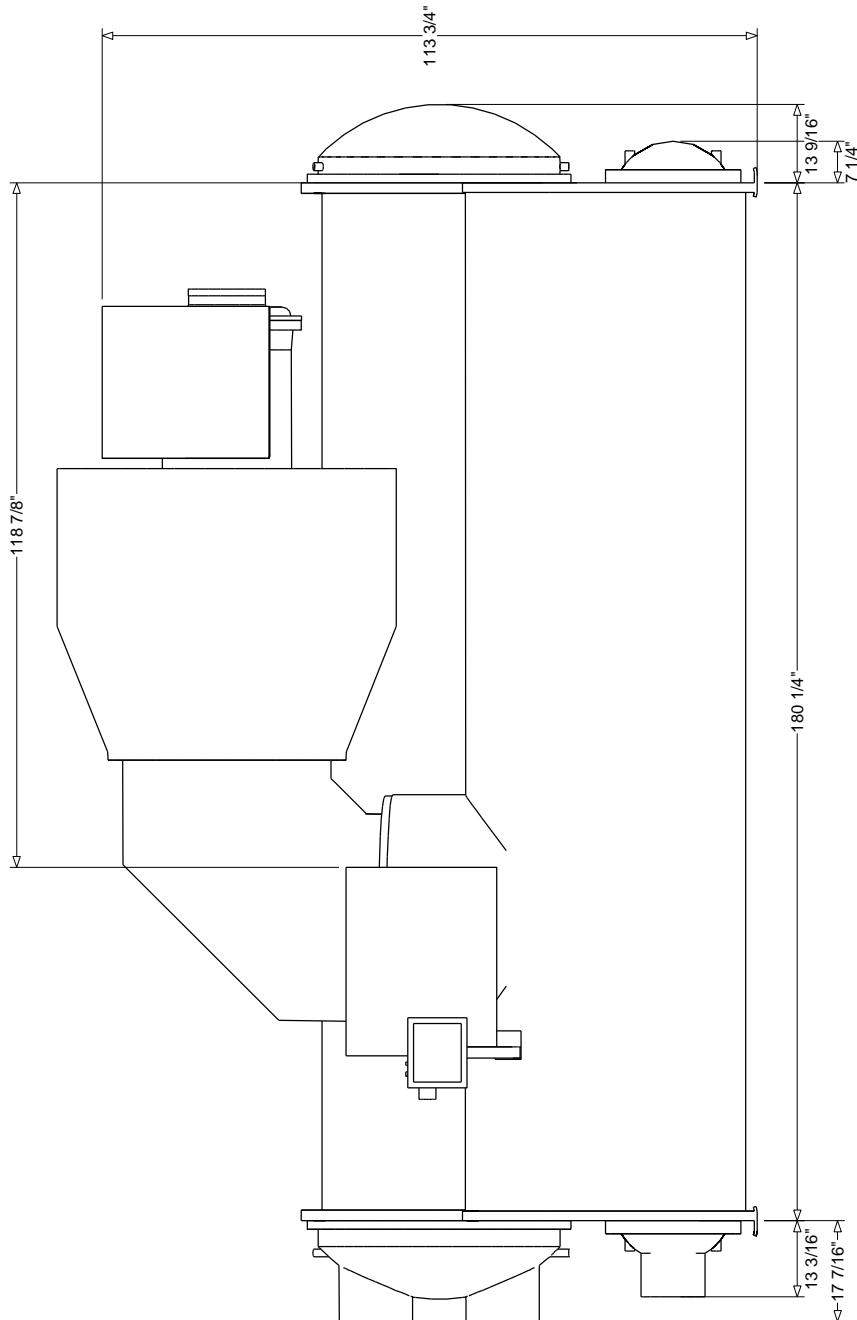
UNLESS OTHERWISE SPECIFIED DIMENSIONAL TOLERANCE $\pm 1/2"$.
COOLING COND CONNS ARE STRAIGHT OUT THE END OF THE WATER BOX.
WATER BOX DRAIN AND VENT LOCATIONS ARE SHOWN ON THE WATER BOX END PLATES.
WATER CONNECTION GROOVES ARE NOT COMPATIBLE WITH AGS FITTINGS

SHELL TYPE	CONN DIA	CONN TYPE	FLOW DIRECTION
EVAPORATOR	10"	FLANGE ADAPTER	IN REAR OUT FRONT
COOLING COND	12"	FLANGE ADAPTER	IN BOTTOM OUT TOP

Unit Dimensions - Centrifugal Water Chillers

Item: A1 Qty: 1 Tag(s): CH-3 RM-VFD

CVHF 760 Nominal tons
800 Ton long shell evap.
1420 Ton long shell cond.
Without additional condenser



FRONT VIEW

CUSTOMER NOTES:

GRAPHICS ON SUBMITTAL ARE SIMPLIFIED TO SHOW MAJOR ENVELOPE COMPONENTS.
UNIT STRUCTURE AND SUBCOMPONENTS MAY BE REMOVED FOR CLARITY.

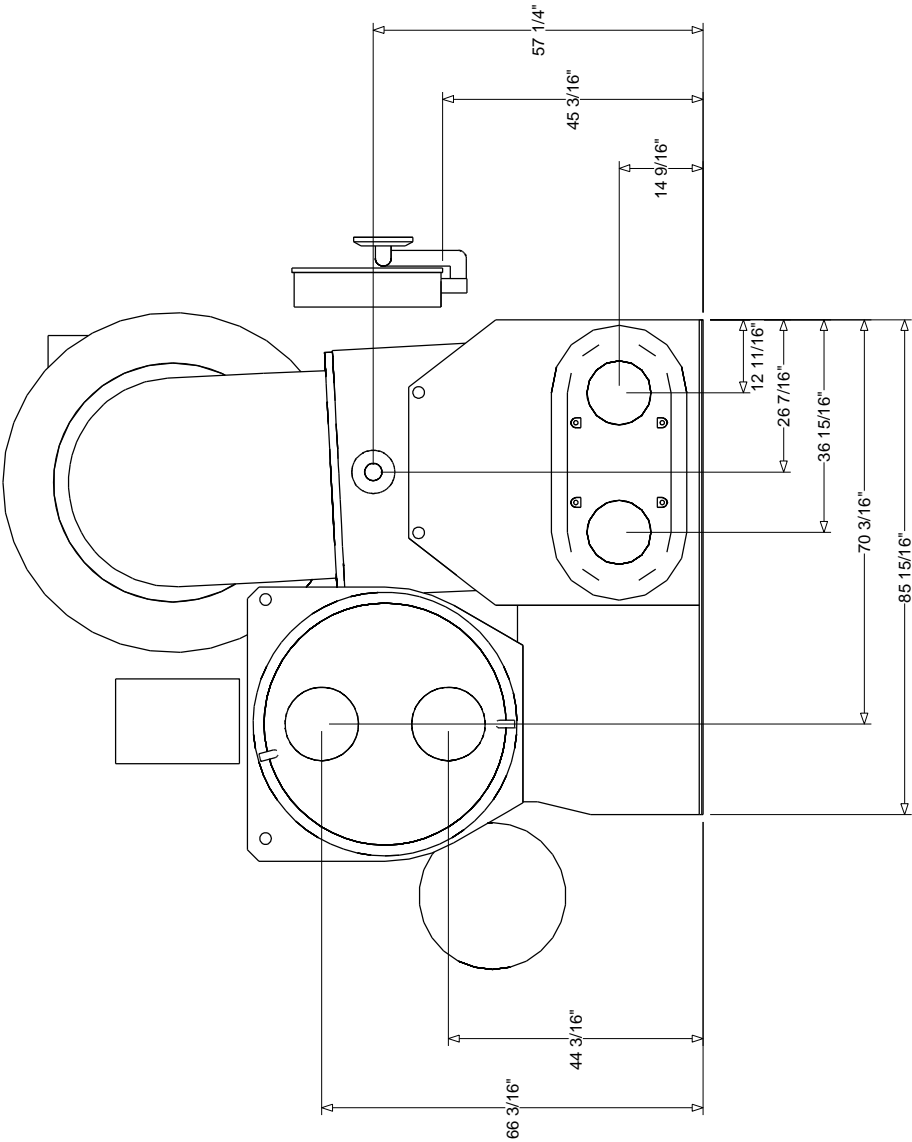
UNLESS OTHERWISE SPECIFIED DIMENSIONAL TOLERANCE $\pm 1/16"$.
COOLING COND CONNS ARE STRAIGHT OUT THE END OF THE WATER BOX.
WATER BOX DRAIN AND VENT LOCATIONS ARE SHOWN ON THE WATER BOX END PLATES.
WATER CONNECTION GROOVES ARE NOT COMPATIBLE WITH AGS FITTINGS

SHELL TYPE	CONN DIA	CONN TYPE	FLOW DIRECTION
EVAPORATOR	10"	FLANGE ADAPTER	IN REAR OUT FRONT
COOLING COND	12"	FLANGE ADAPTER	IN BOTTOM OUT TOP

Unit Dimensions - Centrifugal Water Chillers

Item: A1 Qty: 1 Tag(s): CH-3 RM-VFD

CV/HF 760 Nominal tons
800 Ton long shell evap.
1420 Ton long shell cond.
Without additional condenser



LEFT SIDE VIEW

CUSTOMER NOTES:
GRAPHICS ON SUBMITTAL ARE SIMPLIFIED TO SHOW MAJOR ENVELOPE COMPONENTS.
UNIT STRUCTURE AND SUBCOMPONENTS MAY BE REMOVED FOR CLARITY.

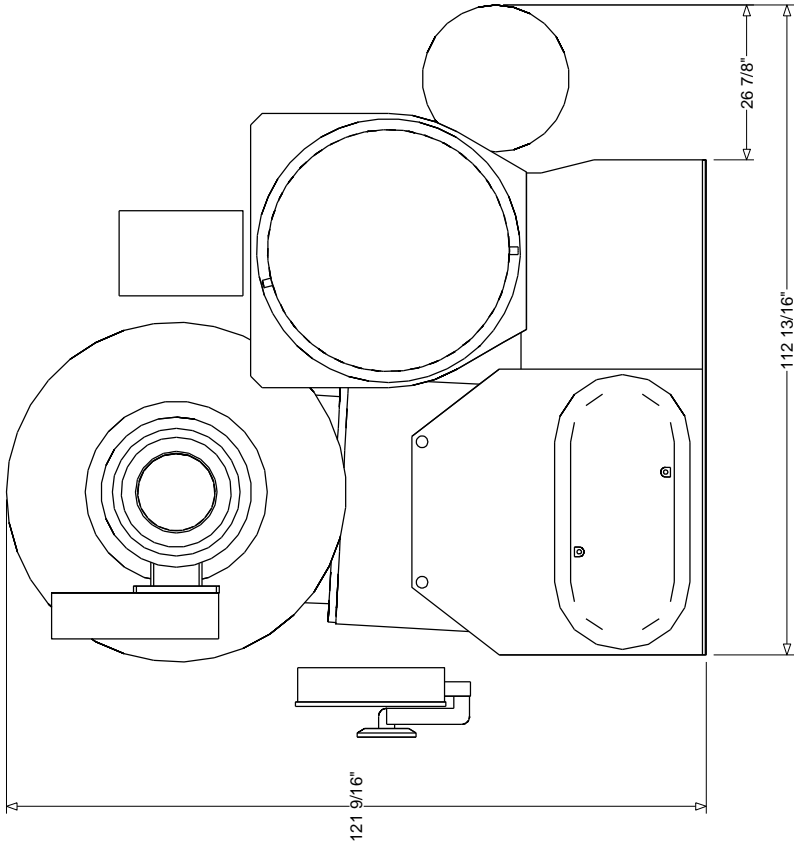
UNLESS OTHERWISE SPECIFIED DIMENSIONAL TOLERANCE +/- 1/2".
COOLING COND CONNS ARE STRAIGHT OUT THE END OF THE WATER BOX.
WATER BOX DRAIN AND VENT LOCATIONS ARE SHOWN ON THE WATER BOX END PLATES.
WATER CONNECTION GROOVES ARE NOT COMPATIBLE WITH AGS FITTINGS

SHELL TYPE	CONN DIA	CONN TYPE	FLOW DIRECTION
EVAPORATOR	10"	FLANGE ADAPTER	IN REAR OUT FRONT
COOLING COND	12"	FLANGE ADAPTER	IN BOTTOM OUT TOP

Unit Dimensions - Centrifugal Water Chillers

Item: A1 Qty: 1 Tag(s): CH-3 RM-VFD

CVHF 760 Nominal tons
800 Ton long shell evap.
1420 Ton long shell cond.
Without additional condenser



RIGHT SIDE VIEW

CUSTOMER NOTES:

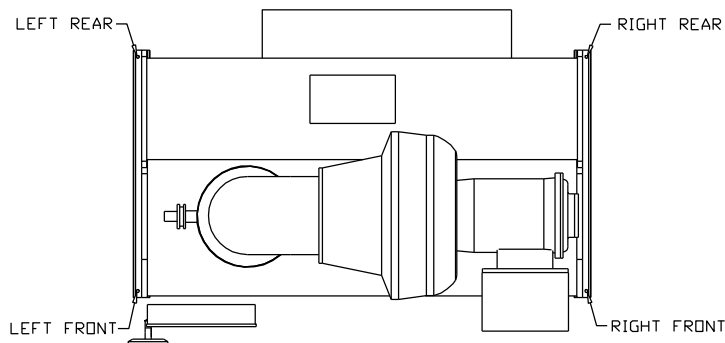
GRAPHICS ON SUBMITTAL ARE SIMPLIFIED TO SHOW MAJOR ENVELOPE COMPONENTS.
UNIT STRUCTURE AND SUBCOMPONENTS MAY BE REMOVED FOR CLARITY.

UNLESS OTHERWISE SPECIFIED DIMENSIONAL TOLERANCE +/-1/2".
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.
WATER CONNECTION GROOVES ARE NOT COMPATIBLE WITH AGS FITTINGS

SHELL TYPE	CONN DIA	CONN TYPE	FLOW DIRECTION
EVAPORATOR	10"	FLANGE ADAPTER	IN REAR OUT FRONT
COOLING COND	12"	FLANGE ADAPTER	IN BOTTOM OUT TOP

Weight, Clearance & Rigging Diagram - Centrifugal Water Chillers**Item: A1 Qty: 1 Tag(s): CH-3 RM-VFD**

WEIGHTS AND CENTER OF GRAVITY

**SPRING ISOLATOR SELECTION**

LOCATION	ISOLATOR LOAD*	VENDOR P/N	TRANE P/N	ISOLATOR COLOR
LEFT FRONT	7182.0 lb			
LEFT REAR	6706.0 lb			
RIGHT FRONT	8649.0 lb			
RIGHT REAR	8129.0 lb			
LEFT MIDDLE	N/A			
RIGHT MIDDLE	N/A			

COMPONENT	WEIGHT*
COMPRESSOR WEIGHT	6045.0 lb
MOTOR WEIGHT	2672.0 lb
STARTER WEIGHT	1.0 lb
SUCTION ELBOW WEIGHT	722.0 lb
ECONOMIZER WEIGHT	878.0 lb
EVAPORATOR WEIGHT	6396.0 lb
EVAPORATOR WATERBOXES WEIGHT	1166.0 lb
CONDENSER WEIGHT	6430.0 lb
CONDENSER WATERBOXES WEIGHT	709.0 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	1108.0 lb

UNIT CENTER OF GRAVITY

CG Z (DIMENSION FROM RIGHT TO LEFT)	80.000 in
CG X (DIMENSION FROM FRONT TO REAR)	41.000 in
CG Y (HEIGHT DIMENSION FROM FLOOR)	56.000 in

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

WEIGHTS

SHIPPING	OPERATING
26127.0 lb	30666.0 lb

NAMEPLATE PRODUCT DESCRIPTION:

MODL	CVHF	VOLT	460	PTON	800.00 tons	NTON	760
EVTM	IMC1	CDTM	IECU	CPKW	513	CPIM	281
CDBS	1080			EVSZ	080L	EVBS	740
				ORSZ	1185	CDSZ	142L

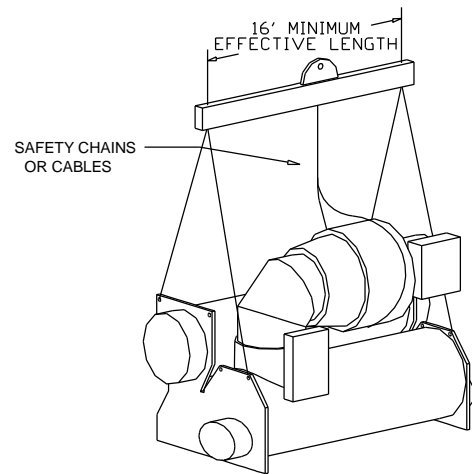
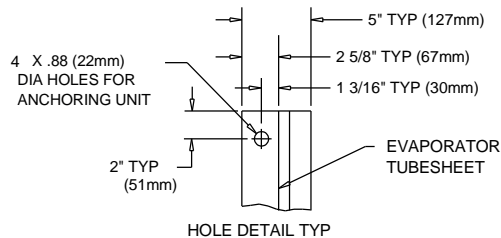
*ALL PUBLISHED WEIGHTS ACCURATE TO +/- 10 %

Weight, Clearance & Rigging Diagram - Centrifugal Water Chillers

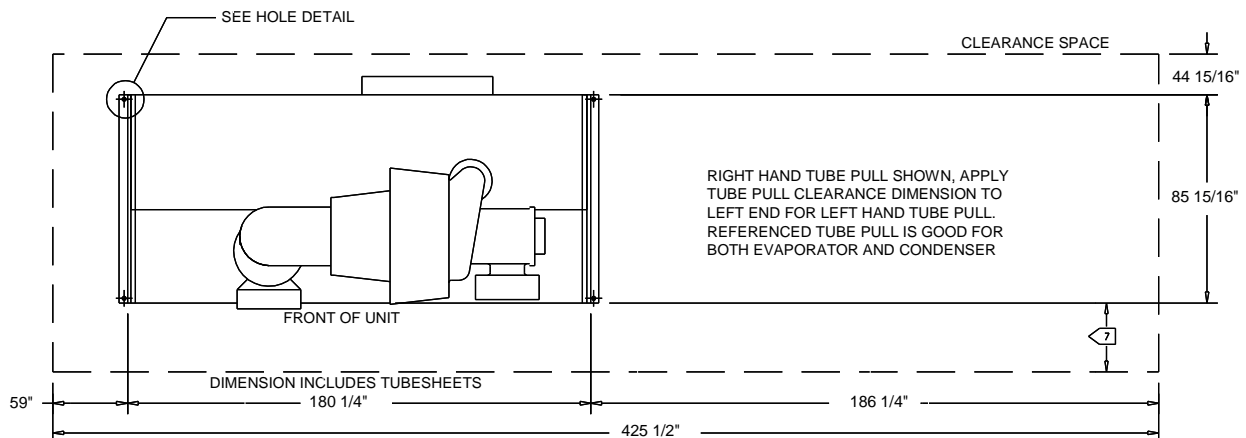
Item: A1 Qty: 1 Tag(s): CH-3 RM-VFD

⚠ WARNING

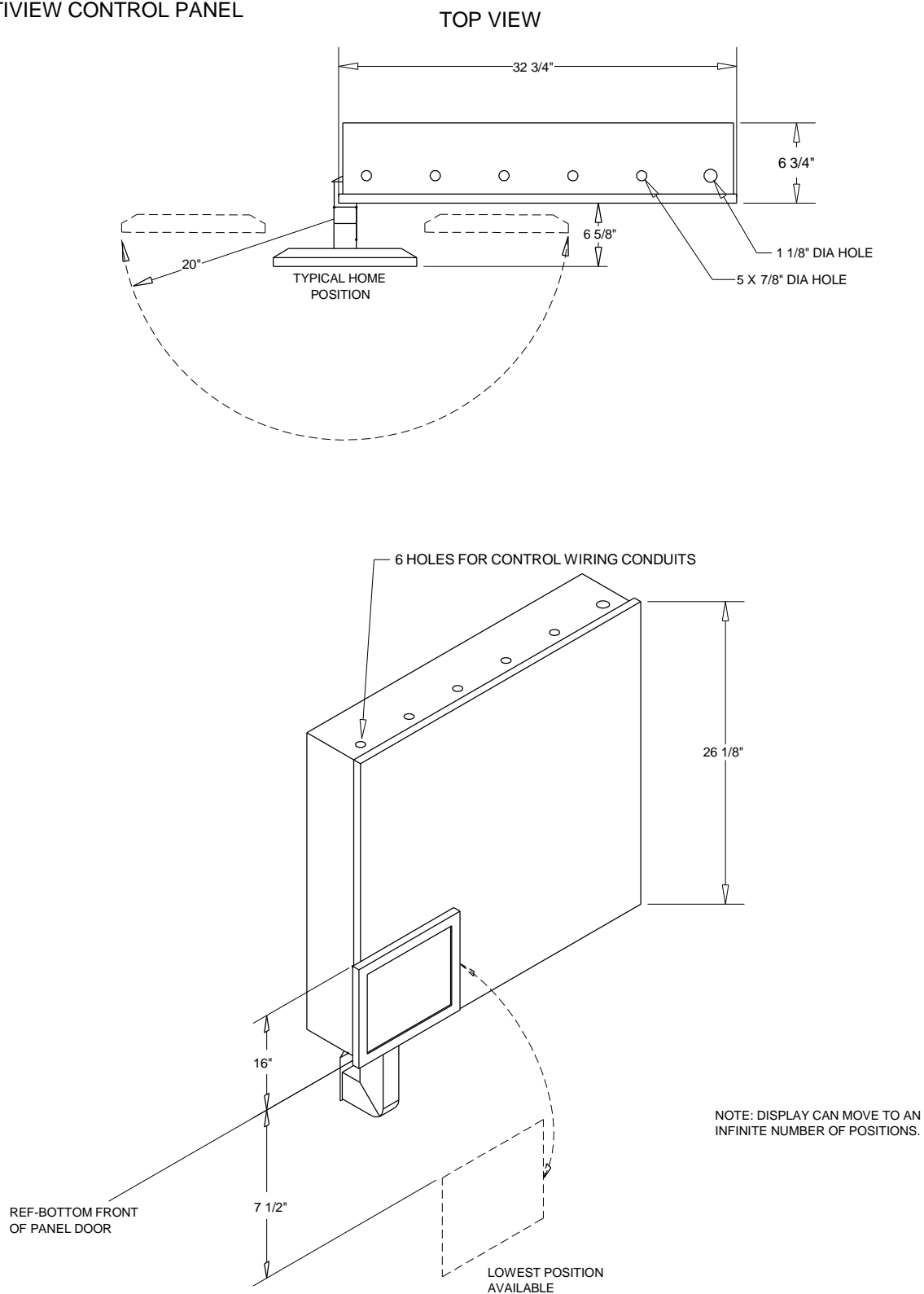
1. **HEAVY OBJECTS!**
DO NOT USE CABLES (CHAINS OR SLINGS) EXCEPT AS SHOWN. EACH OF THE CABLES (CHAINS OR SLINGS) USED TO LIFT THE UNIT MUST BE CAPABLE OF SUPPORTING THE ENTIRE WEIGHT OF THE UNIT. LIFTING CABLES (CHAINS OR SLINGS) MAY NOT BE OF THE SAME LENGTH. ADJUST AS NECESSARY FOR EVEN UNIT LIFT. 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.

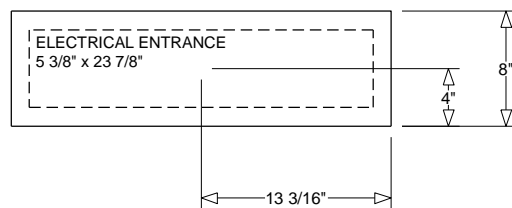


(SEE NOTE 8 ABOVE)	
MAXIMUM SHIPPING	26127.0 lb
MAXIMUM OPERATING	30666.0 lb

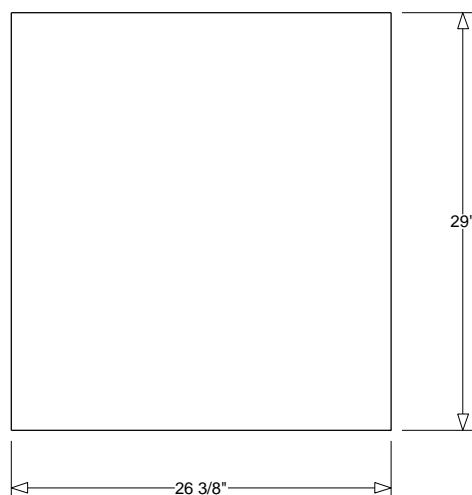


ADAPTIVIEW CONTROL PANEL

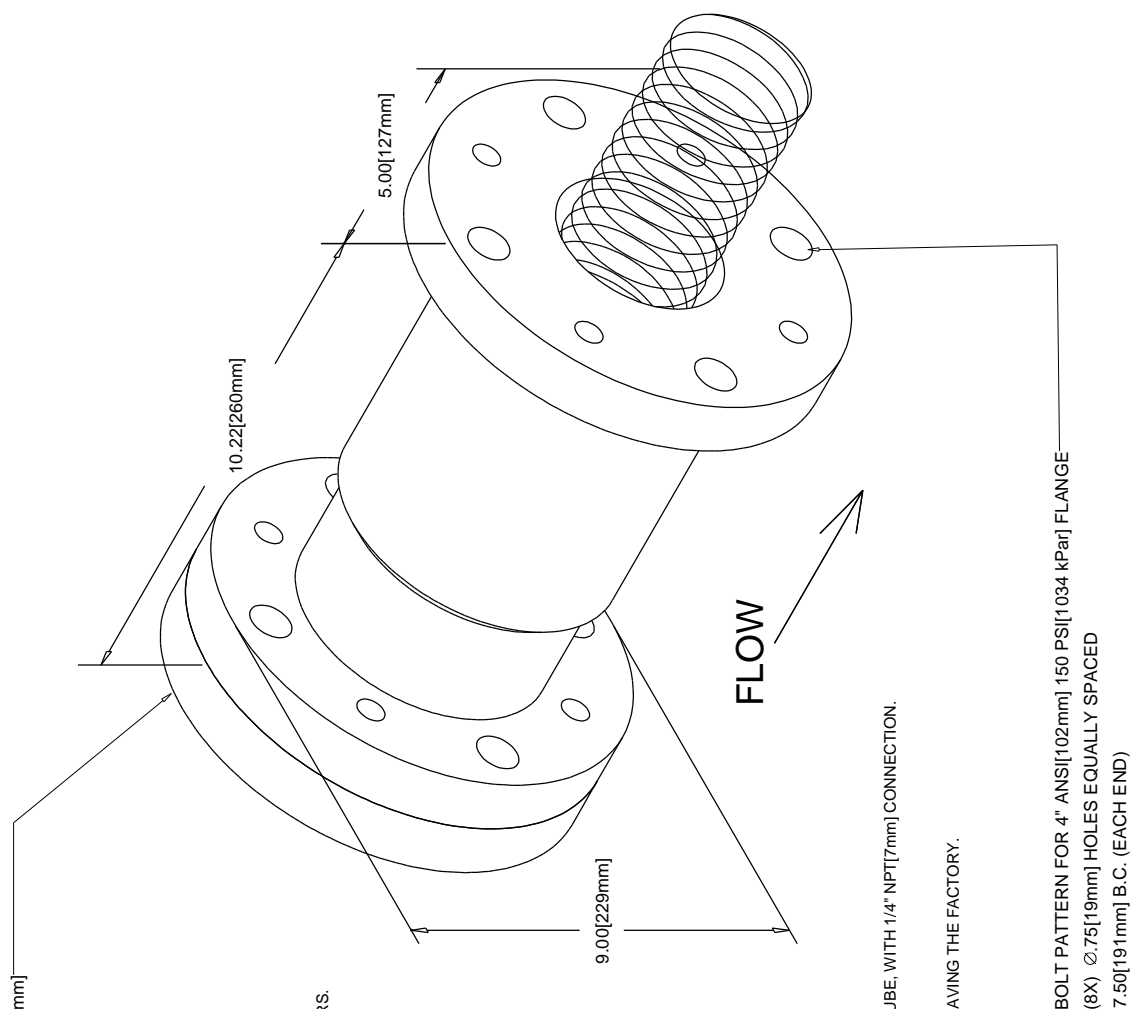


Accessory - Centrifugal Water Chillers
Item: A1 Qty: 1 Tag(s): CH-3 RM-VFD**MOTOR TERMINAL BOX****TOP VIEW**

MOTOR TERMINAL BOX IS FACTORY MOUNTED
WITH ELECTRICAL ENTRANCE AT THE TOP

**FRONT ELEVATION**

RUPTUREGUARD RELIEF VALVE FIELD INSTALLATION



RUPTURE DISK
 NON-FRAGMENTING, SOLID METAL REVERSE BUCKLING DISK
 RUPTURE DISK RATING OF 15 PSIG[104 kPa] ± 2 PSIG[14 kPa] AT 115 °F[46 °C].

RELIEF VALVE
 VALVE RATING 15 PSIG[104 kPa] ± 5 %; COMPATIBLE WITH LOW PRESSURE CHILLERS.
 STAINLESS STEEL VALVE BODY.
 O-RING SEAL LOCATED IN VALVE PLUG.
 FIELD SERVICEABLE O-RING.
 O-RINGS COMPATIBLE WITH REFRIGERANT.

FLANGED INLET AND OUTLET ON VALVE BODY:
 THREE 1/4" NPT[7mm]. SQUARE RECESSED DRAIN PLUGS TO PROVIDE
 DRAIN ACCESS TO THE INTERNAL CAVITY OF THE VALVE BODY. THESE ARE
 LOCATED AT THE BASE OF THE VALVE PLUG AND SPACED AT 120 °.
 (SEE IOM MANUAL CTV-SVX06)

THREE 1/4" NPT[7mm] TAPPINGS INTO THE DISK VALVE INTERSPACE;
 AN EXCESS FLOW VALVE, PRESSURE GAUGE AND A SQUARE RECESSED
 PLUG TO BE LOCATED IN THESE HOLES.
 THESE ARE TO BE SPACED AT 120 °.
 EXCESS FLOW VALVE - A 1/4" NPT[7mm]. VALVE USED TO ENSURE THE
 DISK/VALVE INTERSPACE IS MAINTAINED AT ATMOSPHERIC PRESSURE
 DURING NORMAL CHILLER SERVICE.
 DURING DISK/VALVE OPERATION, THIS VALVE WILL CLOSE.
 PRESSURE GAUGE - A 2"[51mm] FACE, 30"[762mm]HG TO 30 PSIG[207 kPa]. BRONZE TUBE, WITH 1/4" NPT[7mm] CONNECTION.
 (SEE IOM MANUAL CTV-SVX06)

VALVES TO UNDERGO A LEAK TEST, PRESSURE TEST, AND A PULL TEST BEFORE LEAVING THE FACTORY.

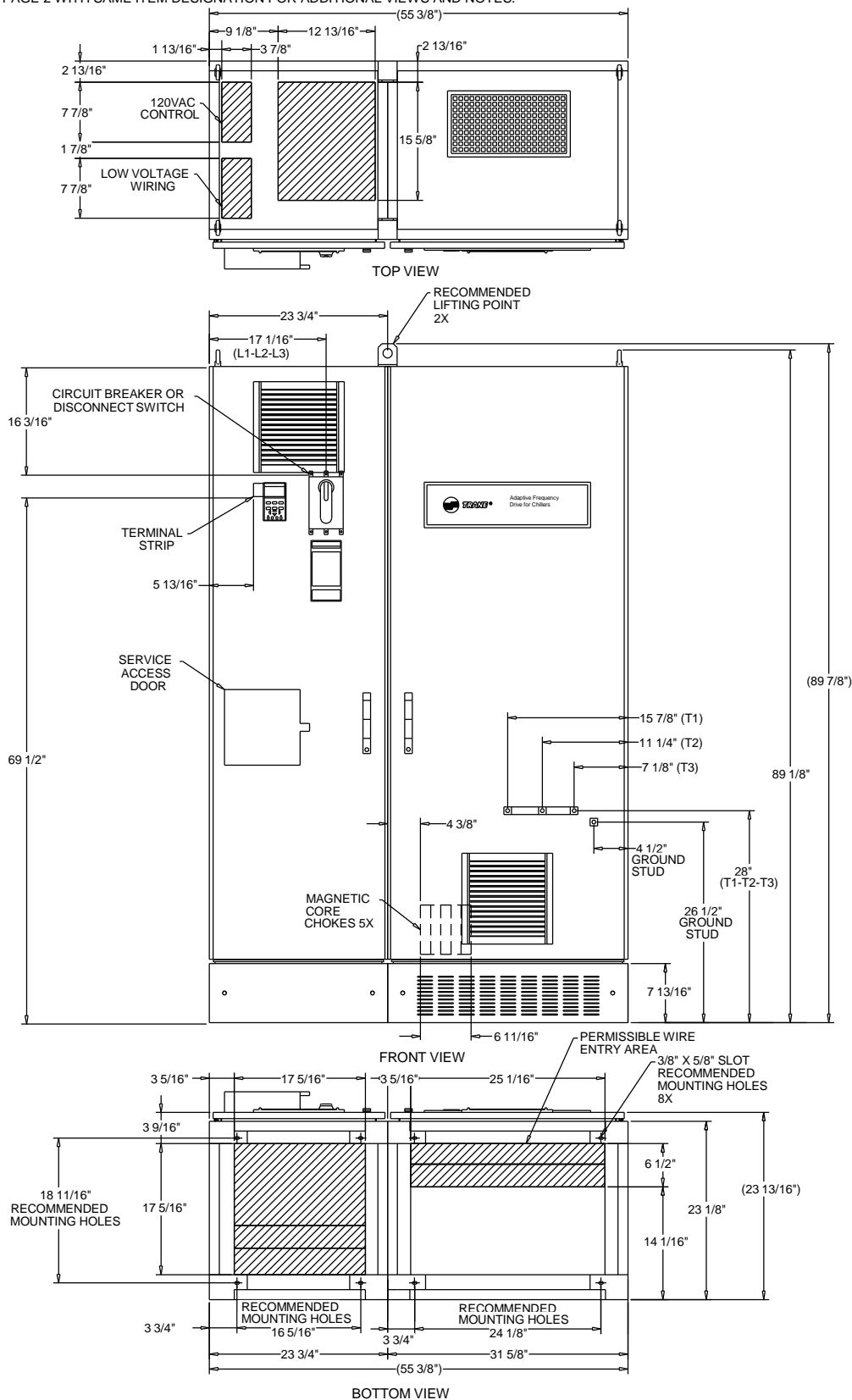
2828 SCFM [1335 L/s]
 "C" VALUE FOR RUPTURE GUARD ONLY = 212.1 LBS/MIN [1.6 kg/s]

VALVE BODY	WEIGHT
4"	40LBS[18kg]

Accessory - Centrifugal Water Chillers

Item: A1 Qty: 1 Tag(s): CH-3 RM-VFD

REMOTE MOUNTED ADAPTIVE FREQUENCY DRIVE W/NEMA 1 ENCLOSURE, PAGE 1 OF 2
SEE STARTER ACCESSORY PAGE 2 WITH SAME ITEM DESIGNATION FOR ADDITIONAL VIEWS AND NOTES.



Accessory - Centrifugal Water Chillers

Item: A1 Qty: 1 Tag(s): CH-3 RM-VFD

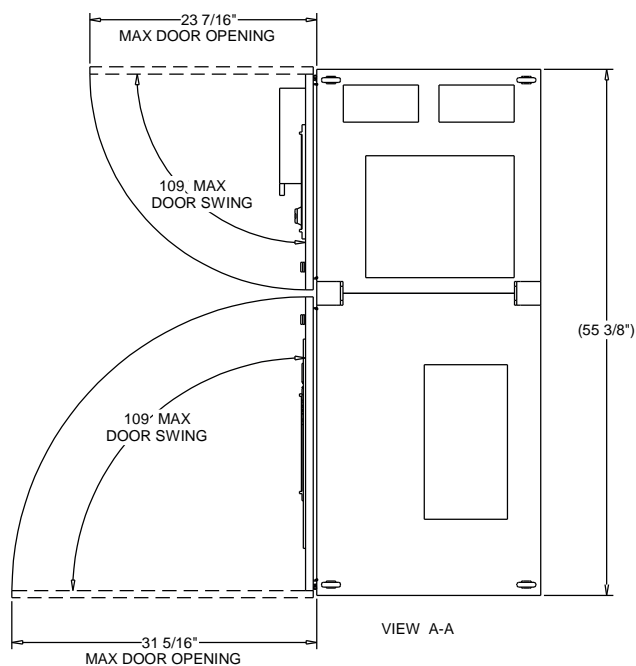
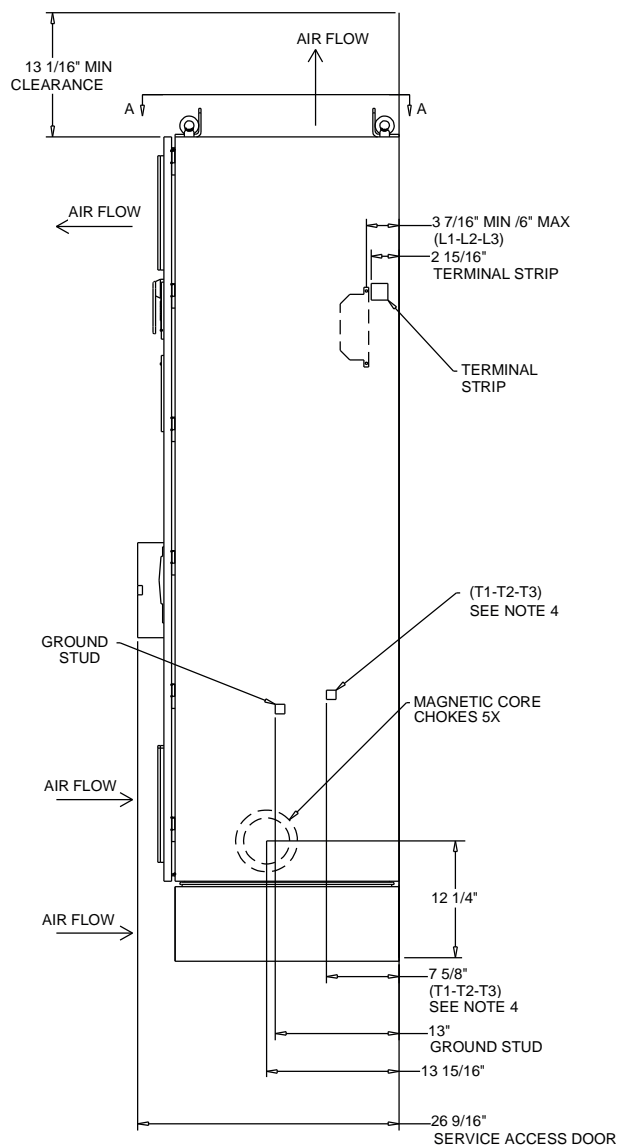
REMOTE MOUNTED ADAPTIVE FREQUENCY DRIVE W/NEMA 1 ENCLOSURE, PAGE 2 OF 2

MAX RLA	BREAKER AIC AMPS	SHORT CIRCUIT WITHSTAND RATINGS (RMS SYMMETRICAL AMPS)	INCOMING LINE PROVISIONS	OUTPUT LOAD PROVISIONS	PANEL CONNECTION	STARTER WEIGHT
678	65,000	65,000	(3) 3/0-400 MCM	(4)3/0-500 MCM	CB	1531.0 lb

CB = CIRCUIT BREAKER

NOTES:

1. FAILURE TO REMOUNT CABINET FLOOR GLAND PLATES WILL HAVE A NEGATIVE INFLUENCE ON THE UNIT'S INTERNAL COOLING CAPACITY AND CAN CAUSE TRIP FAULTS.
2. MAXIMUM CABLE LENGTH BETWEEN DRIVE AND MOTOR SHOULD BE 100 FEET OR LESS.
3. CUSTOMER PROVIDED LOAD LUGS TO BE CRIMP ON CONNECTION FOR BOLT ON LUG.
4. CONNECTIONS ARE SPACED HORIZONTALLY WITH DIMENSION/LOCATION SHOWN IN THE FRONT VIEW.
5. SEE PREVIOUS PAGE FOR STARTER ENCLOSURE DIMENSIONAL INFORMATION.
6. BREAKER AIC (AMPS INTERRUPTING CAPACITY) = APPLIES TO THE CIRCUIT BREAKER AS A COMPONENT ONLY AND IS THE MAXIMUM CURRENT THAT A CIRCUIT BREAKER CAN INTERRUPT WITHOUT DAMAGE TO ITSELF.
7. STARTER SCR (SHORT CIRCUIT RATING) = THE MAXIMUM FAULT CURRENT TO WHICH A STARTER MAY BE EXPOSED AND SAFELY BE CONTAINED WITHIN THE STARTER ENCLOSURE. HOWEVER, THE COMPONENTS MAY SUSTAIN DAMAGE.
8. CONTACT TRANE CENTRAVAC MARKETING WITH ANY QUESTIONS.
9. THE VALUES LISTED ARE 460/480 AND 575/600 VOLT.
10. TERMINALS ACCEPT COPPER OR ALUMINUM WIRE.



Field Wiring - Centrifugal Water Chillers

Item: A1 Qty: 1 Tag(s): CH-3 RM-VFD

<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 CLOQUETTES 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 ENTRAÎNER DES BLESSURES GRAVES POUVANT ETRE MORTELLES.</p>	<p>⚠ ADVERTENCIA ¡VOLTAJE PELIGROSO! DESCONECTE TODA LA ENERGIA ELECTRICA, INCLUIDO LAS DESCONECCIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASCORRESE 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 OCASIONAR 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'UNITÉ 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 DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES. SI NO LO HACE, PUEDE OCASIONAR 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:

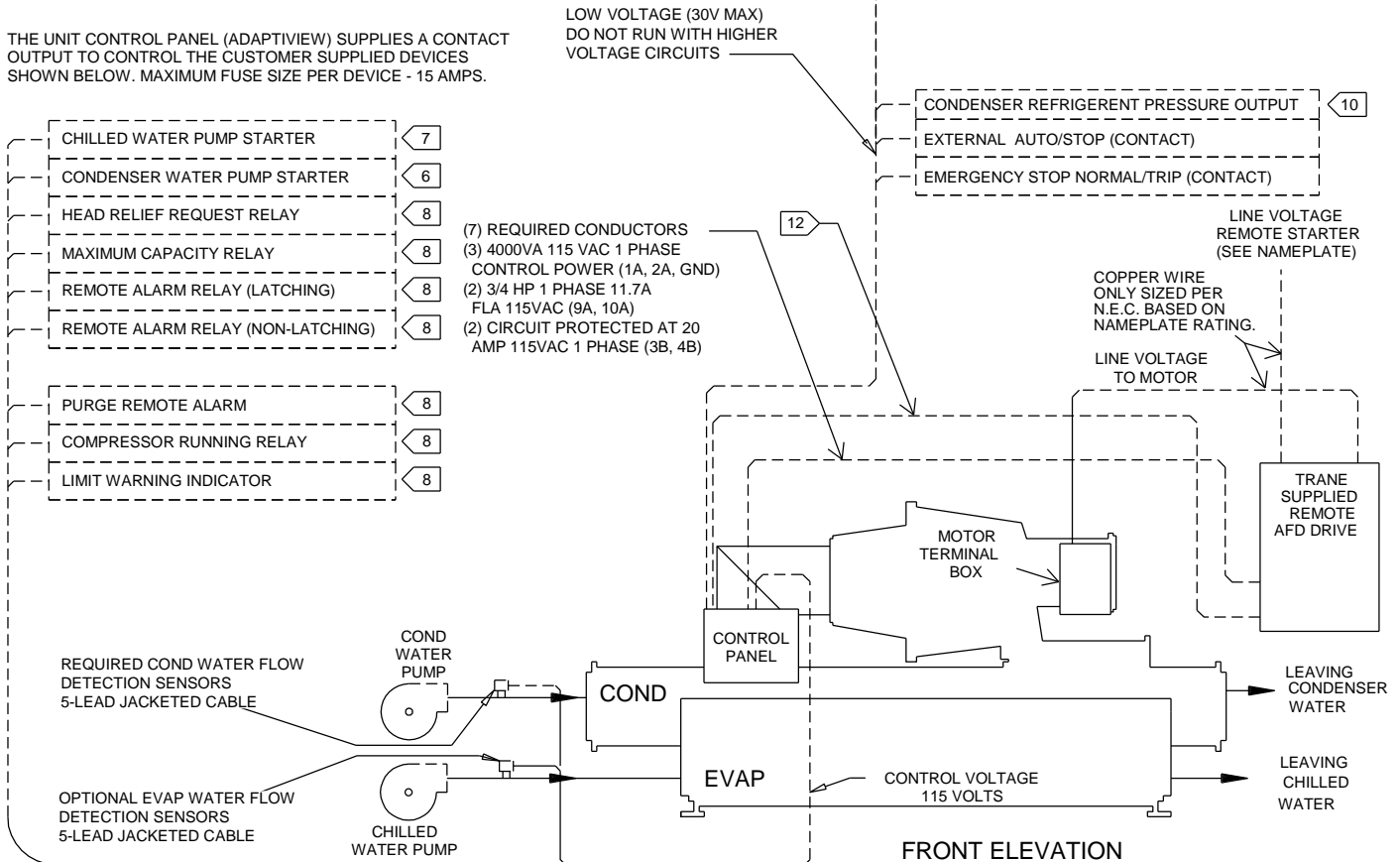
1. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS. CHECK SALES ORDER TO DETERMINE IF WIRING IS REQUIRED FOR SPECIFIC OPTIONS.
2. CAUTION - DO NOT ENERGIZE UNIT UNTIL CHECK-OUT AND START-UP PROCEDURES HAVE BEEN COMPLETED.

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.

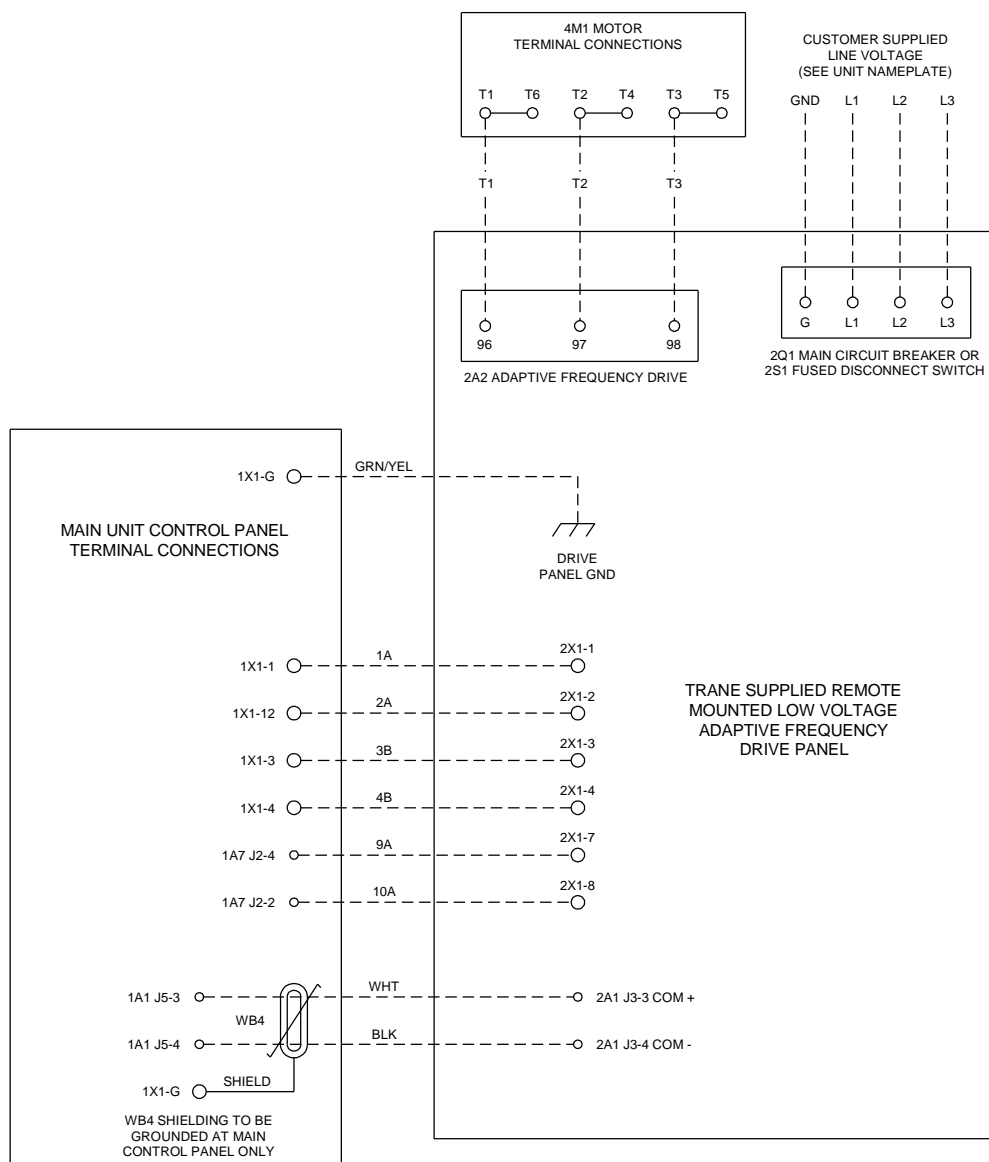
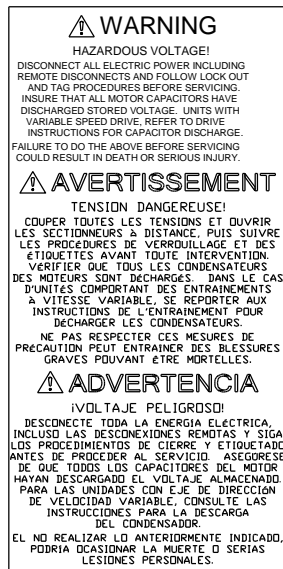
- 6 2 WIRES, 115 VAC CIRCUIT, SEPARATE POWER SUPPLY IS REQUIRED. MINIMUM CONTACT RATING AT 115 VAC - 2.88 INDUCTIVE 1/3 H.P.(.25 kW) AT 115 VAC REQUIRED.
- 7 2 WIRES, 115 VAC CIRCUIT, SEPARATE POWER SUPPLY IS REQUIRED. CONTACTS ARE N.O. CONTACT RATING - 2.88 INDUCTIVE 1/3 H.P.(.25 kW) AT 115 VAC OPTIONAL.
- 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 (ADAPTIVIEW) SUPPLIES A CONTACT OUTPUT TO CONTROL THE CUSTOMER SUPPLIED DEVICES SHOWN BELOW. MAXIMUM FUSE SIZE PER DEVICE - 15 AMPS.



Field Wiring - Centrifugal Water Chillers
Item: A1 Qty: 1 Tag(s): CH-3 RM-VFD

REMOTE AFD CONNECTION DIAGRAM PAGE 1



WIRE NO OR DEVICE	FIELD WIRING CIRCUIT SELECTION INFORMATION
SUPPLY AND MOTOR LEADS	SEE NAMEPLATE; MINIMUM CIRCUIT AMPACITY
1A*, 2A* AND GRN/YEL	4000VA AT 115VAC, 8 AWG MAX WIRE SIZE
9A* AND 10A*	PUMP MOTOR; 1PH 3/4 HP, 11.7 FULL LOAD AMPS AT 115VAC. 14 AWG MAX WIRE SIZE.
WB4	TWISTED, SHIELDED PAIR, 30VDC, MAX LENGTH 1500 FT (BELDEN TYPE 8760 RECOMMENDED)
5S1*, 5S2*, 3B* AND 4B*	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 LUD TERMINALS	CONTACT RATING; 2.88A INDUCTIVE, 1/3 HP, 0.25KW AT 115VAC. 14 AWG MAX WIRE SIZE.

* TAPPED CONTROL CONDUCTORS

NOTES:

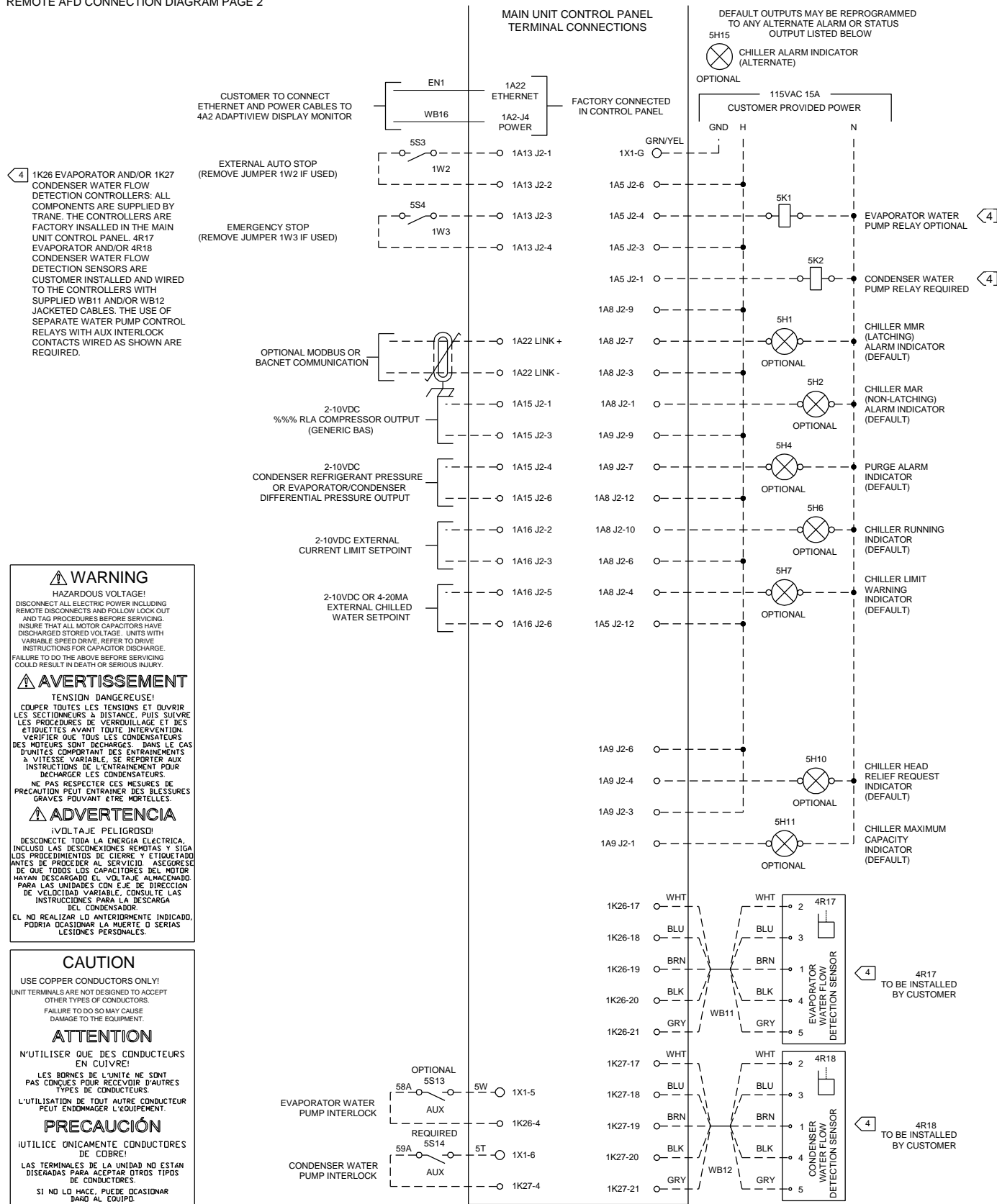
1. DASHED LINES INDICATE FIELD WIRING BY OTHERS. WIRE NUMBERS SHOWN ARE RECOMMENDED BY TRANE.
2. DO NOT ROUTE LOW VOLTAGE (30V) WITH CONTROL VOLTAGE (115V) AND DO NOT POWER UNIT UNTIL CHECK-OUT AND START-UP PROCEDURES HAVE BEEN COMPLETED.

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

Field Wiring - Centrifugal Water Chillers

Item: A1 Qty: 1 Tag(s): CH-3 RM-VFD

REMOTE AFD CONNECTION DIAGRAM PAGE 2



Tri-City Medical Center
Emergency Central Plant Improvements (PR#17-0475)
OSHDP #S172470-37-00
Bid RFI Log

Version: 1.00
Date: 1/15/2018

RFI	Date Created	Submitted By	Contractor Reference	Question, Comment, or Request	Discipline(s)	Sheet	TeamComments	Open/Closed
1	12/29/2017	Murray Company	MC-001	The mechanical equipment schedule calls out notes 5, "Refrigerant Shipped loose in containers and charged on site by contractor" and Note 6, "Chiller Compressor to be removed from chiller in field to aid with installation..."We believe this scope of work will need to be performed by Trane authorized technicians to maintain the warranty. Are we to carry this scope of work in the bid proposal?	Mechanical		As written, and as described. The chiller compressor will be temporarily connected to base to ship to site. It will require the chiller to be "reassembled" and started up by manufacturer at site. The mechanical contractor shall coordinate with Trane and include either by Trane or by mechanical to insure all systems are wholly functional and put into service and to insure all warranty coverage is provided. The mechanical contractor needs to communicate with Trane and include all work by Trane and themselves to insure a completely functional system. The mechanical contractor is fully responsible for chiller. Trane will be hired and retained by mechanical contractor, yes mechanical to carry all scope of work. This document serves as a supplement to the plans and specifications. It does not relieve the contractor of responsibilities under original contract or implied by this response.	Closed
2	1/3/2018	Murray Company	MC-002	Is the Chiller coming insulated from the factory, or will it require insulation in the field?	Mechanical		Insulation on chiller is spelled out in Specification 236416-8, Paragraph 2.7. Contractor to confirm with chiller manufacturer before bid that specification requirements are met.	Closed
3	12/29/2017	Cannon Building	RFI #1	M-002 - Please confirm the Chiller and Cooling tower are to be purchased by Tri-City Medical Center and not by General Contractor.	Mechanical	M-002	Confirmed.	Closed
4	12/29/2017	Cannon Building	RFI #1	If Tri-City is to purchase Chiller and Cooling tower equipment, who will provide warranty labor for these items?	Mechanical		Contractor to provide warranty for the labor performed by self. Equipment will provide labor warranty for work performed by self.	Closed
5	12/29/2017	Cannon Building	RFI #1	Who is responsible for coordination of the deliveries of the cooling tower and chiller to the job site?	Mechanical		Contractor to coordinate deliveries with the equipment suppliers	Closed
6	12/29/2017	Cannon Building	RFI #1	M-002 - Please confirm the Chiller is a Trane unit, and Cooling Tower is Baltimore Air Cooler per the equipment schedule.	Mechanical	M-002	See the specs provided in Addendum #2 & Addendum #3	Closed
7	12/29/2017	Cannon Building	RFI #1	What is the estimated lead time for the chiller and cooling tower equipment? If not available, please provide general assumption.	Mechanical		No lead time available at this time. Start of the project to be determined after the award of contract and lead times will be taken into the consideration at that time.	Closed
8	12/29/2017	Cannon Building	RFI #1	Is there anticipated shut down for the disconnect/reconnection of the utilities? If so, who is responsible for the coordination?	Mechanical		Yes - Shutdowns to be coordinated by contractor with owner for duration, etc. and any temporary equipment as required.	Closed
9	12/29/2017	Cannon Building	RFI #1	A100 - There is a green waste plug valve just to right of Gridline 8 that is not shown on the drawing in the area to be demolished. Does this get demolished or protect in place? If demolished, how far down does the pipe go? If demolished, where is the nearest P.O.C. to safe off and cut?	Mechanical	A-100	Please re-issue RFI with supporting pictures and markups.	Closed
10	12/29/2017	Cannon Building	RFI #1	Is there a Tri-City Medical Center preferred Landscape vendor? If so, please provide.	Chris Miechowski		Landgraphics	Closed
11	12/29/2017	Cannon Building	RFI #1	Is there a Tri-City Medical Center preferred Fire Alarm vendor? If so, please provide.	Chris Miechowski		Redhawk	Closed
12	12/29/2017	Cannon Building	RFI #1	Is there any phasing for the parking lot area to be restriped?	Chris Miechowski		No	Closed
13	12/29/2017	Cannon Building	RFI #1	There is no detail for the refrigerant relief piping. Should there be a drip leg under the vertical riser in the chiller? What about a flex connector at the chiller?	Mechanical		Both are required - drip leg and flexible connectors are provided for in attached newly issued specification "SECTION 232300 - REFRIGERANT PIPING" - plans will be modified per OSHPD requirements after project award.	Closed
14	12/29/2017	Cannon Building	RFI #1	What is the height above the floor of the refrigerant relief pipe in the cooling tower area?	Mechanical		The approximate height of the refrigerant relief piping is 7'-8" from pipe centerline to finished floor.	Closed
15	12/29/2017	Cannon Building	RFI #1	The flow through the cooling tower is listed as 2,000 gpm and the condenser water pump flow is listed as 2,000 gpm. Shouldn't these be the same?	Mechanical		The question has same gpm's. The listed tower capacity was at maximum ability of tower which is above required for Chiller. Tower is correct, pump and chiller ratings are correct..	Closed

Tri-City Medical Center
Emergency Central Plant Improvements (PR#17-0475)
OSHDP #S172470-37-00
Bid RFI Log

Version: 1.00
Date: 1/15/2018

RFI	Date Created	Submitted By	Contractor Reference	Question, Comment, or Request	Discipline(s)	Sheet	TeamComments	Open/Closed
16	12/29/2017	Cannon Building	RFI #1	What size is the CHW pipe for the supply and return to the new pump?	Mechanical		8" - Provided supplemental sketch as well. See MSK-1.	Closed
17	12/29/2017	Cannon Building	RFI #1	M-002 per pump schedule, remark 2 is listed for both pumps. This is a straightening vane flex connector at the suction inlet; per Sheet M-401 details, this item only appears for the P-30, the pump without the suction diffuser. Should we bid per sheet M-401 details?	Mechanical	M-002;M-401	P-30, No suction diffuser, configured and installed per 4 on Sheet M103. Motorized valve and manual valve are shown configured on M103. Detail 2 on M-401 shows requirements but altered for installation on tower.	Closed
18	12/29/2017	Cannon Building	RFI #1	M-302 - Above the chiller there is a PD inside a circle. What is this?	Mechanical	M-302	Originally differential, revised to pressure gauge. See attached MSK-1 and MSK-2.	Closed
19	12/29/2017	Cannon Building	RFI #1	There is no specification for the chilled water insulation listed. Please advise.	Mechanical		Chilled water insulation is published in Specification "Section 230719 - HVAC Piping Insulation". Please verify you have specifications manual for project as extensive information is provided in manual.	Closed
20	12/29/2017	Cannon Building	RFI #1	Is there any work on this project for condenser water treatment?	Mechanical		No - Existing owner vendor shall maintain systems. Confirm with owner.	Closed
21	12/29/2017	Cannon Building	RFI #1	There are no pipe specifications for the nitrogen, nitric oxide, oxygen, and fluoride lines listed. Please advise.	Mechanical		See provided specification "Section 226313 - Gas Piping"	Closed
22	12/29/2017	Cannon Building	RFI #1	KN12/P-102 - is point of connection 4 feet or less below grade?	Mechanical		Estimated depth (to be verified by contractor) is identified in Detail 4 scaled detail.	Closed
23	12/29/2017	Cannon Building	RFI #1	There is no specification for 12" straightening vane flex connector listed. Please advise.	Mechanical		The flex connectors are listed in specification 232116. The following shall replace the flex connectors listed in 232116 "Flexible Connectors: Stainless-steel hose with woven, flexible, stainless steel braid; 150-psig minimum working pressure and 250 deg F maximum operating temperature. Connectors shall have flanged or threaded-end connections to match equipment connected and shall be capable of 3/8-inch misalignment. 1. Pump inlet and outlet flexible connectors: With integral S.S.	Closed
24	12/29/2017	Cannon Building	RFI #1	There is no specification for the refrigerant relief piping listed. Please advise.	Mechanical		See Specification Section - 232300 Refrigerant Piping.	Closed
25	12/29/2017	Cannon Building	RFI #1	Sheets E-002/E-003 show new 12 kV feeder to central plant (3) #6, #1/0 GND 4" C from equipment in existing electrical service building to unit substation "MSA". Please clarify whether new 12 kV feeders are not in the scope of work for this project.	Electrical	E-002;E-003	Correct this is not part of this projects scope, no new 12kv feed.	Closed