

DATE: 8/29/2018
BID NO.: 50-00123954

INVITATION TO BID
THIS IS NOT AN ORDER

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JEFFERSON PARISH

PURCHASING DEPARTMENT
P.O. BOX 9
GRETNA, LA. 70054-0009
504-364-2678

BUYER: MCamardelle@jeffparish.net

BIDS WILL BE RECEIVED IN THE WEST BANK PURCHASING DEPT, SUITE 4400, JEFFERSON PARISH GENERAL GOVERNMENT BUILDING, 200 DERBIGNY STREET, GRETNA, LA 70053 UNTIL 2:00 PM, 10/02/2018 AND PUBLICLY OPENED THEREAFTER.

For convenience, bidders may also submit bids in the East Bank Purchasing Department, Suite 404, Jefferson Parish Joseph S. Yenni Building, 1221 Elmwood Park Blvd., Jefferson LA 70123. However, if submitting bids on the day of bid opening, bidders must submit at the West Bank location only. All bids will be publicly opened at the West Bank location.

At no charge, bidders may also submit via Jefferson Parish's electronic procurement page by visiting www.jeffparishbids.net to register for this free site. Additional instructions are included in the text box highlighting electronic procurement.

LATE BIDS WILL NOT BE ACCEPTED

Unless submitting via online (see Page 3), each bid must be submitted in a sealed envelope bearing on the outside; the name of the Bidder, his address, and the name of the project for which the bid is submitted and the bid number.

NOTE: ONLY BIDS WRITTEN IN INK OR TYPEWRITTEN, AND PROPERLY SIGNED BY A MEMBER OF THE FIRM OR AUTHORIZED REPRESENTATIVE, WILL BE ACCEPTED. PENCIL AND/OR PHOTOSTATIC FIGURES OR SIGNATURES SHALL RESULT IN BID REJECTION.

INSTRUCTIONS FOR BIDDERS AND GENERAL CONDITIONS

THE FOLLOWING INSTRUCTIONS APPLY TO ALL BIDS

All bids submitted are subject to these instructions and general conditions and any special conditions and specifications contained herein, all of which are made part of this bid proposal reference. By submitting a bid, vendor agrees to comply with all provisions of Louisiana Law as well be in compliance with the Jefferson Parish Code of Ordinances, Louisiana Code of Ethics, applicable Jefferson Parish ethical standards and Jefferson Parish Resolution No. 113646 and/or Resolution No. 113647.

All vendors submitting bids should register as a Jefferson Parish vendor if not already yet registered. Registration forms may be downloaded from <http://purchasing.jeffparish.net> and by clicking on Vendor Information. Current W-9 forms with respective Tax Identification numbers and vendor applications may be submitted at any time; however, if your company is not registered and/or a current W-9 form is not on file, vendor registration is mandatory. Further, a current W-9 form and respective Tax Identification number must be supplied upon contract execution, should you be awarded a contract and/or issued purchase order. Failure to do so may result in delay of payment.

All quotations shall be based on F.O.B. Agency warehouse or job site, anywhere within the Parish as designated by the Purchasing Department. This provision does not apply to public works projects

JEFFERSON PARISH requires all products to be new (current) and all work must be performed according to standard practices for the project. Unless otherwise specified, no aftermarket parts will be accepted. Unless otherwise specified, all workmanship and materials must have at least one (1) year guaranty, in writing, from the date of delivery and/or acceptance of the project. Any deviations or alterations from the specifications must be indicated and/or supporting documentation supplied with bid submission.

Bidders should submit all questions in writing via email to the buyer's email address as indicated above, no later than Five (5) working days prior to the bid opening. Bid numbers should be mentioned in all requests. If submitting online, vendors may send questions via the E-Procurement site no later than Five (5) working days prior to the bid opening.

If this bid requires a pre-bid conference (see Additional Requirements section), bidders are advised that such conference will be held to allow bidders the opportunity to identify any discrepancies in the bid specifications and seek further clarification regarding instructions. The Purchasing Department will issue a written response to bidders' questions in the form of an Addendum. Please note that all official communication will be expressed in the form of an addendum.

All formal Addenda require written acknowledgement on the bid form by the bidder. Failure to acknowledge an Addendum on the bid form shall cause the bid to be rejected. JEFFERSON PARISH reserves the right to award bid to next lowest responsive and responsible bidder in this event.

The purpose and intention of this invitation to bid is to afford all suppliers an equal opportunity to bid on all construction, maintenance, repair, operating supplies and/or equipment listed in this bid proposal. JEFFERSON PARISH WILL ACCEPT ONE BID ONLY FROM EACH VENDOR. Items bid must meet specifications.

Visit our website at [HTTP://PURCHASING.JEFFPARISH.NET](http://PURCHASING.JEFFPARISH.NET)

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JEFFERSON PARISH will accept one price for each item unless otherwise indicated. Two or more prices for one item will result in bid rejection. Bidders are required to complete, sign and return the bid form and/or complete and return the associated line item pricing forms as indicated. Vendors must not alter the bid forms. Doing so will cause the bid to be rejected.

A corporate resolution or written evidence of the individual signing the bid having such authority must be submitted with the bid. Failure to comply will cause bid to be rejected. For corporate entities, such written evidence may be a printout of the Louisiana Secretary of State's website listing the signatory as an officer. Such printout shall be included with the bid submission. Bids submitted by Owners or Sole Proprietorships must include certification that he or she owns the entity for which the bid is signed. This documentation must be submitted with the bid. Failure to do so will result in bid rejection.

NOTE: A sample corporate resolution can be downloaded from our website <http://purchasing.jeffparish.net> or you may provide your own document. A sample certification of sole proprietorship can also be downloaded from our website <http://purchasing.jeffparish.net> or you may provide your own document.

INSTRUCTIONS FOR BIDDERS AND GENERAL CONDITIONS

A. AWARD OF CONTRACT: JEFFERSON PARISH reserves the right to award contracts or place orders on a lump sum or individual item basis, or such combination, as shall in its judgment be in the best interest of JEFFERSON PARISH. Every contract or order shall be awarded to the LOWEST RESPONSIVE and RESPONSIBLE BIDDER, taking into consideration the CONFORMITY WITH THE SPECIFICATIONS and the DELIVERY AND/OR COMPLETION DATE. SPLIT AWARDS MADE TO SEVERAL VENDORS WILL ONLY BE GRANTED TO THOSE DEEMED RESPONSIVE AND RESPONSIBLE.

All bid prices shall remain valid for 45 days. Jefferson Parish and the lowest responsive and responsible bidder(s) by mutual written consent may mutually agree to extend the deadline for award by one (1) or more extensions of thirty (30) calendar days.

PROTESTS: Only those vendors that submitted a bid in response to this solicitation may submit a protest in writing to the Director of the Purchasing within 48 hours of bid opening. The Purchasing Director will review it in connection with the Parish Attorney's Office which will then respond in writing as soon as possible.

PREFERENCE: Unless federal funding is directly spent by Jefferson Parish for this purchase, preference is hereby given to materials, supplies, and provisions produced, manufactured or grown in Louisiana, quality being equal to articles offered by competitors outside the state. "LSA - R.S. 38:2251-2261"

B. USE OF BRAND NAMES AND STOCK NUMBERS: Where brand names and stock numbers are specified, it is for the purpose of establishing certain minimum standards of quality. Bids may be submitted for products of equal quality, provided brand names and stock numbers are specified. Complete product data may be required prior to award.

C. CANCELLATION OF CONTRACT: JEFFERSON PARISH reserves the right to cancel all or any part if not shipped promptly. No charges will be allowed for parking or cartage unless specified in quotation. The order must not be filled at a higher price than quoted. JEFFERSON PARISH reserves the right to cancel any contract at anytime and for any reason by issuing a THIRTY (30) day written notice to the contractor.

For good cause and as consideration for executing a contract with Jefferson Parish, vendor conveys, sells, assigns and transfers to Jefferson Parish or its assigns all rights, title and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of Louisiana, relating to the particular good or services purchased or acquired by Jefferson Parish.

D. PRICES: Jefferson Parish is exempt from paying sales tax under LSA-R.S. 47:301 (8)(c). All prices for purchases by Jefferson Parish of supplies and materials shall be quoted in the unit of measure specified and unless otherwise specified, shall be exclusive of state and Parish taxes. The price quoted for work shall be stated in figures. In the event there is a difference in unit prices and totals, the unit price shall prevail.

Quantities listed are for bidding purposes only. Actual requirements may be more or less than quantities listed.

Bidders are not to exclude from participation in, deny the benefits of, or subject to discrimination under any program or activity, any person in the United States on the grounds of race, color, national origin, or sex; nor discriminate on the basis of age under the Age Discrimination Act of 1975, or with respect to an otherwise qualified handicapped individual as provided in Section 504 of the Rehabilitation Act of 1973, or on the basis of religion, except that any exemption from such prohibition against discrimination on the basis of religion as provided in the Civil Rights Act of 1964, or Title VI and VII of the Act of April 11, 1968, shall also apply. This assurance includes compliance with the administrative requirements of the Revenue Sharing final handicapped discrimination provisions contained in Section 51.55 (c), (d), (e), and (k)(5) of the Regulations. New construction or renovation projects must comply with Section 504 of the 1973 Rehabilitation Act, as amended, in accordance with the American National Standard Institute's specifications (ANSI A17.1-1961).

Jefferson Parish and its partners as the recipients of federal funds are fully committed to awarding a contract(s) to firm(s) that will provide high quality services and that are dedicated to diversity and to containing costs. Thus, Jefferson Parish strongly encourages the involvement of minority and/or woman-owned business enterprises (DBE's, including MBE's, WBE's and SBE's) to stimulate participation in procurement and assistance programs.

Advertised bids will be tabulated and a copy of the tabulation will be forwarded to each responding bidder.

IN ACCORDANCE WITH STATE REGULATIONS JEFFERSON PARISH OFFERS ELECTRONIC PROCUREMENT TO ALL VENDORS

This electronic procurement system allows vendors the convenience of reviewing and submitting bids online. This is a secure site and authorized personnel have limited read access only. Bidders are encouraged to submit electronically using this free service; while the website accepts various file types, one single PDF file containing all appropriate and required bid documents is preferred. Bidders submitting uploaded images of bid responses are solely responsible for clarity. If uploaded images/documents are not legible, then bidder's submission will be rejected. Please note all requirements contained in this bid package for electronic bid submission.

Please visit our E-Procurement Page at www.jeffparishbids.net to register and view Jefferson Parish solicitations. For more information, please visit the Purchasing Department page at <http://purchasing.jeffparish.net>.

The general specifications for construction projects and the purchase of materials, services and/or supplies are those adopted by the JEFFERSON PARISH Council by Resolution No. 113646 or 113647 dated 12/09/09. The general conditions adopted by this resolution shall be considered as much a part of this document as if they were written wholly herein. A copy may be obtained from the Office of the Parish Clerk, Suite 6700, Jefferson Parish General Government Building, 200 Derbigny Street, Gretna, LA 70053. You may also obtain a copy by visiting the Purchasing Department webpage at <http://purchasing.jeffparish.net> and clicking on Online Forms.

ADDITIONAL REQUIREMENTS FOR THIS BID

PLEASE MATCH THE NUMBERS PRINTED IN THIS BOX WITH THE CORRESPONDING INSTRUCTIONS BELOW.

1, 3, 4, 5, 6, 8, 10, 11, 12, 13, 15

MANDATORY

PRE-BID CONFERENCE TO BE HELD AT: *MANDATORY* 200 DERBIGNY ST., SUITE 4400
GRETNA, LA 70053 AT 10:00 AM
ON 9/14/2018

1. All bidders must attend the MANDATORY pre-bid conference and will be required to sign in and out as evidence of attendance. In accordance with LSA R.S. 38:2212(l), all prospective bidders shall be present at the beginning of the MANDATORY pre-bid conference and shall remain in attendance for the duration of the conference. Any prospective bidder who fails to attend the conference or remain for the duration shall be prohibited from submitting a bid for the project.
2. Attendance to this pre-bid conference is optional. However, failure to attend the pre-bid conference shall not relieve the bidder of responsibility for information discussed at the conference. Furthermore, failure to attend the pre-bid conference and inspection does not relieve the successful bidder from the necessity of furnishing materials or performing any work that may be required to complete the work in accordance with the specification with no additional cost to the owner.
3. Contractor must hold current applicable JEFFERSON PARISH licenses with the Department of Inspection and Code Enforcement. Contractor shall obtain any and all permits required by the JEFFERSON PARISH Department of Inspection and Code Enforcement. The contractor shall be responsible for the payment of these permits. All permits must be obtained prior to the start of the project. Contractor must also hold any and all applicable Federal and State licenses. Contractor shall be responsible for the payment of these permits and shall obtain them prior to the start of the project.
4. A LA State Contractor's License will be required in accordance with LSA R.S. 37-2150 et. seq. and such license number will be shown on the outside of the bid envelope. Failure to comply will cause the bid to be rejected. Additionally if submitting the bid electronically, then the license number must be entered in the appropriate field in the Electronic Procurement system. Failure to comply will cause the bid to be rejected.
5. It is the bidder's responsibility to visit the job site and evaluate the job before submitting a bid.
6. Job site must be clean and free of all litter and debris daily and upon completion of the contract. Passageways must be kept clean and free of material, equipment, and debris at all times. Flammable material must be removed from the job site daily because storage will not be permitted on the premises. Precautions must be exercised at all times to safeguard the welfare of JEFFERSON PARISH and the general public.

INSTRUCTIONS FOR BIDDERS AND GENERAL CONDITIONS

7. PUBLIC WORKS BIDS: All awards for public works in excess of \$5,000.00 will be reduced to a formal contract which shall be recorded at the contractor's expense with the Clerk of Court and Ex-Officio Recorder of Mortgages for the Parish of Jefferson. A price list of recordation costs may be obtained from the Clerk of Court and Ex-Officio Recorder of Mortgages for the Parish of Jefferson. All awards in excess of \$25,000.00 will require both a performance and a payment bond. Unless otherwise stated in the bid specifications, the performance bond requirements shall be 100% of the contract price. Unless otherwise stated in the bid specifications, the payment bond requirements shall be 100% of the contract price. Both bonds shall be supplied at the signing of the contract.
8. NON-PUBLIC WORKS BIDS: A performance bond will be required for this bid. The amount of the bond will be 100% of the contract price unless otherwise indicated in the specifications. The performance bond shall be supplied at the signing of the contract.
9. NON-PUBLIC WORKS BIDS: A payment bond will be required for this bid. The amount of the bond will be 100% of the contract price unless otherwise indicated in the specifications. The payment bond shall be supplied at the signing of the contract.
10. All bidders must comply with the requirements stated in the attached "Standard Insurance Requirements" sheet attached to this bid solicitation. Prior to contract execution/purchase order issuance, the successful bidder will be required to provide final insurance certificates which shall name Jefferson Parish as an additional insured in accordance with the instructions in the aforementioned "Standard Insurance Requirements" sheet.
11. A bid bond will be required with bid submission in the amount of 5% of the total bid, unless otherwise stated in the bid specifications. Acceptable forms shall be limited to cashier's check, certified check, or surety bid bond. All sureties must be in original format (no copies) If submitting a bid online, vendors must submit an electronic bid bond through the respective online clearinghouse bond management system(s) as indicated in the electronic bid solicitation on Central Auction House. No scanned paper copies of any bid bond will be accepted as part of the electronic bid submission.
12. This is a requirements contract to be provided on an as needed basis. JEFFERSON PARISH makes no representations on warranties with regard to minimum guaranteed quantities unless otherwise stated in the bid specifications.
13. Freight charges should be included in total cost when quoting. If not quoted FOB DELIVERED, freight must be quoted as a separate item. Bid may be rejected if not quoted FOB DELIVERED or if freight charges are not indicated on bid form.
14. PUBLIC WORKS BIDS - Completed, Signed and Properly Notarized Affidavits Required; This applies to all solicitations for construction, alteration or demolition of public buildings or projects, in conformity with the provisions contained in LSA-RS 38:2212.9, LSA-RS 38:2212.10, LSA-RS 38:2224, and Sec 2-923.1 of the Jefferson Parish Code of Ordinances. For bidding purposes, all bidders must submit with bid submission COMPLETED, SIGNED and PROPERLY NOTARIZED Affidavits, including: Non-Collusion Affidavit, Non-Collusion Affidavit, Campaign Contribution Affidavit, Debt Disclosures Affidavit and E-Verify Affidavit. For the convenience of vendors, all affidavits have been combined into one form entitled PUBLIC WORKS BID AFFIDAVIT. This affidavit must be submitted in its original format, and without material alteration, in order to be compliant and for the bid to be considered responsive. A scanned copy of the completed, signed and properly notarized affidavit may be submitted with the bid, however, the successful bidder must submit the original affidavit in its original format and without material alteration upon contract execution. Failure to comply will result in the bid submission being rejected as non-responsive. The Parish reserves the right to award bid to the next lowest responsive and responsible bidder in this event.
15. NON PUBLIC WORK BIDS - Completed, Signed and Properly Notarized Affidavits Required in conformity with the provisions contained in LSA - RS 38:2224 and Sec 2-923.1 of the Jefferson Parish Code of Ordinances. For bidding purposes, all bidders must submit with bid submission COMPLETED, SIGNED and PROPERLY NOTARIZED Affidavits, including: Non-Collusion Affidavit, Debt Disclosures Affidavit and Campaign Contribution Affidavit. For the convenience of vendors, all affidavits have been combined into one form entitled NON PUBLIC WORKS BID AFFIDAVIT. This affidavit must be submitted in its original format, and without material alteration, in order to be compliant and for the bid to be considered responsive. A scanned copy of the completed, signed and properly notarized affidavit may be submitted with the bid, however, the successful bidder must submit the original affidavit in its original format and without material alteration upon contract execution. Failure to comply will result in the bid submission being rejected as non-responsive. The Parish reserves the right to award bid to the next lowest responsive and responsible bidder in this event.
16. The ensuing contract for this bid solicitation may be eligible for FEMA reimbursement and/or Federal funding/reimbursement. As such, the referenced appendix will be applicable accordingly and shall be considered a part of the bid documents. All applicable certifications must be duly completed, signed and submitted with bid submission. Failure to submit applicable certifications with bid submission will result in bid rejection.
17. For this project, the Contractor shall not pay any state or local sales or use taxes on materials and equipment which are affixed and made part of the immovable property of the project or which permanently incorporated in the project (hereinafter referred to as "applicable materials and equipment"). All purchases of applicable materials or equipment shall be made by the contractor on behalf of and as the agent of Jefferson Parish (Owner), a political subdivision of the State of Louisiana. No state and local sales and use taxes are owned on applicable materials and equipment under the provisions of Act 1029 of the 1991 Regular Session - Louisiana Revised Statute 47:301(8)(c). Owner will furnish contractor a certificate form which certifies that Owner is not required to pay such state or local sales and use taxes, and contractor shall furnish a copy of such certificate to all vendors or suppliers of the applicable materials and equipment

It shall be the duty of every parish officer, employee, department, agency, special district, board, and commission: and the duty of every contractor, subcontractor, and licensee of the parish, and the duty of every applicant for certification of eligibility for a parish contract or program, to cooperate with the Inspector General in any investigation, audit, inspection, performance review, or hearing pursuant to Jefferson Parish Code of Ordinances Section 2-155.10(19). By submitting a bid, vendor acknowledges this and will abide by all provisions of the referenced Jefferson Parish Code of Ordinances.

All Public Work Projects are required to use the Louisiana Uniform Public Work Bid Form

All prices must be held firm unless an escalation provision is requested in this bid. Jefferson Parish will allow one escalation during the term of the contract, which may not exceed the U.S. Bureau of Labor Statistics National Index for all Urban Consumers, unadjusted 12 month figure. The most recently published figure issued at the time an adjustment is requested will be used. A request must be made in writing by the vendor, and the escalation will only be applied to purchases made after the request is made.

Are you requesting an escalation provision?

YES _____ NO

MAXIMUM ESCALATION PERCENTAGE REQUESTED 0 %

INITIAL BID PRICES WILL REMAIN FIRM THROUGH THE DATE OF 4-1-2019

For the purposes of comparison of bids when an escalation provision is requested, Jefferson Parish will apply the maximum escalation percentage quoted by the bidder to the period to which it is applied in the bid. The initial price and the escalation will be used to calculate the total bid price. It will be assumed, for comparison of prices only, that an equal amount of material or labor is purchased each month throughout the entire contract.

DELIVERY: FOB JEFFERSON PARISH

INDICATE DELIVERY DATE ON EQUIPMENT AND SUPPLIES

12-31-2018

LOUISIANA CONTRACTOR'S LICENSE NO.: (if applicable)

33486

THIS SECTION MUST BE COMPLETED BY BIDDER:

FIRM NAME: TRANE USA INC.

ADDRESS: 530 Elmwood Park Blvd

CITY, STATE: Harahan LA. ZIP: 70123

TELEPHONE: 504 434-3838 FAX: 504-731-0839

EMAIL ADDRESS: mbarbot@trane.com

In the event that addenda are issued with this bid, bidders MUST acknowledge all addenda on the bid form. Bidder must acknowledge receipt of an addendum on the bid form as indicated. Failure to acknowledge any addendum on the bid form will result in bid rejection.

Acknowledge Receipt of Addenda: NUMBER: ONE (1)
NUMBER: _____
NUMBER: _____
NUMBER: _____

TOTAL PRICE OF ALL BID ITEMS: \$ 185,000.⁰⁰/_{xx}

AUTHORIZED SIGNATURE: Theodore L. Mutzner

Theodore L. Mutzner
Printed Name

TITLE: Senior Contract Manager - Trane U.S. Inc.

SIGNING INDICATES YOU HAVE READ AND COMPLY WITH THE INSTRUCTIONS AND CONDITIONS.
NOTE: All bids should be returned with the BID NUMBER and BID OPENING DATE indicated on the outside of the envelope submitted to the Purchasing Department.

INVITATION TO BID FROM JEFFERSON PARISH - continued

BID NO.: 50-00123954

SEALED BID

ITEM NUMBER	QUANTITY	U/M	DESCRIPTION OF ARTICLES	UNIT PRICE QUOTED	TOTALS
1	1.00	EA	<p>PURCHASE OF WATER COOLED CHILLER WITH VARIABLE SPEED DRIVE AND REFRIGERANT PURGE SYSTEM, INCLUDING A FIVE (5) YEAR MAINTENANCE AGREEMENT, FOR THE JEFFERSON PARISH DEPARTMENT OF GENERAL SERVICES</p> <p>0010 - 350-TON WATER COOLED CHILLER (MAG DRIVE CENTRIFUGAL) CENTRAL PLANT</p> <p>WE EXTEND THIS BID TO PROVIDE AND DELIVER ONE (1) NEW MAG DRIVE CENTRIFUGAL YMC2 YORK 350 CENTRIFUGAL WATER COOLED CHILLER WITH VARIABLE SPEED FOR CENTRAL PLANT LOCATED AT 960 1ST STREET, GRETNA, LA FOR THE DEPARTMENT OF GENERAL SERVICES AS PER THE ATTACHED SPECIFICATIONS.</p> <p>OWNER WILL INSTALL</p>	<p>\$185,000.00 \$185,000.00</p>	<p>185,000.00 185,000.00</p>

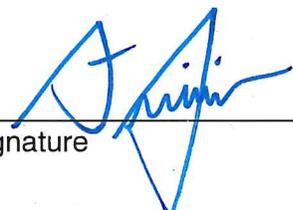


Trane
3600 Pammel Creek Road
La Crosse, WI 54601 USA
T (608) 787-2000
www.irco.com

CERTIFICATE

I, Scott Smillie, Assistant Secretary of Trane U.S. Inc., One Centennial Avenue, Piscataway, NJ 08855, a Delaware Corporation, do hereby certify that Theodore L. Mutzner who executed the attached document is Senior Contract Manager of Trane U.S. Inc., and that he is duly authorized to execute such documents on behalf of the Corporation.

Corporate
Seal



Signature

9/25/18

Date

Non-Public Works Bid

AFFIDAVIT

STATE OF Wisconsin

PARISH/COUNTY OF La Crosse

BEFORE ME, the undersigned authority, personally came and appeared: _____
Theodore L. Mutzner, (Affiant) who after being by me duly sworn, deposed and said that
he/she is the fully authorized Senior Contract Manager of Trane U.S. Inc. (Entity),
the party who submitted a bid in response to Bid Number 50-00123954, to the Parish of
Jefferson.

Affiant further said:

Campaign Contribution Disclosures

(Choose A or B, if option A is indicated please include the required attachment):

Choice A _____ Attached hereto is a list of all campaign contributions, including the date and amount of each contribution, made to current or former elected officials of the Parish of Jefferson by Entity, Affiant, and/or officers, directors and owners, including employees, owning 25% or more of the Entity during the two-year period immediately preceding the date of this affidavit or the current term of the elected official, whichever is greater. Further, Entity, Affiant, and/or Entity Owners have not made any contributions to or in support of current or former members of the Jefferson Parish Council or the Jefferson Parish President through or in the name of another person or legal entity, either directly or indirectly.

Choice B X there are **NO** campaign contributions made which would require disclosure under Choice A of this section.

Debt Disclosures

(Choose A or B, if option A is indicated please include the required attachment):

Choice A _____ Attached hereto is a list of all debts owed by the affiant to any elected or appointed official of the Parish of Jefferson, and any and all debts owed by any elected or appointed official of the Parish to the Affiant.

Choice B X _____ There are NO debts which would require disclosure under Choice A of this section.

Affiant further said:

That Affiant has employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the Affiant whose services in connection with the construction, alteration or demolition of the public building or project or in securing the public contract were in the regular course of their duties for Affiant; and

[The remainder of this page is intentionally left blank.]

That no part of the contract price received by Affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the Affiant whose services in connection with the construction, alteration or demolition of the public building or project were in the regular course of their duties for Affiant.



Signature of Affiant

Theodore L. Mutzner

Printed Name of Affiant

SWORN AND SUBSCRIBED TO BEFORE ME

ON THE 25th DAY OF September, 2018.



Notary Public

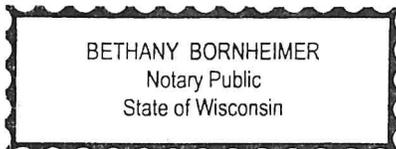
Bethany Bornheimer

Printed Name of Notary

224326

Notary/Bar Roll Number

My commission expires 3/15/22.



Request for Taxpayer Identification Number and Certification

Give Form to the
requester. Do not
send to the IRS.

Print or type See Specific Instructions on page 2.	1 Name (as shown on your income tax return). Name is required on this line, do not leave this line blank. Trane U.S., Inc	
	2 Business name/disregarded entity name (if different from above)	
	3 Check appropriate box for federal tax classification; check only one of the following seven boxes: <input type="checkbox"/> Individual/sole proprietor or single-member LLC <input checked="" type="checkbox"/> C Corporation <input type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate <input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶ _____ <small>Note. For a single-member LLC that is disregarded, do not check LLC; check the appropriate box in the line above for the tax classification of the single-member owner.</small> <input type="checkbox"/> Other (see instructions) ▶ _____	
	4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3): Exempt payee code (if any) _____ Exemption from FATCA reporting code (if any) _____ <small>(Applies to accounts maintained outside the U.S.)</small>	
	5 Address (number, street, and apt. or suite no.) 530 Elmwood Park Blvd	Requester's name and address (optional)
	6 City, state, and ZIP code Harahan, LA 70123	
	7 List account number(s) here (optional)	

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the instructions for line 1 and the chart on page 4 for guidelines on whose number to enter.

Social security number											
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> </tr> </table>											
or											
Employer identification number											
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px; text-align: center;">2</td> <td style="width: 20px; height: 20px; text-align: center;">5</td> <td style="width: 20px; height: 20px; text-align: center;">-</td> <td style="width: 20px; height: 20px; text-align: center;">0</td> <td style="width: 20px; height: 20px; text-align: center;">9</td> <td style="width: 20px; height: 20px; text-align: center;">0</td> <td style="width: 20px; height: 20px; text-align: center;">0</td> <td style="width: 20px; height: 20px; text-align: center;">4</td> <td style="width: 20px; height: 20px; text-align: center;">6</td> <td style="width: 20px; height: 20px; text-align: center;">5</td> </tr> </table>	2	5	-	0	9	0	0	4	6	5	
2	5	-	0	9	0	0	4	6	5		

Part II Certification

Under penalties of perjury, I certify that:

- The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
- I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
- I am a U.S. citizen or other U.S. person (defined below); and
- The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

Sign Here	Signature of U.S. person ▶	Date ▶ 1/2/18
------------------	----------------------------	---------------

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.
 Future developments. Information about developments affecting Form W-9 (such as legislation enacted after we release it) is at www.irs.gov/fw9

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following:

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)

- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See *What is backup withholding?* on page 2.

By signing the filled out form, you:

- Certify that the TIN you are giving is correct (or you are waiting for a number to be issued);
- Certify that you are not subject to backup withholding, or
- Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
- Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting?* on page 2 for further information.



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
9/17/2018

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER MARSH & MCLENNAN COMPANIES 1166 Avenue of the Americas New York NY 10036 ATTN: 212-345-6000	CONTACT NAME: Sadé Henry PHONE (A/C, No., Ext): (212) 345-8387 E-MAIL ADDRESS: sade.henry@marsh.com FAX (A/C, No): (212) 948-1293
	INSURER(S) AFFORDING COVERAGE COMPANY A: National Union Fire Insurance Company of Pittsburgh, PA COMPANY B: Travelers Indemnity Co of America COMPANY C: Travelers Property Casualty Co of Amer
INSURED Trane U.S. Inc. dba Trane 530 Elmwood Park Blvd. Harahan, LA 70123 United States	

COVERAGES **CERTIFICATE NUMBER:** 493800 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> Contractual Liability <input checked="" type="checkbox"/> Time Element Pollution Liability GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:			GL 4611590	4/17/2018	4/17/2019	EACH OCCURRENCE \$7,500,000.00 DAMAGE TO RENTED PREMISES (Ea occurrence) \$1,000,000.00 MED EXP (Any one person) \$10,000.00 PERSONAL & ADV INJURY \$7,500,000.00 GENERAL AGGREGATE \$7,500,000.00 PRODUCTS - COMP/OP AGG \$7,500,000.00 \$
A A A	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> PHYSICAL DAMAGE/SELF <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> NON-OWNED AUTOS APD - Self Insured			CA7742202 (AOS) CA7742201 (MA) CA7742200 (VA) APD - Self Insured	4/17/2018 4/17/2018 4/17/2018	4/17/2019 4/17/2019 4/17/2019	COMBINED SINGLE LIMIT (Ea accident) \$5,000,000.00 BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) \$
	UMBRELLA LIAB EXCESS LIAB DED RETENTION \$						EACH OCCURRENCE AGGREGATE \$
B B C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N	N/A	TC2HUB-7434L10A-18 (AOS) TC2HUB-7434L448-18 (MN) TRJUB-7434L424-18 (AZ, MA, OR, WI) TWXJUB-7434L45A-18 (OH Excess)	4/17/2018 4/17/2018 4/17/2018 4/17/2018	4/17/2019 4/17/2019 4/17/2019 4/17/2019	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$3,000,000.00 E.L. DISEASE - EA EMPLOYEE \$3,000,000.00 E.L. DISEASE - POLICY LIMIT \$3,000,000.00

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Please see page 2 for additional information.

CERTIFICATE HOLDER Jefferson Parish General Services 200 Derbigny Street Gretna, Louisiana 70054 United States	CANCELLATION SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE Marsh USA, Inc. BY: Michaela Grasshoff 
---	--



ADDITIONAL REMARKS SCHEDULE

AGENCY	NAMED INSURED Trane U.S. Inc. dba Trane 530 Elmwood Park Blvd. Harahan, LA 70123 United States
EFFECTIVE DATE:	

ADDITIONAL REMARKS

THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,

FORM NUMBER: _____ FORM TITLE: _____

Jefferson Parish General Services , Jefferson Parish General Services, Jefferson Parish, its Districts, Departments and Agencies under the direction of the Parish President and Parish Council are included as Additional Insured where required by contract with respect to General Liability pursuant to applicable endorsement.

Job Description: JEFFERSON PARISH GENERAL SERVICES BID NO. 50-00123954

For questions regarding this certificate of insurance contact: Janice Ferina Email: jferina@trane.com Phone: 504-733-6789

ENDORSEMENT # MAN001

This endorsement, effective 12:01 A.M. 04/17/2018 forms a part of
policy No. GL 461-15-90 issued to INGERSOLL-RAND COMPANY
BY NATIONAL UNION FIRE INSURANCE COMPANY OF PITTSBURGH, PA

ADDITIONAL INSURED - WHERE REQUIRED UNDER CONTRACT OR AGREEMENT

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE FORM

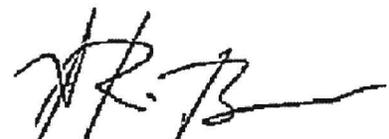
SECTION II – WHO IS AN INSURED, is amended to include as an additional insured:

- (1) Any person or organization to whom you become obligated to include as an additional insured under this policy, as a result of any written contract or agreement you enter into which requires you to furnish insurance to that person or organization of the type provided by this policy, but only with respect to liability to the extent caused by you and arising out of your operations, including both continuing and completed operations, or premises owned by or rented to you; or
- (2) Any designated person or organization, designated by you in writing to us, but only with respect to liability to the extent caused by you and arising out of your operations or premises owned by or rented to you and provided the "bodily injury", "property damage" or "personal and advertising injury" occurs subsequent to your written request to designate such person or organization as additional insured.

However, the insurance provided will not exceed the lesser of:

- The coverage and/or limits of this policy, or
- The coverage and/or limits required by said contract or agreement.

All other terms and conditions remain unchanged.



Authorized Representative

State of Louisiana



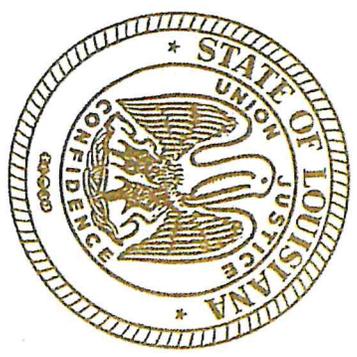
State Licensing Board for Contractors

This is to Certify that:

TRANE U.S. INC.
530 Elmwood Park Blvd.
Harahan, LA 70123

is duly licensed and entitled to practice the following classifications

BUILDING CONSTRUCTION; ELECTRICAL WORK (STATEWIDE); MECHANICAL WORK (STATEWIDE)



Expiration Date: April 16, 2021

License No: 33486

Witness our hand and seal of the Board dated,
Baton Rouge, LA 17th day of April 2018


Director


Chairman

This License Is Not Transferrable


Treasurer

Letter of Transmittal



Date: September 20, 2018

Via: UPS Overnight

To: Michael Barbot

c/o Trane U.S. Inc.
530 Elmwood Park Boulevard
Harahan, Louisiana 70123

Tel.: (504) 858-8179

From: Baron Vogelsberg
Contract Analyst
Trane U.S. Inc.
3600 Pammel Creek Road
La Crosse, WI 54601
Tel.: (608) 787-2037

Re: Jefferson Parish - Chiller Replacement Bid

Hello Michael,

Attached herewith please find:

- Original Bid Bond

Please do not hesitate to contact me if you have any questions.

Best regards,


Baron

 **AIA** Document A310™ – 2010

Bid Bond

CONTRACTOR:

(Name, legal status and address)

TRANE U.S. INC.
3600 Pammel Creek Rd.
LaCrosse, WI 54601

SURETY:

(Name, legal status and principal place of business)

WESTCHESTER FIRE INSURANCE COMPANY
436 Walnut Street, WA10H
Philadelphia, PA 19106

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

OWNER:

(Name, legal status and address)

JEFFERSON PARISH
Department of Purchasing
200 Derbigny Street, General Government, Suite 4400, Gretna, LA 70053

BOND AMOUNT: Five percent of amount bid.
(5% of Amount Bid)

PROJECT:

(Name, location or address, and Project number, if any)

Chiller Replacement Central Plant - Bid Number 50-00123954

Project Number, if any:

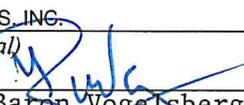
The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this 19th day of September, 2018


(Witness) Shay O'Brien

TRANE U.S. INC.
(Principal)  *(Seal)*
(Title) Baron Vogelsberg - Contract Analyst


(Witness) Mary L. Padilla

WESTCHESTER FIRE INSURANCE COMPANY
(Surety)  *(Seal)*
(Title) Francesca Kazmierczak, Attorney in Fact

Power of Attorney

Westchester Fire Insurance Company | ACE American Insurance Company

Know All by These Presents, that WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY corporations of the Commonwealth of Pennsylvania, do each hereby constitute and appoint Debra A. Deming, Sandra Diaz, Cynthia Farrell, Peter Healy, Francesca Kazmierczak, Kristine Mendez, Aklima Noorhassan, Edward Reilly, Frances Rodriguez and Nancy Schnee of New York, New York-----

each as their true and lawful Attorney-in-Fact to execute under such designation in their names and to affix their corporate seals to and deliver for and on their behalf as surety thereon or otherwise, bonds and undertakings and other writings obligatory in the nature thereof (other than bail bonds) given or executed in the course of business, and any instruments amending or altering the same, and consents to the modification or alteration of any instrument referred to in said bonds or obligations.

In Witness Whereof, WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY have each executed and attested these presents and affixed their corporate seals on this 14th day of August, 2018.

Dawn M. Chloros

Dawn M. Chloros, Assistant Secretary

Stephen M. Haney

Stephen M. Haney, Vice President



STATE OF NEW JERSEY

County of Hunterdon

ss.

On this 14th day of August, 2018, before me, a Notary Public of New Jersey, personally came Dawn M. Chloros, to me known to be Assistant Secretary of WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY, the companies which executed the foregoing Power of Attorney, and the said Dawn M. Chloros, being by me duly sworn, did depose and say that she is Assistant Secretary of WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY and knows the corporate seals thereof, that the seals affixed to the foregoing Power of Attorney are such corporate seals and were thereto affixed by authority of said Companies; and that she signed said Power of Attorney as Assistant Secretary of said Companies by like authority; and that she is acquainted with Stephen M. Haney, and knows him to be Vice President of said Companies; and that the signature of Stephen M. Haney, subscribed to said Power of Attorney is in the genuine handwriting of Stephen M. Haney, and was thereto subscribed by authority of said Companies and in deponent's presence.

Notarial Seal



KATHERINE J. ADELAAR
NOTARY PUBLIC OF NEW JERSEY
No. 2318885
Commission Expires July 16, 2019

Katherine J. Adelaar
Notary Public

CERTIFICATION

Resolutions adopted by the Boards of Directors of WESTCHESTER FIRE INSURANCE COMPANY on December 11, 2006 ; ACE AMERICAN INSURANCE COMPANY on March 20, 2009:

"RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into in the ordinary course of business (each a "Written Commitment"):

- (1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.
(2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such person's written appointment as such attorney-in-fact.
(3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
(4) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing to any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
(5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested."

I, Dawn M. Chloros, Assistant Secretary of WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY (the "Companies") do hereby certify that

- (i) the foregoing Resolutions adopted by the Board of Directors of the Companies are true, correct and in full force and effect,
(ii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Whitehouse Station, NJ, this 19th day of September, 2018.



Dawn M. Chloros

Dawn M. Chloros, Assistant Secretary

IN THE EVENT YOU WISH TO VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT:
Telephone (908) 903-3493 Fax (908) 903-3656 e-mail: surety@chubb.com

WESTCHESTER FIRE INSURANCE COMPANY

FINANCIAL STATEMENT

DECEMBER 31, 2017

ADMITTED ASSETS

BONDS	\$1,414,055,830
SHORT - TERM INVESTMENTS	-
STOCKS	43,460
REAL ESTATE	0
CASH ON HAND AND IN BANK	(10,076,502)
PREMIUM IN COURSE OF COLLECTION*	61,431,233
INTEREST ACCRUED	14,694,454
OTHER ASSETS	175,574,508
TOTAL ASSETS	<u>\$1,655,722,983</u>

LIABILITIES

RESERVE FOR UNEARNED PREMIUMS	\$192,425,216
RESERVE FOR LOSSES	770,552,343
RESERVE FOR TAXES	13,754,897
FUNDS HELD UNDER REINSURANCE TREATIES	5,757,334
OTHER LIABILITIES	(8,973,613)
TOTAL LIABILITIES	<u>973,516,177</u>
CAPITAL: 70,000 SHARES, \$71.43 PAR VALUE	5,000,100
CAPITAL: PAID IN	187,192,131
AGGREGATE WRITE-INS FOR SPECIAL SURPLUS FUNDS	117,350,928
SURPLUS (UNASSIGNED)	372,663,647
SURPLUS TO POLICYHOLDERS	<u>682,206,806</u>
TOTAL	<u>\$1,655,722,983</u>

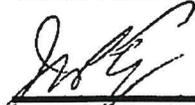
(*EXCLUDES PREMIUM MORE THAN 90 DAYS DUE.)

STATE OF PENNSYLVANIA

COUNTY OF PHILADELPHIA

John Taylor, being duly sworn, says that he is Senior Vice President of Westchester Fire Insurance Company and that to the best of his knowledge and belief the foregoing is a true and correct statement of the said Company's financial condition as of the 31 st day of December, 2017.

Sworn before me this 14th March 2018



Senior Vice President



Notary Public

August 8, 2019
My commission expires
COMMONWEALTH OF PENNSYLVANIA

NOTARIAL SEAL
Diane Wright, Notary Public
City of Philadelphia, Philadelphia County
My Commission Expires Aug. 8, 2019
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES



TRANE

Jefferson Parish Central Plant 350 Ton Chiller Submittal

Prepared For:
Jefferson Parish

Date: September 18, 2018

Jefferson Parish Bid Number: 50-00123954

Job Name:
JP CP Bid 18
100 Dolhonde Street
GRETNA, LA 70054

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

Product Summary

Qty	Product
1	Centrifugal Chiller Water-Cooled Agility

Submittal Notes

Chiller Performance Notes:

- Trane Full Load Efficiency (kW/Ton) of 0.5438 vs. Basis Full Load Efficiency (kW/Ton) of 0.5680.
 - 4.26% More Efficient than Basis of Design at Full Load.
- Trane Part Load Efficiency (NPLV) of 0.3296 vs. Basis Part Load Efficiency (NPLV) of 0.3519.
 - 6.37% More Efficient than Basis of Design at Part Load.

General Notes:

- Jefferson Parish is to Coordinate/Verify all electrical.
- Performance is based on Jefferson Parish Bid Package – 50-00123954.
- Any changes need to be re-coordinated with all parties.
- Jefferson Parish is to approve all submittals before ordering.

Startup Notes

- Please refer to Installation, Operation, and Maintenance Manual for Startup Checklist/Procedure. Checklist/Procedure must be fully completed before unit can be started up.

Production/Lead Time:

- Estimated 11 to 12 weeks from order release.
- Lead time to be confirmed at time of order.

Michael Barbot | James Bellou
Trane
530 Elmwood Park Blvd.
New Orleans, LA 70123
Phone: (504) 733-6789
Fax: (504) 731-0833

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.

Table Of Contents

Product Summary 1

Centrifugal Chiller Water-Cooled Agility (Item A1)

 Tag Data 3

 Product Data 3

 Performance Data 4

 Mechanical Specifications 6

 Unit Dimensions 11

 Weight, Clearance & Rigging Diagram 16

 Accessory 18

 Field Wiring 19

Field Installed Options - Part/Order Number Summary

 Centrifugal Chiller Water-Cooled Agility 21

Tag Data - Centrifugal Chiller Water-Cooled Agility (Qty: 1)

Item	Tag(s)	Qty	Description	Model Number
A1	350T	1	Centrifugal Chiller Water-Cooled Agilit	HDWA400

Product Data - Centrifugal Chiller Water-Cooled Agility**Item: A1 Qty: 1 Tag(s): 350 Ton Machine**

Startup Included - Trane Service must start equipment for warranty to be honored

Centrifugal water cooled high speed direct drive

Compressor size: 400 nominal tons

Incoming line voltage: 460 volt

Incoming line frequency: 60 Hz

Uncoated tubesheet and waterbox

Evaporator tubes: 0.75 inch (19.1 mm) dia. internally enhanced copper

Evaporator waterbox pressure: 150 psig (1034 kPa)

Evaporator water box passes: Two pass

Evaporator waterbox type: Non-marine

Evaporator waterbox connection: Victaulic

Evaporator fluid type: Water

Thermal dispersion flow switch (IFM) - Field Installed (Fld)

Uncoated tubesheet and waterbox

Condenser tube: 0.75 inch (19.1 mm) internally enhanced copper

Condenser waterbox pressure: 150 psig (1034 kPa)

Condenser water box passes: Two pass

Condenser water box type: non-marine

Condenser waterbox connection: Victaulic

Condenser fluid type: Water

Thermal dispersion flow switch (IFM) - Field Installed (Fld)

Agency listing: U.L. listed unit (United States requirement)

Green Seal certified

Complies with ASHRAE 90.1-2013

Factory Installed Insulation package

BACnet interface

Trane Supplied Refrigerant

R134A Refrigerant

Liquid cooled AFD

Unit mounted adaptive frequency drive

With harmonic filter option

5 year parts, labor, refrigerant warranty whole unit

Hinged Water boxes

Performance Data - Centrifugal Chiller Water-Cooled Agility

Tags	350T
Compressor motor RLA (A)	458.90
Cooling capacity (tons)	350.00
Refrigerant charge (lb)	800.0
Shipping weight (lb)	14402.0
Operating weight (lb)	16915.0
Primary power (kW)	190.30
Primary RLA (Incoming line) (A)	252.90
Motor locked rotor amps (A)	1000.00
Minimum circuit ampacity (A)	315.00
Maximum overcurrent protection (A)	500.00
1st stage impeller cutback ()	7.874
2nd stage impeller cutback ()	6.850
Primary efficiency (kW/ton)	0.5438
NPLV (kW/ton)	0.3296
Evaporator entering fluid temp (F)	53.99
Evaporator minimum fluid flow rate (gpm)	291.70
Evaporator leaving fluid temp (F)	44.00
Evaporator fluid flow rate (gpm)	837.00
Evaporator pressure drop (ft H2O)	13.10
Evaporator fouling factor (hr-sq ft-deg F/ Btu)	0.000100
Evaporator fluid concentration (%)	0.00
Condenser entering fluid temp (F)	85.00
Condenser leaving fluid temp (F)	94.19
Condenser fluid flow rate (gpm)	1059.00
Condenser pressure drop (ft H2O)	11.68
Condenser fouling factor (hr-sq ft-deg F/ Btu)	0.000250
Condenser fluid concentration (%)	0.00
Chiller heat rejected to ambient (Btu/hr)	0.27
AFD heat rejected to ambient (MBh)	15.24
Unit center of gravity X (in)	30.000
Unit center of gravity Y (in)	34.000
Unit center of gravity Z (in)	43.000
Left front isolator load (lb)	3877.0
Left rear isolator load (lb)	5438.0
Right front isolator load (lb)	2975.0
Right rear isolator load (lb)	4372.0
Compressor weight (lb)	2743.0
Motor weight (lb)	322.0
Frequency drive weight (lb)	2585.0
Suction elbow weight (lb)	111.0
Economizer weight (lb)	187.0
Evaporator weight (lb)	2768.0
Evaporator water boxes weight (lb)	398.0
Condenser weight (lb)	3494.0
Condenser water boxes weight (lb)	363.0
Miscellaneous weight (lb)	1185.0
Evaporator maximum fluid flow rate (gpm)	1666.00
Evaporator pressure drop maximum flow (ft H2O)	45.58
Evaporator pressure drop minimum flow (ft H2O)	1.61
Condenser maximum fluid flow rate (gpm)	2167.90
Condenser pressure drop maximum flow (ft H2O)	42.40
Condenser minimum fluid flow rate (gpm)	591.20
Condenser pressure drop minimum flow (ft H2O)	4.18
Sound Pressure with Constant Cond @100% (dBA)	79.3
Sound Pressure with Constant Cond @75% (dBA)	79.8

Tags	350T
Sound Pressure with Constant Cond @50% (dBA)	83.2
Sound Pressure with Constant Cond @25% (dBA)	81.9
Sound Pressure with AHRI Relief @100% (dBA)	78.1
Sound Pressure with AHRI Relief @75% (dBA)	73.2
Sound Pressure with AHRI Relief @50% (dBA)	71.2
Sound Pressure with AHRI Relief @25% (dBA)	74.4

Octave Band Sound Data

	100%	75%	50%	25%
	Pa	Pa	Pa	Pa
	dB	dB	dB	dB
31.5	60.3	58.8	58.2	62.9
63	59.2	57.6	57.3	59.1
125	63.9	60.7	68.8	67.4
250	71.6	73.6	63.5	66.9
500	73.8	71.8	68.2	68.0
1000	71.2	66.3	65.6	69.4
2000	72.1	64.7	64.8	69.6
4000	70.3	64.6	61.4	62.5
8000	64.8	59.4	55.0	55.2

Mechanical Specifications - Centrifugal Chiller Water-Cooled Agility**Item: A1 Qty: 1 Tag(s): 350T****General**

The chiller is completely factory-packaged including the compressor, motor, evaporator, condenser, unit controller, economizer, and all interconnecting chiller piping and wiring. A control power transformer is standard and supplies all the auxiliary power needs for chiller mounted devices. The adaptiview frequency drive (AFD) is integral to the chiller as standard.

Evaporator-Condenser

Shells are carbon steel plate. Evaporator and condenser include relief devices per ASME Section VIII, Div.1 / 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. 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 (300.00 psi condenser / 200.00 psi evaporator 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 chillers nameplate refrigerant charge and the quantity of refrigerant charge shipped in the unit or 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 and condensers have one vent and one drain. If grooved connections are offered, the design is based on Style 77.

Economizer

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

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 or 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 or contact local Trane sales office.

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 Agility (TM). It is a factory mounted package including a full complement of controls to safely and efficiently operate the Agility chiller, including interface to the starter, and comprehensive motor protection. Inlet and outlet water (fluid) temperature sensors are located in the evaporator and condenser water box 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. Class 1 control panel voltage (30-115V) is clearly labeled. Class 2 input voltage (30V max) is also labeled.

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 temperatures
- *evaporator refrigerant pressure
- *condenser entering and leaving water temperatures
- *condenser saturated refrigerant temperatures
- *condenser approach temperatures
- *condenser refrigerant pressure
- *AFD average motor current %RLA
- *motor winding temperatures
- *AFD output power

The AdaptiView also contains the following dedicated reports:

Evaporator, Condenser, Compressor Motor, 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
- *preparing shutdown
- *shutting down
- *stopped

Safeties Including:

Automatic safety shutdown for:

- *low chilled water temperature
- *low evaporator refrigerant pressure
- *high condenser refrigerant pressure
- *evaporator and condenser flow status
- *high motor temperature
- *AFD function faults
- *critical temperature and pressure sensor faults
- *AFD motor current overload

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.

Surge protection - avoids surge by changing operating conditions through speed and inlet guide vane adjustments. 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 customer 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.

Hardwire BAS Interface includes:

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

Operating Status

The following hardwire binary outputs are available:

Compressor running relay

Alarm relay - manual reset

Alarm relay - auto reset

Head relief request relay

Maximum capacity relay

AFD interrupt failure

Paint

All Agility(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. Enough pads are provided to cover the area under the chiller supports.

Shipment

All units are of hermetic design, leak tested, factory charged with refrigerant, or charged to 5.00 psi dry nitrogen and shipped as a single factory assembled package. The entire chiller is shrink wrapped for protection.

Trane Adaptive Frequency Drive (AFD)

The Trane AFD is a closed-loop, hybrid air and liquid 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 Agility(TM) 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.

AFD Design Features:

*NEMA 1 ventilated enclosure with hinged, locking door is tested to a short circuit rating of 65,000 Amps. It includes a padlock-able 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%, or as an option 600/60/3

*Displacement power factor of 0.98 at full load and 0.96 at part load.

*Minimum efficiency of 97% at rated load

*Full motor voltage (460/480 +/- 10%) is applied regardless of the input voltage

*Soft-start; linear acceleration; coast to stop

*Adjustable output frequency from 100 to 308 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

*Optional harmonic attenuation - integrated passive 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

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:

*chiller load command

*demand limit

*magnetic bearing backup 120 VAC power

Digitally displayed on the AdaptiView panel:

*AFD average motor current %RLA

*AFD motor current U, V, and W

*motor winding temperatures

*compressor percent speed

*AFD heatsink temperature

*AFD DC bus voltage

*AFD output power

*AFD cooling supply temperature

*AFD cooling valve percent open

Environmental Ratings:

*32.0 F to 104.0 F operating ambient temperature

*Altitude to 3300 ft (1000 meters). When operating at maximum ambient temperature, de-rate output current by 4% per 1000 meters to 3000 meters. When operating at maximum current rating, de-rate ambient temperature 1.2 degrees C per 1000 meters above rated altitude to 3000 meters.

*Humidity 95% non-condensing

Required Installer Responsibilities

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

-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 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 the unit can operate only when waterflow 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 of 25 lb. per machine and dry nitrogen of 50.0 lb. per machine for pressure testing under manufacturer's supervision.

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

-Where specified, insulate evaporator and any other portions of the 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, pre-piping of water connections closer than 36" is not recommended. Any problems associated with pre-piping of water connections closer than 36" to the chiller are the responsibility of the installing contractor.

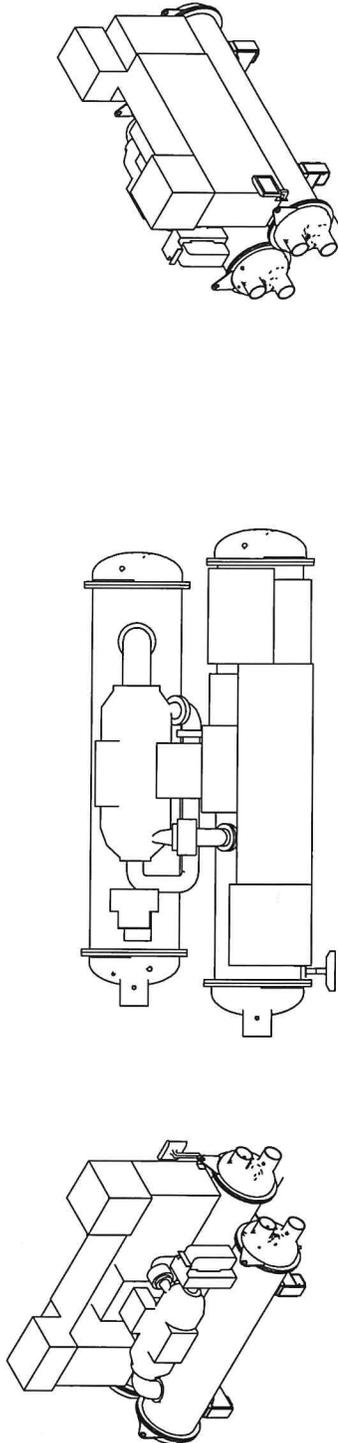
-Furnish and install vent lines for evaporator and condenser relief devices venting to atmosphere per ASHRAE 15 and unit installation manual.

Field Disassembly

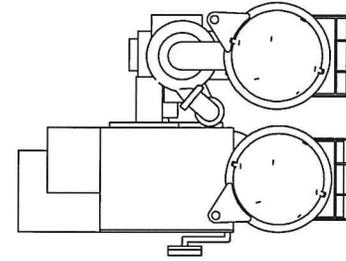
With chillers that may require field disassembly (for example due to clearance concerns during unit installation), reference the Disassembly and Reassembly manual and your Trane Sales representative prior to the order being placed. Caution: if certain components are removed in the field, for example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

Unit Dimensions - Centrifugal Chiller Water-Cooled Agility
Item: A1 Qty: 1 Tag(s): 350T

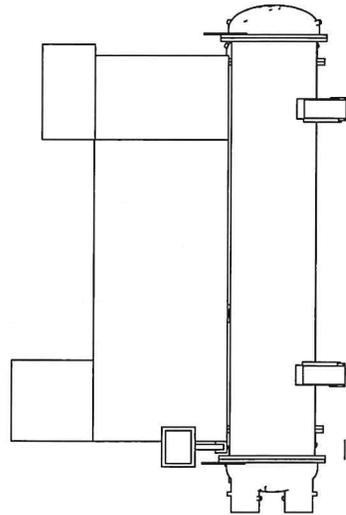
Model HDWA
 Nominal tons 400



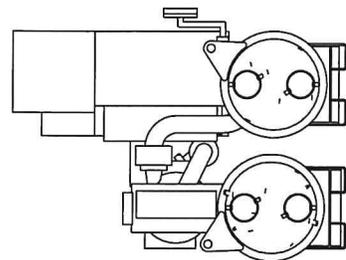
TOP VIEW



RIGHT SIDE VIEW



FRONT VIEW



LEFT SIDE VIEW

CUSTOMER NOTES:

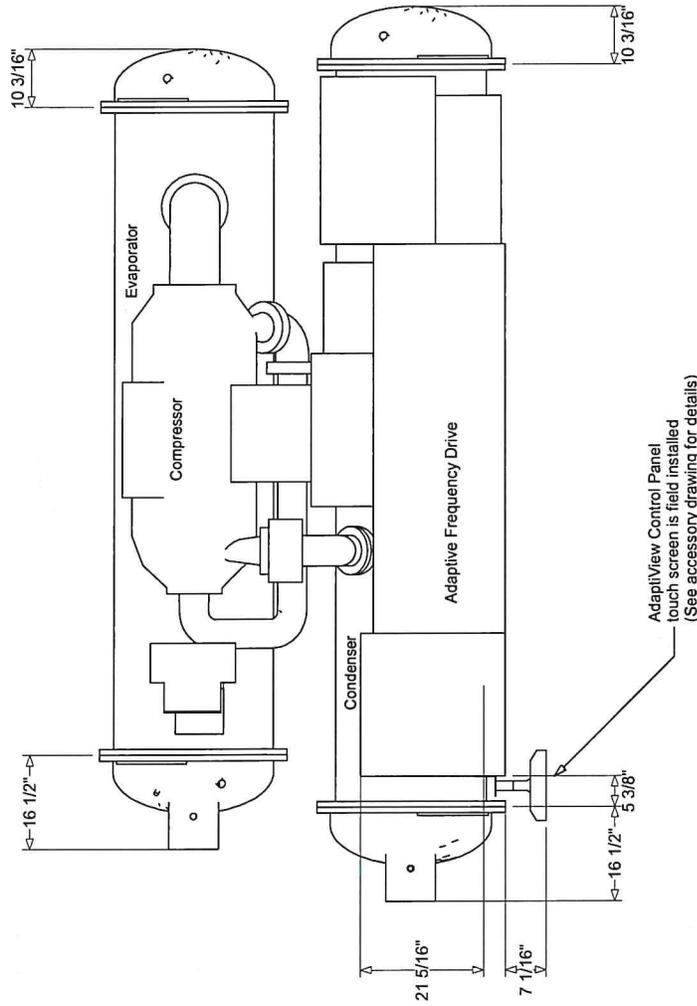
GRAPHICS ON SUBMITTAL ARE SIMPLIFIED TO SHOW MAJOR ENVELOPE COMPONENTS. UNIT STRUCTURE AND SUBCOMPONENTS MAY BE REMOVED FOR CLARITY.

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.

SHELL TYPE	CONN DIA	CONN TYPE	FLOW DIRECTION
EVAPORATOR CONDENSER	8" 8"	VICTAULIC VICTAULIC	IN BOTTOM OUT TOP IN BOTTOM OUT TOP

Unit Dimensions - Centrifugal Chiller Water-Cooled Agility
Item: A1 Qty: 1 Tag(s): 350T

Model HDWA
 Nominal tons 400



TOP VIEW

SHELL TYPE	CONN DIA	CONN TYPE	FLOW DIRECTION
EVAPORATOR	8"	VICTAULIC	IN BOTTOM OUT TOP
CONDENSER	8"	VICTAULIC	IN BOTTOM OUT TOP

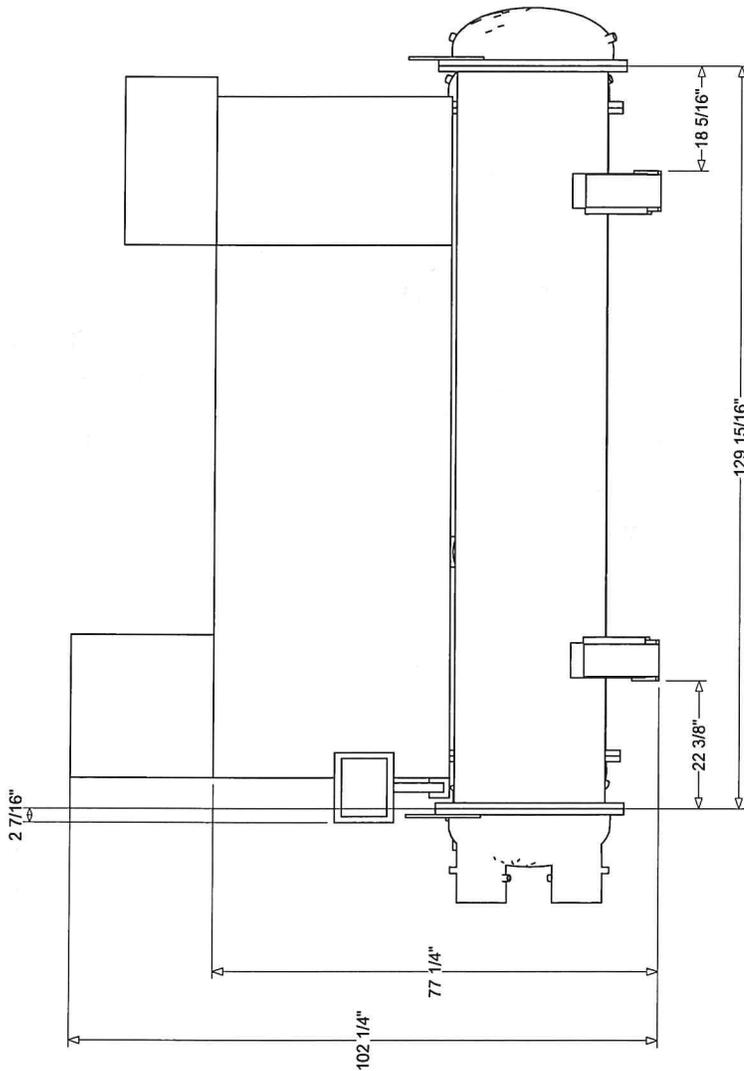
CUSTOMER NOTES:

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

UNLESS OTHERWISE SPECIFIED DIMENSIONAL TOLERANCE +/- 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.

Unit Dimensions - Centrifugal Chiller Water-Cooled Agility
Item: A1 Qty: 1 Tag(s): 350T

Model HDWA
 Nominal tons 400



FRONT VIEW

CUSTOMER NOTES:

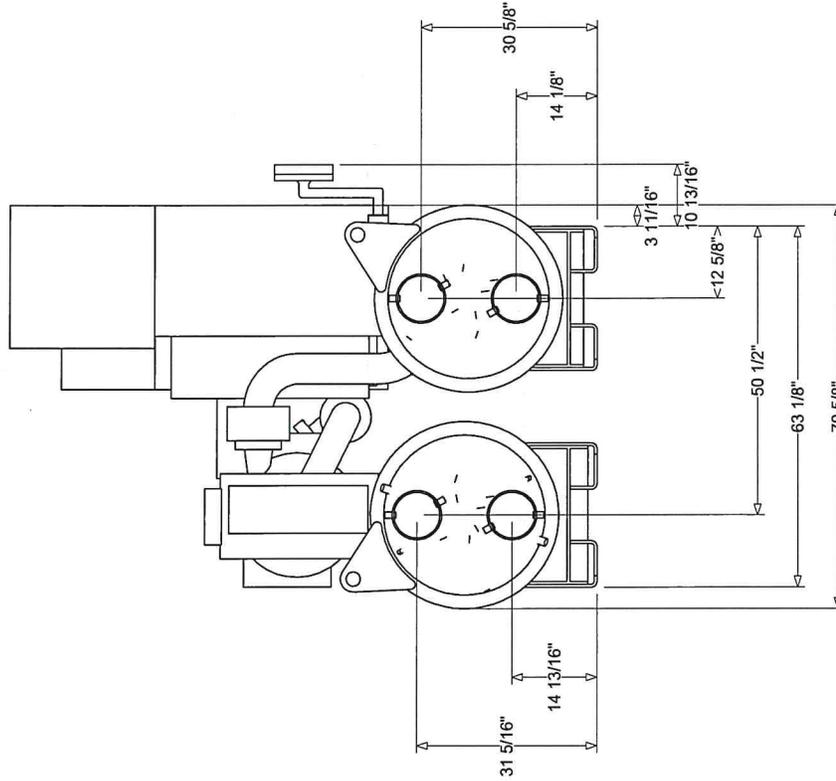
GRAPHICS ON SUBMITTAL ARE SIMPLIFIED TO SHOW MAJOR ENVELOPE COMPONENTS.
 UNIT STRUCTURE AND SUBCOMPONENTS MAY BE REMOVED FOR CLARITY.

UNLESS OTHERWISE SPECIFIED DIMENSIONAL TOLERANCE +/-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.

SHELL TYPE	CONN DIA	CONN TYPE	FLOW DIRECTION
EVAPORATOR CONDENSER	8" 8"	VICTAULIC VICTAULIC	IN BOTTOM OUT TOP IN BOTTOM OUT TOP

Unit Dimensions - Centrifugal Chiller Water-Cooled Agility
Item: A1 Qty: 1 Tag(s): 350T

Model HDWA
 Nominal tons 400



LEFT SIDE VIEW

CUSTOMER NOTES:

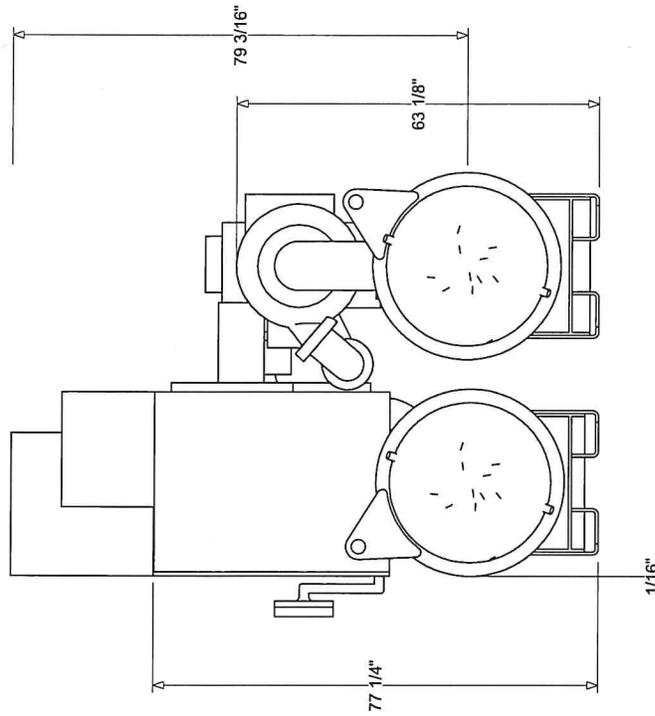
GRAPHICS ON SUBMITTAL ARE SIMPLIFIED TO SHOW MAJOR ENVELOPE COMPONENTS.
 UNIT STRUCTURE AND SUBCOMPONENTS MAY BE REMOVED FOR CLARITY.

UNLESS OTHERWISE SPECIFIED, DIMENSIONAL TOLERANCE $\pm 1/2''$.
 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.

SHELL TYPE	CONN DIA	CONN TYPE	FLOW DIRECTION
EVAPORATOR	8"	VICTAULIC	IN BOTTOM OUT TOP
CONDENSER	8"	VICTAULIC	IN BOTTOM OUT TOP

Unit Dimensions - Centrifugal Chiller Water-Cooled Agility
Item: A1 Qty: 1 Tag(s): 350T

Model HDWA
 Nominal tons 400



RIGHT SIDE VIEW

CUSTOMER NOTES:

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

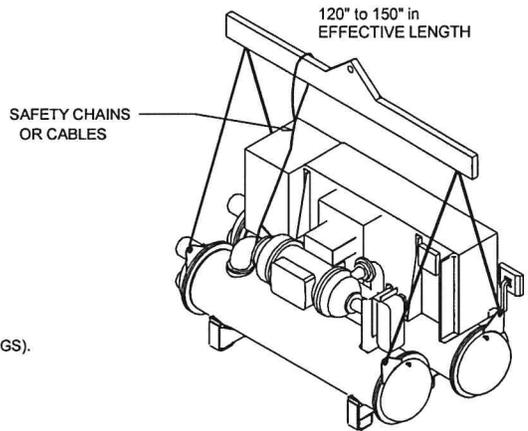
UNLESS OTHERWISE SPECIFIED DIMENSIONAL TOLERANCE +/-1/2".
 COOLING COND CONNS ARE STRAIGHT OUT THE END OF THE WATER BOX.
 WATER BOX DRAIN AND VENT LOCATIONS ARE SHOWN ON THE WATER BOX END PLATES.

SHELL TYPE	CONN DIA	CONN TYPE	FLOW DIRECTION
EVAPORATOR	8"	VICTAULIC	IN BOTTOM OUT TOP
CONDENSER	8"	VICTAULIC	IN BOTTOM OUT TOP

Weight, Clearance & Rigging Diagram - Centrifugal Chiller Water-Cooled Agility
Item: A1 Qty: 1 Tag(s): 350T

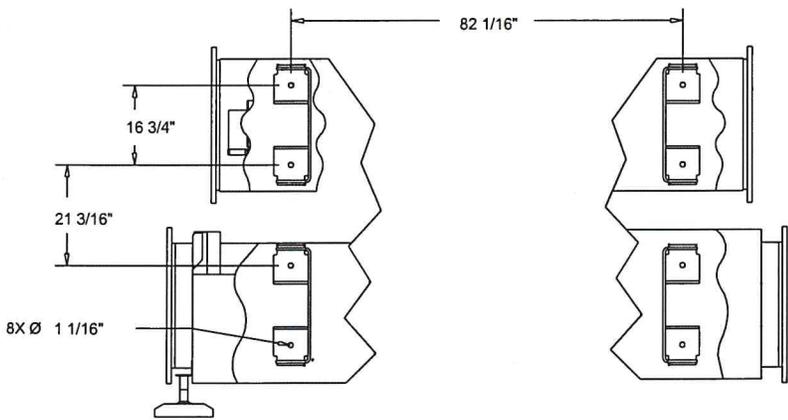
⚠ WARNING

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 LEVEL SINGLE POINT 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 12 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. ONLY USE IDENTIFIED 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. CONTACT YOUR LOCAL TRANE SALES ENGINEER IF THIS DATA IS REQUIRED.

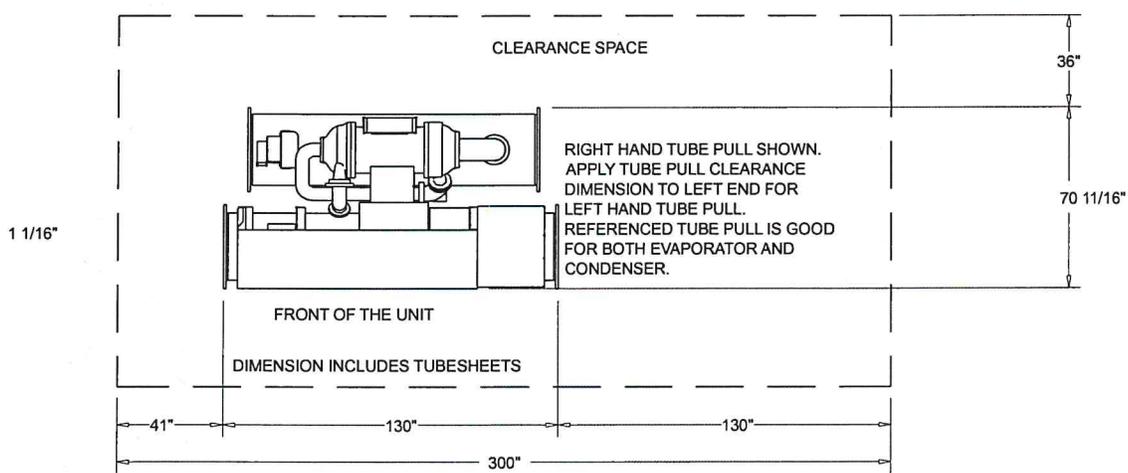


(SEE NOTE 8 ABOVE)

MAXIMUM SHIPPING	14402.0 lb
MAXIMUM OPERATING	16915.0 lb

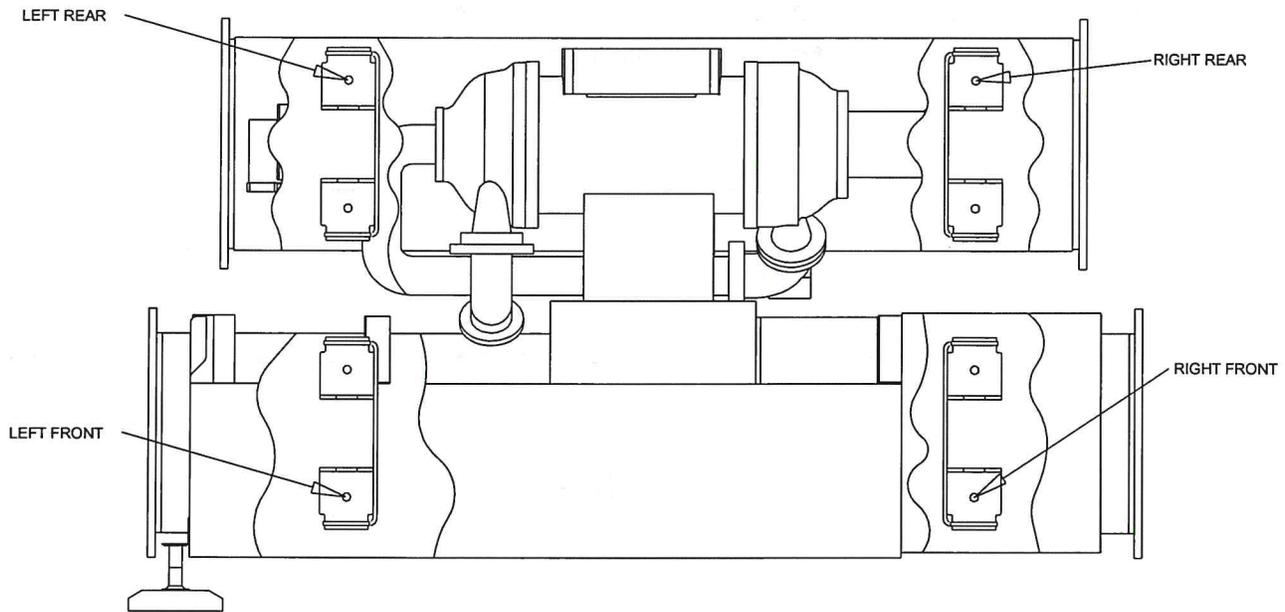


HOLE DETAILS



Weight, Clearance & Rigging Diagram - Centrifugal Chiller Water-Cooled Agility
 Item: A1 Qty: 1 Tag(s): 350T

WEIGHTS AND CENTER OF GRAVITY



COMPONENT	WEIGHT*
COMPRESSOR WEIGHT	2743.0 lb
MOTOR WEIGHT	322.0 lb
DRIVE WEIGHT	2585.0 lb
SUCTION ELBOW WEIGHT	111.0 lb
ECONOMIZER WEIGHT	187.0 lb
EVAPORATOR WEIGHT	2768.0 lb
EVAPORATOR WATERBOXES WEIGHT	398.0 lb
CONDENSER WEIGHT	3494.0 lb
CONDENSER WATERBOXES WEIGHT	363.0 lb
MISCELLANEOUS WEIGHT	1185.0 lb

UNIT CENTER OF GRAVITY	
CG X (DIMENSION TOWARDS FRONT)	30.000 in
CG Y (HEIGHT DIMENSION FROM FLOOR)	34.000 in
CG Z (DIMENSION FROM RIGHT TO LEFT)	43.000 in

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

WEIGHTS	
SHIPPING **	OPERATING
14402.0 lb	16915.0 lb

NAMEPLATE PRODUCT DESCRIPTION:

MODL	HDWA	VOLT	460	PTON	350.00 tons	NTON	400
EVTM	TECU	CDTM	TECU	CPKW	442	IMP1	7.874
IMP2	6.850	CDBS	A	EVSZ	040A	EVBS	B
						CDSZ	040A

* ALL PUBLISHED WEIGHTS ACCURATE TO +/- 10 %

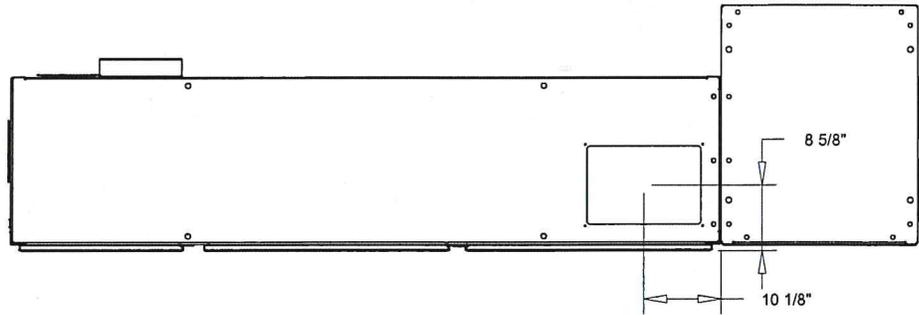
** SHIPPING WEIGHT INCLUDES REFRIGERANT. IF ORDERED WITHOUT, CONSULT PRODUCT SUPPORT FOR DRY SHIP WEIGHT.

Accessory - Centrifugal Chiller Water-Cooled Agility
Item: A1 Qty: 1 Tag(s): 350T

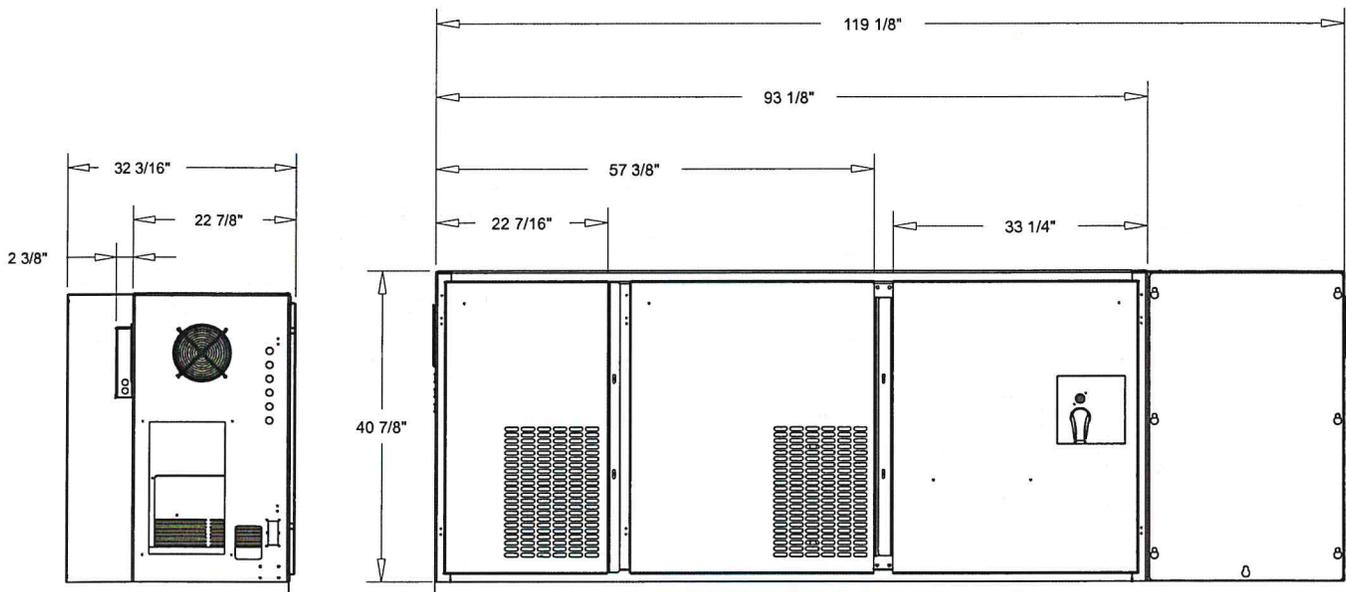
ADAPTIVE FREQUENCY DRIVE

MAX RLA	BREAKER AIC AMPS	SHORT CIRCUIT WITHSTAND RATINGS (RMS SYMETRICAL AMPS)	LINE CONNECTION LUGS ADAPTIVE FREQUENCY DRIVE	TOTAL DRIVE WEIGHT MINUS SHIPPING PALLET
440	65000	65000	(2) 3/0-250 MCM	2585.0 lb

THE NON-FUSED DISCONNECT OR CIRCUIT BREAKER IS DESIGNED FOR USE AS A SERVICE DISCONNECT ONLY.



TOP VIEW



FRONT ELEVATION

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 Chiller Water-Cooled Agility

Item	Tag(s)	Qty	Description	Model Number
A1	350T	1	Centrifugal Chiller Water-Cooled Agilit	HDWA400

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

Agility Chiller 350T

Constant Condenser (Constant Flow)

% Load	Capacity	Evap LWT	Evap FR	Evap EWT	Evap PD	Cond EWT	Cond FR	Cond LWT	Cond PD	kW	Amps	Efficiency
100	350.0	44.00	837.0	53.99	13.1	85.00	1059	94.19	11.7	190.3	458.90	0.5438
90	315.0	44.00	837.0	52.99	13.2	85.00	1059	93.24	11.7	165.9	413.60	0.5266
80	280.0	44.00	837.0	51.99	13.1	85.00	1059	92.30	11.7	143.9	371.00	0.5141
70	245.0	44.00	837.0	50.99	13.2	85.00	1059	91.38	11.8	123.9	329.60	0.5059
60	210.0	44.00	837.0	49.99	13.2	85.00	1059	90.47	11.8	106.2	290.50	0.5056
50	175.0	44.00	837.0	48.99	13.2	85.00	1059	89.58	11.8	92.18	258.80	0.5268
40	140.0	44.00	837.0	47.99	13.2	85.00	1059	88.72	11.8	81.98	233.60	0.5856
30	105.0	44.00	837.0	46.99	13.3	85.00	1059	87.80	11.9	62.31	176.90	0.5935
20	70.00	44.00	837.0	46.00	13.3	85.00	1059	87.11	11.9	76.86	176.00	1.098
19	66.50	44.00	837.0	45.90	13.3	85.00	1059	87.08	11.9	83.52	183.30	1.256



Data Generation Date: 9/18/2018
 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.

MODL-HDWA	TYPE-SNGL	NTON-400	IVLT-460	HRZ-60	VOLT-460	RCTP-YES
FRAM- T1	DSOP- NO	EVSZ-040A	ETSP-NONE	EVBS- B	EVTM-TECU	EVTC-284
EVWP- 2	EVFP-TDFS	CDSZ-040A	TSTY-STD	CDBS- A	CDTM-TECU	CDTC-283
CDTH- 25	CDWP- 2	CDFP-TDFS	EXEV-400	GNSL-YES	FTST-YES	TEST-NONE
TTOL- NA	ASST- NO	OPMM-KWTN	INSL-YES	GBAS-YES	TRMM-BCNT	CRFG-R134
RLDV-SPLD						

Agility Chiller, Version 31.08, REVL 55200

Agility Chiller 350T

Constant Condenser (Constant Flow)

% Load	Capacity	Evap LWT	Evap FR	Evap EWT	Evap PD	Cond EWT	Cond FR	Cond LWT	Cond PD	kW	Amps	Efficiency
100	350.0	44.00	837.0	53.99	13.1	80.00	1059	89.07	11.9	172.3	427.20	0.4923
90	315.0	44.00	837.0	52.99	13.2	80.00	1059	88.13	11.9	149.7	384.80	0.4752
80	280.0	44.00	837.0	51.99	13.1	80.00	1059	87.20	11.9	129.3	344.80	0.4619
70	245.0	44.00	837.0	50.99	13.2	80.00	1059	86.28	12.0	110.7	305.20	0.4520
60	210.0	44.00	837.0	49.99	13.2	80.00	1059	85.38	12.0	94.05	267.80	0.4478
50	175.0	44.00	837.0	48.99	13.2	80.00	1059	84.49	12.0	78.80	231.40	0.4503
40	140.0	44.00	837.0	47.99	13.2	80.00	1059	83.62	12.0	67.88	203.70	0.4849
30	105.0	44.00	837.0	46.99	13.3	80.00	1059	82.73	12.1	53.25	160.50	0.5071
20	70.00	44.00	837.0	46.00	13.3	80.00	1059	82.02	12.1	65.02	156.60	0.9289
18	63.00	44.00	837.0	45.80	13.3	80.00	1059	81.95	12.1	76.70	169.80	1.217



Data Generation Date: 9/18/2018

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MODL-HIDWA	TYPE-SNGL	NTON-400	ILT-460	IHRZ- 60	VOLT-460	RCTP-YES
FRAM- T1	DSOP- NO	EVSZ-040A	ETSP-NONE	EVBS- B	EVTM-TECU	EVTC-284
EWWP- 2	EVFP-TDFS	CDSZ-040A	TSTY-STD	CDBS- A	CDTM-TECU	CDTC-283
GDTH- 25	CDWP- 2	CDFP-TDFS	EXEV-400	GNSL-YES	FTST-YES	TEST-NONE
TTOL- NA	ASTT- NO	OPMM-KWTN	INSL-YES	GBAS-YES	TRMM-BCNT	CRFG-R134
RLDV-SPLD						

Agility Chiller, Version 31.08, REVL 55200

Agility Chiller 350T

Constant Condenser (Constant Flow)

% Load	Capacity	Evap LWT	Evap FR	Evap EWT	Evap PD	Cond EWT	Cond FR	Cond LWT	Cond PD	kW	Amps	Efficiency
100	350.0	44.00	837.0	53.99	13.1	75.00	1059	83.95	12.1	155.5	397.00	0.4444
90	315.0	44.00	837.0	52.99	13.2	75.00	1059	83.02	12.1	134.8	358.00	0.4280
80	280.0	44.00	837.0	51.99	13.1	75.00	1059	82.10	12.1	115.7	319.40	0.4133
70	245.0	44.00	837.0	50.99	13.2	75.00	1059	81.19	12.2	98.25	281.70	0.4010
60	210.0	44.00	837.0	49.99	13.2	75.00	1059	80.30	12.2	82.42	245.20	0.3925
50	175.0	44.00	837.0	48.99	13.2	75.00	1059	79.41	12.2	68.39	210.30	0.3908
40	140.0	44.00	837.0	47.99	13.2	75.00	1059	78.54	12.3	56.60	178.80	0.4043
30	105.0	44.00	837.0	46.99	13.3	75.00	1059	77.67	12.3	44.70	143.50	0.4257
20	70.00	44.00	837.0	46.00	13.3	75.00	1059	76.95	12.3	54.71	138.70	0.7815
17	59.50	44.00	837.0	45.70	13.4	75.00	1059	76.82	12.3	68.97	153.20	1.159



Data Generation Date: 9/18/2018

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MODL-HDWA	TYPE-SNGL	NTON-400	IVLT-460	IHRZ-60	VOLT-460	RCTP-YES
FRAM-T1	DSOP-NO	EVSZ-040A	ETSP-NONE	EVBS- B	EVTM-TECU	EVTC-284
EWVP- 2	EVFP-TDFS	CDSZ-040A	TSTY-STD	CDBS- A	CDTM-TECU	CDTC-283
CDTH- 25	CDWP- 2	CDFP-TDFS	EXEV-400	GNSL-YES	FTST-YES	TEST-NONE
TTOL- NA	ASTT- NO	OPMM-KWTN	INSL-YES	GBAS-YES	TRMM-BCNT	CRFG-R134
RLDV-SPLD						

Agility Chiller, Version 31.08, REVL 55200

Agility Chiller 350T

Constant Condenser (Constant Flow)

% Load	Capacity	Evap LWT	Evap FR	Evap EWT	Evap PD	Cond EWT	Cond FR	Cond LWT	Cond PD	kW	Amps	Efficiency
100	350.0	44.00	837.0	53.99	13.1	70.00	1059	78.84	12.3	140.6	369.70	0.4016
90	315.0	44.00	837.0	52.99	13.2	70.00	1059	77.92	12.3	120.9	331.80	0.3838
80	280.0	44.00	837.0	51.99	13.1	70.00	1059	77.01	12.3	102.9	294.80	0.3674
70	245.0	44.00	837.0	50.99	13.2	70.00	1059	76.11	12.4	86.40	258.70	0.3526
60	210.0	44.00	837.0	49.99	13.2	70.00	1059	75.22	12.4	71.62	223.30	0.3411
50	175.0	44.00	837.0	48.99	13.2	70.00	1059	74.34	12.4	58.78	190.10	0.3359
40	140.0	44.00	837.0	47.99	13.2	70.00	1059	73.47	12.5	47.31	157.90	0.3379
30	105.0	44.00	837.0	46.99	13.3	70.00	1059	72.62	12.5	38.33	131.30	0.3650
20	70.00	44.00	837.0	46.00	13.3	70.00	1059	71.76	12.5	28.02	93.400	0.4003
17	59.50	44.00	837.0	45.70	13.4	70.00	1059	71.58	12.5	36.01	102.30	0.6051



Data Generation Date: 9/18/2018

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MODL-HDWA	TYPE-SNGL	NTON-400	MLT-460	IHRZ-60	VOLT-460	RCTP-YES
FRAM- T1	DSOP- NO	EVSZ-040A	ETSP-NONE	EVBS- B	EVTM-TECU	EVTC-284
EWWP- 2	EVFP-TDFFS	CDSZ-040A	TSTY-STD	CDBS- A	CDTM-TECU	CDTC-283
CDTH- 25	CDWP- 2	CDFP-TDFFS	EXEV-400	GNSL-YES	FTST-YES	TEST-NONE
TTOL- NA	ASTT- NO	OPMM-KWTN	INSL-YES	GBAS-YES	TRMM-BCNT	CRFG-R134
RLDV-SPLD						

Agility Chiller, Version 31.08, REVL 55200

Agility Chiller 350T

Constant Condenser (Constant Flow)

% Load	Capacity	Evap LWT	Evap FR	Evap EWT	Evap PD	Cond EWT	Cond FR	Cond LWT	Cond PD	kW	Amps	Efficiency
100	350.0	44.00	837.0	53.99	13.1	65.00	1059	73.73	12.5	126.5	342.30	0.3613
90	315.0	44.00	837.0	52.99	13.2	65.00	1059	72.82	12.5	108.0	306.10	0.3427
80	280.0	44.00	837.0	51.99	13.1	65.00	1059	71.92	12.6	90.83	270.70	0.3244
70	245.0	44.00	837.0	50.99	13.2	65.00	1059	71.03	12.6	75.32	235.80	0.3074
60	210.0	44.00	837.0	49.99	13.2	65.00	1059	70.15	12.6	61.63	202.20	0.2935
50	175.0	44.00	837.0	48.99	13.2	65.00	1059	69.28	12.7	49.57	169.90	0.2833
40	140.0	44.00	837.0	47.99	13.2	65.00	1059	68.42	12.7	39.44	140.10	0.2817
30	105.0	44.00	837.0	46.99	13.3	65.00	1059	67.57	12.7	31.29	114.40	0.2980
20	70.00	44.00	837.0	46.00	13.3	65.00	1059	66.72	12.8	22.75	82.400	0.3250
10	35.00	44.00	837.0	45.00	13.3	65.00	1059	65.91	12.8	18.39	59.400	0.5255



Data Generation Date: 9/18/2018

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MODL-HDWA	TYPE-SNGL	NTON-400	MLT-460	IHRZ-60	VOLT-460	RCTP-YES
FRAM- T1	DSOP- NO	EVSZ-040A	ETSP-NONE	EVBS- B	EVTM-TECU	EVTC-284
EVWP- 2	EVFP-TDFS	CDSZ-040A	TSTY-STD	CDBS- A	CDTM-TECU	CDTC-283
CDTH- 25	CDWP- 2	CDFP-TDFS	EXEV-400	GNSL-YES	FTST-YES	TEST-NONE
TTOL- NA	ASST- NO	OPMM-KWTN	INSL-YES	GBAS-YES	TRMM-BCNT	CRFG-R134
RLDV-SPLD						

Agility Chiller, Version 31.08, REVL 55200

Agility Chiller 350T

Constant Condenser (Constant Flow)

% Load	Capacity	Evap LWT	Evap FR	Evap EWT	Evap PD	Cond EWT	Cond FR	Cond LWT	Cond PD	kW	Amps	Efficiency
100	350.0	44.00	837.0	53.99	13.1	60.00	1059	68.64	12.7	113.0	313.70	0.3228
90	315.0	44.00	837.0	52.99	13.2	60.00	1059	67.73	12.8	95.57	279.30	0.3034
80	280.0	44.00	837.0	51.99	13.1	60.00	1059	66.84	12.8	79.66	246.10	0.2845
70	245.0	44.00	837.0	50.99	13.2	60.00	1059	65.95	12.8	65.23	213.30	0.2662
60	210.0	44.00	837.0	49.99	13.2	60.00	1059	65.08	12.9	52.09	180.60	0.2480
50	175.0	44.00	837.0	48.99	13.2	60.00	1059	64.21	12.9	40.93	150.10	0.2339
40	140.0	44.00	837.0	47.99	13.2	60.00	1059	63.36	12.9	32.02	122.30	0.2287
30	105.0	44.00	837.0	46.99	13.3	60.00	1059	62.52	13.0	24.69	97.200	0.2351
20	70.00	44.00	837.0	46.00	13.3	60.00	1059	61.69	13.0	17.90	70.400	0.2558
10	35.00	44.00	837.0	45.00	13.3	60.00	1059	60.87	13.0	13.33	80.000	0.3808



Data Generation Date: 9/18/2018

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MODL-HDWA	TYPE-SNGL	NTON-400	IVLT-460	IHRZ-60	VOLT-460	RCTP-YES
FRAM- T1	DSOP- NO	EVSZ-040A	ETSP-NONE	EVBS- B	EVTM-TECU	EVTC-284
EVWP- 2	EVFP-TDFS	CDSZ-040A	TSTY-STD	CDBS- A	CDTM-TECU	CDTC-283
CDTH- 25	CDWP- 2	CDFP-TDFS	EXEV-400	GNSL-YES	FTST-YES	TEST-NONE
TTOL- NA	ASTT- NO	OPMM-KWTN	INSL-YES	GBAS-YES	TRMM-BCNT	CRFG-R134
RLDV-SPLD						

Agility Chiller, Version 31.08, REVL 55200

Agility Chiller 350T

Constant Condenser (Constant Flow)

% Load	Capacity	Evap LWT	Evap FR	Evap EWT	Evap PD	Cond EWT	Cond FR	Cond LWT	Cond PD	KW	Amps	Efficiency
100	350.0	44.00	837.0	53.99	13.1	55.00	1059	63.55	13.0	101.7	288.90	0.2905
90	315.0	44.00	837.0	52.99	13.2	55.00	1059	62.65	13.0	84.89	255.20	0.2695
80	280.0	44.00	837.0	51.99	13.1	55.00	1059	61.77	13.0	69.79	222.40	0.2493
70	245.0	44.00	837.0	50.99	13.2	55.00	1059	60.88	13.1	55.63	189.40	0.2271
60	210.0	44.00	837.0	49.99	13.2	55.00	1059	60.01	13.1	42.99	158.10	0.2047
50	175.0	44.00	837.0	48.99	13.2	55.00	1059	59.15	13.1	32.91	129.70	0.1881
40	140.0	44.00	837.0	47.99	13.2	55.00	1059	58.31	13.2	24.82	99.100	0.1773
30	105.0	44.00	837.0	46.99	13.3	55.00	1059	57.50	13.2	21.09	82.300	0.2009
20	70.00	44.00	837.0	46.00	13.3	55.00	1059	56.68	13.2	16.60	64.300	0.2371



Data Generation Date: 9/18/2018

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MODL-HDWA	TYPE-SINGL	NTON-400	IVLT-460	IHRZ- 60	VOLT-460	RCTP-YES
FRAM- T1	DSOP-NO	EVSZ-040A	ETSP-NONE	EVBS- B	EVTM-TECU	EVTC-284
EWWP- 2	EVFP-TDFS	CDSZ-040A	TSTY-STD	CDBS- A	CDTM-TECU	CDTC-283
CDTH- 25	CDWP- 2	CDFP-TDFS	EXEV-400	GNSL-YES	FTST-YES	TEST-NONE
TTOL- NA	ASST- NO	OPMM-KWTN	INSL-YES	GBAS-YES	TRMM-BCNT	CRFG-R134
RLDV-SPLD						

Agility Chiller, Version 31.08, REVL 55200



Installation, Operation, and Maintenance

HDWA Water-cooled Agility™ Chillers With Tracer® AdaptiView™ Control

HDWA



X39641347001

⚠ SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

May 2018

HDWA-SVX001A-EN





Introduction

Read this manual thoroughly before operating or servicing this unit.

Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.



Indicates a situation that could result in equipment or property-damage only accidents.

Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants-including industry replacements for CFCs and HCFCs such as saturated or unsaturated HFCs and HCFCs.

Important Responsible Refrigerant Practices

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to local rules. For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.

All field wiring **MUST** be performed by qualified personnel. Improperly installed and grounded field wiring poses **FIRE** and **ELECTROCUTION** hazards. To avoid these hazards, you **MUST** follow requirements for field wiring installation and grounding as described in **NEC** and your local/state/national electrical codes.

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury. Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, **MUST** follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- Before installing/servicing this unit, technicians **MUST** put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). **ALWAYS** refer to appropriate Material Safety Data Sheets (MSDS)/Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.
- When working with or around hazardous chemicals, **ALWAYS** refer to the appropriate MSDS/SDS and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.
- If there is a risk of energized electrical contact, arc, or flash, technicians **MUST** put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, **PRIOR** to servicing the unit. **NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

⚠ WARNING**Follow EHS Policies!**

Failure to follow instructions below could result in death or serious injury.

- All Ingersoll Rand personnel must follow Ingersoll Rand Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. All policies can be found on the [BOS site](#). Where local regulations are more stringent than these policies, those regulations supersede these policies.
- Non-Ingersoll Rand personnel should always follow local regulations.

⚠ WARNING**Refrigerant under High Pressure!**

Failure to follow instructions below could result in an explosion which could result in death or serious injury or equipment damage.

System contains refrigerant under high pressure. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or refrigerant additives.

requires disassembly or partial disassembly, and reassembly— which could include but is not limited to the evaporator, condenser, control panel, compressor/motor, economizer, factory-mounted starter or any other components originally attached to the fully assembled unit— compliance with the following is required to preserve the factory warranty:

- Trane, or an agent of Trane specifically authorized to perform start-up and warranty of Trane® products, will perform or have direct on-site technical supervision of the disassembly and reassembly work.
- The installing contractor must notify Trane—or an agent of Trane specifically authorized to perform startup and warranty of Trane® products—two weeks in advance of the scheduled disassembly work to coordinate the disassembly and reassembly work.
- Start-up must be performed by Trane or an agent of Trane specifically authorized to perform startup and warranty of Trane® products.

Trane, or an agent of Trane specifically authorized to perform start-up and warranty of Trane® products, will provide qualified personnel and standard hand tools to perform the disassembly and reassembly work at a location specified by the contractor. The contractor shall provide the rigging equipment such as chain falls, gantries, cranes, forklifts, etc. necessary for the disassembly and reassembly work and the required qualified personnel to operate the necessary rigging equipment.

Factory Warranty Information

Compliance with the following is required to preserve the factory warranty:

All Unit Installations

Startup **MUST** be performed by Trane, or an authorized agent of Trane, to **VALIDATE** this WARRANTY. Contractor must provide a two-week startup notification to Trane (or an agent of Trane specifically authorized to perform startup).

Additional Requirements for Units Requiring Disassembly and Reassembly

When a new chiller is shipped and received from our Trane manufacturing location and, for any reason, it

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Unit Nameplate

The unit nameplate is located on the right side of the control panel. A typical unit nameplate is illustrated in the following figure and contains the following information:

- Unit model and size descriptor
- Unit serial number
- Unit electrical requirements
- Correct operating charge and refrigerant type
- Unit test pressures and maximum operating pressures
- Unit literature
- Drawing numbers for unit wiring diagrams

Serial Number. The unit serial number provides the specific chiller identity. Always provide this serial number when calling for service or during parts identification.

Service Model Number. The service model represents the unit as built for service purposes. It identifies the selections of variable unit features required when ordering replacements parts or requesting service.

Note: *Unit-mounted Adaptive Frequency™ Drives (AFDs) are identified by a separate number; refer to "Model Number Descriptions," p. 8.*

Product Description Block. The Agility™ chiller models are defined and built using the Product Definition and Selection (PDS) system. This system describes the product offerings using a product coding block which is made up of feature categories and codes that identify all characteristics of a unit.

Figure 1. Typical unit nameplate


MADE IN USA

MODEL: HDWA400 DATE OF MFG (DD/MM/YY): 01-02-18
 MODEL NO:
 HDWA400FAAAL0DCBMFCBJFABG140W1100A
 SERIAL NO: L17M05538 S.O.NO: MSHDWA1

AFD MODEL: AFDT0173FAAA00E2B1
 AFD PART NO: 453693600007

ELECTRICAL CHARACTERISTICS
 LINE VOLTAGE: 460 VOLTS 60HZ 3 PH
 NAMEPLATE KW: 105 KW LINE CURRENT: 160 AMPS
 VOLTAGE UTILIZATION RANGE: 414- 506 VAC
 MINIMUM CIRCUIT AMPACITY: 200 AMPS
 MAXIMUM OVERCURRENT PROTECTIVE DEVICE: 350 AMPS
 SHORT CIRCUIT CURRENT RATING: 65000 AMPS

	VOLTS-AC	HZ	PH	RLA	
COMPRESSOR MOTOR				173	
CONTROL CIRCUIT	115	60	1	3000	VA MAX

REFRIGERANT SYSTEM
 TO BE FIELD CHARGED FACTORY CHARGED
 WITH 800 LBS. OF R-134A WITH LBS. OF R-134A

MAXIMUM REFRIGERANT WORKING PRESSURE
 HI SIDE 300 PSIG LO SIDE 200 PSIG
 FACTORY TEST PRESSURE
 HI SIDE 330 PSIG LO SIDE 260 PSIG

PATENT PENDING

SERVICE LITERATURE
 INSTALLATION/OPERATION/MAINTENANCE GUIDE:
 HDWA-SVX001A-EN

FOR INSTALLATION REQUIREMENTS, USE ELECTRICAL CHARACTERISTICS NOT PRODUCT DESCRIPTION.

PRODUCT DESCRIPTION:				PTON 200
NMRA 173	IMP1 200	IMP2 174		TRPM 4500
MODL HDWA	DSEQ AA	APTY STD		TYPE SNGL
LQDD NO	LQDP NO	NTON 400		IVLT 460
IHRZ 60	VOLT 460	CPKW 442		FRAM T1
DSOP YES	EVSZ 040A	ETSP NONE		EVBS B
EVTM TMCU	EVTC 280	EVTH 25		EVPR 150
EVWC STD	EVWP 2	EVWT NMAR		EVWA RERE
EVCO FLNG	EFLD WATE	EVFP TDFS		CDSZ 040A
TSTY STD	CTSP NONE	CDBS B		CDTM TECU
CDTC 283	CDTH 28	CDPR 150		CDWC STD
CDWP 2	CDWT NMAR	CDWA LELE		CDCO FLNG
CFLD WATE	CDFP TDFS	EXEV 30.6		AGLT UL
GNSL YES	AH13 COMP	AH16 COMP		ARCL CERT
FTST YES	TLOC FACT	TEST NONE		TTOL NA
TPUL AHRI	ASTT NO	ASKT NONE		DEMO YES
OPMM KWTN	INSL STD	OPST YES		GBAS YES
EXOP YES	TRMM BCNT	CWR YES		TRIC TRIP
SPKG DOM	WPSR WFC	REFG YES		CRFG R134
RLDV SPLD	THRM TME	STRM AFDT		SRTY UAFD
SRRL 440	RCTP YES			

ASHRAE 90.1 - 2013 AND 2016 COMPLIANT

Compressor Nameplate

The compressor assembly has a separate model number which is required to identify internal and external compressor parts. The model number begins with "HDMA" and the nameplate is located on the interstage pipe; refer to "Model Number Descriptions," p. 8.

Figure 2. Compressor nameplate

	SERIAL NUMBER	
	MODEL NUMBER	
	SALES ORDER NUMBER	
HDM COMPRESSOR		
ELECTRICAL CHARACTERISTICS TO DRIVE		
DRIVE INPUT VOLTAGE	DRIVE INPUT FREQUENCY (HZ)	
480-460	50 OR 60	
NOTICE: VARIABLE SPEED COMPRESSORS ELECTRICAL SUPPLY VIA TRANE SUPPLIED DRIVE ONLY.		
REFRIGERANT		
R-134a OR R-513A		
THERMALLY PROTECTED SYSTEM		
		
ASSEMBLED IN USA		
		

Note: Do NOT cover compressor nameplate with wrap or insulation (leave a window).



Model Number Descriptions

Digit 1, 2 — Unit Function

HD = Agility™ Centrifugal Water-cooled Chiller

Digit 3 — Drive

W = Direct Drive

Digit 4 — Development Sequence

A

Digit 5, 6, 7 — Nominal Compressor Tonnage

400 = 400 Nominal Tons

SSS = Special

Digit 8 — Incoming Line Voltage/Unit Drive Voltage

F = 460V Incoming Line/400V-60Hz—3Ph

G = 480V Incoming Line/400V-60Hz—3Ph

H = 575V Incoming Line/400V-60Hz—3Ph

J = 600V Incoming Line/400V-60Hz—3Ph

S = Special

Digit 9 — Unit Type

A = Cooling Condenser

S = Special

Digit 10, 11 — Design Sequence

AA = Original Design

Digit 12 — Manufacturing Location

L = La Crosse, Wisconsin

Digit 13 — Hot Gas Bypass

0 = Without HGB

S = Special

Digit 14 — Control Enclosure

C = Standard Control Enclosure

D = Standard Control Enclosure with Tracer® SC

S = Special

Digit 15 — Evaporator Shell Size

C = 040A Evaporator Shell

S = Special

Digit 16 — Evaporator Tube Bundle

A = Evaporator Tube Bundle A

B = Evaporator Tube Bundle B

C = Evaporator Tube Bundle C

D = Evaporator Tube Bundle D

E = Evaporator Tube Bundle E

S = Special

Digit 17 — Evaporator Tubes

C = 0.025 Wall Thickness—0.75 Diameter Internally Enhanced Copper Evaporator Tube

M = 0.025 Wall Thickness—0.75 Diameter High Performance Internal Surface Evaporator Tube

S = Special

Digit 18 — Evaporator Waterbox

F = 150 psi Non-marine, 2-Pass Standard

S = Special

Digit 19 — Condenser Shell Size

C = 040A Condenser Shell

S = Special

Digit 20 — Condenser Tube Bundle

A = Condenser Tube Bundle A

B = Condenser Tube Bundle B

C = Condenser Tube Bundle C

S = Special

Digit 21 — Condenser Tubes

C = 0.025 Condenser Tube Wall— 0.75 Internal Enhanced Copper Tube

J = 0.028 Condenser Tube Wall—0.75 Internal Enhanced Copper Tube

S = Special

Digit 22 — Condenser Waterbox

F = 150 psi Non-marine, 2-Pass Standard

S = Special

Digit 23 — Evaporator Expansion Valve

A = 30.6

S = Special

Digit 24 — Unit Option

B = Insulation Package and Spring Loaded Pressure Relief Valve

D = Spring Loaded Pressure Relief Valve Only

Digit 25 — Control: Generic Building Automation System (BAS)

0 = None

G = Generic BAS

Digit 26 — Control: Extended Operation

0 = None

1 = Extended Operation

Digit 27 — Tracer® Communication Interface

0 = None

2 = Tracer® Comm 5

3 = Tracer® MODBUS®

4 = Tracer® BACnet®

Digit 28 — Special Options

0 = None

S = Special Option

Digit 29 — Control: Water Flow Control

0 = None

W = Water Flow Control

Digit 30 — Control: Chilled Water Reset

0 = None

1 = Chilled Water Reset

Digit 31 — Control: Operating Status

0 = None

1 = Operating Status

Digit 32 — Industrial Chiller Package (INDP)

0 = Without INDP

Digit 33 — Control Power Transformer (CPTR)

0 = Without CPTR

S = Special

Digit 34 — Thermal Dispersion Water Flow Proving

0 = None, Customer to Provide Device for Condenser and Evaporator

A = Thermal Dispersion Water Flow Proving Selected for Condenser and Evaporator

Model Number Descriptions

HDMA Centrifugal Compressor Description

The compressor assembly has a separate model number which is required to identify internal and external compressor parts. The model number begins with "HDMA" and the nameplate is located on the foot of the volute.

Digit 1 — Higher-speed Centrifugal

Digit 2 — Direct Drive

Digit 3 — Medium Pressure

Digit 4 — Development Sequence

Digit 5, 6, 7 — Nominal Total Compressor Tonnage

Digit 8 — Compressor VFD Input Design Voltage

Digit 9 — Motor Type

Digit 10, 11 — Design Sequence

Digit 12, 13, 14 — First Stage Impeller Designation

Digit 15, 16, 17 — Second Stage Impeller Designation

Digit 18 — Bearing Type

Digit 19 — Discharge Port Orientation

Digit 20 — Motor Cooling

AFDT Adaptive Frequency Drive Description

The Adaptive Frequency™ Drive (AFD) has a separate model number which is required to identify the drive and its components. The model number begins with "AFDT".

Digit 1, 2, 3 — Adaptive Frequency™ Drive AFD

Digit 4 — Development Sequence

T = Unit-mounted, Air-/Liquid-cooled Communicating with Tracer® AdaptiView™ Controls

Digit 5, 6, 7, 8 — Starter Size

Use Rated Load Amps (RLA) Value

Digit 9 — Incoming Line Voltage/Unit Drive Voltage

F = 460V Incoming Line/400V-60Hz-3Ph
 G = 480V Incoming Line/400V-60Hz-3Ph
 H = 575V Incoming Line/400V-60Hz-3Ph
 J = 600V Incoming Line/400V-60Hz-3Ph
 S = Special

Digit 10, 11 — Design Sequence

AA = Original Design of Tracer® AdaptiView™ Controls with TR200 Drive

Digit 12 — Starter Type

A = Unit-mounted

Digit 13 — Agency Listing

0 = UL- and CUL-Listed (Standard on All Units)

Digit 14 — Special Options

0 = None
 S = Special Options (See Sales Order)

Digit 15 — VFD Frame Size (SRRL)

D = 362
 E = 440
 F = 533
 G = 676

Digit 16 — Connection Type Short Circuit Current Rating (SCCR)

2 = Standard Circuit Breaker
 S = Special

Digit 17 — Control Power Option

B = Control Power Transformer 3KVA

Digit 18 — Panel Option

0 = None
 1 = Input Matrix Filter
 2 = 575V/60 Hz Autotransformer
 S = Special Option



General Information

Unit Description

Agility™ chillers are centrifugal, water-cooled liquid chillers designed for indoor installation. Each unit is a completely assembled, hermetic package that is factory-piped, wired, leak-tested, dehydrated, charged, and tested for proper control operation before shipment. The following figures show typical Agility™

chillers and their components. Water inlet and outlet openings are covered before shipment. The unit ships charged with refrigerant.

Component Locations

Chiller

Figure 3. Typical Agility chiller component location (front view)

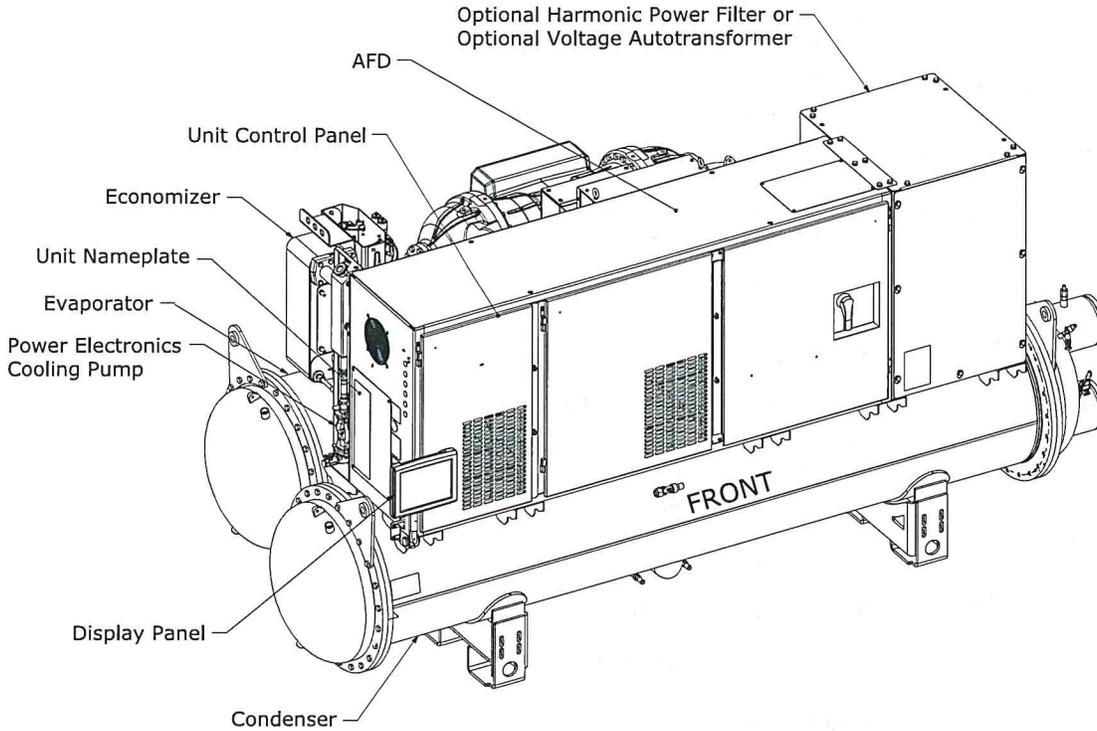
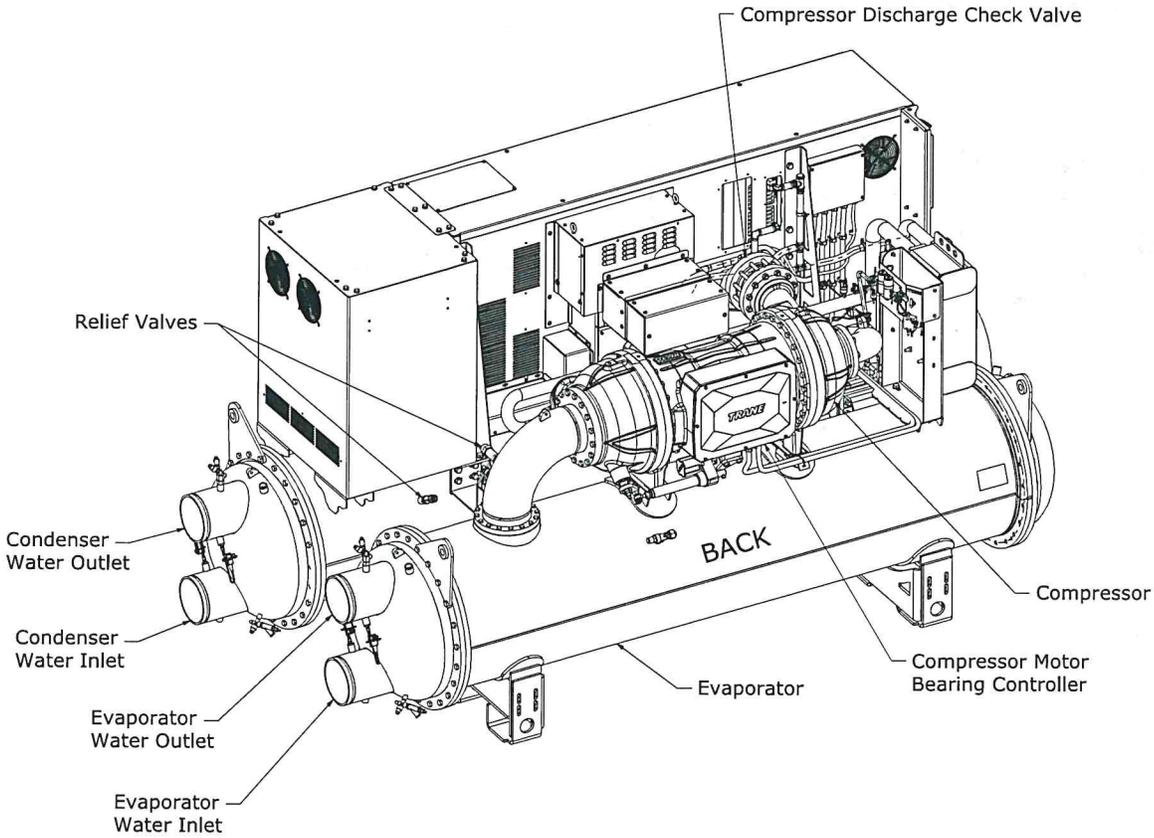


Figure 4. Typical Agility chiller component location (back view)



Adaptive Frequency Drive

Figure 5. Assembly transformer options

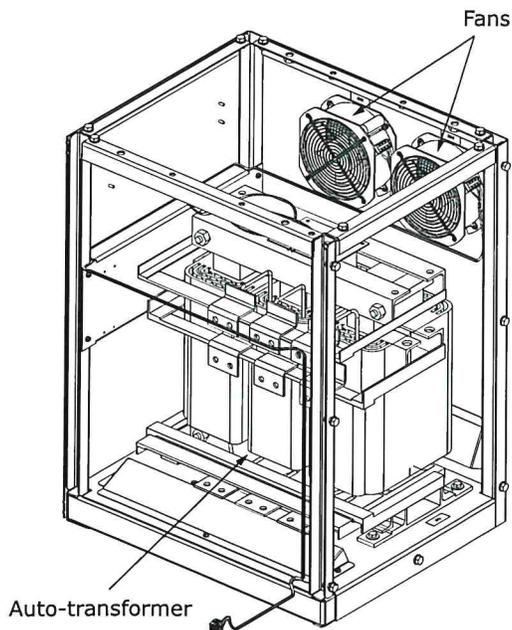
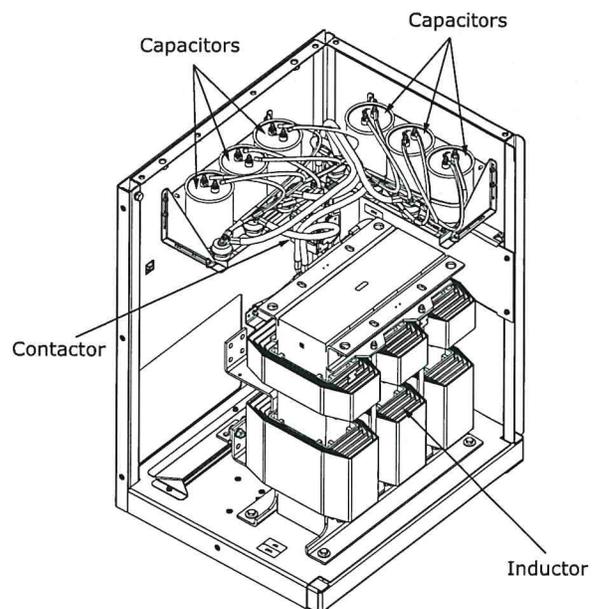


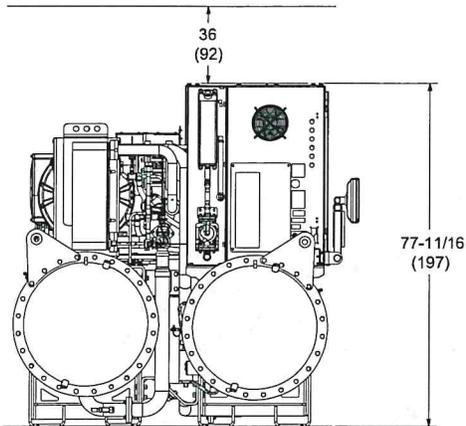
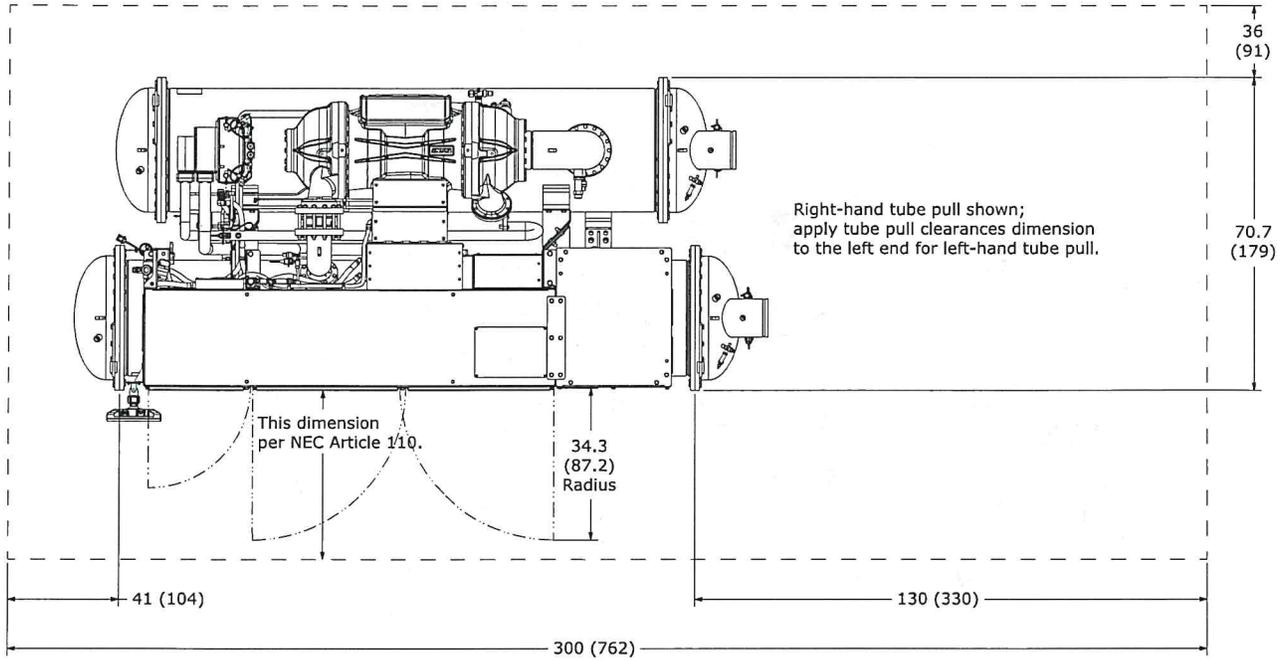
Figure 6. Assembly harmonic filter options





Unit Clearances

Figure 7. Clearance requirements, in. (cm)



Dimensions and Weights

Dimensions

Refer to unit submittals for specific chiller dimensions and water connection locations.

Unit Specifications—Imperial (I-P) Units

Weights (lb)

Important: The weight information provided here should be used for general information only. For specific weights for your chiller, refer to your submittal package.

Table 1. Agility chiller weights (lb)

	Shipping Weight		Operating Weight
	With Refrigerant	Without Refrigerant	
Minimum	12659	11859	14087
Maximum	15003	14203	16775

Notes:

1. All weights ± 5 percent.
2. Shipping weights include standard 150 psig waterboxes.
3. Operating weights include refrigerant, glycol, and water charges.

Center of Gravity (in.)

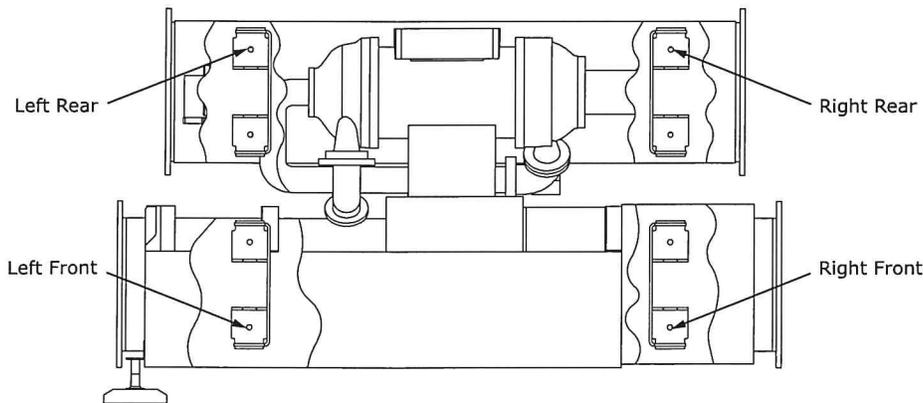
Table 2. Agility chiller center of gravity (in.)

	Shipping			Operating		
	X	Y	Z	X	Y	Z
Minimum	27.1	40.0	34.3	27.7	40.3	31.8
Maximum	29.5	45.9	36.2	30.3	45.7	33.9

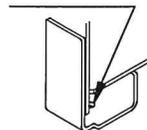
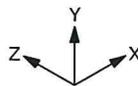
Notes:

1. All weights ± 5 percent.
2. Shipping weights include standard 150 psig waterboxes.
3. Operating weights include refrigerant, glycol, and water charges.

Figure 8. Zero point location for center of gravity data



Right Front Mounting Hole
The bottom of this hole is the (0,0,0) point for center of gravity dimensions.





General Information

Unit Specifications—International System (SI) Units

Weights (kg)

Important: The weight information provided here should be used for general information only. For specific weights for your chiller, refer to your submittal package.

Table 3. Agility chiller weights (kg)

	Shipping Weight		Operating Weight
	With Refrigerant	Without Refrigerant	
Minimum	5754	5390	6403
Maximum	6820	6456	7625

Notes:

1. All weights ± 5 percent.
2. Shipping weights include standard 1034.2 kPaG waterboxes.
3. Operating weights include refrigerant, glycol, and water charges.

Center of Gravity (mm)

Table 4. Agility chiller center of gravity (mm)

	Shipping			Operating		
	X	Y	Z	X	Y	Z
Minimum	688.6	1014.7	872.0	703.8	1023.1	806.5
Maximum	748.3	1166.4	918.5	769.6	1159.5	860.8

Notes:

1. All weights ± 5 percent.
2. Shipping weights include standard 1034.2 kPaG waterboxes.
3. Operating weights include refrigerant, glycol, and water charges.



Pre-installation

ASHRAE Standard 15 Compliance

Trane recommends that indoor Agility™ chiller installations fully meet or exceed the guidelines of the current version of ASHRAE Standard 15, in addition to any applicable national, state, or local requirements. This typically includes:

- A refrigerant monitor or detector that is capable of monitoring and alarming within the acceptable exposure level of the refrigerant, and that can actuate mechanical ventilation.
- Audible and visual alarms, activated by the refrigerant monitor, inside the equipment room and outside of every entrance.
- The equipment room should be properly vented to the outdoors, using mechanical ventilation that can be activated by the refrigerant monitor.
- If required by local or other codes, a self-contained breathing apparatus should be available in close proximity to the equipment room.

Refer to the latest copy of ASHRAE Standard 15 for specific guidelines. Trane assumes no responsibility for any economic, health, or environmental issues that may result from an equipment room's design or function.

Inspection Checklist

To protect against loss due to damage incurred in transit, complete the following checklist upon receipt of the unit.

- Inspect the individual pieces of the shipment before accepting the unit. Check for obvious damage to the unit or packing material.
- Inspect the unit for concealed damage as soon as possible after delivery and before it is stored. Concealed damage must be reported within 10 days after receipt.
- If concealed damage is discovered, stop unpacking the shipment. Do not remove damaged material from the receiving location. Take photos of the damage, if possible. The owner must provide reasonable evidence that the damage did not occur after delivery.
- Notify the carrier's terminal of the damage immediately, by phone and by mail. Request an immediate, joint inspection of the damage with the carrier and the consignee.
- Notify the Trane sales representative and arrange for repair. Do not repair the unit, however, until damage is inspected by the transportation representative.

Loose Parts Inventory

Check all items against the shipping list. Display, display arm and mounting, water vessel drain plugs, isolation pads, and other optional components are shipped loose in the parts box. Electrical diagrams and service literature are located inside the Adaptive Frequency™ Drive (AFD) panel.

Storage

Note: *If the chiller is stored outdoors for any amount of time, do NOT remove ANY shipping coverings. Protect the chiller from the elements and protect against freezing, especially if any shipping materials have been removed.*

If the chiller is to be stored more than one month prior to installation, observe the following precautions:

- Do NOT store the chiller in areas in which the temperature exceeds 122°F (50.0°C) or the refrigerant will relieve.
- Do NOT remove the protective coverings from the electrical panel.
- Store the chiller in a dry, secure area.
- Upon receipt and every three months thereafter, attach a gauge and manually check the pressure in the refrigerant circuit. Call a qualified service organization and the appropriate Trane sales office if:
 - for R-134a, if the refrigerant pressure is below 71 psig at 70°F (489.5 kPaG at 21.1°C) or 46 psig at 50°F (317.2 kPaG at 10.0°C).
 - for R-513A, if the refrigerant pressure is below 77 psig (530.9 kPaG at 21.1°C) at 70°F or 50 psig at 50°F (344.7 kPaG at 10.0°C).

Note: *Pressure will be approximately 20 psig (137.9 kPaG) if shipped with the optional nitrogen charge*

Installation Requirements and Contractor Responsibilities

A list of the contractor responsibilities typically associated with the unit installation process is provided in the following table.

⚠ WARNING

Combustible Material!

Failure to follow instructions below could result in death or serious injury or equipment damage. Shrink-wrap is a combustible material. Avoid open flames and hot sparks.



Pre-installation

Note: The chiller should remain within its protective shrink-wrap covering during storage.

Type of Requirement	Trane Supplied Trane Installed	Trane Supplied Field Installed	Field Supplied Field Installed
Foundation			<ul style="list-style-type: none"> Meet foundation requirements
Rigging			<ul style="list-style-type: none"> Safety chains Rigging shackles Lifting beam
Disassembly/Reassembly (as required)	<ul style="list-style-type: none"> Trane will perform or have direct on-site supervision of the disassembly and reassembly work (contact your local Trane office for pricing) 		
Isolation		<ul style="list-style-type: none"> Isolation pads 	<ul style="list-style-type: none"> Isolation pads Optional spring isolators, when required, are installed by others; do NOT overload springs and do NOT install isolation springs if they block serviceable parts such as service valves, etc.
Electrical	<ul style="list-style-type: none"> Circuit breakers Unit-mounted Adaptive Frequency™ Drive (AFD) Harmonic filter (optional) Autotransformer (optional) 	<ul style="list-style-type: none"> Temperature sensor (optional outdoor air) Flow switches (may be field supplied) Tracer® AdaptiView™ display and mounting arm 	<ul style="list-style-type: none"> Electrical connections to unit-mounted AFD Wiring sizes per submittal and National Electric Code (NEC) Ground connection(s) BAS wiring (optional) Inter-processor communication (IPC) wiring Control voltage wiring High condenser pressure interlock wiring Chilled water pump contactor and wiring Condenser water pump contactor and wiring Option relays and wiring
Water piping		<ul style="list-style-type: none"> Flow switches (may be field supplied) Condenser water regulating valve controller (optional; may be field-supplied) 	<ul style="list-style-type: none"> Thermometers Water flow pressure gauges Isolation and balancing valves in water piping Vents and drain valves Pressure relief valves (for waterboxes as required)
Pressure Relief	<ul style="list-style-type: none"> Relief valves 		<ul style="list-style-type: none"> Vent line and flexible connector
Insulation	<ul style="list-style-type: none"> Insulation (optional) 		<ul style="list-style-type: none"> Insulation
"Appendix B: Agility™ Chiller Installation Completion and Request for Trane Service," p. 67 (HDWA-ADF001*-EN; refer to "Appendix A: Forms and Check Sheets," p. 66)			<ul style="list-style-type: none"> To be completed by installing contractor prior to contacting Trane for start-up
Chiller start-up commissioning ^(a)	<ul style="list-style-type: none"> Trane, or an agent of Trane specifically authorized to perform start-up of Trane® products 		
Post-commissioning transport of empty refrigerant containers for return or recycling			<ul style="list-style-type: none"> Move empty refrigerant containers to an easily accessible point of loading

^(a) Start-up must be performed by Trane or an agent of Trane specifically authorized to perform start-up and warranty of Trane® products. Contractor shall provide Trane (or an agent of Trane specifically authorized to perform start-up) with notice of the scheduled start-up at least two weeks prior to the scheduled start-up.



Installation: Mechanical

Location Requirements

Sound Considerations

- Install rubber vibration isolators in all water piping.
- Isolate all pipe hangers and be sure they are not supported by main structure beams that could introduce vibration into occupied spaces.
- Make sure that the piping does not put additional stress on the unit.

Note: Do not use metal braided type eliminators on the water piping. Metal braided eliminators are not effective at the frequencies at which the unit will operate.

- Use flexible electrical conduit.
- Seal all wall penetrations.

Note: Consult an acoustical engineer for critical applications.

Foundation Requirements

Chiller mounting surface must be:

- rigid non-warping mounting pads or a concrete foundation, and
- able to support the chiller at its full operating weight (including completed piping and full operating charges of refrigerant and water).

For proper unit operation, the chiller must be level within 1/4 in. (6.35 mm) over its length and width when set into place on the mounting surface. Refer to "Leveling the Unit," p. 19 for more information. For minimum and maximum chiller weights/dimensions in pounds/inches and kilograms/millimeters, refer to "Weights (lb)," p. 13 and "Weights (kg)," p. 14, respectively.

Note: For specific weight information, refer to the unit submittal package.

Important: Trane will not assume responsibility for equipment problems resulting from an improperly designed or constructed foundation.

Clearances

Provide enough space around the unit to allow the installation and maintenance personnel unrestricted access to all service points. Refer to submittal drawings for the unit dimensions.

Refer to "Unit Clearances," p. 12 for minimum clearances required for service. In all cases, local codes will take precedence over these recommendations.

Ventilation

The unit produces heat even though the compressor is cooled by the refrigerant. Make provisions to remove heat generated by unit operation from the equipment room. Ventilation must be adequate to maintain an ambient temperature lower than 104°F (40°C).

Vent the evaporator, condenser, and compressor pressure relief valves in accordance with all local and national codes. Refer to "Refrigerant Pressure Relief Valve Venting," p. 20.

Make provisions in the equipment room to keep the chiller from being exposed to freezing temperatures (32°F [0°C]).

Water Drainage

Locate the unit near a large capacity drain for water vessel drain-down during shutdown or repair. Condensers and evaporators are provided with drain connections. Refer to "Overview," p. 24. All local and national codes apply.

Access Restrictions

Door clearances are provided in "Unit Clearances," p. 12. See unit submittals for specific "per unit" dimensional information.

Operating Environment

Important:

- The standard chiller is designed for **INDOOR USE ONLY** and as such has NEMA Type 1 enclosures.
- The warranty requires an equipment room/chiller environment surrounding the NEMA 1 chiller to be maintained in the temperature range of 34°F to 104°F (1.1°C to 40°C) AND at less than 95% relative humidity (non-condensing conditions). If your equipment room/chiller environment does not meet these conditions, contact your local Trane Service Agency immediately.

NOTICE

AFD Component Damage!

Operating unit at ambient temperatures below 34° F (1.1°C) or in excess of 104°F (40°C), or in excess of 95% relative humidity (non-condensing conditions), could result in AFD component damage due to the panel's inability to dissipate heat adequately.

If any of these adverse operating conditions are present, take necessary action to improve the equipment room environment.



Installation: Mechanical

To ensure that electrical components operate properly, do NOT locate the chiller in an area exposed to dust, dirt, corrosive fumes, or excessive heat and humidity. The ambient temperature range for chiller operation is 34°F to 104°F (1.1°C to 40°C).

Adaptive Frequency Drive Enclosure Rating

The Adaptive Frequency™ Drive (AFD) cabinet has a NEMA 1 enclosure rating:

NEMA 1: Vented. Intended for general-purpose indoor applications.

Environmental Conditions

Important: Location of the Adaptive Frequency™ Drive (AFD) is important if proper performance and normal operating life is to be expected. Therefore, unless designed for special environments, the controller should be installed in an area where the following conditions exist

- Verify that NEMA 1 enclosure drives can be kept clean and dry.
- The area chosen should allow the space required for proper air flow. Adequate clearance for air circulation around the enclosure is a 6 in. (16 cm) minimum clearance required wherever vents are located in the cabinet.
- Be sure that the NEMA 1 enclosure is installed away from oil, coolants, or other airborne contaminants.
- Do NOT install the drive above 3300 ft (1005.8 m) without derating output power. For every 300 ft (91.4 m) above 3300 ft (1005.8 m), derate the output current 1 percent.
- Line frequency is 50 or 60 Hz.
- Non-corrosive location.
- Verify that the drive location will meet the environmental conditions specified in the following table.

Table 5. Environmental conditions

Condition	Specification
Ambient Temperature (outside NEMA 1 enclosure)	32°F to 104°F (0°C to 40°C)
Storage Temperature (ambient)	-20°F to 122°F (-28.9°C to 50.0°C)
Humidity	5% to 95% (non-condensing)

Rigging

Lifting is the recommended method for moving chillers. Suggested lifting arrangements for standard units are described in "Standard Chiller Lift," p. 18.

Note: The lifting beam used for HDWA Agility™ chillers must be at least 12.5 ft (3.8 m) long.

Important: If unit must be disassembled for installation, refer to Installation Instructions: Agility Chiller Disassembly/ Reassembly Units (HDWA-SVN001*-EN) for instructions, including weights and rigging instruction for components.

Agility™ chillers should be moved ONLY by lifting at designated lift points. Refer to the following instructions in this manual for typical rigging arrangements.

⚠ WARNING

Heavy Object!

Failure to follow instructions below could result in unit dropping which could result in death or serious injury, and equipment or property-only damage.

Ensure that all the lifting equipment used is properly rated for the weight of the unit being lifted. Each of the cables (chains or slings), hooks, and shackles 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.

⚠ WARNING

Improper Unit Lift!

Failure to properly lift unit in a LEVEL position could result in unit dropping and possibly crushing operator/technician which could result in death or serious injury, and equipment or property-only damage.

Test lift unit approximately 24 inches (61 cm) to verify proper center of gravity lift point. To avoid dropping of unit, reposition lifting point if unit is not level.

NOTICE

Wiring Damage!

Damage to unit wiring could result in equipment failure.

Care must be taken during rigging, assembly and disassembly to avoid damaging unit wiring.

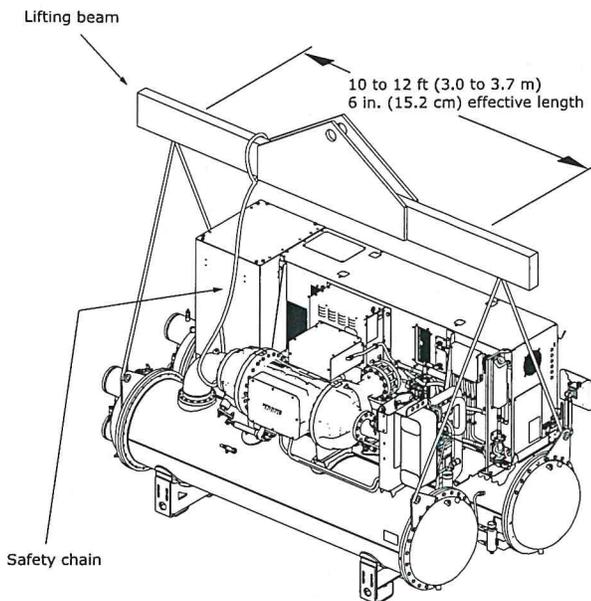
Standard Chiller Lift

1. Insert rigging shackles at the points indicated in the following figure. A 1.25 in. (31.8 mm) diameter lifting hole is provided at each of these points.
2. Attach the lifting chains or cables.
3. After the lifting cables are in place, attach a safety chain or cable between the first-stage of the compressor and the lifting beam.

Important: There should NOT be tension on this safety cable; the cable is used only to prevent the unit from rolling during the lift.

4. Position isolator pads beneath the chiller feet (refer to "Unit Isolation," p. 19 for instructions).
5. Once the isolators are in place, lower the chiller—working from end to end—in small increments to maintain stability.
6. When lift is complete, detach the rigging shackles and safety chain.

Figure 9. Typical rigging arrangements



Special Lift Requirements

NOTICE

Equipment Damage!

Moving the chiller using a fork lift could result in equipment or property-only damage.

Do not use a fork lift to move the chiller!

If the chiller cannot be moved using a standard chiller lift, consider the following:

- When job site conditions require rigging of the chiller at an angle greater than 45° from horizontal (end-to-end), the unit may require removal of the compressor. Contact Trane or an agent of Trane specifically authorized to perform start-up and warranty of Trane® products regarding the disassembly and reassembly work. For more information, refer to "Factory Warranty Information," p. 3.

Note: Disassembly and reassembly work includes removing the compressor from the unit. Contact Trane or an agent of Trane specifically authorized to perform start-up and warranty of Trane® products for specific rigging instructions. Do NOT attempt to rotate the chiller onto its side.

- When lifting the chiller is either impractical or undesirable, machinery dollies should be placed under the supports; then push or pull the unit across a smooth surface. Should the chiller be on blocks, it is not necessary to remove the blocks from the chiller before moving it into place.
- Use care on uneven surfaces. Piping in the center of the unit is within 1/2 in. (12.7 mm) of the ground.

Unit Isolation

To minimize sound and vibration transmission through the building structure and to ensure proper weight distribution over the mounting surface, Trane recommends installing isolation padding under the chiller feet. For seismic installations, refer to the specific installation details provided by the foundation designer.

Note: Isolation pads are provided with each chiller.

Specific isolator loading data is provided in the unit submittal package. If necessary, contact your local Trane sales office for further information.

Important: When determining placement of isolation pads, remember that the control panel side of the unit is always designated as the front side of the unit.

Isolation Pads

When isolation pads are used, place them under each of the eight individual mounting points. The pads may be cut to suit the application, but should cover the entire face of the support.

Leveling the Unit

Note: The chiller **MUST** be set level within 1/4 in. (6.35 mm) over its length and width.

1. Use a water level to align the tube sheet tooling holes or bottom edge of the tube sheet axially along both the condenser and evaporator; refer to the following figures.
2. Use a water level to align the tooling holes across the condenser tube sheet; refer to the following figures.

Important: Do NOT level the tooling holes from the evaporator to the condenser as they may be at different heights.

Figure 10. Leveling the chiller (front and left views)

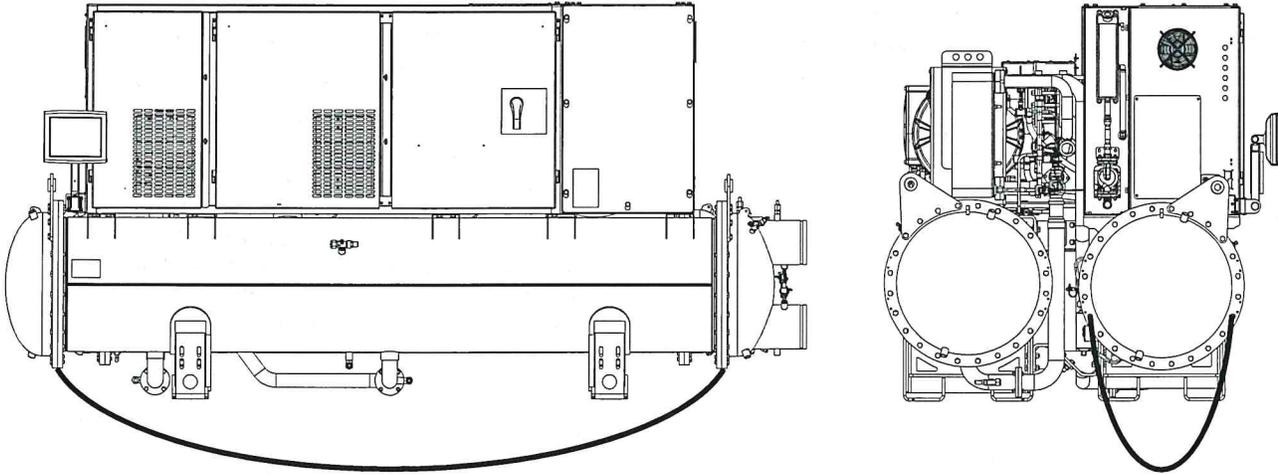
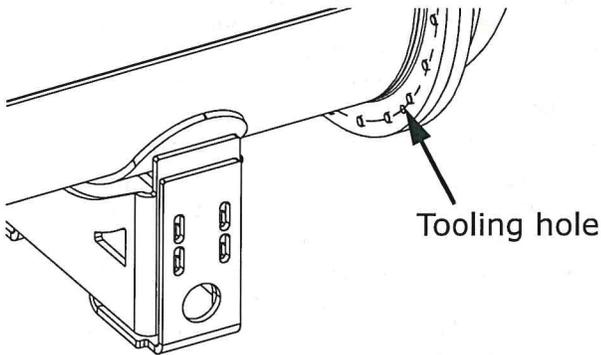
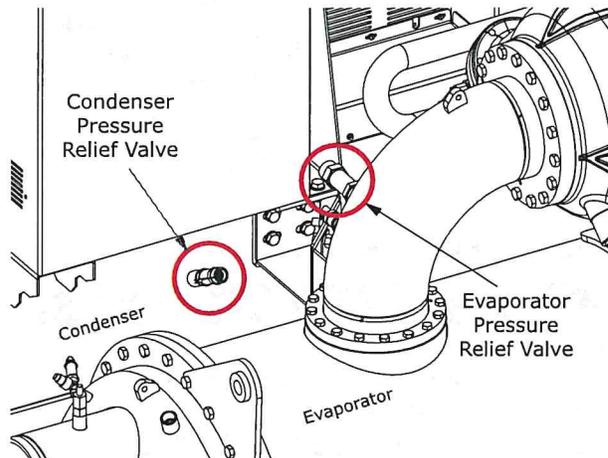


Figure 11. Leveling the chiller (tooling hole)



All HDWA chillers use evaporator and condenser pressure relief valves (refer to the following figure) that must be vented to the outside of the building.

Figure 12. Location of relief valves



Relief valve connection sizes and locations are shown in unit submittals. Refer to local codes for relief valve vent line sizing information.

Refrigerant Pressure Relief Valve Venting

⚠ WARNING

Confined Space Hazards!

Failure to follow instructions below could result in death or serious injury.

Do not work in confined spaces where refrigerant or other hazardous, toxic or flammable gas may be leaking. Refrigerant or other gases could displace available oxygen to breathe, causing possible asphyxiation or other serious health risks. Some gases may be flammable and or explosive. If a leak in such spaces is detected, evacuate the area immediately and contact the proper rescue or response authority.

Note: Vent pipe size must conform to the ANSI/ASHRAE Standard 15 for vent pipe sizing. All federal, state, and local codes take precedence over any suggestions stated in this manual.

All relief valve venting is the responsibility of the installing contractor.

NOTICE

Equipment Damage!

Failure to comply with specifications may result in capacity reduction, unit damage and/or relief valve damage.

Do NOT exceed vent piping code specifications!

Relief valve discharge setpoints and capacities rates are provided in the following table. After the relief valve has opened, it will re-close when pressure is reduced to a safe level.

Note: After they are opened, relief valves may have tendency to leak and must be replaced.

Pressure relief valve discharge capacities varies with shell diameter and length and also compressor displacement. Discharge venting capacity should be

calculated as required by ASHRAE Standard 15-94. Do NOT adjust relief valve setting in the field.

Table 6. Pressure relief valve data

Valve Location	Discharge Setpoint		Rated Capacity		Field Connection Pipe Size		Factory Shell Side Connection	
	psi	kPa	lb air/ min.	kg air/ min.	NPT	mm	in.	mm
Evaporator— Compressor Low Side Pipe (Suction)	200	1379.0	78.8	35.7	1-1/4	31.8	1-5/8 - 12	41.3 - 304.8
Condenser	300	2068.4	49.2	22.3	3/4	19.1	7/8 - 14	22.2 - 355.6



Freeze Protection

For unit operation in a low temperature environment, adequate protection measures must be taken against

freezing. Refer to the following tables for adjusted settings and recommended ethylene glycol and propylene glycol solution strengths.

Table 7. Agility chiller control settings based on ethylene glycol percentage

Ethylene Glycol Percentage, %	Solution Freeze Point		Minimum Recommended LRTC		Minimum Recommended LWTC	
	°F	°C	°F	°C	°F	°C
0	32.0	0.0	28.6	-1.9	34.0	1.1
2	31.0	-0.6	27.6	-2.5	33.0	0.5
4	29.7	-1.3	26.3	-3.2	31.7	-0.2
5	29.0	-1.7	25.6	-3.6	31.0	-0.6
6	28.3	-2.0	24.9	-3.9	30.3	-0.9
8	26.9	-2.8	23.5	-4.7	28.9	-1.7
10	25.5	-3.6	22.1	-5.5	27.5	-2.5
12	23.9	-4.5	20.5	-6.4	25.9	-3.4
14	22.3	-5.4	18.9	-7.3	24.3	-4.3
15	21.5	-5.9	18.1	-7.7	23.5	-4.7
16	20.6	-6.3	17.2	-8.2	22.6	-5.2
18	18.7	-7.4	15.3	-9.3	20.7	-6.3
20	16.8	-8.4	13.4	-10.3	18.8	-7.3
22	14.7	-9.6	11.3	-11.5	16.7	-8.5
24	12.5	-10.8	9.1	-12.7	14.5	-9.7
25	11.4	-11.4	8.0	-13.3	13.4	-10.3
26	10.2	-12.1	6.8	-14.0	12.2	-11.0
28	7.7	-13.5	4.3	-15.4	9.7	-12.4
30	5.1	-15.0	1.7	-16.8	7.1	-13.8
32	2.3	-16.5	-1.1	-18.4	5.0	-15.0
34	-0.7	-18.2	-4.1	-20.1	5.0	-15.0
35	-2.3	-19.0	-5.7	-20.9	5.0	-15.0
36	-3.9	-19.9	-7.3	-21.8	5.0	-15.0
38	-7.3	-21.8	-10.7	-23.7	5.0	-15.0
40	-10.8	-23.8	-14.2	-25.7	5.0	-15.0

Table 8. Agility chiller control settings based on propylene glycol percentage

Propylene Glycol Percentage, %	Solution Freeze Point		Minimum Recommended LRTC		Minimum Recommended LWTC	
	°F	°C	°F	°C	°F	°C
0	32.0	0.0	28.6	-1.9	34.0	1.1
2	31.0	-0.6	27.6	-2.4	33.0	0.6
4	29.9	-1.2	26.5	-3.1	31.9	-0.1
5	29.3	-1.5	25.9	-3.4	31.3	-0.4
6	28.7	-1.8	25.3	-3.7	30.7	-0.7
8	27.6	-2.5	24.2	-4.4	29.6	-1.4
10	26.4	-3.1	23.0	-5.0	28.4	-2.0
12	25.1	-3.8	21.7	-5.7	27.1	-2.7
14	23.8	-4.6	20.4	-6.5	25.8	-3.5
15	23.1	-5.0	19.7	-6.8	25.1	-3.8
16	22.4	-5.4	19.0	-7.2	24.4	-4.2
18	20.9	-6.2	17.5	-8.1	22.9	-5.1
20	19.3	-7.1	15.9	-9.0	21.3	-6.0

Table 8. Agility chiller control settings based on propylene glycol percentage (continued)

Propylene Glycol Percentage, %	Solution Freeze Point		Minimum Recommended LRTC		Minimum Recommended LWTC	
	°F	°C	°F	°C	°F	°C
22	17.6	-8.0	14.2	-9.9	19.6	-6.9
24	15.7	-9.0	12.3	-10.9	17.7	-7.9
25	14.8	-9.6	11.4	-11.5	16.8	-8.5
26	13.8	-10.1	10.4	-12.0	15.8	-9.0
28	11.6	-11.3	8.2	-13.2	13.6	-10.2
30	9.3	-12.6	5.9	-14.5	11.3	-11.5
32	6.8	-14.0	3.4	-15.9	8.8	-12.9
34	4.1	-15.5	0.7	-17.4	6.1	-14.4
35	2.7	-16.3	-0.7	-18.1	5.0	-15.0
36	1.3	-17.1	-2.1	-19.0	5.0	-15.0
38	-1.8	-18.8	-5.2	-20.7	5.0	-15.0
40	-5.2	-20.7	-8.6	-22.5	5.0	-15.0



Installation: Water Piping

Overview

The following water piping circuits must be installed and connected to the chiller:

- Pipe the evaporator into the chilled water circuit.
- Pipe the condenser into the cooling tower water circuit.

Note: Piping must be arranged and supported to avoid stress on the equipment. It is strongly recommended that the piping contractor does not run pipe closer than 3 ft (0.9 m) minimum to the equipment. This will allow for proper fit upon arrival of the unit at the job site. Any adjustment that is necessary can be made to the piping at that time. Expenses that result from a failure to follow this recommendation will NOT be paid by Trane.

Piping suggestions for each of the water circuits listed above are outlined in "Evaporator and Condenser Water Piping," p. 27. General recommendations for the installation of field-supplied piping components (e.g., valves, flow switches, etc.) common to most chiller water circuits are listed in the following sections.

Water Treatment

The use of untreated or improperly treated water in a Agility™ chiller may result in inefficient operation and possible tube damage.

Important: Trane strongly recommends using the services of a qualified water treatment specialist to determine necessary water treatment. A label with a customer disclaimer note is affixed to each unit.

NOTICE

Proper Water Treatment Required!

The use of untreated or improperly treated water could result in scaling, erosion, corrosion, algae or slime.

Use the services of a qualified water treatment specialist to determine what water treatment, if any, is required. Trane assumes no responsibility for equipment failures which result from untreated or improperly treated water, or saline or brackish water.

Water Pressure Gauges

Locate pressure gauge taps in a straight length of pipe. Place each tap a minimum of one pipe diameter downstream of any elbow, orifice, etc. For example, for a 6 in. (16 cm) pipe, the tap would be at least 6 in. (16 cm) from any elbow, orifice, etc.

Valves—Drains and Vents

NOTICE

Waterbox Damage!

Failure to follow instructions could result in damage to the waterbox.

Do not over-tighten or use excessive Teflon® pipe tape when installing valves, drains, plugs and vents on waterboxes.

1. Install field-supplied air vents and drain valves on the waterboxes. Each waterbox is provided with a National Pipe Thread Female (NPTF) vent and drain connection; depending on the waterbox types ordered, the openings may be 1/4 in. (6.35 mm), 1/2 in. (12.7 mm), or 3/4 in. (19.05 mm).

NOTICE

Waterbox Damage!

Failure to follow instructions could result in damage to the waterbox due to hydrostatic expansion.

Install pressure-relief valves in the condenser and evaporator water circuits.

NOTICE

Equipment Damage!

Failure to follow instructions could result in equipment damage.

Do NOT allow chiller to freeze! Bundles must be drained and air-blown dry if chiller is stored in an unheated equipment room.

2. If necessary for the application, install pressure-relief valves at the drain connections on the evaporator and condenser waterboxes. To do so, add a tee with the relief valve attached to the drain valve.

To determine whether or not pressure relief valves are needed for a specific application, keep in mind that:

- a. Vessels with close-coupled shutoff valves may cause high potentially damaging hydrostatic pressures as fluid temperature rises.
- b. Relief valves are required by American Society of Mechanical Engineers (ASME) codes when the shell waterside is ASME. Follow ASME guidelines or other applicable codes to ensure proper relief valve installation.

Strainers

NOTICE

Water Born Debris!

To prevent components damage, pipe strainers must be installed in the water supplies to protect components from water born debris. Trane is not responsible for equipment-only-damage caused by water born debris.

Install a strainer in the entering side of each piping circuit to avoid possible tube plugging in the chiller with debris.

Required Flow-Sensing Devices

The ifm efector® flow detection controller and sensor (refer to “Water Flow Detection Controller and Sensor,” p. 25) is used to verify evaporator and condenser water flows.

If a customer-supplied flow sensing device is used to ensure adequate chiller flow protection, refer to the wiring diagrams that shipped with the unit for specific electrical connections.

Be sure to follow the manufacturer’s recommendations for device selection and installation.

Water Flow Detection Controller and Sensor

Important: Before installing the ifm efector® flow detection controller and sensor, use a marker to draw a line on the probe at 3.5 in. (8.9 cm) from the end of the probe. Do NOT insert more than 3.5 in. (8.9 cm) of the probe length into the pipe. Refer to the following figure.

Figure 13. Installation of ifm efector flow detection controller and sensor

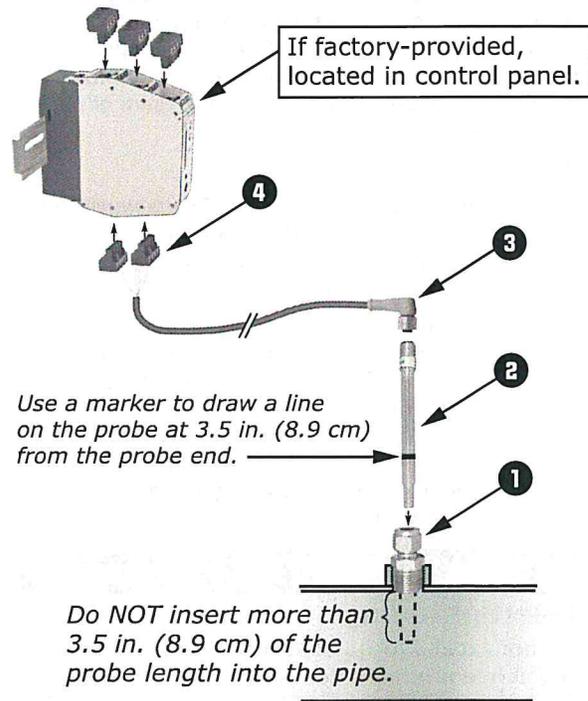
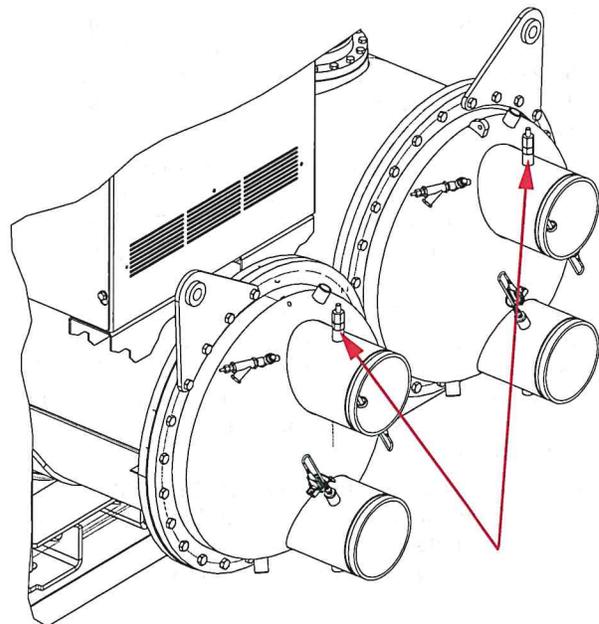


Figure 14. Location of ifm efector flow detection controller and sensor



Note: In Agility™ chillers, the ifm efector® flow detection controller and sensor is mounted in the waterbox nozzle, as shown in the preceding figure.

Installation: Water Piping

1. Mount the 1/2-in. NPT adapter in a horizontal or vertical section of pipe. The maximum distance from the control panel must not exceed 29.5 ft (9 m) (see item labeled "1" in the preceding figure). Allow at least five pipe diameters straight run of pipe upstream of the sensor location, and three pipe diameters straight run of pipe downstream of the sensor location.

Notes:

- In Agility™ chillers, the ifm efector® flow detection controller and sensor is mounted in the waterbox nozzle, as shown in the preceding figure.
- If the ifm efector® flow detection controller and sensor is mounted in an alternate location on a horizontal pipe, mounting the sensor in the side of the pipe is preferred; in the case of a vertical pipe, mounting the sensor in a place where the water flows upwards is preferred.

NOTICE

Overtightening!

Do not exceed torque specifications as it could result in equipment damage.

2. Insert the flow sensor probe (see item labeled "2" in the preceding figure) through the 1/2-in. NPT adapter so that 3 to 3.5 in. (7.6 to 8.9 cm) of the probe's length extends into the pipe. Tighten the 1/2-in. NPT adapter as needed to prevent leakage and keep the probe from backing out under pressure. **Do NOT exceed 40 ft-lb (54.2 N-m) of torque on the fitting. Sensor damage can occur if it is overtightened.**

Note: When installed, the tip of the ifm efector® sensor probe must be at least 1 in. (2.54 cm) away from any pipe wall. Do NOT insert more than 3.5 in. (8.9 cm) of the probe length into the pipe.

3. Install the Micro DC Cable by inserting it through the wire openings on the back side of the control panel (see item labeled "3" in the preceding figure). Install the supplied Micro DC Cable (29.5 ft [9 m] in length) to the Flow Probe and hand-tighten the connector nut.
4. Plug the other end of the Micro DC Cable into the Flow Control Monitor with the Combicon connector (see item labeled "4" in the preceding figure). Refer to the following figure for cable wiring.

NOTICE

Do Not Apply Electrical Power to a Unit in a Vacuum!

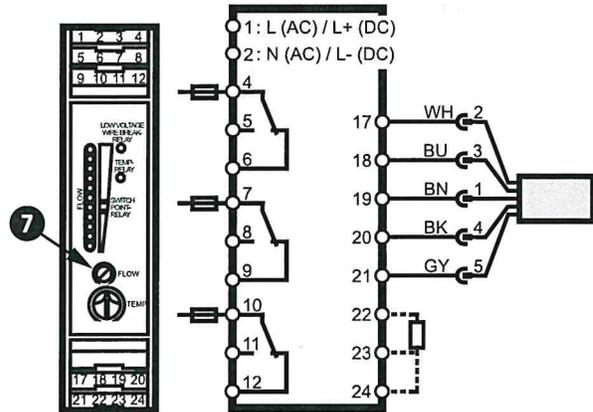
Failure to follow instructions below could result in motor and compressor damage. Do not apply electrical power to a motor in a vacuum.

5. Apply power to the chiller control panel to verify the Flow Control Monitor has power and the Low Volt Broken Wire Relay light is NOT lit.
6. Remove all air from the piping circuit prior to adjusting the low water flow setpoint.
7. Reduce the water flow to the minimum allowable flow and adjust the Flow setting on the Flow Control Monitor (see item labeled "7" in the following figure). Adjusting the "Flow" potentiometer clockwise (+) reduces the flow setting cutout and adjusting counterclockwise (-) increases the flow setting cutout.

Note: The "Temp" potentiometer on the ifm efector® control module has no effect in Trane application. It is NOT necessary to make adjustments to the "Temp" potentiometer.

8. After the cutout setting is adjusted, the cutout setpoint will be indicated with a yellow light on the Flow Control Monitor LED bar graph display. When the water flows are higher than the cutout, a green light will indicate proper flow status. If the flows fall below the cutout setpoint, a red light will indicate low/no flow status.

Figure 15. ifm efector® flow sensing device terminal connection



NOTICE

Proof of Flow Switch!

Failure to provide flow switches or jumping-out of switches could result in severe equipment damage.

Evaporator and condenser water circuits require proof of flow switches.

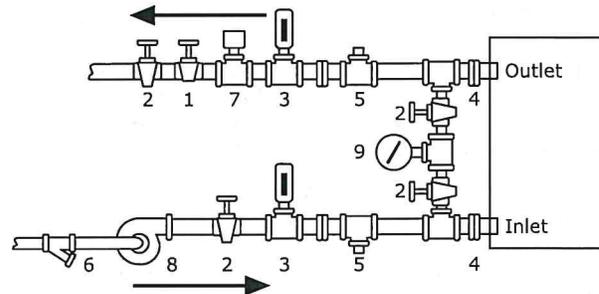
- Failure to include the proof of flow devices and/or jumping out these devices could cause the unit to stop on a secondary level of protection.
- Frequent cycling on these higher level diagnostic devices could cause excessive thermal and pressure cycling of unit components (O-rings, gaskets, sensors, motors, controls, etc.) and/or freeze damage, resulting in premature failure of the chiller.

Evaporator and condenser proof of flow switches are required. These switches are used with control logic to confirm flow prior to starting a unit and to stop a running unit if flow is lost. For troubleshooting, a viewable diagnostic is generated if a proof of flow switch does not close when flow is required.

Evaporator and Condenser Water Piping

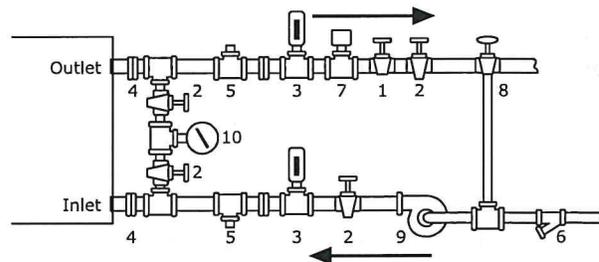
The following two figures illustrate the recommended (typical) water piping arrangements for the evaporator and condenser.

Figure 16. Typical evaporator water piping circuit



1. Balancing valve.
2. Gate (Isolation) valve or ball valve.
3. Thermometer (if field supplied).
4. Waterbox nozzle connection.
5. Drain, vent, and anode.
6. Strainer.
7. Chilled water flow switch (5S1). Flow switch 5S1 may be installed in either the entering or leaving leg of the chilled water circuit.
8. Pump.
9. Pressure gauge. It is recommended to pipe the gauge between entering and leaving pipes. A shutoff valve on each side of the gauge allows the operator to read either entering or leaving water pressure.

Figure 17. Typical condenser water piping circuits



1. Balancing valve.
2. Gate (isolation) valve or ball valve.
3. Thermometer (if field supplied).
4. Waterbox nozzle connection.
5. Drain, vent, and anode.
6. Strainer.
7. Condenser water flow switch (5S2). Flow switch 5S2 may be installed in either the entering or leaving leg of the chilled water circuit.
8. Three-way valve (optional).
9. Condenser water pump.
10. Pressure gauge. It is recommended to pipe a single gauge between entering and leaving pipes.

Installation: Water Piping

Piping must be arranged and supported to avoid stress on the equipment. It is strongly recommended that the piping contractor does not run pipe closer than 3 ft (0.9 m) minimum to the equipment. This will allow for proper fit upon arrival of the unit at the job site. Any adjustment that is necessary can be made to the piping at that time. Expenses that result from a failure to follow this recommendation will NOT be paid by Trane.

Water piping connection sizes and components are identified in the tables in “Water Piping Connections,” p. 28 and “Grooved Pipe Coupling,” p. 29. Remember that with many waterboxes, the entering and leaving evaporator water can be piped to either waterbox connection when the tube bundles are split vertically. However, large evaporator waterboxes with entering and leaving connections not at the same level must be connected with the entering water at the bottom and the leaving water at the top.

Waterboxes with multiple pass arrangements utilize a baffle to separate the passes. These baffles are designed for a maximum pressure of 20 psid (137.9 kPaD). If larger pressure drops are expected in the application, contact your local Trane representative to discuss special waterbox options.

Important: *Water flows must be piped in accordance with nameplate designation.*

Field-provided isolation valves for the evaporator and condenser water lines should be installed upstream and downstream of the heat exchangers, and be installed far enough away from the chiller to also provide practical service isolation for flow sensing devices, field thermometers, flexible connectors, and any removable pipe spools.

Ensure that the evaporator water piping is clear; check it after the chilled water pump is operated but before initial chiller start-up. If any partial blockages exist, they can be detected and removed to prevent possible tube damage resulting from evaporator freeze-up or erosion.

For condenser and evaporator connections, arrange the water piping so that the water supply enters the shell at the lower connection and exits from the top connection. Operational problems may result if this piping is not correct.

For applications that include an “infinite source” or “multiple-use” cooling condenser water supply, install a valved bypass “leg” (optional) between the supply and return pipes. This valved bypass allows the operator to short-circuit water flow through the cooling condenser when the supply water temperature is too low.

Water Piping Connections

All standard units use grooved-pipe connections. These are grooved-end NSP (Victaulic® style) pipe connections. Flanged connections are optional.

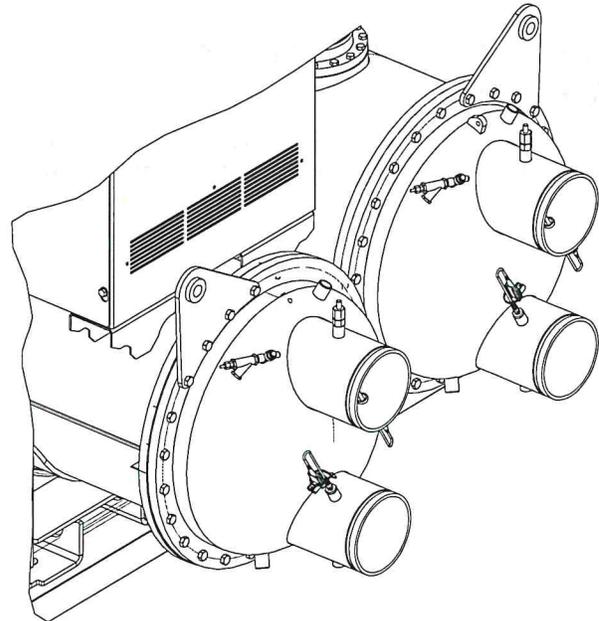
Piping joined using grooved type couplings, like all types of piping systems, requires proper support to carry the weight of pipes and equipment. The support methods used must eliminate undue stresses on joints, piping, and other components, allow movement where required, and provide for any other special requirements (i.e., drainage, etc.).

Note: *If needed, plug-type sensor extension cables are available for purchase from Trane Parts Service. These sensor extension cables may be necessary if the waterboxes are changed or if the temperature sensors are moved out into the unit piping for better mixed temperature readings.*

Table 9. Water connection pipe sizes

EVSZ/CDSZ	Nominal Pipe Size	
	2 Pass	
	in.	mm
020	6	168.3
040	8	219.1

Figure 18. Typical grooved pipe connection



Waterbox Locations

Note: *Do NOT interchange evaporator and condenser waterboxes. Supply evaporator waterbox and tubesheet contain match marks to aid in identifying matching shells and waterboxes.*

If removal of waterboxes is necessary, refer to “Waterbox Removal,” p. 63.

If the waterboxes on any of the shells are exchanged end-for-end, be sure to reinstall them right-side up to

maintain the correct baffle arrangements. Use a new gasket with each waterbox cover.

Reversing Waterboxes

All waterboxes can be reversed end-for-end. Refer to "Waterbox Removal," p. 63 for detailed waterbox removal instructions.

Remove sensors from wells before removing waterbox.

Do NOT rotate waterboxes.

Complete the waterbox switch and replace sensors.

Notes:

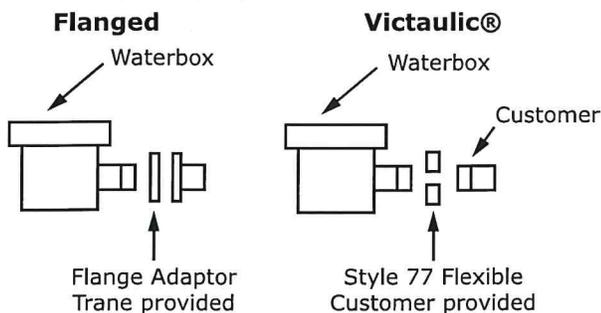
- *If waterboxes are reversed, be sure to properly rewire water temperature sensors in the control panel.*
- *Be sure to replace waterboxes right-side-up to maintain proper baffle orientation. Use new O-rings.*

Grooved Pipe Coupling

A customer-supplied, standard flexible grooved pipe coupling (Victaulic® Style 77 or equivalent) should be used to complete the Victaulic® connection for both 150 psig (1034.2 kPaG) and 300 psig (2068.4 kPaG) waterboxes.

When a flexible coupling such as this is installed at the waterbox connections, other flexible piping connectors (i.e., braided-steel, elastomeric arch, etc.) are not usually required to attenuate vibration and/or prevent stress on the connections.

Figure 19. Customer piping connection types



Notes:

- *Refer to the coupling manufacturer's guidelines for specific information concerning proper piping system design and construction methods for grooved water piping systems.*
- *Flexible coupling gaskets require proper lubrication before installation to provide a good seal. Refer to the coupling manufacturer's guidelines for proper lubricant type and application.*

Flange-connection Adapters

NOTICE

Never Weld to Cast Boxes!

Welding to cast boxes will result in equipment damage.

Adapters must be used to convert flanges.

When flat-face flange connections are specified, flange-to-groove adapters are provided (Victaulic® Style 741, 150 psig [1034.2 kPaG]). The adapters are shipped in spare parts box included with the unit. Adapter descriptions are given in the tables in "Victaulic Gasket Installation," p. 29. The flange adapters provide a direct, rigid connection of flanged components to the grooved-pipe chiller waterbox connections.

In this case, the use of flexible type connectors (i.e., braided steel, elastomeric arch, etc.) are recommended to attenuate vibration and prevent stress at the waterbox connections.

All flange-to-flange assembly screws must be provided by the installer. Hex head screw sizes and number required are included in the tables in "Victaulic Gasket Installation," p. 29. The Style 741 (150 psig [1034.2 kPaG]) flange adapter requires a smooth, hard surface for a good seal.

Connection to other type flange faces (i.e., raised, serrated, rubber, etc.) requires the use of a flange washer between the faces. Refer to the flange adapter manufacturer's guidelines for specific information.

The flange-adapter gasket must be placed with the color-coded lip on the pipe and the other lip facing the mating flange.

NOTICE

Piping Connection Leaks!

Failure to provide effective seal could result in equipment or property-only damage.

To provide effective seal, gasket contact surfaces of adapter must be free of gouges, undulations or deformities.

Victaulic Gasket Installation

1. Inspect supplied gasket to be certain it is suited for intended service (code identifies gasket grade). Apply a thin coat of silicone lubricant to gasket tips and outside of gasket.
2. Install gasket, placing gasket over pipe end and making sure gasket lip does not overhang pipe end. Refer to the following figure for gasket configuration.
3. Align and bring two pipe ends together and slide gasket into position centered between the grooves on each pipe. No portion of the gasket should extend into the groove on either pipe.

Installation: Water Piping

4. Open fully and place hinged Victaulic® flange around the grooved pipe end with the circular key section locating into the groove.
5. Insert a standard hex head screw through the mating holes of the Victaulic® flange to secure the flange firmly in the groove.
6. Tighten fasteners alternately and equally until housing screw pads are firmly together (metal-to-metal); refer to "Screw-Tightening Sequence for Water Piping Connections," p. 30. Do NOT excessively tighten fasteners.

Note: Uneven tightening may cause the gasket to pinch.

Figure 20. Typical Victaulic® flange gasket configuration

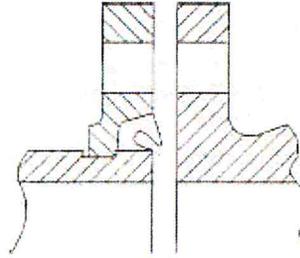


Table 10. Installation data for 150 psig (1034.2 kPaG) flange adapters (Style 741)

Nominal Pipe Size		Assembly Screw Size ^(a)	Number of Assembly Screws Required	Screw Pattern Diameter		Weight	
in.	mm	in.		in.	mm	lb	kg
6	168.3	3/4 x 3-1/2	8	9.5	241	10.3	4.7
8	219.1	3/4 x 3-1/2	8	11.75	298	16.6	7.5

^(a) Screw size for conventional flange-to-flange connection. Longer screws are required when flange washer must be used. Grade 5 screws are recommended.

Screw-Tightening Sequence for Water Piping Connections

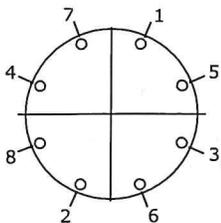
This section describes a screw-tightening sequence for flanges with flat gaskets or O-rings. Remember that improperly tightened flanges may leak.

Note: Before tightening any of the screws, align the flanges.

Flanges with 8 Screws

Tighten all screws to a snug tightness, following the numerical sequence for the appropriate pattern as shown in the following figure. Repeat this sequence to apply the final torque to each screw.

Figure 21. Flange screw tightening sequence (8 screws)



8 screws

Pressure Testing Waterside Piping

NOTICE

Equipment Damage!

Failure to follow these instructions could result in equipment damage.

Do not over pressurize the system or exceed design pressure. Always perform a hydro pressure test with water present in piping and waterboxes.

Waterside design pressure is 150 psig (1034.2 kPaG).



Insulation

Unit Insulation Requirements

Factory-installed insulation is available as an option for all units. Factory installation does NOT include insulation of the chiller feet. In applications where the chiller is not factory-insulated, install insulation over all surfaces shown in the figure in "Factory-applied Insulation," p. 31 (i.e., compressor, condenser, economizer, and drive [not shown]).

The quantity of insulation required is listed in the following table. Insulation thickness is determined at normal design conditions which are:

- Standard comfort-cooling leaving chilled water temperature
- 85°F (29.4°C) dry bulb ambient temperature
- 75 percent relative humidity

Operation outside of normal design conditions as defined in this section may require additional insulation; contact Trane for further review.

Note: *If the unit is not factory-insulated, install insulation around the evaporator bulbwells and ensure that the bulbwells and connections for the waterbox drains and vents are still accessible after insulation is applied. The sensor modules (Low Level Intelligent Devices [LLIDs]) and interconnecting four-wire cable inter-processor communication (IPC) bus must be raised up above the field-installed insulation. Secure the IPC bus to the insulation top/outer surface after insulation is completed.*

Important: *Do NOT insulate the compressor, motor housing, unit wiring, or sensor modules.*

Table 11. Agility chiller insulation requirements

Location	3/4 in. (19.05 mm) Insulation, Square Feet (Square Meters)
Evaporator, Suction Elbow, Pipe	120 (11.1)

Insulation Thickness Requirements

Factory-applied Insulation

All low-temperature surfaces are covered with 3/4 in. (19.05 mm) Armaflex® II or equal .

The insulation is Armaflex® or equivalent closed cell elastomeric insulation to prevent the formation of condensation . Chillers in high humidity areas or ice storage, low leaving water temperature (less than 36°F [2.2°C] chilled water temperature/glycol) units, may require double thickness to prevent formation of condensation.

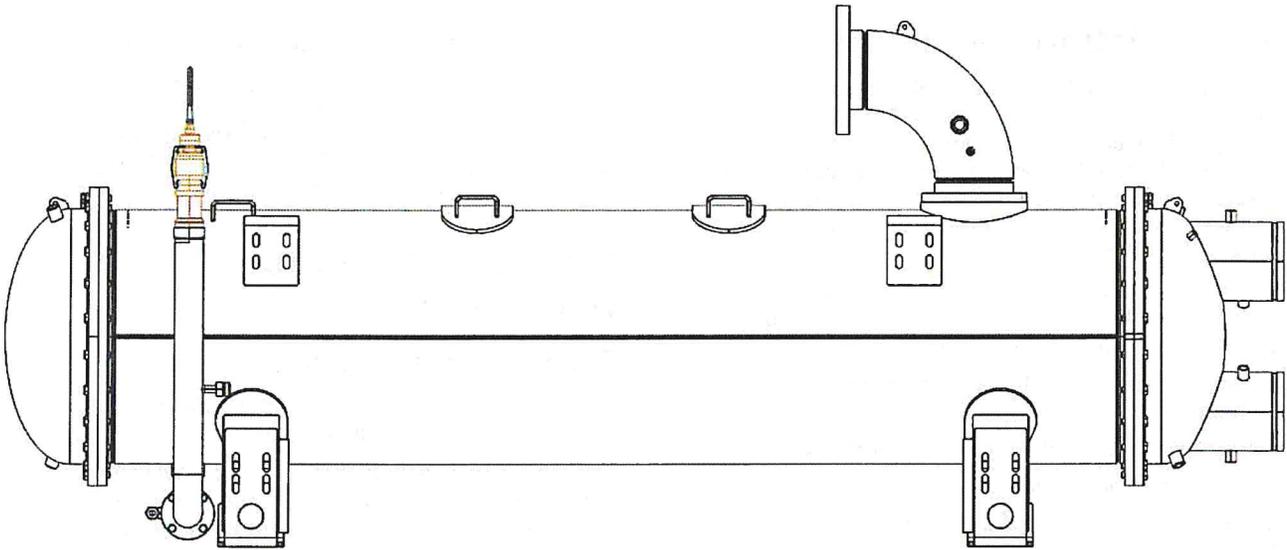
NOTICE

Insulation Damage!

Failure to follow these instructions could result in insulation damage.

To prevent damage to factory installed insulation:

- Do not allow the insulation to be exposed to excessive sunlight. Store indoors or cover with canvas to prevent exposure.
- Do not use thinners and solvents or other types of paint. Use only water base latex.

Figure 22. Recommended area for unit insulation**Notes:**

- *Bulbwells, drain, and vent connections must be accessible after insulating.*
- *All units with evaporator marine waterboxes: wrap waterbox shell insulation with strapping and secure strapping with seal.*
- *Evaporators with ASME nameplates must have insulation cut out around the nameplate. Do NOT glue insulation to the nameplate.*
- *Apply 2-in. (50.8-mm) wide black tape on overlap joints. Where possible, apply 3-in. (76.2-mm) wide strip of 0.38-in. (9.652-mm) thick insulation over butt joint seams.*



Electrical Requirements

Installation Requirements

⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.

All field wiring **MUST** be performed by qualified personnel. Improperly installed and grounded field wiring poses **FIRE** and **ELECTROCUTION** hazards. To avoid these hazards, you **MUST** follow requirements for field wiring installation and grounding as described in NEC and your local/state/national electrical codes.

Unit-mounted Adaptive Frequency™ Drives (AFDs) are standard on all units. While this option eliminates most field-installed wiring requirements, the electrical contractor must still complete the electrical connection for the following:

- power supply wiring to the AFD,
- other unit control options present, and
- any field-supplied control devices.

As you review this manual along with the wiring instructions presented in this section, keep in mind that:

- All field-installed wiring must conform to National Electric Code (NEC) guidelines, and any applicable local, state, and national codes. Be sure to satisfy proper equipment grounding requirements per NEC.
- Compressor motor and unit electrical data (including motor kW, voltage utilization range, rated load amps, and locked rotor amps) is listed on the chiller nameplate.
- All field-installed wiring must be checked for proper terminations, and for possible shorts or grounds.

Note: Always refer to the actual wiring diagrams that shipped with the chiller or the unit submittal for specific as-built electrical schematic and connection information.

NOTICE

Adaptive Frequency Drive (AFD)/ Starter Component Damage!

Failure to remove debris from inside the AFD/ starter panel could result in an electrical short and could cause serious AFD/starter component damage.

Do NOT modify or cut enclosure to provide electrical access. Removable panels have been provided, and any modification should be done away from the

enclosure. If the AFD enclosure must be cut to provide electrical access, exercise care to prevent debris from falling inside the enclosure. Refer to submittal drawings.

Electrical Requirements

Before wiring begins, observe the following electrical requirements:

- Follow all lockout/tagout procedures prior to performing installation and/or service on the unit.
- Always wear appropriate personal protective equipment.
- Wait the required time to allow the capacitor(s) to discharge; this could be up to 30 minutes.
- Verify that all capacitors are discharged prior to service using a properly rated volt meter.
- Use appropriate capacitor discharge tool when necessary.
- Comply with the safety practices recommended in PROD-SVB06*-EN.

⚠ WARNING

Hazardous Voltage w/Capacitors!

Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with a CAT III or IV voltmeter rated per NFPA 70E that all capacitors have discharged.

For additional information regarding the safe discharge of capacitors, see PROD-SVB06-EN.*

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Failure to wear PPE and follow proper handling guidelines could result in death or serious injury. Always wear appropriate personal protective equipment in accordance with applicable regulations and/or standards to guard against potential electrical shock and flash hazards.



⚠ WARNING

Live Electrical Components!

Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

When it is necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks.

Adaptive Frequency Drive

Table 12. Adaptive Frequency Drive (AFD) electrical data

Maximum RLA	Breaker AIC Amps	Short Circuit Withstand Rating	Line Connection Lugs
240	65,000	65,500	(2) 3/0 - 250 MCM
361	65000	65000	(2) 3/0 - 250 MCM
443	65000	65000	(2) 3/0 - 250 MCM
535	65000	65000	(3) 2/0 - 400 MCM
678	65000	65000	(4) 4/0 - 500 MCM



Electrical Requirements

Table 13. Unit control panel wiring 120 Vac

Standard Control Circuits: Unit Control Panel Control Wiring (120 Vac)	Unit Control Terminations	Input or Output Type	Contacts
Evaporator Water Flow Switch	1K11-J3-1 to 2	Binary Input	Normally Open, Closure with Flow
Condenser Water Flow Switch	1K11-J2-1 to 2	Binary Input	Normally Open, Closure with Flow
Evaporator Water Pump Control	1K12-J2-4 to 6	Binary Output	Normally Open
Condenser Water Pump Control	1K12-J2-1 to 3	Binary Output	Normally Open
Optional Control Circuits (120 Vac)	Note: Defaults are factory programmed; alternates can be selected at start-up using the service tool.		
Maximum Capacity Relay Output	1K14-J2-4	Binary Output	Normally Open
Head Relief Request Relay Output	J11-J2-4 to 6	Binary Output	Normally Open
Ice Building Indicator	1K15-J2-1 to 3	Binary Output	Normally Open
Standard Low Voltage Circuits (Less than 30 Vac)^(a)	Unit Control Panel Terminations	Input or Output Type	Contacts
External Auto Stop Input	1K4-J2-1 to 2	Binary Input	Closure Required for Normal Operation
Emergency Stop Input	1K4-J2-3 to 4	Binary Input	Closure Required for Normal Operation
Optional Low Voltage Circuits			
External Base Loading Enable Input	1k8-J2-2 to 3	Binary Input	Normally Open
External Hot Water Control Enable Input	1k9-J2-3 to 4	Binary Input	Normally Open
External Ice Machine Control Enable Input	1K3-J2-1 to 2	Binary Input	Normally Open
Condenser Refrigerant Pressure	1K7-J2-4 to 6	Analog Output	2–10 Vdc
Chiller % Capacity Output	1K7-J2-1 to 3	Analog Output	2–10 Vdc
Evaporator/Condenser Differential Pressure Output	1K7-J2-4 to 6	Analog Output	2–10 Vdc
Condenser Head Pressure Control	1K7-J2-4 to 6	Analog Output	2–10 Vdc
External Current Limit Setpoint Input	1K6-J2-2 to 3	Analog Input	2–10 Vdc, or 4–20 mA
External Chilled Water Setpoint Input	1K6-J2-5 to 6	Analog Input	2–10 Vdc, or 4–20 mA
External Base Loading Setpoint Input	1K8-J2-2 to 3	Analog Input	2–10 Vdc, or 4–20 mA
Generic Refrigerant Monitor Input	1K8-J2-5 to 6	Analog Input	2–10 Vdc, or 4–20 mA
Outdoor Air Temperature Sensor	Inter-processor Communication (IPC) Bus Connection and Sensor—4BT9	Communication and Sensor	
Trace Comm Interface or LonTalk	1K5-J2-1(+) to 2(-) 1K5-J2-3(+) to 4(-)	Communication to Tracer or LonTalk	(As Ordered; See Sales Order)
BACnet or MODBUS	1K20 5(+) to 6(-)	Communication to BACnet or MODBUS	(As Ordered; See Sales Order)
Tracer SC Module	1K21	Communication to Tracer SC Module	

Note: All wiring to be in accordance with National Electrical Code (NEC) and any local codes.

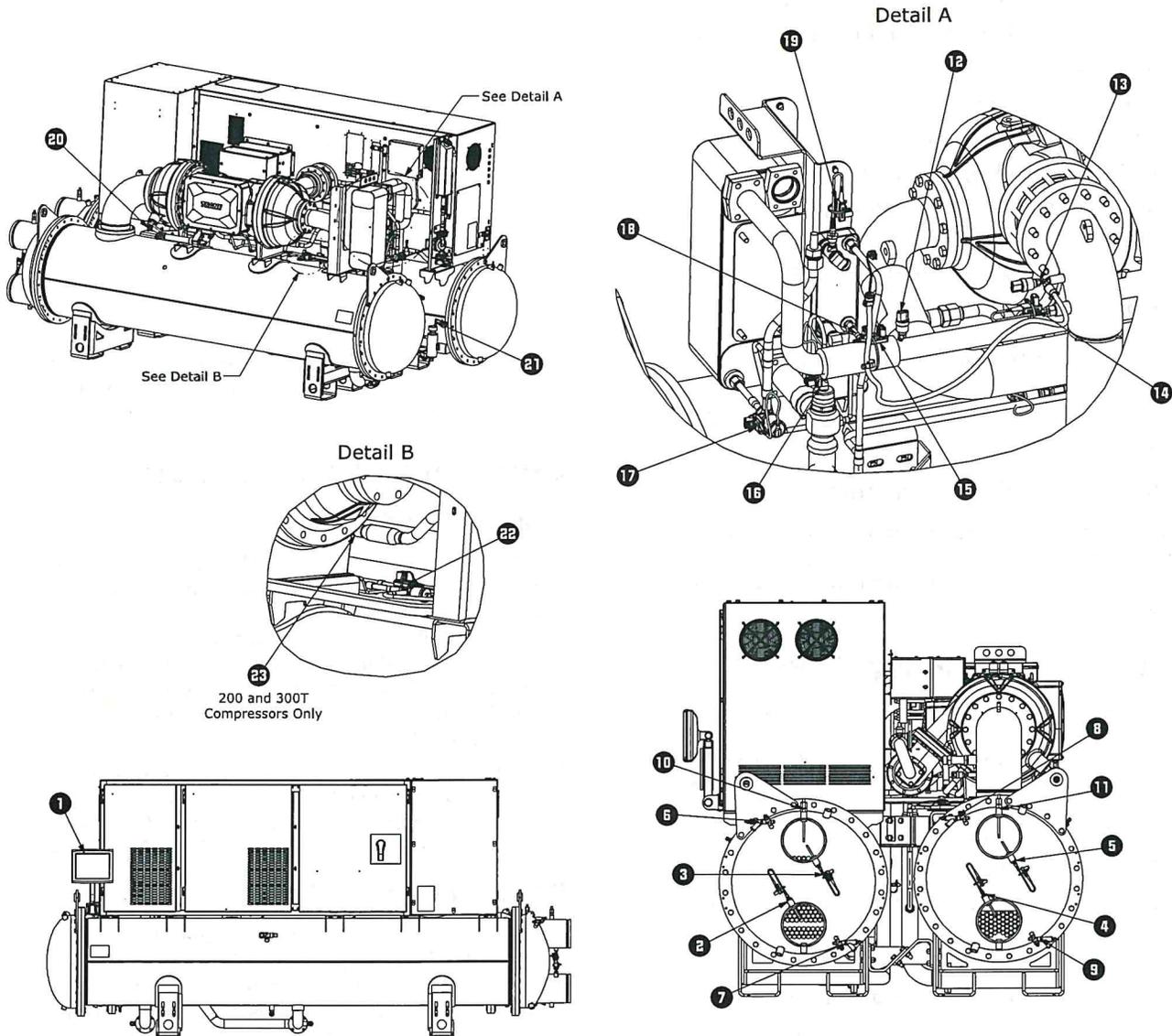
^(a) Standard low-voltage circuits (less than 30 Vac) must be separated from 120 Vac or higher wiring.

Sensor Circuits

All sensors are factory-installed except the optional outdoor air temperature sensor (refer to the following figure for sensor locations). This sensor is required for the outdoor air temperature type of chilled water reset.

Use the following guidelines to locate and mount the outdoor air temperature sensor. Mount the sensor probe where needed; however, mount the sensor module in the control panel.

Figure 24. Agility chiller sensor locations



1. 4P1, Tracer® AdaptiView™ display
2. 4BT3, Condenser entering water temperature
3. 4BT6, Condenser leaving water temperature
4. 4BT2, Evaporator entering water temperature
5. 4BT5, Evaporator leaving water temperature
6. 4BP4, Condenser leaving water differential pressure (LO)
7. 4BP4, Condenser entering water differential pressure (HI)
8. 4BP5, Evaporator leaving water differential pressure (LO)
9. 4BP5, Evaporator entering water differential pressure (HI)
10. 4R18, Condenser water flow detector
11. 4R17, Evaporator water flow detector
12. 4BP3, Economizer leaving pressure



Electrical Requirements

13. **4BP2**, Condenser pressure
14. **4BT7**, Compressor discharge temperature
15. **4BT8**, Economizer leaving refrigerant temperature
16. **4M2**, Evaporator EXV
17. **4M4**, Economizer EXV
18. **4M6**, Drive cooling EXV
19. **4BT4**, Drive cooling supply temperature
20. **4M5**, Inlet guide vane second stage actuator
21. **4B1**, Condenser liquid level
22. **4M3**, Motor bearing control cooling EXV
23. **4M8**, Motor cooling EXV

Optional Control and Output Circuits

Install various optional wiring as required by the owner's specifications (refer to "System Control Circuit Wiring (Field Wiring)," p. 35).

Schematic Wiring Drawings

Please refer to the submittals and drawings that shipped with the unit. Additional wiring drawings for Agility™ chillers are available from your local Trane office.

Adaptive Frequency Drive

The Trane TR200 Adaptive Frequency™ Drive (AFD) is an electronic motor controller that converts alternating current (AC) mains input into a variable AC waveform output. The frequency and voltage of the output are regulated to control the motor speed or torque. The TR200 drive includes the following features:

- Soft start to minimize inrush current
- Improved harmonic mitigation with direct current (DC) link reactor
- Integrated power fuse
- Graphical liquid-crystal display (LCD) keypad
- Unit-mounted with factory pre-wiring
- "Trane Drive Utility" for configuration and tracking

Programming

NOTICE

Equipment Damage!

Changing default clockwise phase rotation or enabling phase reversal protection could prevent proper chiller operation or cause equipment damage.

- Do NOT change Adaptive Frequency™ drive (AFD) phase rotation to counterclockwise.
- Do NOT enable phase reversal protection.

Field replacement drives must be programmed via the keypad interface. Contact your local Trane Service Agency for assistance.

Communications Interface

LonTalk Interface (LCI-C)

UC800 provides an optional LonTalk® Communication Interface (LCI-C) between the chiller and a Building Automation System (BAS). An LCI-C LLID shall be used to provide "gateway" functionality between a LonTalk® compatible device and the Chiller. The inputs/outputs include both mandatory and optional network variables as established by the LONMARK® Functional Chiller Profile 8040.

Note: For more information, refer to Hardware and Software Installation Guide: LonTalk Communication Interface for Trane Chillers with Tracer AdaptiView Control (ACC-SVN100*-EN).

BACnet Interface (BCI-C)

Optional BACnet® Communication Interface for Chillers (BCI-C) is comprised of a Tracer® UC800 controller with interface software. It is a non-programmable communications module that allows units to communicate on a BACnet® communications network.

MODBUS Remote Terminal Unit Interface

Modicon Communication Bus (MODBUS®) enables the chiller controller to communicate as a slave device on a MODBUS® network. Chiller setpoints, operating modes, alarms and status can be monitored and controlled by a MODBUS® master device.



Installation: Controls

This section covers information pertaining to the UC800 controller hardware. For information about the Tracer® AdaptiView™ display, which is used to interface with the internal chiller data and functions provided by the UC800, refer to *Tracer AdaptiView Display for Water-cooled Agility Chillers Operations Guide* (HDWA-SVU001*-EN).

UC800 Specifications

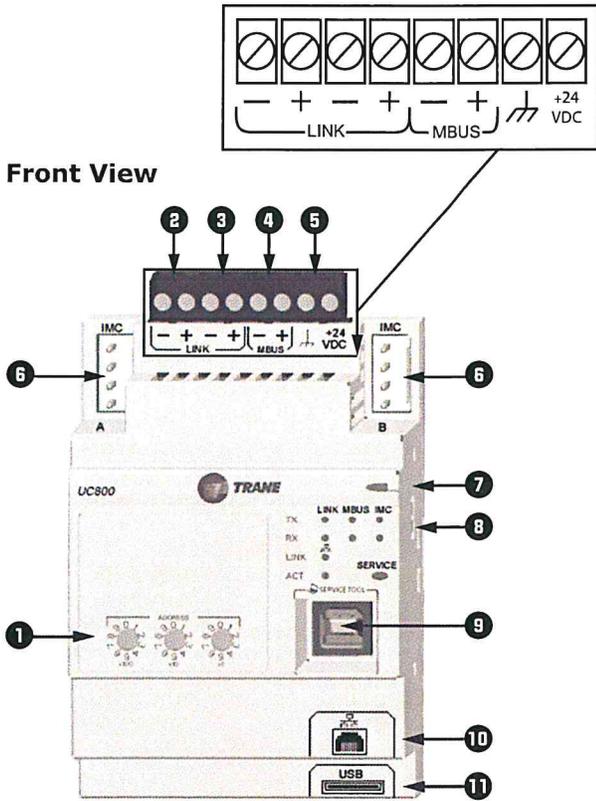
Power Supply

The UC800 (1K20) receives 24 Vac (210 mA) power from the 1T2 power supply located in the chiller control panel.

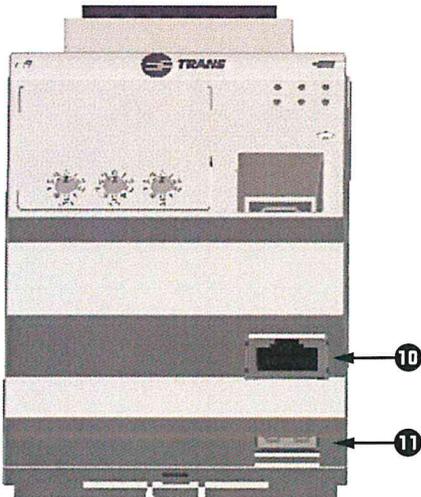
Wiring and Port Descriptions

The following figure illustrates the UC800 controller ports, LEDs, rotary switches, and wiring terminals. The numbered list following the figure corresponds to the numbered callouts in the illustration.

Figure 25. UC800 wiring locations and connection ports



Bottom View



1. Rotary Switches for setting BACnet® MAC address or MODBUS® ID.
2. LINK for BACnet® MS/TP, or MODBUS® Slave (two terminals, ±). Field wired if used.
3. LINK for BACnet® MS/TP, or MODBUS® Slave (two terminals, ±). Field wired if used.

4. Machine bus for existing machine LLIDs (IPC3 Tracer bus). *IPC3 Bus: used for LonTalk® using LCI-C.*
5. Power (210 mA at 24 Vdc) and ground terminations (same bus as Item 4). Factory wired.
6. MODBUS® Master.
7. Marquee LED power and UC800 Status indicator (refer to the table in “LED Description and Operation,” p. 40).
8. Status LEDs for the BAS link, MBus link, and IMC link.
9. USB device Type B connection for the service tool (Tracer® TU).
10. The Ethernet connection can *only* be used with the Tracer® AdaptiView™ display.
11. USB Host (not used).

Communication Interfaces

There are four connections on the UC800 that support the communication interfaces listed. Refer to the figure in “Wiring and Port Descriptions,” p. 39 for the locations of each of these ports.

- BACnet® MS/TP
- MODBUS® Slave
- LonTalk® using LCI-C (from the IPC3 bus)

Rotary Switches

There are three rotary switches on the front of the UC800 controller. Use these switches to define a three-digit address when the UC800 is installed in a BACnet® or MODBUS® system (e.g., 107, 127, etc.).

Note: Valid addresses are 001 to 127 for BACnet® and 001 to 247 for MODBUS®.

LED Description and Operation

There are ten LEDs on the front of the UC800. The following figure shows the locations of each LED and the following table describes their behavior in specific instances.

Figure 26. LED locations

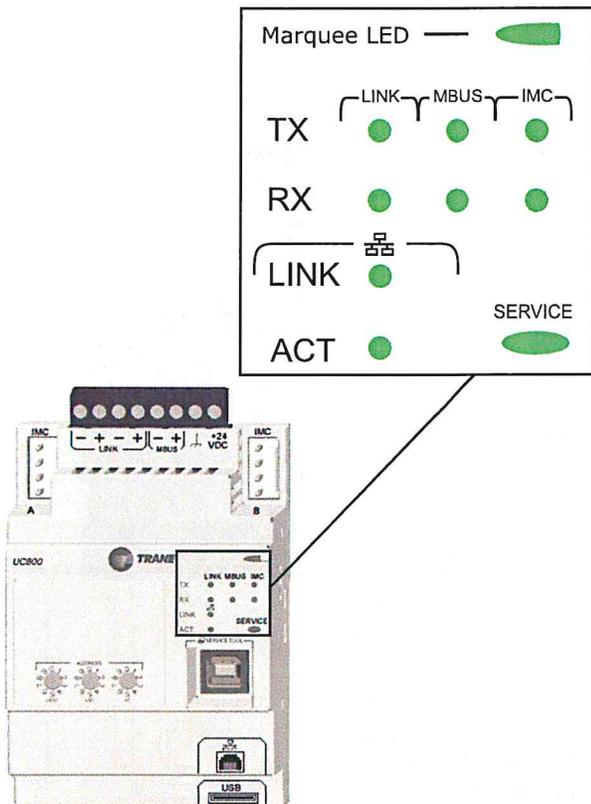


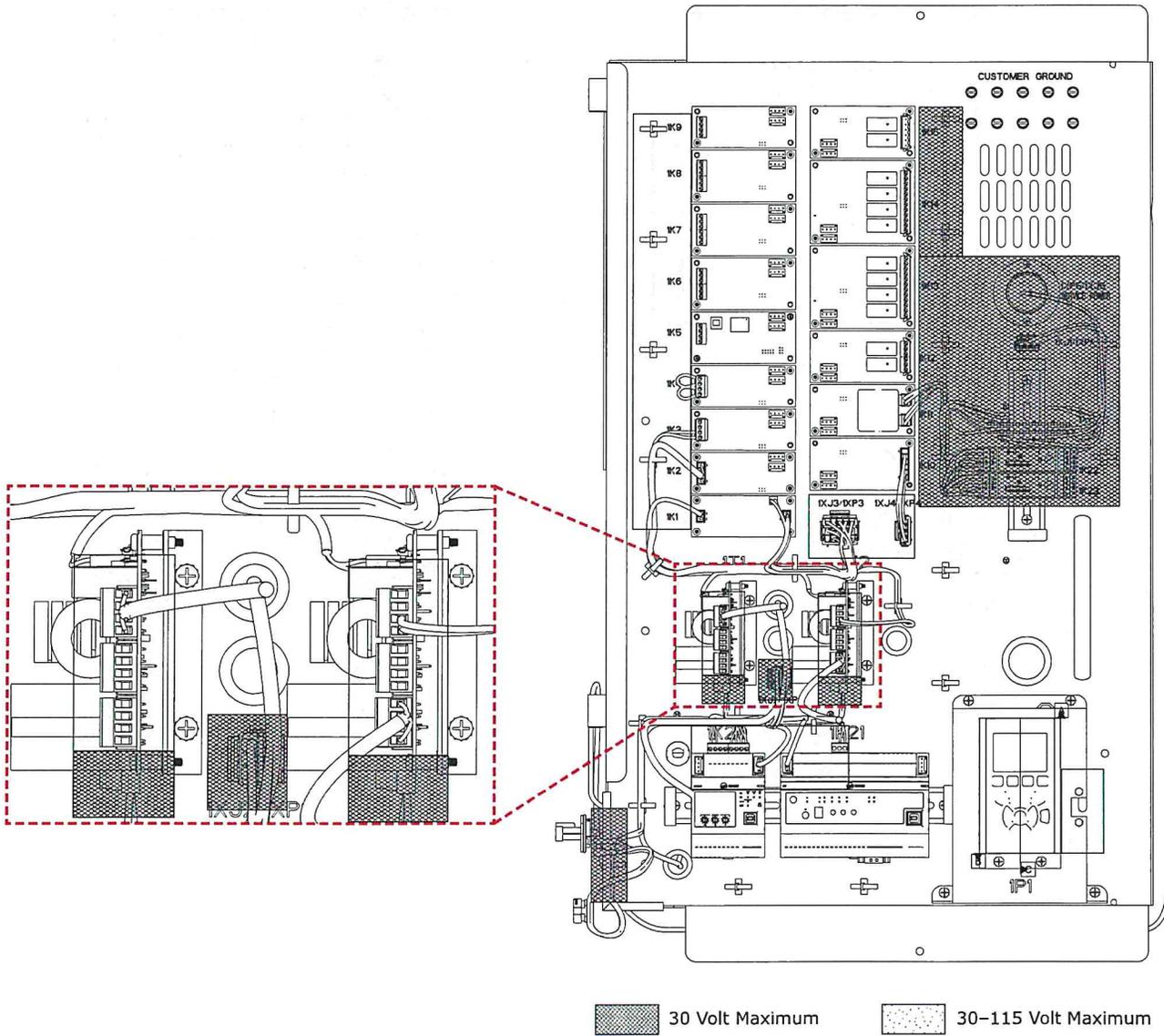
Table 14. LED behavior

LED	UC800 Status
Marquee LED	Powered. If the Marquee LED is green solid, the UC800 is powered and no problems exist.
	Low power or malfunction. If the Marquee LED is red solid, the UC800 is powered but there are problems present.
	Alarm. The Marquee LED blinks red when an alarm exists.
LINK, MBUS, IMC	The TX LED blinks green at the data transfer rate when the UC800 transfers data to other devices on the link. The RX LED blinks yellow at the data transfer rate when the UC800 receives data from other devices on the link.
Ethernet Link	The LINK LED is solid green if the Ethernet link is connected and communicating. The ACT LED blinks yellow at the data transfer rate when data flow is active on the link.
Service	The Service LED is solid green when pressed. For qualified service technicians only. Do NOT use.

Important: Maintain at least 6 in. (16 cm) between low-voltage (less than 30V) and high voltage circuits. Failure to do so could result in electrical noise that could distort the signals carried by the low-voltage wiring, including inter-processor communication (IPC).

Installation: Controls

Figure 27. Control panel: Tracer AdaptiView main unit assembly (showing low voltage and higher voltage areas for proper routing of field wiring)



Installing the Tracer AdaptiView Display

During shipment, the Tracer® AdaptiView™ and support arm are boxed, shrink-wrapped, and unit. The display and support arm must be installed at the site.

Important: For best results, Trane, or an agent of Trane, must install the Tracer® AdaptiView™ display and support arm.

1. Unwrap the chiller. Locate the box containing the Tracer® AdaptiView™ display and support arm strapped to the shear plate between the condenser and the evaporator (see the following figure).

2. Remove the display and support arm from the box.

Note: Display to support arm screws are M4 (metric size 4), 6 to 8 mm long, and are shipped with the display. Display arm screws are M6 (metric size 6), 16 mm long, washers, and nuts used to secure arm to unit bracket are shipped in the parts box.

3. Using the M6 hardware shipped in the parts box, attach the display support arm to the mounting bracket on the side of the control panel (labeled A and B in the following figure).
4. Plug the power cable (labeled C in the following figure) and the Ethernet cable (labeled D in the following figure) into the bottom of the display. Plug other ends of the cables into the ports on the side of the control panel.
5. Adjust the Tracer® AdaptiView™ display support arm so the base plate that attaches to the display is horizontal.

⚠ CAUTION

Tension in Display Support Arm!

Failure to follow instructions below could result in unexpected movement of the spring-loaded support arm which could result in minor to moderate injury.

Ensure that the support arm is in the full upright position when removing the Tracer AdaptiView display from the support arm.

Note: Review "Adjusting the Tracer AdaptiView Display Arm," p. 44 before attaching the display as some adjustments may be required prior to attaching the display to the support arm base.

6. Position the Tracer® AdaptiView™ display—with the LCD screen facing up—on top of the display support arm base plate.

Note: Ensure the Trane logo is positioned so that it will be at the top when the display is attached to the display support arm.

Important: Use care when positioning the Tracer® AdaptiView™ display on top of the support arm base plate and do NOT drop the display.

7. Align the four holes in the display with the screw holes in the display support arm base plate.
8. Attach the Tracer® AdaptiView™ display to the display support arm base plate (labeled E in the following figure) using the M4 (metric size 4) screws referenced in Step 3.

Figure 28. Display arm installation

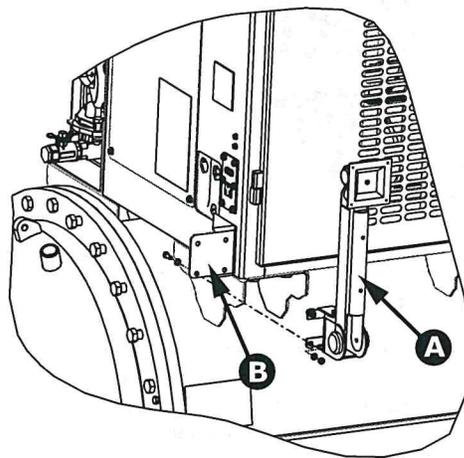


Figure 29. Power cable and Ethernet cable connections

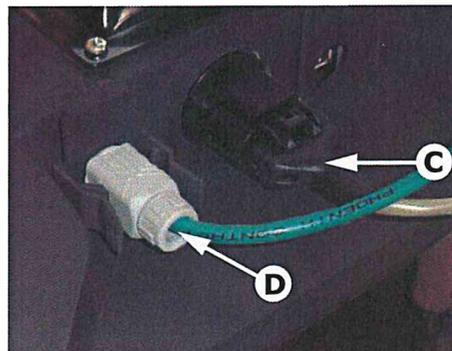
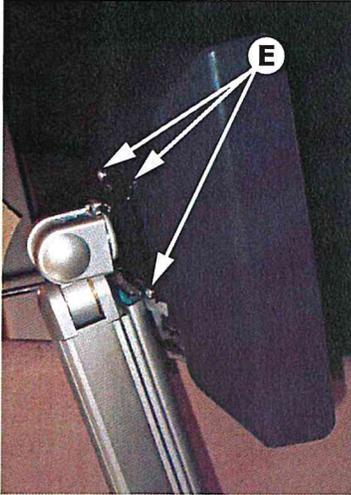


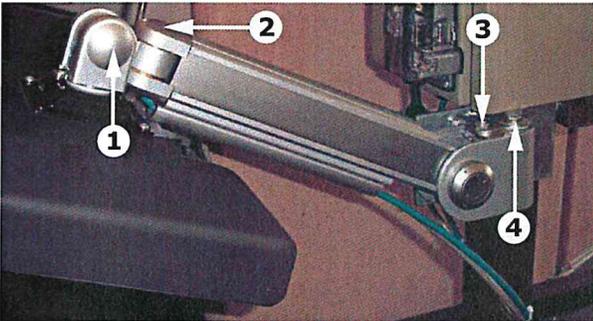
Figure 30. Display attachments to the support arm base plate



Adjusting the Tracer AdaptiView Display Arm

The Tracer® AdaptiView™ display arm may become too loose or too tight and may need adjustment. There are three joints on the display arm that allow the display to be positioned at a variety of heights and angles (refer to items labeled 1, 2, and 3 in the following figure).

Figure 31. Joint locations on the display arm



To adjust the tension on the display arm:

- At each joint in the display arm, there is either a hex bolt (1 and 2) or hex screw (3). Turn the hex bolt or screw in the proper direction to increase or decrease tension.

Note: Each hex bolt or screw is labeled with *loosen/tighten* or *+/-* indicators.

- Joint 3 has a 6 mm hex screw controlling the tension on a gas spring, which allows the Tracer® AdaptiView™ display to tilt up and down.
- Joints 1 and 2 are covered by a plastic cap. Remove the plastic cap to access the screw. Adjust using a 13 mm wrench as necessary.
- To adjust the swivel rotation tension of the Tracer® AdaptiView™ display, adjust the screw located in the support arm base plate, as described in the final step in "Installing the Tracer AdaptiView Display," p. 43. *This adjustment must be done prior to attaching the display to the support arm base.* Use a 14 mm wrench to adjust the tension.
- To adjust the left/right swivel of the entire display arm, use a 13 mm wrench to adjust the screw labeled 4 in the preceding figure.



Operating Principles

General Requirements

Operation and maintenance information for HDWA Agility™ chillers are covered in this section. By carefully reviewing this information and following the instructions given, the owner or operator can successfully operate and maintain a Agility™ chiller. If mechanical problems do occur, however, contact a Trane service technician to ensure proper diagnosis and repair of the unit.

Important:

- Although Agility™ chillers can operate through surge, it is NOT recommended to operate them through repeated surges over long durations. If repeated surges of long durations occur, contact your Trane Service Agency to resolve the issue.
- Agility™ are selected, designed, and built for a particular set of design conditions. Operation outside of design conditions may result in improper operation. Refer to chiller selection for minimum unloading.

Cooling Cycle

When in the cooling mode, liquid refrigerant is distributed along the length of the evaporator and sprayed through small holes in a distributor (i.e., running the entire length of the shell) to uniformly coat each evaporator tube. Here, the liquid refrigerant absorbs enough heat from the system water circulating through the evaporator tubes to vaporize. The gaseous refrigerant is then drawn through the suction connection and the first-stage variable inlet guide vanes, and into the first-stage impeller.

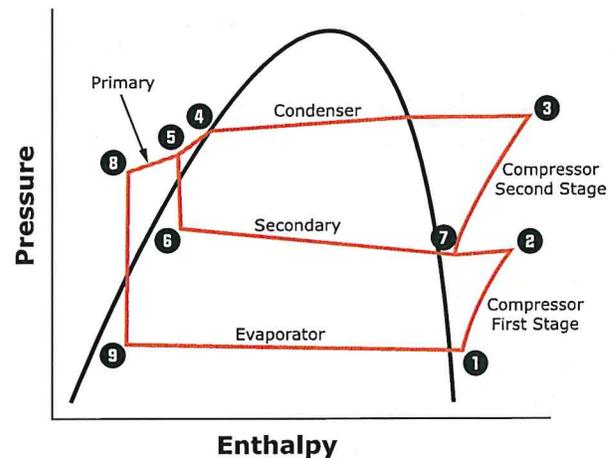
HDWA Compressor

The unit is equipped with a semi-hermetic, direct-drive, two-stage, centrifugal compressor that includes inlet guide vanes for capacity control. The Adaptive Frequency™ Drive (AFD) provides capacity control with lower speeds. Compressed gas from the first-stage impeller is discharged through the interstage pipe to the second-stage impeller. Here, the refrigerant gas is again compressed, and then discharged into the condenser. Baffles within the condenser shell distribute the compressed refrigerant gas evenly across the condenser tube bundle. Cooling tower water circulated through the condenser tubes absorbs heat from the refrigerant, causing it to condense. The subcooled liquid refrigerant then flows out of the bottom of the condenser.

The liquid refrigerant is then split such that the primary flow is directed through one side of the brazed plate

heat exchanger economizer, while a significantly smaller portion of the flow passes through an expansion valve, lowering refrigerant pressure and temperature before entering the secondary side of the BPHE as two-phase refrigerant. The heat transfer between the primary and secondary channels in the BPHE results in further subcooling of the primary liquid as it rejects heat to, and consequently superheats, the secondary flow. The additional subcooling of the liquid prior to expansion through the main electronically-controlled valve effectively increases the overall capacity of the evaporator. In addition, the superheated vapor bypasses the evaporator and first stage of compression (the secondary BPHE flow is added prior to the second stage of compression).

Figure 32. Refrigerant flow



Compressor Motor

Two magnetic bearing modules levitate and align the rotating assembly. The motor is permanent magnet type and is cooled by refrigerant gas sourced from the interstage pipe, metered through an orifice or electronic expansion valve, and routed through the bearing modules and motor windings.

Adaptive Frequency Drive

An Adaptive Frequency™ Drive (AFD) and control panel is provided on every chiller. Microprocessor-based unit control modules (Tracer® UC800) provide for accurate chilled water control as well as monitoring, protection, and adaptive limit functions. The "adaptive" nature of the controls intelligently prevents the chiller from operating outside of its limits, or compensates for unusual operating conditions, while keeping the chiller running rather than simply tripping due to a safety concern. When problems do occur, diagnostic messages assist the operator in troubleshooting.

Uninterruptible Power Supply

Agility™ chillers contain an on-line double-conversion Uninterruptible Power Supply (UPS) to ensure that the compressor's magnetic bearing system continues to function in the event of a power failure. The UPS (2T5) provides power to both the Magnetic Bearing Controller (MBC; 4K1) and the tachometer board (1K1). The UPS will power the MBC system for one minute while the compressor coasts to a stop. When line power fails, power is supplied to the UPS by a 48 Vdc battery pack (2C1) which must always be connected to the UPS.

When power is removed, or if the chiller's disconnect switch is turned off, the UPS will only supply power to the magnetic bearing system for one minute and then the UPS will de-activate. The battery pack is not completely discharged so that when power is restored, the battery can provide enough power for additional shutdowns.

The UPS has a fault indicator that is wired to a UC800 controls Low Level Intelligent Device (LLID; 1K3). If the UPS indicates a fault, an immediate shutdown diagnostic will be announced on the UC800 controls.

The following UPS issues could cause this diagnostic:

- Low Battery
- Utility Fail/On Battery
- Temp Alarm
- Output Fault
- Overload Bypass
- General Fault
- Failed Battery Test

Evaporator and Condenser

Heat exchangers are shell and tube design. Standard tubes are externally finned, internally enhanced seamless copper with lands at all tube sheets. All tube sheets are made of carbon steel. Tubes are mechanically expanded into tube sheets and mechanically fastened to tube supports. Evaporator and condenser tubes are 0.75-in. (19.05-mm) diameter. All tubes can be individually replaced.

Shells are carbon steel plate. The evaporator is designed, tested, and stamped in accordance with ASME Code for refrigerant-side/working-side pressure of 200 psig (1379.0 kPaG). The condenser is designed, tested, and stamped in accordance with ASME Code for refrigerant-side/ working-side pressure of 300 psig (2068.4 kPaG).

All water pass arrangements are available with grooved connections (150 psig [1034.2 kPaG] waterside working pressure). All connections may be either right- or left-handed. Waterside shall be hydrostatically tested at 1.5X design working pressure.

Drive Cooling System

The drive cooling system rejects heat through a hybrid air and fluid heat sink. The Adaptive Frequency™ Drive (AFD) controls the fan speed to reject some of the heat while the refrigerant expansion valve modulates to maintain a fluid supply temperature to reject the remaining heat.

Drive cooling circuit includes a wet rotor circulation pump that circulates a secondary heat transfer fluid in a closed system through the AFD heat sinks, output load inductor and a brazed plate heat exchanger. The pump is fed from a thermal expansion tank with a vented-pressure cap which is also used as the circuit pressure relief. The circuit also includes a particulate strainer and a drain valve for servicing.

Tracer AdaptiView Display

Information is tailored to operators, service technicians, and owners.

When operating a chiller, there is specific information you need on a day-to-day basis—setpoints, limits, diagnostic information, and reports.

Day-to-day operational information is presented at the display. Logically organized groups of information—chiller modes of operation, active diagnostics, settings, graphs, and reports put information conveniently at your fingertips. For more information, refer to *Tracer AdaptiView Display for Water-cooled Agility Chillers Operations Guide* (HDWA-SVU001*-EN).

Start-up and Shut-down

Important: Initial unit commissioning start-up must be performed by Trane or an agent of Trane specifically authorized to perform start-up and warranty of Trane products. Contractor shall provide Trane (or an agent of Trane specifically authorized to perform start-up) with notice of the scheduled start-up at least two weeks prior to the scheduled start-up.

Sequence of Operation

Adaptive control algorithms are used on Agility™ chillers. This section illustrates common control sequences.

Software Operation Overview Diagram

The following figure is a diagram of the five possible software states. This diagram can be thought of as a

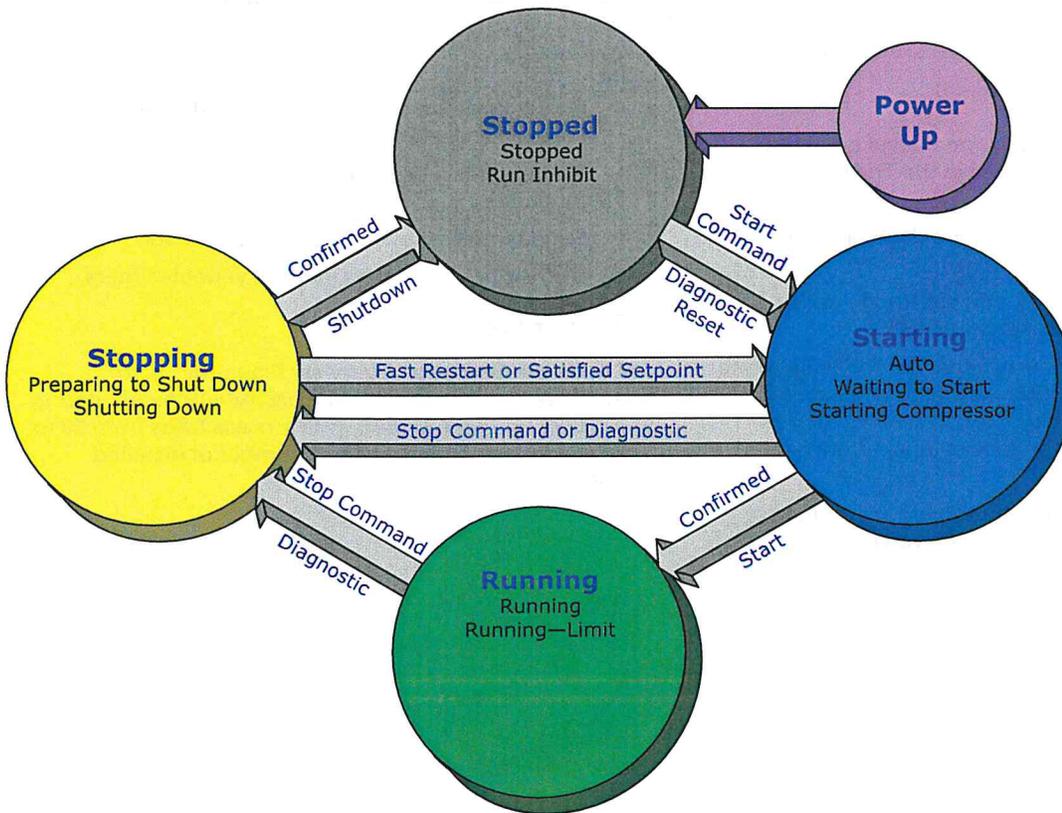
state chart, with the arrows and arrow text, depicting the transitions between states:

- The text in the circles is the internal software designations for each state.
- The first line of text in the circles is the visible top level operating modes that can be displayed in Tracer® AdaptionView™.
- The shading of each software state circle corresponds to the shading on the time lines that show the chiller's state.

There are five generic states that the software can be in:

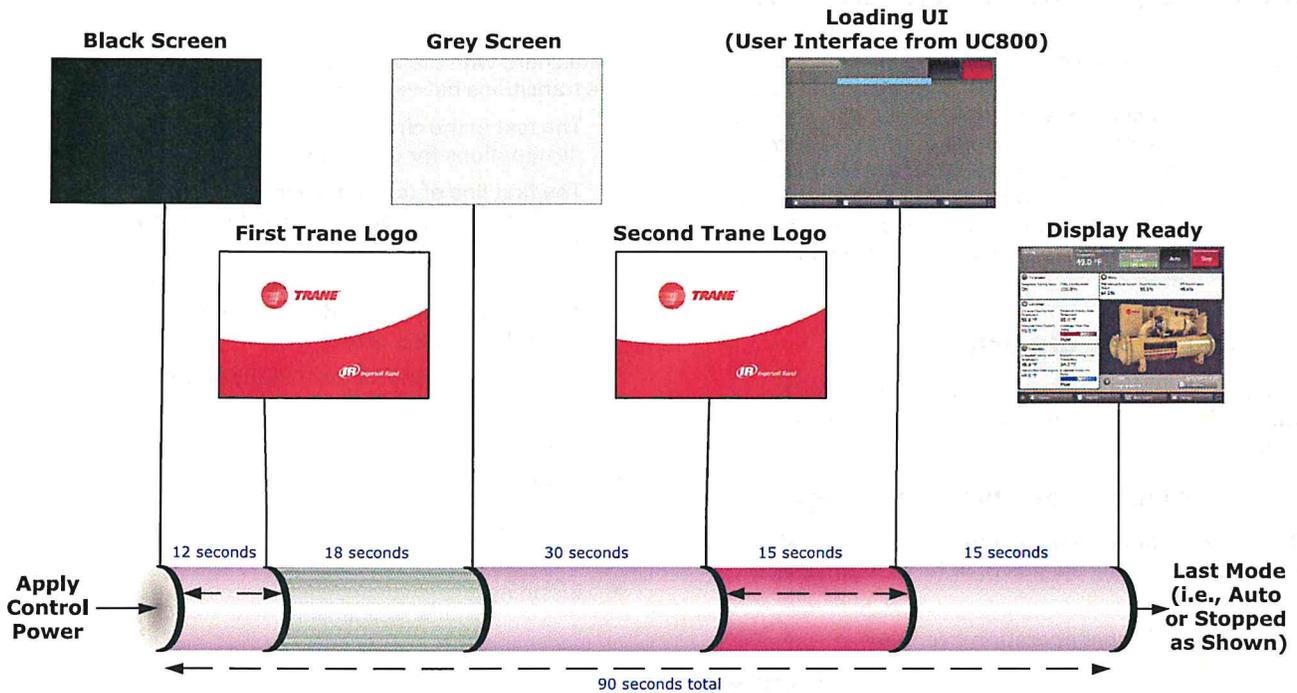
- Power Up
- Stopped
- Starting
- Running
- Stopping

Figure 33. Software operation overview



Start-up and Shut-down

Figure 34. Sequence of operation: Tracer AdaptiView power up



Note: The variation in power up time is dependent on the number of installed options.

In the following diagrams:

- The time line indicates the upper level operating mode, as it would be viewed in the Tracer® AdaptiView™.
- The shading color of the cylinder indicates the software state.
- Text in parentheses indicates sub-mode text as viewed in the Tracer® AdaptiView™.
- Text above the time line cylinder is used to illustrate inputs to the UC800. This may include user input to the Tracer® AdaptiView™ touch screen, control inputs from sensors, or control inputs from a generic BAS.
- Boxes indicate control actions such as turning on relays, or moving the inlet guide vanes.
- Smaller cylinders under the main cylinder indicate diagnostic checks.
- Text outside a box or cylinder indicates time-based functions.
- Solid double arrows indicate fixed timers.
- Dashed double arrows indicate variable timers.

Power Up

"Software Operation Overview Diagram," p. 47 includes an illustration of Tracer® AdaptiView™ during a power up of the UC800. This process takes from 30 to 50 seconds depending on the number of installed options.

Power Up to Starting

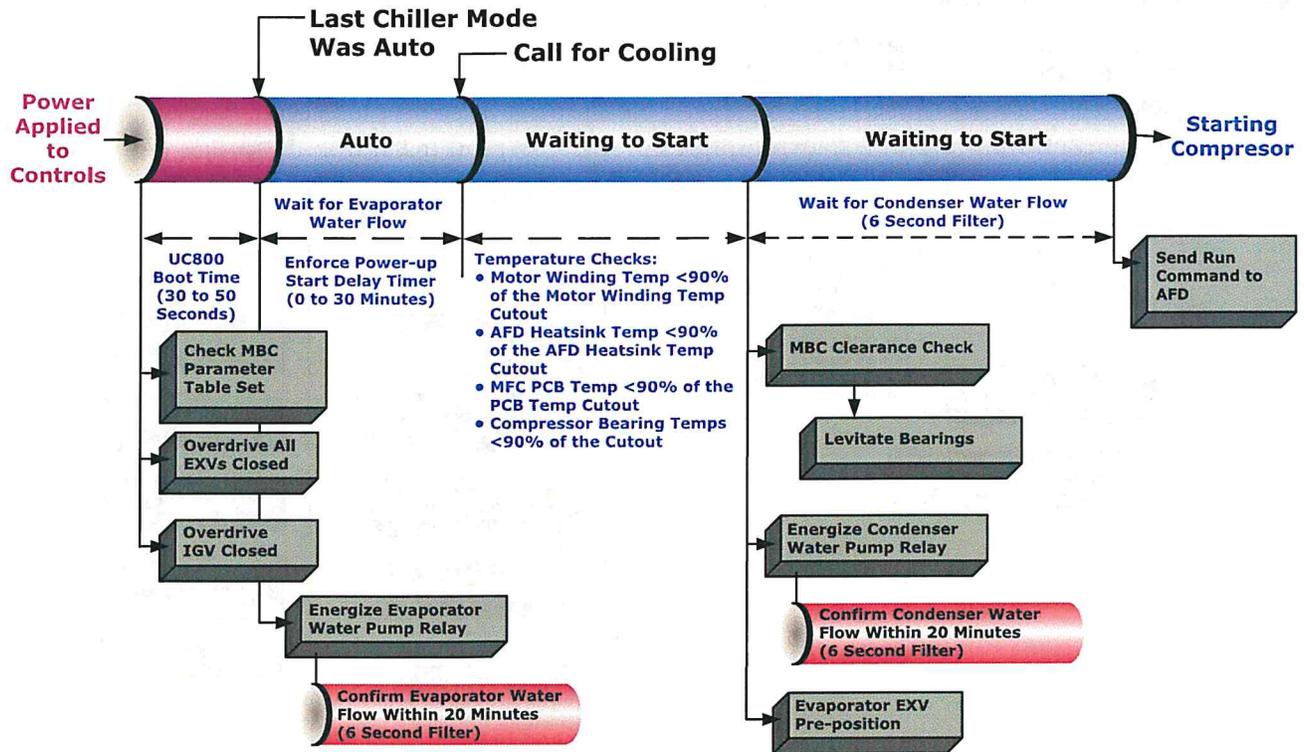
The following figure shows the timing from a power up event to energizing the compressor. The shortest allowable time would be under the following conditions:

- All temperatures below their starting limits

- Evaporator and condenser water flowing
- Power up start delay setpoint set to 0 minutes
- Need to cool

The above conditions would allow for a minimum power up to starting compressor time of 45 seconds.

Figure 35. Sequence of events: power up to starting



Stopped to Starting

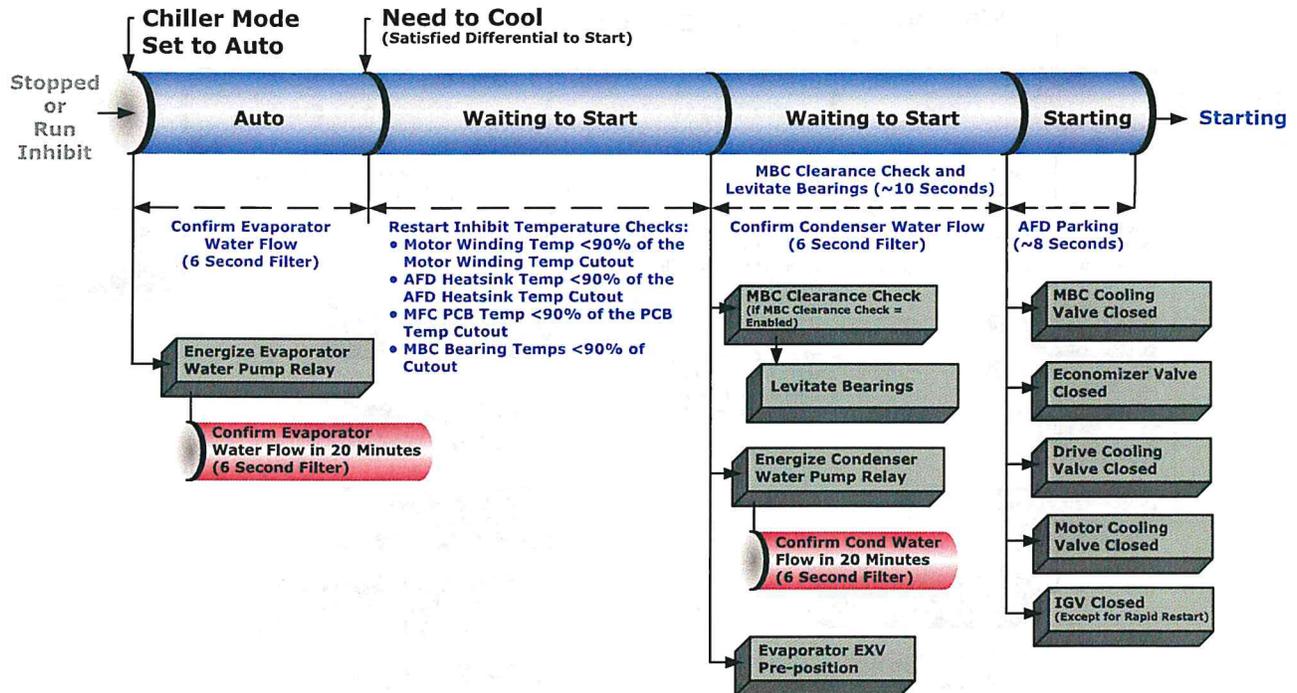
The stopped to starting diagram shows the timing from a stopped mode to energizing the compressor. The shortest allowable time would be under the following conditions:

- All temperatures below their starting limits
- Evaporator and condenser water flowing

- Power up start delay timer has expired
- Adjustable stop to start timer has expired
- Need to cool

The above conditions would allow the compressor to start in 45 seconds.

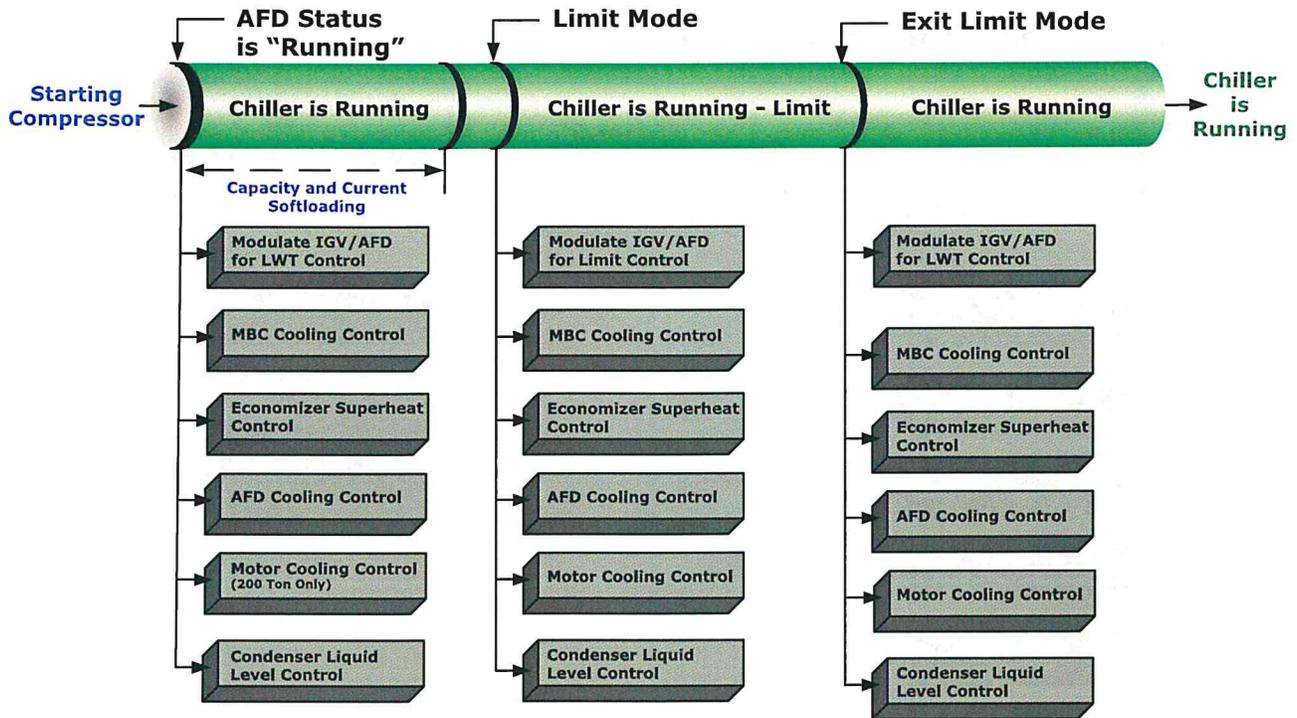
Figure 36. Sequence of events: stopped to starting



Running

The following figure shows a typical running sequence.

Figure 37. Sequence of events: running

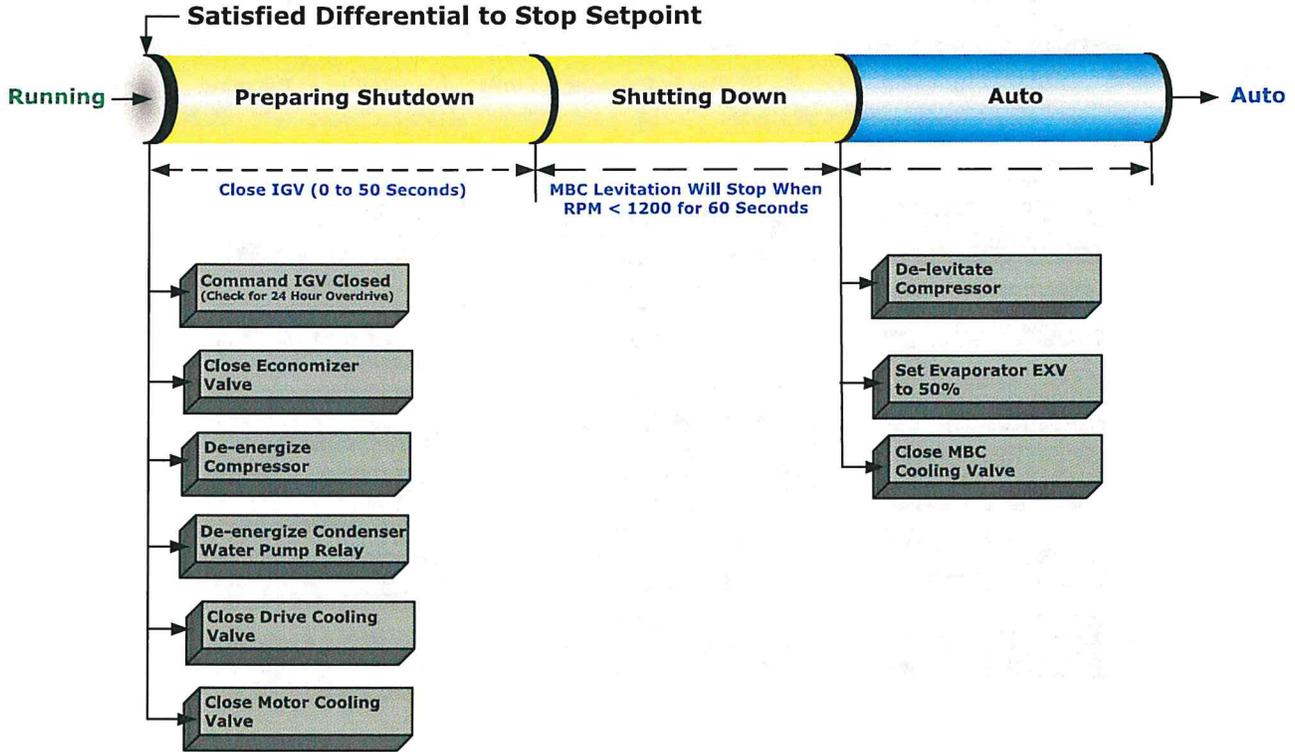


Satisfied Setpoint

The following figure shows the normal transition from running to shutting down due to the evaporator leaving

water temperature falling below the differential to stop setpoint.

Figure 38. Sequence of events: satisfied setpoint

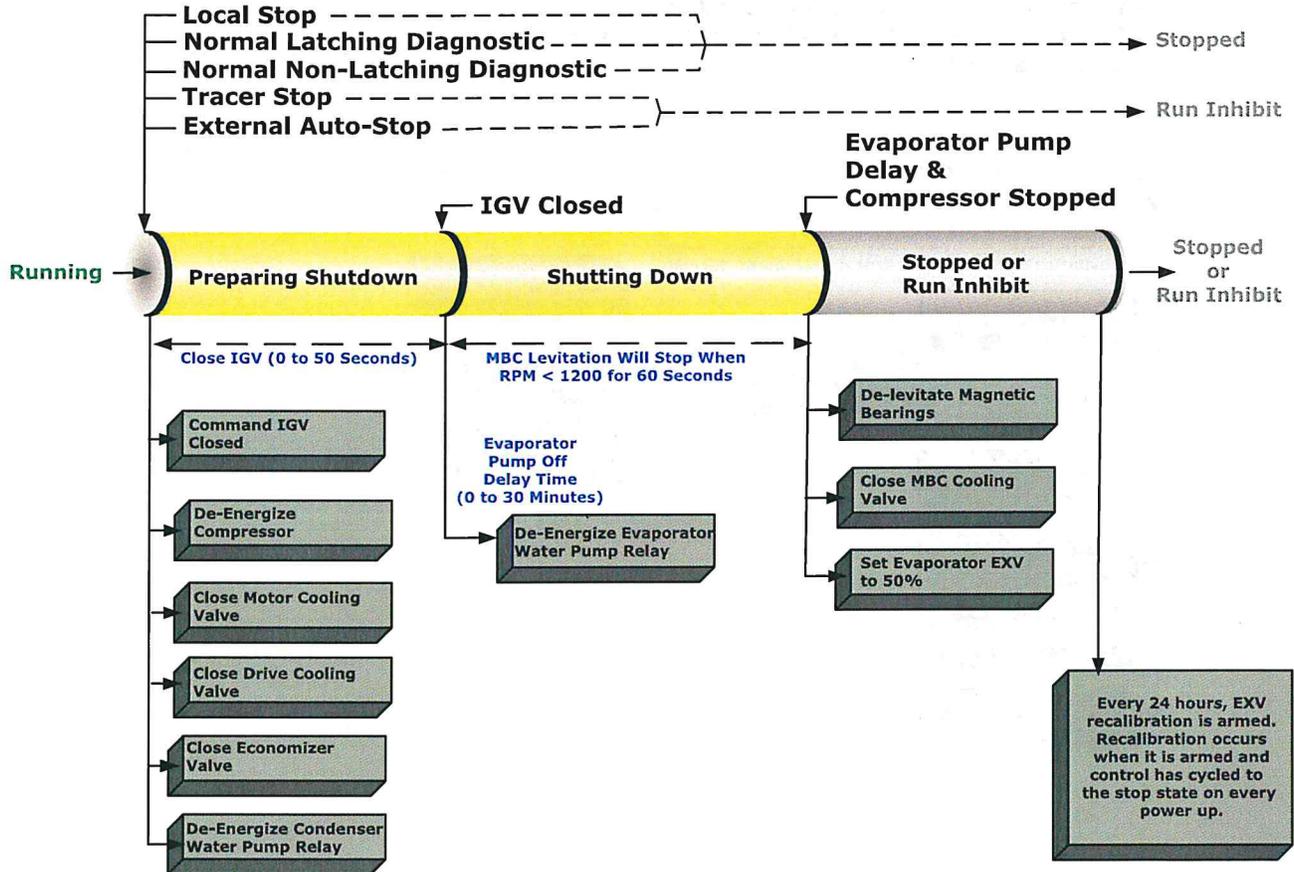


Normal Shutdown to Stopped or Run Inhibit

lines on the top indicate the final mode if the stop is entered via various inputs.

The following figure shows the transition from running through a normal (friendly) shutdown. The dashed

Figure 39. Sequence of events: normal shutdown to stopped or run inhibit

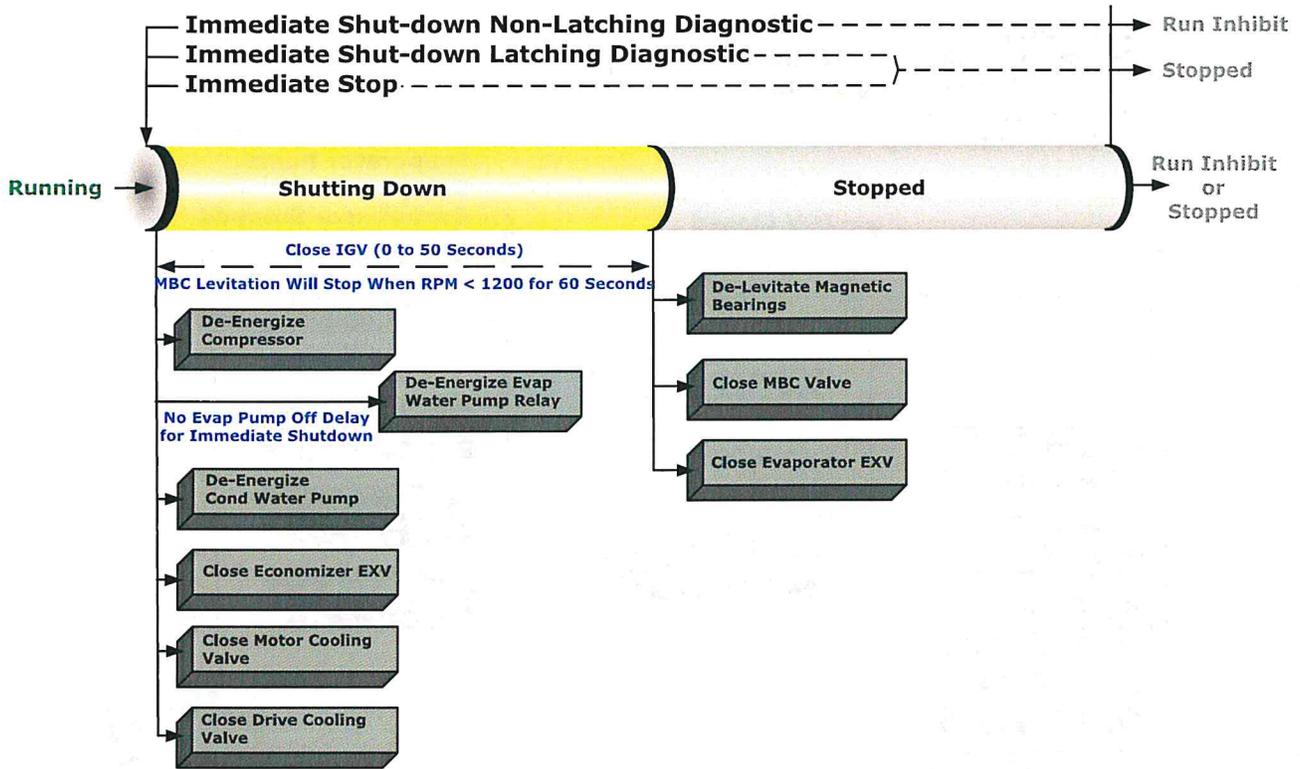


Immediate Shutdown to Stopped or Run Inhibit

the top indicate the final mode if the stop is entered via various inputs.

The following figure shows the transition from running through an immediate shutdown. The dashed lines on

Figure 40. Sequence of events: immediate shutdown to stopped or run inhibit

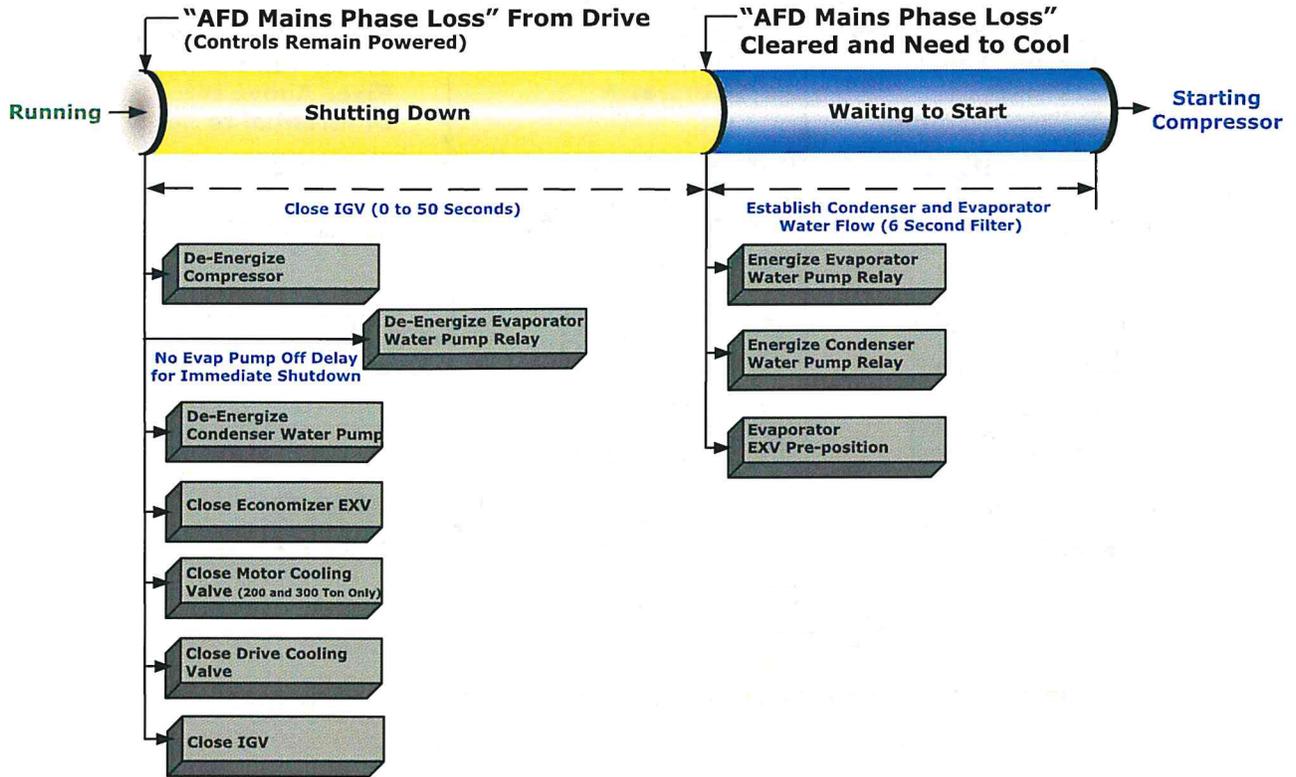


AFD Mains Phase Loss

The following figure shows how the controls act in a power interruption event that the Adaptive

Frequency™ Drive (AFD) diagnoses as a AFD Mains Phase Loss (MPL) diagnostic.

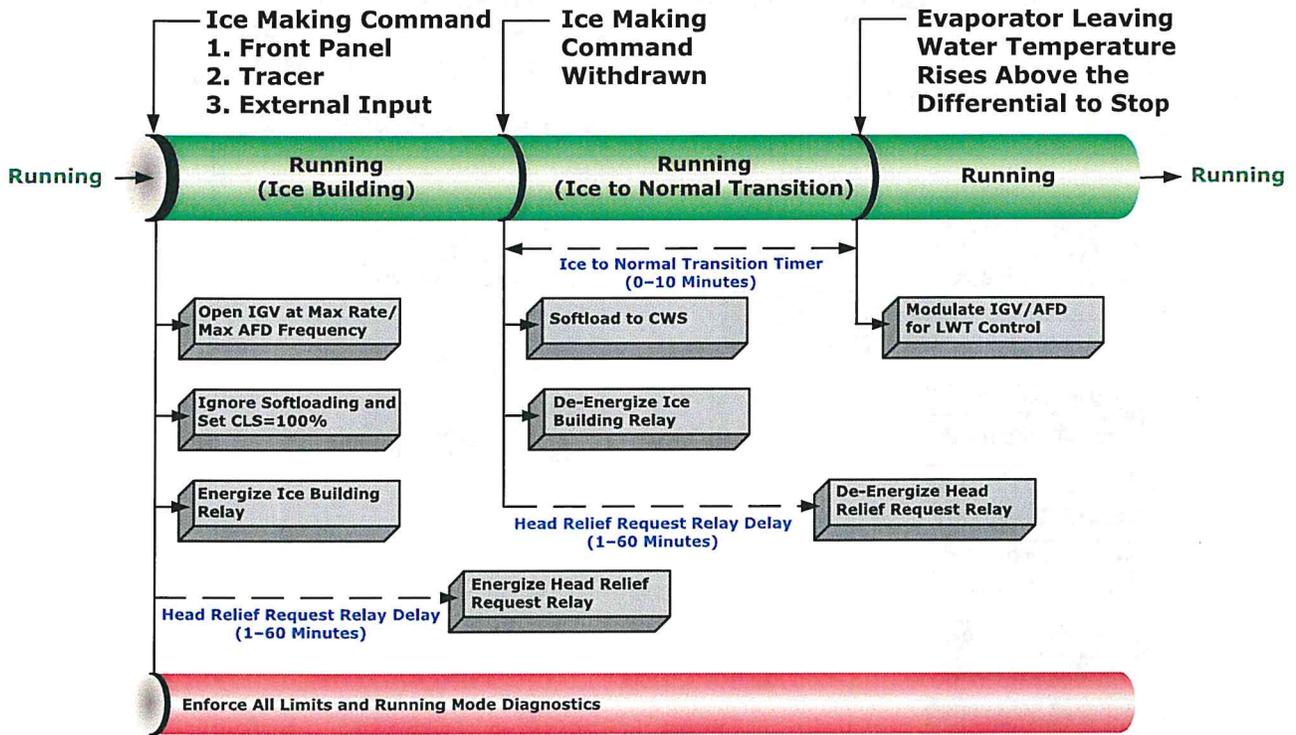
Figure 41. Sequence of events: AFD mains phase loss



Ice Making (Running to Ice Making to Running)

The following figure shows the transition from normal cooling to ice making, and back to normal cooling.

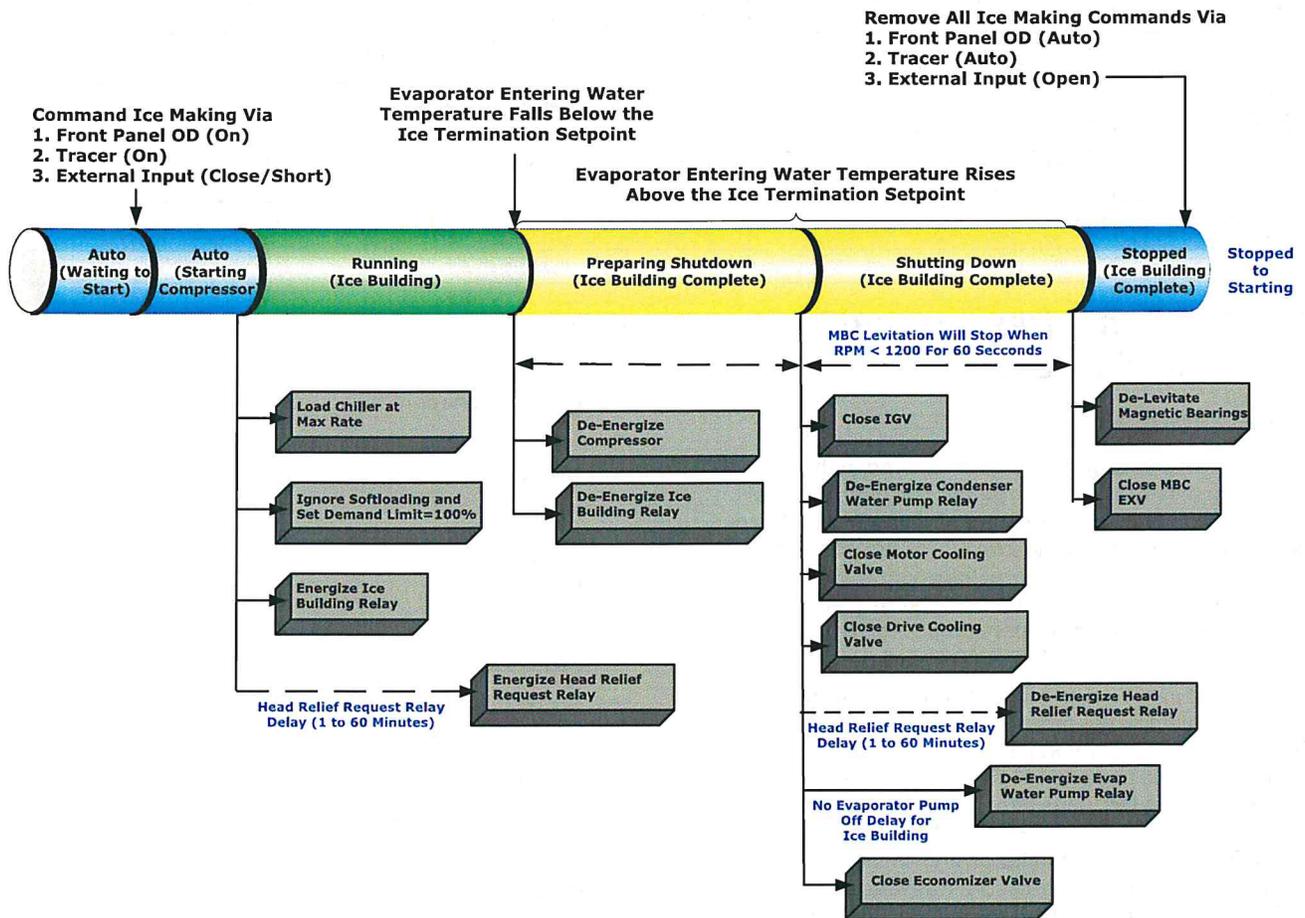
Figure 42. Sequence of events: ice making (running to ice making to running)



Ice Making (Auto to Ice Making to Ice Making Complete)

The following figure shows the transition from auto to ice making, to ice making complete.

Figure 43. Sequence of events: ice making (auto to ice making to ice making complete)





Start-up and Shut-down

Limit Conditions

The UC800 will automatically limit certain operating parameters during startup and run modes to maintain

optimum chiller performance and prevent nuisance diagnostic trips. These limit conditions are noted in the following table.

Table 15. Limit conditions

Condition	Description
Running - Limit	The chiller, circuit, and compressor are currently running, but the operation of the chiller/compressor is being actively limited by the controls. Further information is provided by the sub-mode.
Condenser Pressure Limit	The circuit is experiencing condenser pressures at or near the condenser limit setting. The compressor will be unloaded to prevent exceeding the limits.
Evaporator Refrigerant Temperature Limit	The circuit is experiencing saturated evaporator temperatures at or near the Low Refrigerant Temperature Cutout setting. The compressors will be unloaded to prevent tripping.
Current Limit	The compressor is running and its capacity is being limited by high currents. The current limit setting is 100% RLA (to avoid overcurrent trips).
AFD Heat Sink Temperature Limit	This limit will unload the chiller if the communicated heat sink temperature approaches cutout.
Demand Limit	This limit allows the customer to control the maximum power into the chiller.

Control Panel Devices and Unit-Mounted Devices

Unit Control Panel

Safety and operating controls are housed in the unit control panel and the starter panel. The control panel operator interface is called Tracer® AdaptiView™ and is located on an adjustable arm connected to the side of the control panel. For more information about operating Tracer® AdaptiView™, refer to *Tracer AdaptiView Display for Water-cooled Agility Chillers Operations Guide* (HDWA-SVU001*-EN).

The control panel houses several other controls modules called panel-mounted Low Level Intelligent Devices (LLIDs), power supply, terminal block, fuse, circuit breakers, and transformer. The inter-processor communication (IPC) bus allows the communications between LLIDs and the UC800. Unit-mounted devices are called frame-mounted LLIDs and can be temperature sensors or pressure transducers. The MODBUS® master connection on the UC800 provides communication to the TR200 AFD and to the Magnetic Bearing Controller (MBC). These and other functional switches provide analog and binary inputs to the control system.

User-defined Language Support

Tracer® AdaptiView™ is capable of displaying English text or any of 26 other languages (27 total languages). Switching languages is simply accomplished from a Language Settings menu. The following languages are available:

- English
- French
- French (Canada)
- German
- Greek
- Hebrew
- Hungarian
- Indonesian
- Italian
- Japanese
- Korean
- Norwegian
- Polish
- Portuguese (Portugal)
- Portuguese (Brazil)
- Russian
- Romanian
- Spanish (Europe)
- Spanish (Latin America)
- Swedish
- Thai
- Turkish

Unit Start-up and Shut-down Procedures

⚠ WARNING

Live Electrical Components!

Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

When it is necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks.

⚠ WARNING

Asphyxiation Hazard!

A significant release of refrigerant into a confined space could displace available oxygen to breathe and cause possible asphyxiation. Failure to follow instructions below could result in death or serious injury.

Should a refrigerant release occur, evacuate the area immediately and contact the appropriate rescue or response authority.

- Do not run evaporator water pump longer than 30 minutes after the chiller is shut down.
- Ensure that the evaporator is isolated from the hot water loop before changeover to heating mode.

The relief device is designed to relieve and discharge the refrigerant from the unit if the pressure in the evaporator exceeds 200 psig (1379.0 kPaG) on the evaporator or 300 psig (2068.4 kPaG) on the condenser.

Unit Start-up

NOTICE

Equipment Damage!

Failure to follow instructions could result in equipment damage.

Ensure that the Uninterruptible Power Supply (UPS) has been operating properly for a minimum of 24 hours before starting.

If required, after the system has been operating for approximately 30 minutes and has become stabilized, complete the remaining start-up procedure, as follows:

1. Check evaporator and condenser refrigerant pressures under Condenser and Evaporator Reports on the Tracer® AdaptiView™. The pressures are referenced to sea level (14.6960 psia [101.3254 kPaA]).

Temporary Shut-down and Restart

To shut down for a short time, use the following

procedure:

1. Press the STOP key on the Tracer® AdaptiView™.
2. UC800 pump control will turn off the pump (after a optional water pump delay time) when the STOP key is pressed and automatically restart the pump when the "Auto" key is pressed.
3. The unit will start normally, provided the following conditions exist:
 - a. The UC800 receives a call for cooling and the differential-to-start is above the setpoint.
 - b. All system operating interlocks and safety circuits are satisfied.

Extended Unit Shut-down

1. Perform the normal unit stop sequence using the STOP key.

Note: Unless the water bundles are valved off and drained, chiller power should remain ON at all times to allow the magnetic bearings to levitate the rotor in case water flow-driven rotation should occur. Trane recommends leaving the power on to maintain the Uninterruptible Power Supply (UPS) battery.

2. Verify the chilled water and condenser water pumps are cycled off. If desired, open disconnect switches to the pumps.
3. Drain the condenser piping and cooling tower.
4. Remove the drain and vent plugs from the condenser headers to drain the condenser.
5. After the unit is secured, perform the maintenance identified in the following sections.

Seasonal Unit Start-up

1. Close all drain valves and reinstall the drain plugs in the evaporator and condenser headers.
2. Service the auxiliary equipment according to the start-up and maintenance instructions provided by the respective equipment manufacturers.
3. Vent and fill the cooling tower, if used, as well as the condenser and piping. At this point, all air must be removed from the system (including each pass). Then, close the vents in the condenser chilled water circuits.
4. Open all of the valves in the evaporator chilled water circuit.
5. If the evaporator was previously drained, vent and fill the evaporator and chilled water circuit. After all air is removed from the system (including each pass), install the vent plugs in the evaporator waterboxes.



Start-up and Shut-down

NOTICE

Equipment Damage!

Failure to follow instructions could result in equipment damage.

Ensure that the Uninterruptible Power Supply (UPS) has been operating properly for a minimum of 24 hours before starting.

6. Check the adjustment and operation of each safety and operating control.
7. Close all disconnect switches.
8. Perform instructions listed in "Unit Start-up," p. 59.



Maintenance

⚠ WARNING

Hazardous Voltage w/Capacitors!

Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with a CAT III or IV voltmeter rated per NFPA 70E that all capacitors have discharged.

For additional information regarding the safe discharge of capacitors, see PROD-SVB06*-EN.

Recommended Maintenance

Weekly

While the unit is running in stable conditions:

- Log the chiller.
- Check evaporator and condenser pressures with gauges and compare to the reading on the Tracer® AdaptiView™ or Tracer® TU service tool. Pressure readings should fall within operating ranges specified in the following tables. If chiller measurements vary significantly from values listed in the following tables, problems may exist with refrigerant charge levels. Contact your local Trane Service Agency.

Note: Optimum condenser pressure is dependent on condenser water temperature, and should equal saturation pressure of refrigerant at a temperature 2°F to 5°F (1.1°C to 2.8°C) above that of leaving condenser water at full load.

Monthly

- Review operating log.
- Clean all water strainers in both the chilled and condensing water piping systems.

Annual

Contact your local Trane Service Agency to shut down the chiller once each year and perform the following:

- Perform all weekly and monthly maintenance procedures.
- Leak check the chiller, inspect safety controls, and inspect electrical components, such as magnetic

bearing controller and Uninterruptible Power Supply (UPS) battery.

- Inspect all piping components for leakage and/or damage. Clean out any in-line strainers.
- Clean and repaint any areas that show signs of corrosion.
- Inspect vent piping of all relief valves for presence of refrigerant to detect improperly sealed relief valves.
- Inspect the condenser tubes for fouling. Clean if necessary; refer to "Cleaning the Condenser," p. 62.
- Test the UPS battery.

Note: If, after 10 years, the battery has not been replaced, Trane recommends replacing the battery.

Other

- Use a nondestructive tube test to inspect the condenser and evaporator tubes at 3-year intervals.
Note: It may be desirable to perform tube tests on these components at more frequent intervals, depending upon chiller application. This is especially true of critical process equipment.
- Depending on chiller duty, contact your local Trane Service Agency to determine when to conduct a complete examination of the unit to determine the condition of the compressor and internal components.

Maintenance Procedures

Drive Cooling System

NOTICE

Equipment Damage!

Use of unapproved fluids, or dilution of approved fluid, could result in catastrophic equipment damage.

Use only Trane Heat Transfer Fluid P/N CHM01023. This fluid is a direct use concentration and is not to be diluted. Do not top off with water or any other fluid.

Service Intervals

NOTICE

Equipment Damage!

Failure to follow instructions could result in equipment damage.

Drive cooling fluid and strainer must be serviced every five (5) years.

- Every (5) years, contact your local Trane Service Agency to service the drive fluid and strainer.
- On a yearly basis, perform a fluid pH test.

Unit Diagnostics

An improperly filled drive cooling system (either low fluid level or entrapped air in the circuit) can result in the AFD drive or output load inductor overheating. This condition may result in the following diagnostics:

- AFD Fault
- Loss of Drive Cooling Control

If chiller diagnostics indicate a drive cooling system problem, contact your local Trane Service Agency.

pH Test

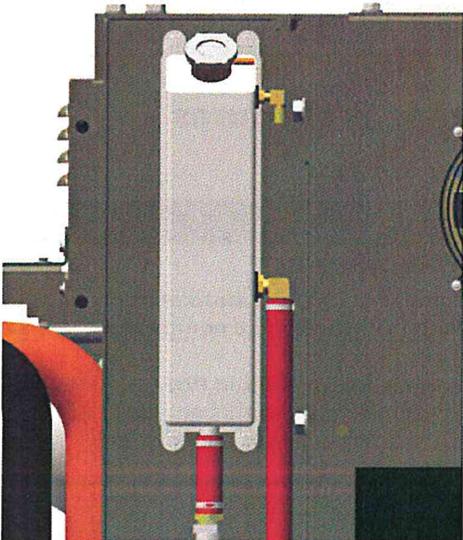
Obtain a sample of fluid from the drive cooling loop via the loop drain located near the discharge of the pump. Test for pH level using litmus paper with a 0.5 resolution.

- pH < 8 indicates fluid to be changed
- pH < 7 indicates potential component damage

Pressure Relief Cap

The pressure relief cap is an automotive style pressure-vent radiator cap; refer to the following figure. The setting for the relief spring is 16 lb (7.3 kg). The function of the relief cap can be verified with a standard automotive radiator cap tester.

Figure 44. Pressure relief cap

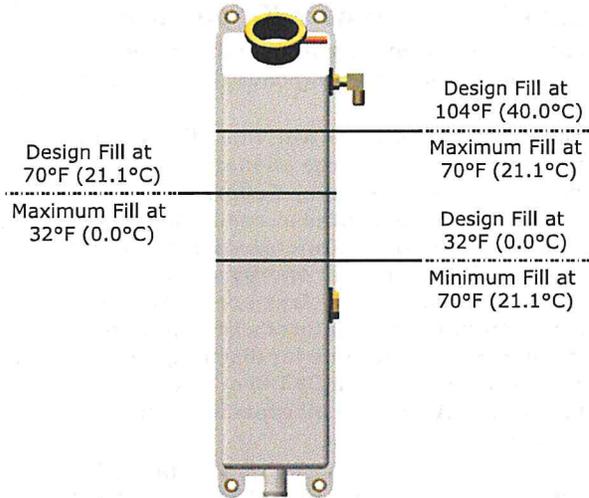


Drive Cooling Expansion Tank

Proper fluid level is important to the operation of the unit. To verify proper level, inspect the liquid level in the fluid reservoir (located on the left side of the electrical panel); refer to the following figure for fluid

levels under various temperature conditions. If levels are low, contact your local Trane Service Agency.

Figure 45. Drive cooling expansion tank fill



Note: Fill lines are NOT marked on the tank. The top level is just below the upper fitting and the bottom level is just above the lower fitting; the middle level is midway between the two fittings.

Cleaning the Condenser

Condenser tube fouling is suspect when the "approach" temperature (i.e., the difference between the refrigerant condensing temperature and the leaving condenser water temperature) is higher than predicted.

Condenser tube fouling is indicated when the approach temperature (the difference between the condensing refrigerant temperature and the leaving condenser water temperature) is higher than predicted. Refer to sales order selection data for approach temperatures.

Note: Glycol in the water system typically doubles the standard approach.

If the annual condenser tube inspection indicates that the tubes are fouled, two cleaning methods (mechanical or chemical) can be used to rid the tubes of contaminants. The methods are described in the following sections.

Mechanical Cleaning

Mechanical tube cleaning is used to remove sludge and loose material from smooth-bore condenser tubes.

⚠ WARNING

Heavy Objects!

Failure to properly lift waterbox could result in death or serious injury. Each of the individual cables (chains or slings) used to lift the waterbox must be capable of supporting the entire weight of the waterbox. The cables (chains or slings) must be rated for overhead lifting applications with an acceptable working load limit. Refer to the table for waterbox weights.

Waterbox Removal

Review mechanical room limitations and determine the safest method or methods of rigging and lifting the waterboxes.

Important:

- Do NOT rotate waterboxes.
- Be sure to replace water boxes right-side-up to maintain proper baffle orientation. Use new O-rings.

1. Determine the size of chiller being serviced. See unit nameplate located on chiller control panel.
2. Use a 3/8-in. (9.5-mm) rigging shackle for waterbox removal as shown in the following figure. The rated lifting capacity of the selected lift connection device must meet or exceed the published weight of the waterbox. Refer to the tables in "Waterbox Reassembly," p. 63.
3. Install rigging shackle onto the lifting connection on the waterbox.
4. Disconnect water pipes, if connected.
5. Remove waterbox bolts.

⚠ WARNING

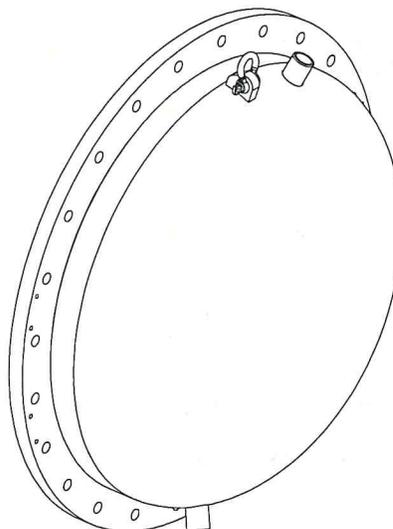
Overhead Hazard!

Failure to follow instructions could result in death or serious injuries. Never stand below or in close proximity to heavy objects while they are suspended from, or being lifted by, a lifting device in case the object drops.

6. Lift the waterbox away from the shell.
7. Store the waterbox in a safe and secure location and position.
8. Work a round nylon or brass bristled brush (attached to a rod) in and out of each of the condenser water tubes to loosen the sludge.
9. Thoroughly flush the condenser water tubes with clean water.

Note: To clean internally enhanced tubes, use a bi-directional brush or consult a qualified service organization for recommendations.

Figure 46. Waterbox and 3/8-in. (9.5-mm) rigging shackle



Waterbox Reassembly

After service is complete, the waterbox should be reinstalled on the shell following removal procedures in reverse (refer to "Waterbox Removal," p. 63). After thoroughly cleaning each joint, use new O-rings on ALL joints. Torque waterbox bolts in a star pattern to 163 ft-lb (221.0 N·m) dry.

Table 16. Waterbox weights

Shell Size	Description	Fabricated Non-marine Waterbox Welded Dome	
		lb	kg
020	Condenser Supply, 150 psi (1034.2 kPa)	145	65.8
	Evaporator Supply, 150 psi (1034.2 kPa)	170	77.1
	Return	100	45.4
040	Condenser Supply, 150 psi (1034.2 kPa)	210	95.3
	Evaporator Supply, 150 psi (1034.2 kPa)	245	111.1
	Return	145	65.8

Obtain the required parts from your local Trane Parts Center.

Chemical Cleaning

Scale deposits are best removed by chemical means. Consult a qualified water treatment specialist (i.e., one that knows the local water supply chemical/mineral



Maintenance

content) for a recommended cleaning solution suitable for the job. (A standard condenser water circuit is composed solely of copper, cast iron and steel.) Improper chemical cleaning can damage tube walls.

All of the materials used in the external circulation system, the quantity of the solution, the duration of the cleaning period, and any required safety precautions should be approved by the company furnishing the materials or performing the cleaning.

Note: *Chemical tube cleaning should ALWAYS be followed by mechanical tube cleaning.*

Cleaning the Evaporator

Because the evaporator is typically part of a closed circuit, it does not accumulate appreciable amounts of scale or sludge. However, if cleaning is deemed necessary, use the same cleaning methods described in "Cleaning the Condenser," p. 62.

Adaptive Frequency Drive Periodic Maintenance and Inspection

Adaptive Frequency™ Drive (AFD) periodic maintenance and inspections should be performed every 1–12 months, depending on operating environment.

Visual Inspection—Power Removed

⚠ WARNING

Hazardous Voltage w/Capacitors!

Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with a CAT III or IV voltmeter rated per NFPA 70E that all capacitors have discharged.

For additional information regarding the safe discharge of capacitors, see PROD-SVB06-EN.*

1. Ensure the door interlocks are present and working.
2. Verify the safety ground connections to the door panels are securely connected.
3. Inspect power wire cables and devices to assure no abrasion is occurring from vibrations against

chassis of cabinets, or other edges.

4. Ensure the drive interior and exterior is clear of any dust or debris. Fans, vents, etc. must be clean.

Important: *Only use a vacuum for cleaning. Do NOT use compressed air.*

5. Inspect the interior of the drive for any signs of moisture entry or leakage.
6. Visually inspect all drive components and wiring. Look for signs of heat or failure (look for swelled or leaking capacitors, discolored reactors or inductors, broken pre-charge resistors, smoke or arc trails on MOVs and capacitors, etc.).
7. Closely inspect the motor terminal board for any signs of leakage, arcing, etc..
8. Check ALL cable/lug/terminal connections inside the drive enclosure. Ensure all are clean and tight, and not rubbing against each other anywhere.
9. Test pH levels annually. Replace fluid as necessary, or every 5 years.
10. Remove and clean electrical panel air filters.

Operational Inspection—Power Applied

⚠ WARNING

Live Electrical Components!

Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

When it is necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks.

1. Verify the drive cabinet cooling fans are operating. This should be done from outside the enclosure, by looking into the cabinet at door and cabinet vents, to avoid electrical hazards.
Note: *The power module fan comes on with power. Other fans cycle with drive operation.*
2. Check historic fault codes using Adaptive Frequency™ Drive (AFD) control panel (LCP).
Note: *The AFD control panel is used ONLY for service and should never be used for machine operation.*
3. Check configuration settings and confirm all proper settings are still present in the controls.
4. Review the diagnostic history.
5. Make Chiller Service report to document all setpoints.
6. Check the UC800 alarm histories for any indications of operational problems.



Wiring

The following tables provide lists of field wiring diagrams, electrical schematics, and connection diagrams for Agility™ chillers. To determine the specific electrical characteristics of a particular chiller, refer to the nameplates mounted on the units.

Table 17. Wiring drawings

Drawing	Description
2311-4823	Diagram—Schematic Wiring
2311-4919	Diagram—Field Wiring: Unit-mounted Low Voltage Air-cooled AFD (240~678A Range)



Appendix A: Forms and Check Sheets

The following forms and check sheets are included for use with Trane start-up of HDWA Agility™ chillers. Forms and check sheets are used, as appropriate, for installation completion verification before Trane start-up is scheduled, and for reference during the Trane start-up.

Where the form or check sheet also exists outside of this publication as standalone literature, the literature order number is also listed.

- "Appendix B: Agility™ Chiller Installation Completion and Request for Trane Service," p. 67 (HDWA-ADF001*-EN)
- "Appendix C: Settings," p. 69

- "Appendix D: Operator Log," p. 71

Unit Start-up/Commissioning

Important: *Start-up must be performed by Trane or an agent of Trane specifically authorized to perform start-up and warranty of Trane® products. Contractor shall provide Trane (or an agent of Trane specifically authorized to perform start-up) with notice of the scheduled start-up at least two weeks prior to the scheduled start-up.*



Appendix B: Agility™ Chiller Installation Completion and Request for Trane Service

Important: A copy of this completed form must be submitted to the Trane Service Agency that will be responsible for the start-up of the chiller. Start-up will NOT proceed unless applicable items listed in this form have been satisfactorily completed.

TO: _____
 TRANE SERVICE OFFICE: _____
 S.O. NUMBER: _____
 SERIAL NUMBERS: _____
 JOB/PROJECT NAME: _____
 ADDRESS: _____

The following items are being installed and will be completed by: _____

Important: Start-up must be performed by Trane or an agent of Trane specifically authorized to perform start-up and warranty of Trane® products. Contractor shall provide Trane (or an agent of Trane specifically authorized to perform start-up) with notice of the scheduled start-up at least two weeks prior to the scheduled start-up. **Equipment not started by Trane is not warranted by Trane.**

Check box if the task is complete or if the answer is "yes".

1. Agility™ Chiller

- Installation meets foundation requirements.
- In place and piped.
- Isolation pads installed.

Note: Do not insulate the Agility™ chiller or adjacent piping prior to the chiller commissioning by Trane service personnel. The contractor is responsible for any foreign material left in the unit.

2. Piping

Chilled water piping connected to:

- Evaporator
- Air handling units
- Pumps
- Flow switch or flow proving device installed (if not factory-provided)

Condenser piping connected to:

- Condenser
- Pumps

- Flow switch or flow proving device installed (if not factory-provided)

- Cooling tower

Additional piping:

- Make-up water connected to cooling tower
- Water supply connected to filling system

- Does unit have freeze inhibitor? If unit has freeze inhibitor:

- Verify type and concentration correct per unit submittal
- Calculate and record freeze point of the solution: _____ (specify °F or °C)

- Systems filled

- Pumps run, air bled from system

- Strainers installed in entering water piping (evaporator and condenser) and cleaned

- Relief valve ventilation piping installed (as applicable)

3. Flow balancing valves installed

- Leaving chilled water
- Leaving condenser water
- Proper porting to measure flow and balance

4. Gauges, thermometers, and air vents

- Installed on both sides of evaporator
- Installed on both sides of condenser

5. Wiring

- Wire size per submittal and NEC 310-16
- Full power available
- External interlocks (flow switch, pumps auxiliary, etc.)
- Chilled water pump (connected and tested)
- Condenser water pump (connected and tested)
- Cooling tower fan rotation checked
- 115 Vac power available for service tools (as required)
- All controls installed and connected
- If unit was disassembled for installation, all interconnecting wiring reinstalled

6. Testing

- Dry nitrogen available for pressure testing
- Trace gas amounts of R-134a available for leak testing (if necessary)



Appendix B: Agility™ Chiller Installation Completion and Request for Trane Service

7. Refrigerant

- Refrigerant on job site and in close proximity to chiller (if shipped separately)

Total amount in cylinders/drums: _____ (specify lb or kg) and fill in specifics below:

Number of cylinders/drums _____ of size _____ (specify lb or kg)

Number of cylinders/drums _____ of size _____ (specify lb or kg)

Note: After commissioning is complete, it is the installer's responsibility to transport empty refrigerant containers to an easily accessible point of loading to facilitate container return or recycling.

8. System

- Systems can be operated under all design selection points to verify proper operation.

9. Equipment room

- Does the equipment room have a refrigerant monitor/sensor capable of monitoring and alarming within the allowable exposure level of the refrigerant?
- Does the installation have properly placed and operating audible and visual refrigerant alarms?
- Does the equipment room have proper mechanical ventilation?
- If it is required by local code, is a self-contained breathing apparatus available?
- Does the equipment room meet environmental condition requirements specified in the chiller *Installation, Operation, and Maintenance* manual?

10. Owner awareness

- Has the owner been fully instructed on the proper use and handling of refrigerant?

- Does the owner have a copy of the MSDS for refrigerant?

Note: Additional time required to properly complete the start-up and commissioning, due to any incompleteness of the installation, will be invoiced at prevailing rates.

This is to certify that the Trane equipment has been properly and completely installed, and that the applicable items listed above have been satisfactorily completed.

Checklist Completed by (Print Name): _____

SIGNATURE: _____

DATE: _____

In accordance with your quotation and our purchase order number _____, we therefore require the presence of Trane service on this site, for the purpose of start-up and commissioning, by _____ (date).

Note: Minimum of two week advance notification is required to allow for scheduling of the chiller start-up.

ADDITIONAL COMMENTS/INSTRUCTIONS

Note: A copy of this completed form must be submitted to the Trane Service Agency that will be responsible for start-up of chiller.



Appendix C: Settings

Chiller Settings	Value
Setpoint Source	
Front Panel Hot Water Command	
Front Panel Chilled Water Setpoint	
Front Panel Hot Water Setpoint	
Front Panel Ice Building Command	
Front Panel Ice Termination Setpoint	
Ice to Normal Cooling Timer Setpoint	
Front Panel Demand Limit Setpoint	
Front Panel Base Loading Setpoint	
Front Panel Base Loading Command	
Differential to Start	
Differential to Stop	
Condenser Water Pump Off Delay	
Evaporator Water Pump Off Delay	
Evap Low Water Flow Warning Setpoint	
Power-Up Start Delay	
Chiller Power Demand Time Period	
Service Settings	Value
Low Evaporator Water Temp Cutout	
Low Refrigerant Temperature Cutout	
Local Atmospheric Pressure	
Maximum Capacity Limit	
Minimum Capacity Limit	
BAS Setpoint Power Loss Store Enable	
Capacity Control Softload Time	
Demand Limit Softload Time	
Demand Limit Startup Target	
Condenser Pressure Limit Setpoint	
Feature Settings	Value
Ext Chilled/Hot Water Setpoint Enable	
External Demand Limit Setpoint Enable	
Ice Building Feature Enable	
Minimum Capacity Timer	
Security	
LCI-C Diagnostic Encoding	
External Base Loading Setpoint Enable	
Chilled Water Reset	Value
Chilled Water Reset Type	
Return Water Reset Ratio	
Return Water Start Reset	
Return Water Maximum Reset	
Outdoor Air Reset Ratio	
Outdoor Air Start Reset	
Outdoor Air Maximum Reset	



Appendix C: Settings

Manual Control Settings	Value
Evaporator Water Pump Override	
Condenser Water Pump Override	
Manual Capacity Control	
Clear Energy Consumption	
Display Settings	Value
Date Format	
Date Separator	
Time Format	
Unit System	
Pressure Units	
Language	
Date	
Time	
UTC Offset	
Summer Time	



Appendix D: Operator Log

Note: An Operator Log can be captured by using the "Logsheet Report" found on the Tracer@

AdaptiView™ display; refer to the following figures.

Figure 47. Reports, Log Sheet button highlighted



Figure 48. Sample Agility chiller Log Sheet





Appendix D: Operator Log

Data Name	Run Time		
	15 Minutes	30 Minutes	1 Hour
Evaporator			
Evaporator Entering Water Temperature			
Evaporator Leaving Water Temperature			
Evaporator Saturated Rfgt Temp			
Evaporator Refrigerant Pressure			
Evaporator Approach Temperature			
Evaporator Water Flow Status			
Approx Evap Water Flow			
Evap Differential Wtr Press			
Evaporator EXV Percent Open			
Condenser			
Condenser Entering Water Temperature			
Condenser Leaving Water Temperature			
Condenser Saturated Rfgt Temp			
Condenser Refrigerant Pressure			
Condenser Approach Temperature			
Condenser Water Flow Status			
Approx Cond Water Flow			
Cond Differential Wtr Press			
Condenser Refrigerant Liquid Level			
Compressor			
Compressor Starts			
Compressor Running Time			
Compressor Refrigerant Discharge Temperature			
IGV Percent Open			
Chiller Load Command			
MBC PCB Temperature			
MBC Cooling Valve Percent Open			
Compressor Bearing Temperature 1			
Compressor Bearing Temperature 2			
Motor			
AFD Average Motor Current % RLA			
AFD Motor Current U % RLA			
AFD Motor Current V % RLA			
AFD Motor Current W % RLA			
AFD Motor Current U			
AFD Motor Current V			
AFD Motor Current W			
Motor Winding Temp #1			
Motor Winding Temp #2			
Motor Winding Temp #3			
Motor Temperature			
AFD Percent Speed			
AFD Heatsink Temperature			



Notes



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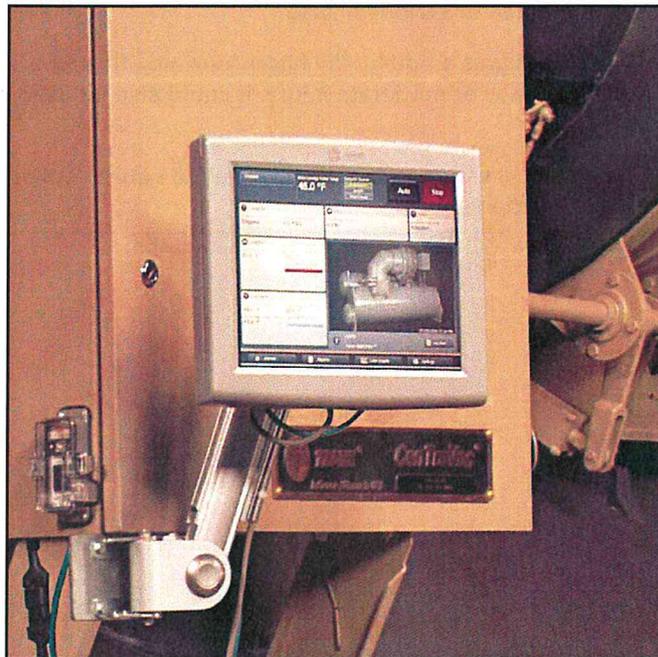
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Operations Guide

Tracer AdaptiView™ Display for CenTracVac™ Water-cooled Chillers



X39641071-040

SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

July 2011

CTV-SVU01D-EN



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Warnings, cautions, and notices are provided in appropriate places throughout this document:

⚠WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION: Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.

NOTICE: Indicates a situation that could result in equipment or property-damage-only accidents.



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Introduction

The Tracer AdaptiView™ display provides a means for viewing data and for making operational changes on the following types of chillers:

- CenTraVac™ chiller models CVHE, CVHF, CVHG
- CenTraVac Duplex chiller models CDHF, CDHG

The purpose of this guide is to assist you in using the Tracer AdaptiView display. The guide describes how to access the screens and the types of information that appear on the screens.

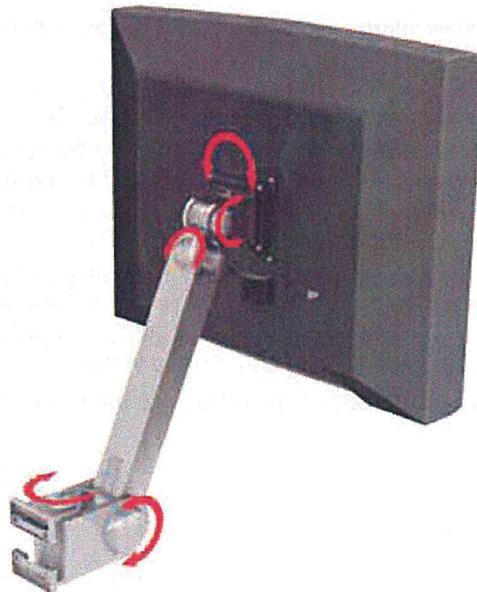
Equipment Description

The basic equipment features of the Tracer AdaptiView display are described here.

Hardware

The Tracer AdaptiView display is mounted on or near the chiller control panel. It can be attached to the chiller by an arm that can extend 11 inches. Five pivot points enable full articulation as described in the following specifications and in the illustration:

- Two horizontal pivots points 90° right or left (180° total)
- Two vertical pivots points: 90° degrees up or down (180° total)
- Rotation: 135° clockwise and 135° counterclockwise (270° total)



Screen characteristics

The 12.1-inch VGA touch-sensitive color screen displays data in either inches and pounds (IP) or standard international (SI) units, and in one of twenty-four available languages. Animated color graphics indicate the status of the chiller and its components.



Introduction

DC Power

The Tracer AdaptiView display receives DC power through its power cable. The Tracer UC800 controller must be powered On.

Communication

A separate cable provides communication between the Tracer AdaptiView display and the Tracer UC800 controller. Alarms are communicated immediately upon detection.

Touchscreen Guidelines

The touch screen registers the downward pressure of a touch. Light, quick, yet deliberate presses are most effective. Touching with more pressure has no effect.

Recommended tools to use: finger, thumb, pencil eraser. Do not use a pen or pencil point, or any other sharp or pointed object that might scratch the screen surface.

If you apply and hold pressure at more than one point, the touch screen registers only the first touch. For example, if you press a finger on an area of the screen that is not touch sensitive, pressing a sensitive area with another finger will not register.

Holding on to the screen with your hand can cause unintended navigation, such as from thumb or palm pressure.

Reference Sources

Additional information on CenTraVac chillers with AdaptiView control can be found in these documents:

- *CVHE, CVHF, CVHG Water-Cooled CenTraVac™ Chillers with Tracer AdaptiView™ Control Installation, Operation, and Maintenance Guide (CVHE-SVX02)*
- *CDHF, CDHG Water-Cooled CenTraVac™ Chillers with Tracer AdaptiView™ Control Installation, Operation, and Maintenance Guide (CDHF-SVX01)*
- *EarthWise™ Purge System with Tracer AdaptiView™ Control Operation and Maintenance Guide (PRGD-SVX01)*
- *Diagnostics Descriptions, Troubleshooting Tables, and Control Component Overview for Water-Cooled CenTraVac™ Chillers with Tracer AdaptiView™ Control (CTV-SVD03)*
- *Tracer™ TU Service Tool Programming Guide for Water-Cooled CenTraVac™ Chillers with Tracer AdaptiView™ Control (CTV-SVP02)*
- *Tracer™ TU Service Tool Getting Started Guide (TTU-SVN01)*

Screen Overview

The touch-sensitive areas of the Tracer AdaptiView display screen are described in detail in this section.

In Figure 1, three areas are identified, which correspond to the following subsections:

1. "Chiller Status Area," p. 8
2. "Main Display Area/Home Screen," p. 9. This area is different between the CVHE, CVHF, CVHG chiller models and the Duplex CDHF and CDHG chiller models. Table 2, p. 9 describes the differences.
3. "Main Menu Area," p. 15

Figure 1. Tracer AdaptiView display (Home screen for CVHE, CVHF, and CVHG chillers is shown)

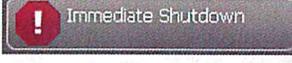
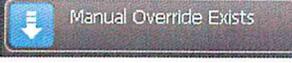
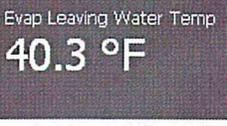


Introduction

Chiller Status Area

The chiller status area (shown as location ① in Figure 1, p. 7) remains visible from every screen on the Tracer AdaptiView display. Basic information about chiller status and control appears on the face of the buttons and touch targets. When touched, the buttons and touch targets open other screens that provide more information and control access. Table 1 provides the details.

Table 1. Chiller status area

Button/Touch target	Description
<p>Chiller status button</p> 	<p>The top-level operating mode of the chiller appears on the chiller status button. Touch this button to view the Chiller Operating Mode screen.</p> <p>Note: For more information, see "Reports," p. 21.</p>
<p>Alarm indicator button</p> 	<p>If an active alarm exists, the alarm indicator button appears with the alarm severity indicated on it. If there is more than one alarm, the most severe appears. You can touch this button as an alternate way to view the Alarms screen.</p> <p>Note: For more information, see "Alarms," p. 18.</p>
<p>Manual override button</p> 	<p>If a manual override exists but no active alarm exists, a manual override button appears in the same location as the alarm indicator button. If neither an alarm nor a manual override exist, no button appears. If a manual override exists, you can touch this button as an alternate way to view the Manual Control Settings screen.</p> <p>Note: For more information, see "Manual Control Settings," p. 49.</p>
<p>Water temperature touch target</p> 	<p>The water temperature touch target shows one of the following, depending on whether the chiller is in heating or cooling mode (also referred to as the Active Control Type):</p> <ul style="list-style-type: none"> • If the Active Control Type is chilled water, the Evaporator Leaving Water Temperature appears and the touch target links to the evaporator component screen. • If the Active Control type is hot water, the Condenser Leaving Water Temperature, and the touch target links to the condenser component screen. <p>Note: For more information on the evaporator and condenser component screens, see "Component Screens," p. 13.</p>
<p>Setpoint source touch target</p> 	<p>The current setpoint source is highlighted in green on the setpoint source touch target. Touch this target to view the Setpoint Source screen, where you can change the setpoint source.</p> <p>Note: For more information, see "Changing the Setpoint Source," p. 45.</p>
<p>Auto/Stop buttons</p> 	<p>Auto and Stop are toggle buttons: One appears raised when the other is appears depressed.</p> <ul style="list-style-type: none"> • Touch Auto to activate the chiller startup process. • Touch Stop to active the chiller shutdown process. <p>Note: For more information, see "Stopping/Restarting Chiller Operation," p. 16.</p>

Main Display Area/Home Screen

All screens appear within the main display area (shown as location 2 in Figure 1, p. 7).

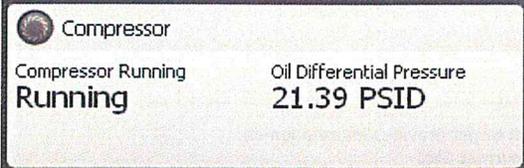
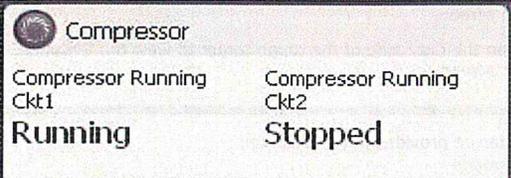
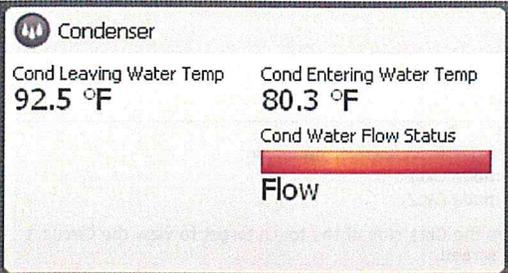
Home screen: Chiller status information

The home screen (Figure 1, p. 7) provides the most frequently needed chiller status information on “touch targets” (the entire white rectangular areas) for each chiller component. Touching any touch target displays a screen containing more chiller status information related to each component (see “Component Screens,” p. 13).

Each touch targets that appears on the home screen is described in Table 2, including those for CVHE, CVHF, CVHG chillers, and those for Duplex CDHF and CDHG chillers.

In the lower right corner of the home screen, you can view the date and time as well as additional chiller information. For details, see the last three rows of Table 2.

Table 2. Home screen touch targets and buttons

Touch target	Description
<p>Compressor for CVHE, CVHF, and CVHG chillers</p> 	<p>This compressor touch target chiller provides information on:</p> <ul style="list-style-type: none"> Compressor Running Status Differential Oil Pressure <p>Touch anywhere on the touch target to view the Compressor component screen.</p>
<p>Compressor for Duplex CDHF and CDHG chillers</p> 	<p>This compressor touch target provides information on:</p> <ul style="list-style-type: none"> Compressor Running Status Ckt1 Compressor Running Status Ckt2 <p>Touch anywhere on the Ckt1 side of the touch target to view the Circuit 1 Compressor component screen. Touch anywhere on the Ckt2 side of the touch target to view the Circuit 2 Compressor component screen.</p>
<p>Condenser for all chiller models</p> 	<p>This condenser touch target provides information on:</p> <ul style="list-style-type: none"> Condenser leaving water temperature Condenser entering water temperature Active hot water setpoint (if hot water control is available) Condenser water flow (animation in graphic indicates if condenser is running) <p>Touch anywhere on the touch target to view the Condenser component screen.</p>

Introduction

Table 2. Home screen touch targets and buttons (continued)

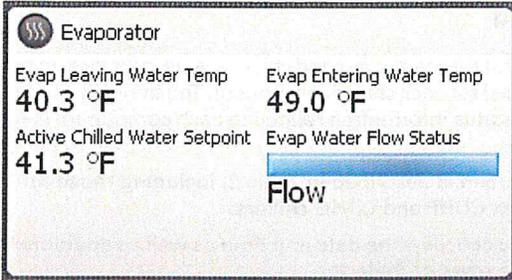
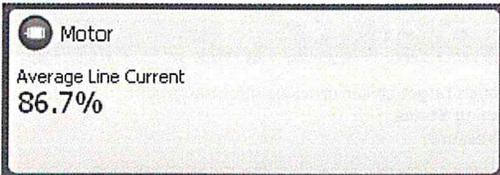
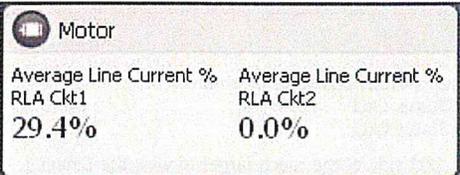
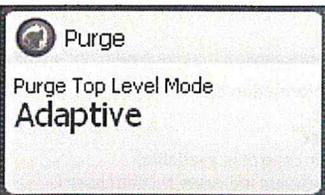
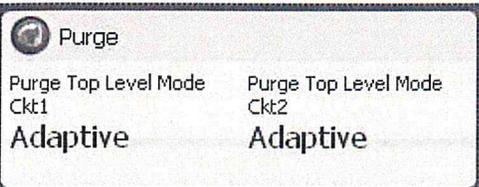
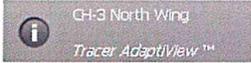
Touch target	Description
<p>Evaporator for all chiller models</p> 	<p>The evaporator touch target provides information on:</p> <ul style="list-style-type: none"> • Evaporator leaving water temperature • Evaporator entering water temperature • Active chilled water setpoint (if chilled water control is available) • Evaporator water flow (animation in graphic indicates if evaporator is running) <p>Touch anywhere on the touch target to view the Evaporator component screen.</p>
<p>Motor for CVHE, CVHF, and CVHG chillers</p> 	<p>The motor touch target provides information on:</p> <ul style="list-style-type: none"> • Average line current • Frequency (if adjustable-frequency drive is configured) <p>Touch anywhere on the touch target to view the Motor component screen.</p>
<p>Motor for Duplex CDHF and CDHG chillers</p> 	<p>The motor touch target provides information on:</p> <ul style="list-style-type: none"> • Average line current Ckt1 • Average line current Ckt2 <p>Touch anywhere on the Ckt1 side of the touch target to view the Circuit 1 Motor component screen.</p> <p>Touch anywhere on the Ckt2 side of the touch target to view the Circuit 2 Motor component screen.</p>
<p>Purge for CVHE, CVHF, and CVHG chillers</p> 	<p>The purge touch target provides information on:</p> <ul style="list-style-type: none"> • Purge top level mode <p>Touch anywhere on the touch target to view the Purge component screen.</p>
<p>Purge for Duplex CDHF and CDHG chillers</p> 	<p>The purge touch target provides information on:</p> <ul style="list-style-type: none"> • Purge top level mode Ckt1 • Purge top level mode Ckt2 <p>Touch anywhere on the Ckt1 side of the touch target to view the Circuit 1 Purge component screen.</p> <p>Touch anywhere on the Ckt2 side of the touch target to view the Circuit 2 Purge component screen.</p>

Table 2. Home screen touch targets and buttons (continued)

Touch target	Description
<p>Information button and chiller and display names</p> 	<p>Touch the "i" or the chiller or display name to view the About this Chiller screen.</p> <p>Note: For more information, see "Viewing Unit Information (About This Chiller)," p. 24.</p>
<p>Custom Report</p> 	<p>Touch the Custom Report button to view the Custom Report screen.</p> <p>Note: For more information, see "Creating and Viewing a Custom Report," p. 22.</p>

Home screen: Animated graphic

A graphic of a chiller appears on the home page. The graphic uses animation to indicate the operational status of the chiller. If the chiller is running, animation appears within the cutaway areas of the compressor, the evaporator, and the condenser, as shown in [Figure 1, p. 7](#). If the chiller is not running, the components are enclosed and are not animated.

The chiller graphic that appears on the screen also indicates the *type* of chiller that the Tracer AdaptiView display is monitoring. One of the following graphics will appear in the display for CVHE, CVHF, and CVHG chillers:

- 2-stage compressor, cooling only (as shown in [Figure 1](#))
- 2-stage compressor with auxiliary condenser
- 2-stage compressor with heat recovery
- 3-stage compressor, cooling only
- 3-stage compressor with auxiliary condenser
- 3-stage compressor with heat recovery

One of the following graphics will appear on the display for CDHF and CDHG Duplex chillers:

- 2-stage compressor
- 3-stage compressor

Main Display Area/Screen Saver

After 30 minutes of inactivity, the screen dims and a screen saver (Figure 2) appears in the main display area. The screen saver also appears if you touch the animated graphic on the home screen. Alternately, if you touch the screen saver, the home screen appears.

Figure 2. Screen saver



Component Screens

Each chiller component has a touch target, accessible from the home screen, that is illustrated in Figure 1, p. 7 (main display area/home screen) and described in Table 2, p. 9.

CVHE, CVHF, and CVHG chillers

If you touch anywhere on a component touch target, a screen appears containing data that is related to that component (see the example in Figure 3). You can use the shortcut buttons at the top of each of the component screens (location 2 in Figure 3) to view the other components screens.

“Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers,” p. 64 lists the settings and status points that are accessible from each of the component screens. The chiller configuration determines which of the settings and status points appear.

Figure 3. Component screen example for CVHE, CVHF, and CVHG chillers



1. Data Graph shortcut button
2. Component screen shortcut buttons

CDHF and CDHG Duplex chillers

Each component has a separate screen for circuit 1 and circuit 2.

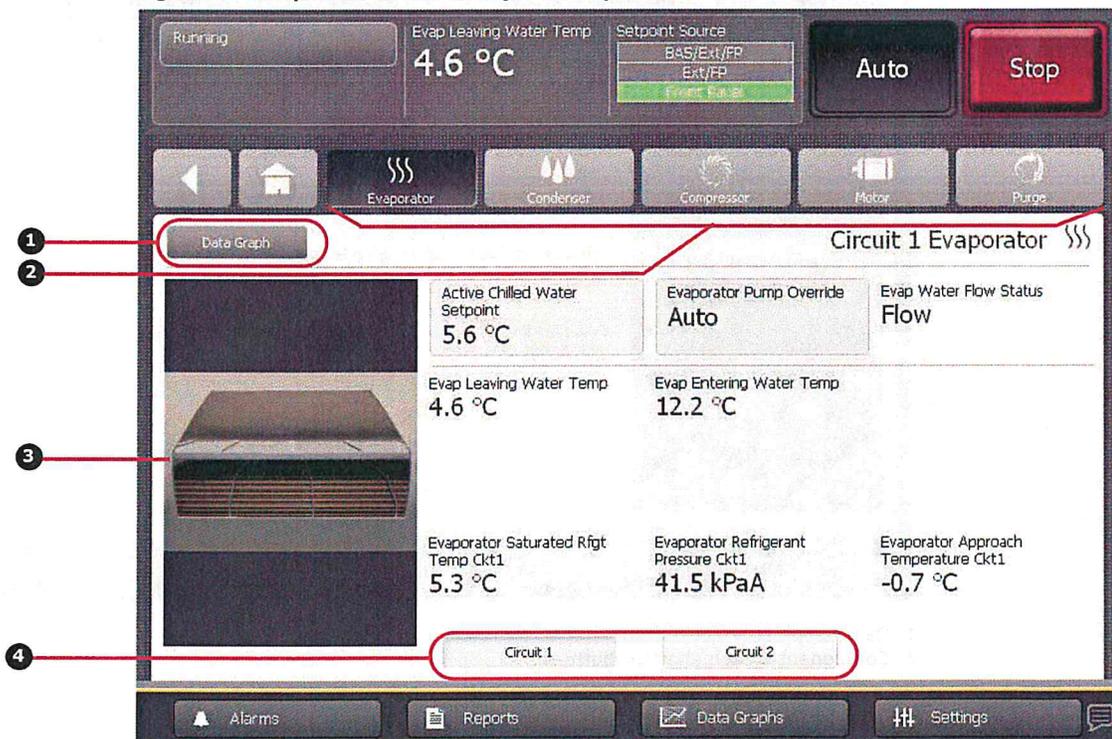
- If you touch anywhere on an evaporator or condenser component touch target, a screen appears containing data related to circuit 1 of that component (see Figure 4).
- If you touch in the circuit 1 data area of a compressor, motor, or purge component touch target, a screen appears containing data related to circuit 1 of that component. If you touch in the circuit 2 data area of a compressor, motor, or purge component touch target, a screen appears containing data related to circuit 2 of that component.

Circuit 1 and Circuit 2 buttons at the bottom of each component screen (location 4 in Figure 4) allow you to toggle between circuit 1 and circuit 2 component screens.

You can use the shortcut buttons at the top of each of the component screens (location 2 in Figure 3) to view the other components screens. If you are viewing a circuit 1 component screen and touch a shortcut button, the circuit 1 screen for the component represented by that button appears; and likewise for circuit 2.

“Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers,” p. 79 lists the settings and status points that are accessible from each of the component screens. The chiller configuration determines which of the settings and status points appear.

Figure 4. Component screen example for Duplex CDHF and CDHG chillers



1. Data Graph shortcut button
2. Component screen shortcut buttons
3. Animated graphic
4. Circuit 1 and Circuit 2 components screen toggle buttons

Component screen settings

Some settings appear on the component screens as buttons. These buttons take you to another screen, where you can change the setting. (See, for example, the buttons on the evaporator component screen in [Figure 3](#), which show the Active Chilled Water Setpoint and the Evaporator Water Pump Override).

Note: For more information about changing settings, see *“Equipment Settings,”* p. 39.

Data Graph shortcut button

To view a data graph that is related to the component screen you are viewing, touch the Data Graph button at the top left of the component screen (location ❶ in [Figure 3](#), p. 13 and [Figure 4](#), p. 14).

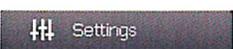
Component screen graphics

On the left side of each component screen is a graphic of the component. If the chiller is running, each graphic, except for the purge graphic, is animated.

Main Menu Area

The main menu area (shown in [Figure 1](#), p. 7) always remains visible at the bottom of the display. When touched, each of the buttons displays the main menu screen for the topic listed on the button. [Table 3](#) provides a description of each button.

Table 3. Main menu area

Button	Description
 Alarms	<p>Touch the Alarms button to view the Alarms screen.</p> <p>If there is an active alarm, the button flashes a color. The flashing color is determined by the highest severity of active alarms:</p> <ul style="list-style-type: none"> • If an Immediate Shutdown alarm exists, the flashing color is red. • If a Normal Shutdown alarm exists, the flashing color is yellow. • If a Warning alarm exists, the flashing color is blue. <p>Note: For more information, see <i>“Alarms,”</i> p. 18.</p>
 Reports	<p>Touch the Reports button to view the Reports screen.</p> <p>Note: For more information, see <i>“Reports,”</i> p. 21.</p>
 Data Graphs	<p>Touch the Data Graphs button to view the Data Graphs screen.</p> <p>Note: For more information, see <i>“Data Graphs,”</i> p. 32.</p>
 Settings	<p>Touch the Settings button to view the Settings screen, which is separated into the following three categories:</p> <ul style="list-style-type: none"> • <i>“Equipment Settings,”</i> p. 39 • <i>“Display Settings,”</i> p. 52 • <i>“Security Settings,”</i> p. 59 <p>Note: Refer to the page numbers for detailed information about each category.</p>
	<p>Touch the Language icon to view the Language screen. (This button is a shortcut. You can also view the Language screen by using the Settings button.)</p> <p>Note: For more information, see <i>“Viewing and Changing the Language Preference,”</i> p. 55.</p>



Stopping/Restarting Chiller Operation

You can start or stop the chiller from the AdaptiView display by using the **Auto** and **Stop** buttons. The buttons are located in upper right (Figure 1, p. 7).

Stopping the Chiller

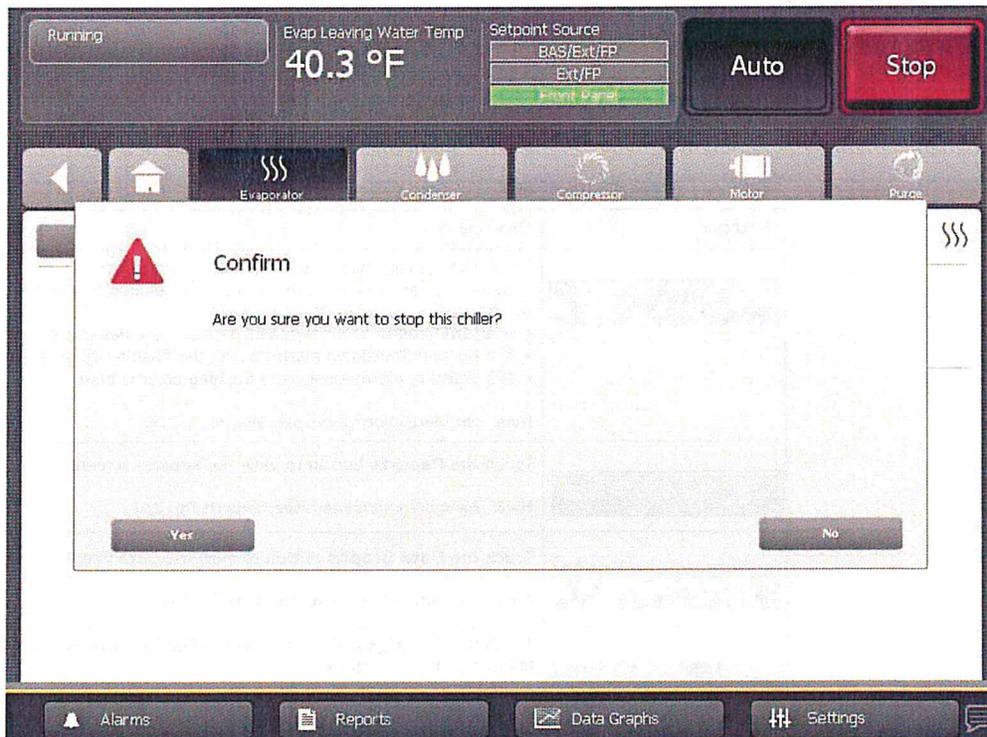
You can stop the chiller in two ways:

- Normally, which involves stopping the various components sequentially in order to protect them from damage
- Immediately, which shuts down all the components at once, and should be used only in an emergency

To stop the chiller in either of these ways:

1. Touch the Stop button to initiate the chiller shutdown process. A confirmation screen appears (Figure 5).

Figure 5. Stop the Chiller confirmation screen



Stopping/Restarting Chiller Operation

2. Touch the **Yes** button. The Shutting Down Chiller screen appears (Figure 6).
 - To stop the chiller normally, no further action is required. You can observe the submodes change and the timers count down.
 - To stop the chiller immediately, touch the **Immediate Shutdown** button.
 - To cancel shutdown, touch the **Cancel Shutdown** button.

Figure 6. Shutting Down Chiller screen



Note: If the chiller is a Duplex (CDHF or CDHG), the screen shows top-level modes and submodes for both the chiller and the two circuits.

Restarting the Chiller

Touch the **Auto** button to initiate the chiller restart process. You can observe the mode change to **Auto**. The chiller will wait until cooling is needed before starting the compressor.

When the chiller is running normally, it automatically starts and stops as needed to reach its setpoints.



Alarms

You can use the Tracer AdaptiView display to view alarms and to reset them. Alarms are communicated to the display immediately upon detection.

Viewing the Alarms Screen

Touch the **Alarms** button in the main menu area (Figure 1, p. 7) to view the Alarms screen. A table of active alarms appears that is organized chronologically with the most recent at the top of the list, as shown in Figure 7. This example shows the default view, which appears each time you return to the screen.

Note: A page number appears in the lower right corner of the screen. If a screen contains more than one page, up/down arrows also appear for viewing the other pages.

Figure 7. Alarms screen (default view)



1. Reset Alarms button
2. Number of alarms
3. Sortable columns—The example is sorted by date/time.
4. Page numbering
5. Alarms categories—The example shows active alarms.

Understanding Alarm Icons

Alarm icons, which appear in the left-most column of the alarms screen and on the alarms indicator button if there is an existing alarm, are distinguished by their shape and color. Their meaning is explained in Table 4.

Table 4. Alarm icons

Active alarm icons	Historic alarm icons	Level of severity
 Red octagon	 Gray octagon	Immediate shutdown
 Yellow triangle	 Gray triangle	Normal shutdown
 Blue circle	 Gray circle	Warning

Viewing Active and Historic Alarms

You can view alarms by three different categories:

- **Active alarms:** These are alarms that require attention. All alarms that are currently active appear when you view this category.
- **Historic alarms:** After an alarm condition has been resolved, the alarm is reclassified as historic. The 20 most recent historic alarms appear when you view this category.
- **All alarms:** All active alarms and the 20 most recent historic alarms appear when you view this category. The alarms are listed in chronological order.

The Alarms screen defaults to active alarms, as in Figure 7, p. 18. Note that the **Active Alarms** button in location 5 appears shaded in this figure, which indicates that you are viewing active alarms. To view a different category, touch **Historic Alarms** or **All Alarms**. The button you select becomes shaded and the list appears.

Sorting Alarms

To sort alarms by a category other than date and time, touch one of the other column headings in the table. The column heading responds by changing to blue, and the alarms table re-sorts according to the blue column heading. If you touch the blue column heading again, the column changes the order from ascending to descending.

You can sort the alarms table by:

- **Date/Time** (the default sort): Most recent alarms are at the top.
- **Severity:** Active alarms are at the top (if you are viewing both active and historic alarms), followed by the most severe, followed by the most recent.
- **Description:** Alarms are sorted alphanumerically by name, followed by the most recent.
- **Status:** Alarms are sorted according to active/historic status (if you are viewing both active and historic alarms), followed by the most recent.

Resetting Alarms

Some alarms require reset to move from the active to the historic state, even if the issue causing the alarm has been resolved. These manual reset alarms are sometimes referred to as latching alarms. Non-latching alarms change from the active to the historic state automatically, after the problem has been resolved.

Alarms

The Alarms screen does not directly state whether the alarms are latching or non-latching. However, their behavior indicates their type:

- Reset latching alarms by touching the **Reset Alarms** button at the top of the Alarms screen (Figure 7, p. 18). Latching alarms respond by disappearing from the active alarms list and becoming a part of the historic alarms list. However, if the condition that caused the alarm persists, the alarm will re-appear in the active alarms list.
- You do not have to reset non-latching alarms. Non-latching alarms automatically disappear from the active alarms list and re-appear in the historic alarms list when the conditions that caused them are resolved.

Other Alarm Indicators

In addition to the Alarms screen, there are two buttons that indicate alarm conditions. These buttons are viewable from any screen on the display. You can touch either one to access the Alarms screen.

- The **Alarms** button in the main menu area of the screen (Figure 1, p. 7) flashes a color that represents the alarm level of the most severe active alarm. The three color possibilities correspond to those of the active alarm icons shown in Table 4, p. 19.
- If an active alarm is present, the alarm indicator button (Table 1, p. 8) appears in the upper left of the screen, as in Figure 7, p. 18. The icon on this button indicates the level of the most severe active alarm.

Reports

You can use the Tracer AdaptiView display to view a variety of reports and to create and edit a custom report. All reports contain live data that refreshes every 2–5 seconds.

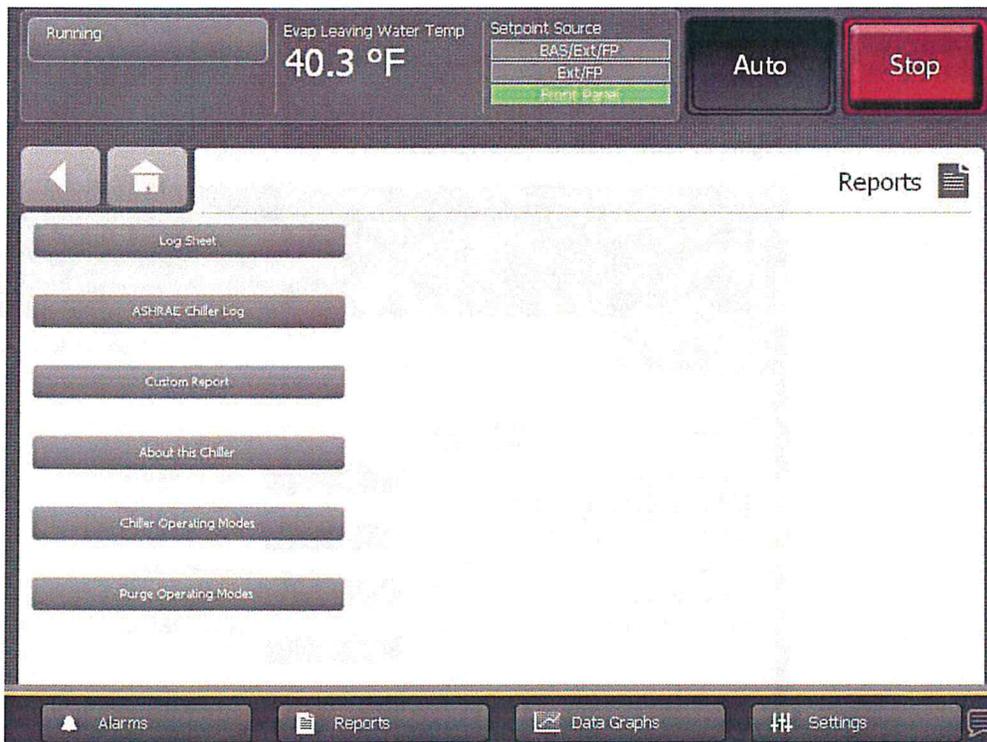
Viewing the Reports Screen

Touch the **Reports** button in the main menu area (Figure 1, p. 7) to view the Reports screen. The Reports screen contains the following buttons:

- Log Sheet
- ASHRAE Chiller Log
- Custom Report
- About This Chiller
- Chiller Operating Modes
- Purge Operating Modes

Each button links to the report named on the button.

Figure 8. Reports screen



Viewing the Log Sheet

On the Reports screen, touch **Log Sheet** to view the information that is itemized in “Log Sheet,” p. 67 for the CVHE, CVHF, and CVHG chillers, and in “Log Sheet,” p. 83 for the Duplex CDHF and CDHG chillers. The items included in the Log Sheet are those recommended by Trane. See current Trane service literature for more information.

Viewing the ASHRAE Chiller Log

On the Reports screen, touch **ASHRAE Chiller Log** to view the information that is itemized in “ASHRAE Chiller Log,” p. 69 for the CVHE, CVHF, and CVHG chillers, and in “ASHRAE Chiller Log,” p. 85 for the Duplex CDHF and CDHG chillers.

Creating and Viewing a Custom Report

You can create a custom report in which you specify the type and order of data that it contains. Items available to select for a custom report are grouped according to subsystem. (For CVHE, CVHF, and CVHG chillers, see “Items available to include in custom reports,” p. 71; for CDHF and CDHG chillers, see “Items available to include in custom reports,” p. 87.)

To create and view a custom report:

1. On the Reports screen, touch **Custom Report**. The Custom Report screen appears.
2. On the Custom Report screen, touch **Edit**. The Edit Custom Report screen appears (Figure 9, p. 22).

Figure 9. Edit Custom Report screen

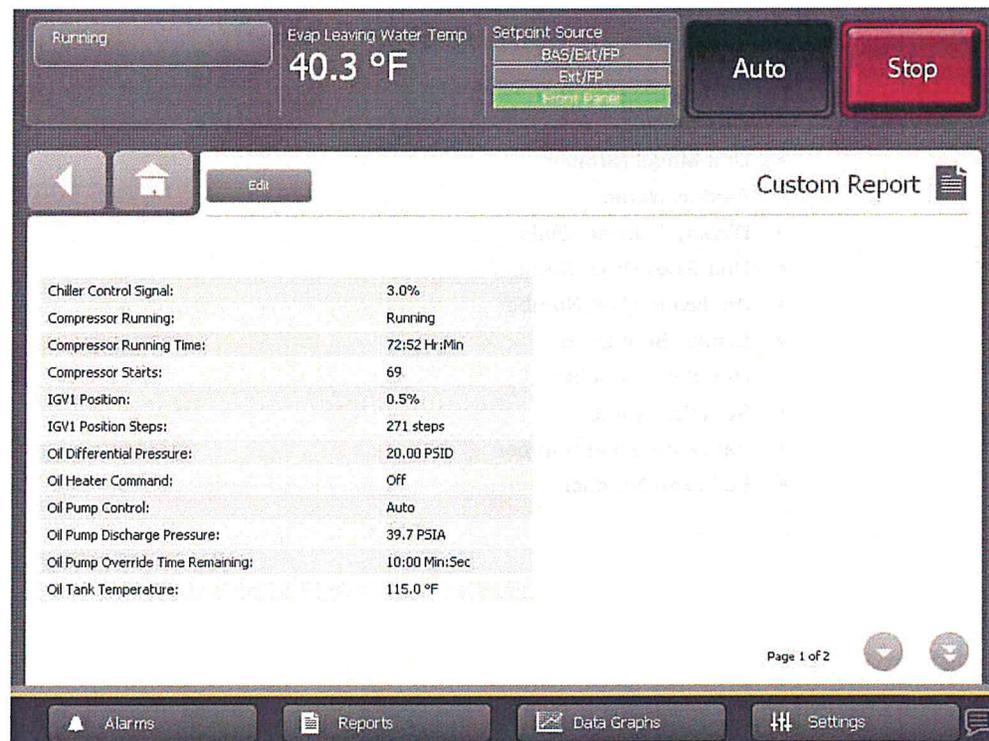


3. Touch the up/down arrows at the top of the left box on this screen to scroll through the items that are available to add to a custom report.
4. To set up a custom report by adding:
 - One item at a time, touch the item. It responds by changing to blue. Touch **Add** to move the selected item to the right box on the screen.
 - All of the items at once to the right box on the screen, touch **Add All**.

Note: You can organize your selections in any order by using the down arrows that appears in the right box, and by adding them one at a time in the order in which you want them to appear in your report.
5. To save and view your custom report, touch **Save**. The Custom Reports screen appears, containing the custom report you have just created (Figure 10, p. 23).

Note: A page number appears in the lower right corner of the screen. If a screen contains more than one page, up/down arrows also appear for viewing the other pages, as in Figure 10.

Figure 10. Custom Report screen



Editing a Custom Report

You can edit the custom report by adding, removing, or re-order data as follows:

1. On the Custom Report screen, touch **Edit**. The **Edit Custom Report** screen appears.
2. Add, remove, or re-order as follows:
 - To add an item to the custom report, touch it. It responds by changing to blue. You can use the arrows to scroll through the rest of the items that can be added to the custom report. Then touch **Add** to move the selected item to the box on the right side of the screen. To add all of the remaining items in the left box to the custom report, touch **Add All**.
 - To remove an item from the custom report, touch it. It responds by changing to blue. You can use the arrows to scroll through the rest of the items that can be removed from the custom report. Then touch **Remove** to move the selected item to the box on the left side of the screen.
 - To re-order items in the custom report, touch it. It responds by changing to blue. Use the arrows to change the order of a highlighted item.
3. To save and view your edited custom report, touch **Save**. The Custom Reports screen appears, containing the custom report you have just edited.

Viewing Unit Information (About This Chiller)

On the Reports screen, touch **About This Chiller** to view the following unit information:

- Unit Name
- Unit Model Number
- Product Name
- Display Software Build
- Unit Sales Order Number
- Application Part Number
- Display Boot Code
- Unit Serial Number
- Boot Part Number
- Hardware Serial Number
- Build Part Number

Viewing Chiller Operating Modes

On the Reports screen, touch **Chiller Operating Modes** to view the current operating status of the chiller in terms of the top-level operating mode and submodes.

Note: You can also access the Chiller Operating Modes screen from the chiller status button in the upper left corner of the screen.

CVHE, CVHF, and CVHG Chillers

Figure 11 shows an example of a Chiller Operating Modes screen for a CVHE, CVHF, or CVHG chiller.

Figure 11. Chiller Operating Modes screen for CVHE, CVHF, and CVHG chillers



CVHE, CVHF, and CVHG chillers operate in one of the top-level operating modes shown in Table 5. The table gives a description of the top-level modes and lists the submodes that correspond to each top-level mode.

Submodes are dependent on the top-level mode. Their appearance on the Chiller Operating Modes screen has the following characteristics:

- The newest submode appears at the top of the submode list.
- Submodes disappear when they no longer apply.
- The screen displays up to 6 submodes.
- If less than 6 submodes are active, the submode rows that do not apply are blank.

Reports

Table 5. Chiller top-level operating modes and corresponding submodes for CVHE, CVHF, and CVHG chillers

Top-level mode	Description	Corresponding submodes
Stopped	Chiller is inhibited from running and requires user action to go to Auto.	Local Stop
		Panic Stop
		Diagnostic Shutdown—Manual Reset
Run Inhibit	Unit is inhibited from running by building automation system (BAS), external control source (Ext), or Auto Reset diagnostic	Ice Building Is Complete
		Tracer Inhibit
		External Source Inhibit
		Diagnostic Shutdown—Auto Reset
Auto	Unit is determining if there is a need to run.	Waiting for Evaporator Water Flow
		Waiting for a Need to Cool
		Waiting for a Need to Heat
		Power Up Delay Inhibit (MIN:SEC) ^(a)
Waiting to Start	Unit is waiting for tasks required prior to compressor start to be completed.	Waiting For Condenser Water Flow
		Establishing Oil Pressure
		Pre-Lubrication Time (MIN:SEC) ^(a)
		Motor Temperature Inhibit: Motor Temperature/Inhibit Temperature
		Restart Time Inhibit (MIN:SEC) ^(a)
		High Vacuum Inhibit: Oil Sump Press/Inhibit Press
		Low Oil Temperature Inhibit: Oil Temperature/Inhibit Temperature
Waiting for Starter To Start (MIN:SEC) ^(a)		
Starting Compressor	Unit is starting compressor.	No submode is shown
Running	Compressor is running with no limits in effect.	No submode is shown
		Hot Water Control
		Surge
		Base Loaded
		Hot Gas Bypass
		Ice Building
		Ice To Normal Transition
		Current Control Soft Loading

Table 5. Chiller top-level operating modes and corresponding submodes for CVHE, CVHF, and CVHG chillers (continued)

Top-level mode	Description	Corresponding submodes
Running—Limit	Compressor is running with limits in effect.	Current Limit
		Phase Unbalance Limit
		Condenser Pressure Limit
		Evaporator Temperature Limit
		Minimum Capacity Limit
		Maximum Capacity Limit
Free Cooling	Unit is in Free Cooling mode and will not run the compressor.	Opening Free Cooling Valves
		Closing Free Cooling Limit
Preparing to Shutdown	Unit is closing inlet guide vanes prior to compressor shutdown.	Closing IGV (IGV Position %) ^(b)
Shutting Down	Compressor has been stopped and unit is performing shutdown tasks.	Post-Lubrication Time (MIN:SEC) ^(a)
		Evaporator Pump Off Delay (MIN:SEC) ^(a)
		Condenser Pump Off Delay (MIN:SEC) ^(a)
		Satisfied Need to Minimum Capacity Timer (will appear for only 10 seconds)

(a) "MIN:SEC" refers to a count-down timer that appears on the screen to indicate how long the submode will remain active.

(b) "IGV Position %" refers to a value that indicates the position of the inlet guide vane (IGV).

Duplex CDHF and CDHG Chillers

Figure 12 shows an example of a Chiller Operating Modes screen for a Duplex CDHF or CDHG chiller.

Figure 12. Chiller Operating Modes screen for Duplex CDHF and CDHG chillers



For Duplex CDHF or CDHG chillers, the Chiller Operating Modes screen shows top-level modes and submodes for the chiller (Table 6, p. 29) and for the circuits (Table 7, p. 30). Each table shows top-level modes in the left column, a description in the middle column, and the corresponding submodes in the right column.

Submodes are dependent on the top-level mode. They appear on the Chiller Operating Modes screen with the following characteristics:

- The newest submode appears at the top of the submode list.
- Submodes disappear when they no longer apply.
- The screen displays up to 4 submodes.
- If less than 4 submodes are active, the submode rows that do not apply are blank.

Table 6. Chiller top-level operating modes and corresponding submodes for CDHF and CDHG chillers

Top-level mode	Description	Corresponding submodes
Stopped	The chiller is not running either circuit and cannot run without intervention.	Local Stop
		Panic Stop
		Diagnostic Shutdown—Manual Reset
Run Inhibit	The chiller is currently being inhibited from starting (and running), but may be allowed to start if the inhibiting or diagnostic condition is cleared.	Ice Building Is Complete
		Start Inhibited By BAS
		Waiting for BAS Communication
		External Source Inhibit
		Diagnostic Shutdown—Auto Reset
Auto	The chiller is not currently running but can be expected to start at any moment given that the proper conditions and interlocks are satisfied.	No Circuits Available
		Waiting for Evaporator Water Flow
		Waiting for a Need to Cool
		Waiting for a Need to Heat
Power Up Display Inhibit (MIN:SEC) ^(a)		
Waiting to Start	The chiller is going through the necessary steps to allow the lead circuit to start.	The chiller will wait up to 4 minutes and 15 seconds in this mode for condenser water flow to be established by means of the flow switch hardwired input.
Running	At least one circuit on the chiller is currently running.	Hot Water Control
		Base Loaded
		Ice Building
		Ice To Normal Transition (MIN:SEC) ^(a)
		Current Control Softloading
		Capacity Control Softloading
Minimum Capacity Limit		
Running—Limit	At least one circuit on the chiller is currently running, but the operation of the chiller as a whole is being actively limited by the controls. The submodes that apply the Running top modes may be displayed along with the following limit-specific modes.	All of the chiller-level Running submodes apply. There are no specific submodes associated with Running—Limit.
Shutting Down	The chiller is still running, but shutdown is imminent. The chiller is going through a compressor run-unload.	Evaporator Pump Off Delay (MIN:SEC) ^(a)
		Condenser Pump Off Delay (MIN:SEC) ^(a)
		Satisfied Need to Cool
		Satisfied Need to Heat
		Satisfied Need to Minimum Capacity Timer (will display for only 10 seconds)

Reports

Table 6. Chiller top-level operating modes and corresponding submodes for CDHF and CDHG chillers (continued)

Top-level mode	Description	Corresponding submodes
Miscellaneous	These submodes may appear with most of the top-level chiller modes.	Evaporator Pump Off Override
		Condenser Pump Override
		Manual Capacity Override
		IGV Manual Override ^(b)
		Software Service Lock

(a) "MIN:SEC" refers to a count-down timer that appears on the screen to indicate how long the submode will remain active.

(b) "IGV Position %" refers to a value that indicates the position of the inlet guide vane (IGV).

Table 7. Circuit-level operating modes and corresponding submodes for CDHF and CDHG chillers

Top-level mode	Description	Corresponding submodes
Stopped	The circuit is not running, and cannot run without intervention.	Diagnostic Shutdown—Manual Reset
		Front Panel Circuit Lockout
Run Inhibit	The circuit is currently being inhibited from starting (and running), but may be allowed to start if the inhibiting or diagnostic condition is cleared.	Diagnostic Shutdown—Auto Reset
		External Circuit Lockout
Auto	The circuit is currently not running but is expected to start at any moment if the proper conditions are satisfied.	No Circuit Submodes
Waiting To Start	The chiller is going through the necessary steps to allow the lead circuit to start.	Waiting for Low Oil Differential Pressure
		Establishing Oil Pressure
		Pre-Lubrication Time (MIN:SEC) ^(a)
		Motor Temperature Inhibit: Motor Temperature/Inhibit Temperature
		Restart Time Inhibit (MIN:SEC) ^(a)
		High Vacuum Inhibit: Oil Sump Press/Inhibit Press
		Low Oil Temperature Inhibit: Oil Temperature/Inhibit Temperature
		Waiting for Starter To Start (MIN:SEC) ^(a)
		Waiting for IGV Positioning to Complete ^(b)
Waiting for Starter Interlock		
Starting Compressor	The circuit is going through the necessary steps to allow the compressor on that circuit to start.	No submodes
Running	The compressor on the circuit is currently running.	Surge
		Hot Gas Bypass
		Current Limit
		Phase Unbalance Limit
		Evaporator Temperature Limit
		High Compressor Discharge Temp Limit

Table 7. Circuit-level operating modes and corresponding submodes for CDHF and CDHG chillers (continued)

Top-level mode	Description	Corresponding submodes
Running—Limit	Compressor is running with limits in effect.	Current Limit
		Phase Unbalance Limit
		Condenser Pressure Limit
		Evaporator Temperature Limit
		High Compressor Discharge Temp Limit
Preparing to Shutdown	The circuit is preparing to de-energize the compressor.	Closing IGV ^(b)
Shutting Down	The chiller is going through the necessary steps after de-energizing the compressor.	Post-Lubrication Time (MIN:SEC) ^(a)
Miscellaneous	These submodes may appear with most of the top-level chiller modes.	Overdrive IGV Closed ^(b)
		Oil Pump Override

(a) "MIN:SEC" refers to a count-down timer that appears on the screen to indicate how long the submode will remain active.

(b) "IGV Position %" refers to a value that indicates the position of the inlet guide vane (IGV).

Viewing Purge Operating Modes

On the Reports screen, touch **Purge Operating Modes** to view the current operating status of the purge system in terms of the top-level operating mode and submodes.

Note: For Duplex CDHF or CDHG chillers, the operating status of purge system is shown in terms of the two circuits.

The purge system operates in one of four top-level operating modes:

- Stop
- On
- Auto
- Adaptive

Submodes are dependent on the top-level mode. Their appearance on the Purge Operating Modes screen has the following characteristics:

- The newest submode appears at the top of the submode list.
- Submodes disappear when they no longer apply.
- The screen displays up to 6 submodes.
- If less than 6 submodes are active, the submode rows that do not apply are blank.

For detailed information about purge operating modes and submodes, see the *EarthWise™ Purge System with Tracer AdaptiView™ Control Operation and Maintenance Guide* (PRGD-SVX01A-EN).



Data Graphs

You can use the Tracer AdaptiView display to view a variety of default data graphs and to create up to six custom data graphs with up to eight data points per graph. The data sample rate is 30 seconds, and the data storage duration is 48 hours. These rates cannot be adjusted.

Viewing the Data Graphs Screen

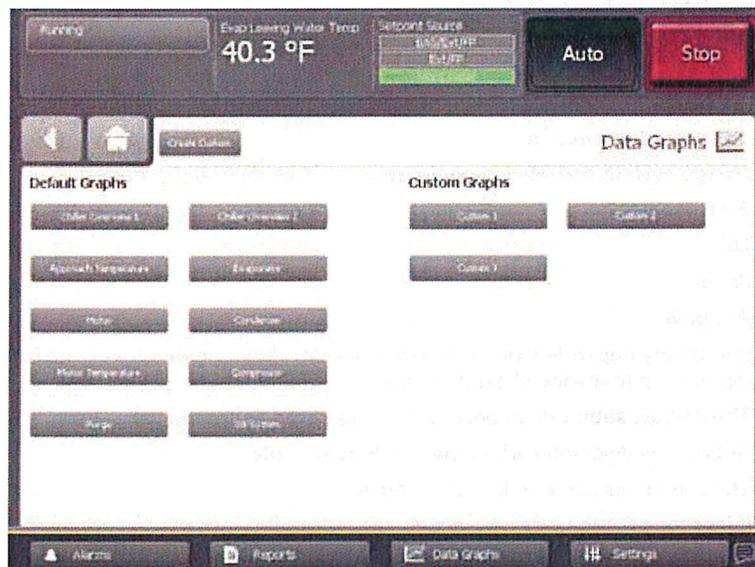
Touch the **Data Graphs** button in the main menu area (Figure 1, p. 7) to view the Data Graphs screen (Figure 13). Each button on the screen links to a data graph.

The buttons under the Default Graphs heading for CVHE, CVHF, and CVHG chillers are:

- Chiller Overview 1
- Chiller Overview 2
- Approach Temperature
- Evaporator
- Motor
- Condenser
- Motor Temperature
- Compressor
- Purge
- Oil System

When you create custom graphs, they appear under the Custom Graphs heading with names such as "Custom 1" and "Custom 2," as shown in Figure 13.

Figure 13. Data Graphs screen



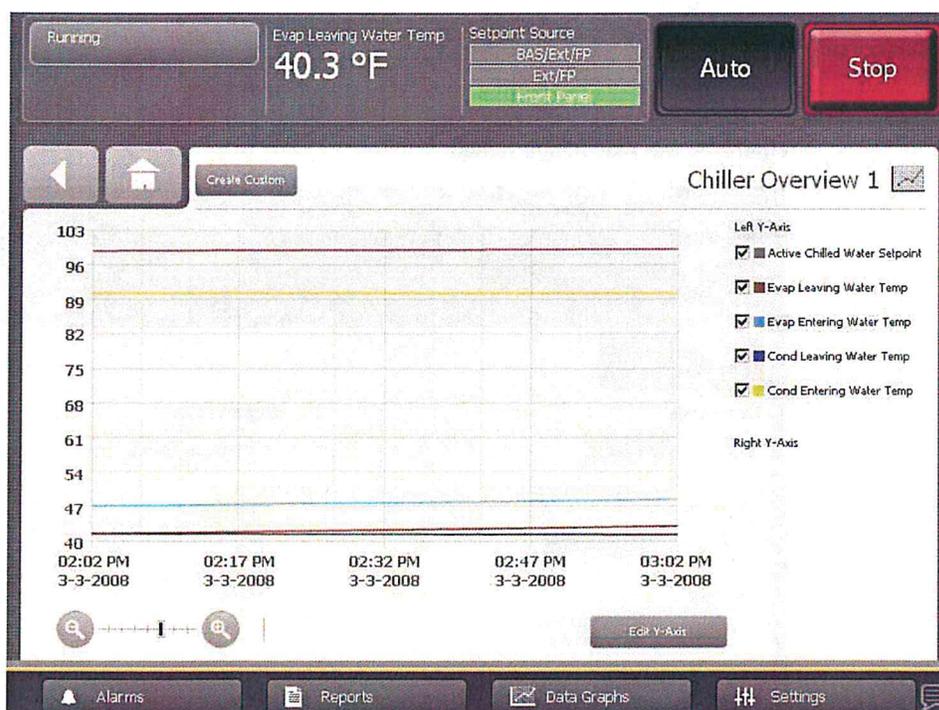
The buttons under the Default Graphs heading for Duplex CDHF and CDHG chillers are:

- | Chiller | Circuit 1 | Circuit 2 |
|----------------------|------------------------|------------------------|
| • Chiller Overview 1 | • Oil System | • Oil System |
| • Chiller Overview 2 | • Approach Temperature | • Approach Temperature |
| • Evaporator | • Compressor | • Compressor |
| • Condenser | • Motor | • Motor |
| | • Motor Temperature | • Motor Temperature |
| | • Purge | • Purge |

Viewing Data Graphs

On the Data Graphs screen, touch any of the buttons to view a live graph (Figure 14 shows Chiller Overview 1 as an example). For every graph, the X-axis shows time. The Y-axis presents data points specific to each graph. The data points are listed in "Data Graphs," p. 32.

Figure 14. Example of Data Graph (Chiller Overview 1 shown)



Changing the Scales on Data Graphs

You can change the scales of the X-axis and the Y-axes on data graphs.

Changing the scale of the X-axis

The X-axis scale defaults to the most recent one hour with 15 minutes in between the time labels that appear across the bottom of the graph. You can change the scale from the last 12 minutes to the last 48 hours and increments in between, as follows:

- 12-minute graph with 3 minutes between time labels
- 40-minute graph with 10 minutes between time labels
- 60-minute graph with 15 minutes between time labels
- 4-hour graph with 1 hour between time labels
- 8-hour graph with 2 hours between time labels
- 1-day graph with 6 hours between time labels
- 2-day graph with 12 hours between time labels

To change the scale, touch the plus or minus button in the magnifying glass in the lower left corner of a data graph that you want to edit (see Figure 14, p. 33 as an example). The slider scale moves to the right or left as you touch either the plus or minus button. The time scale for the X-axis changes in response.

Changing the scale of the Y-axes

The Y-axes scales have a default range that varies for each data graph. You can change the range for each graph.

1. Touch the **Edit Y-Axis** button at the bottom of a data graph that you want to edit (see Figure 14 as an example). The Set Axis Range screen appears (Figure 15). The screen shows the minimum and maximum values for that particular graph.

Figure 15. Set Axis Range screen



2. Touch the **Manually set values** button under either the Left Y-Axis or Right Y-Axis heading. **Enter number** buttons appear to the right of the minimum and maximum values.
3. Touch the **Enter number** button for the value you want to change. A keypad appears on the screen.
4. Touch the appropriate numbers to change the current value. The new value appears above the keypad.
5. Touch the **Enter** button. The graph you were previously viewing appears with changed maximum and/or minimum values.
6. Touch **Save**. The data graph appears with changed Y-axes scales.

Creating Custom Data Graphs

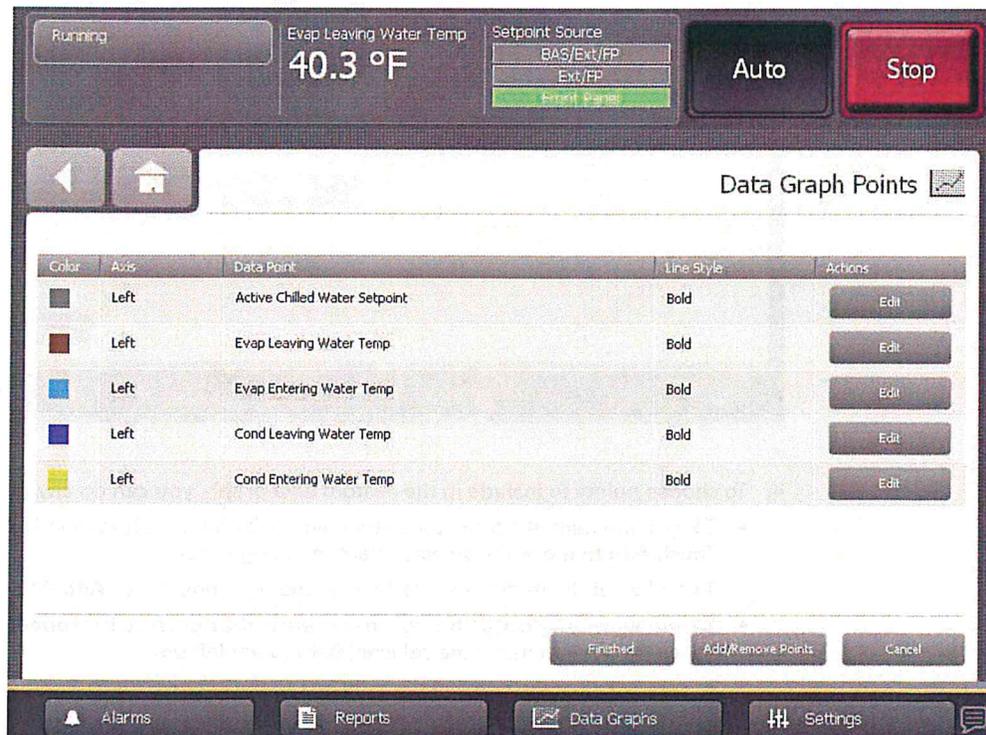
You can create a custom data graph in two ways:

- By starting with a default data graph
- By starting from a blank screen, with no previously defined data graph points

Creating a custom data graph from a default data graph

1. Touch the **Create Custom** button at the top left of any default data graph screen (see Figure 14, p. 33, for example). The Data Graph Points screen appears (Figure 16).

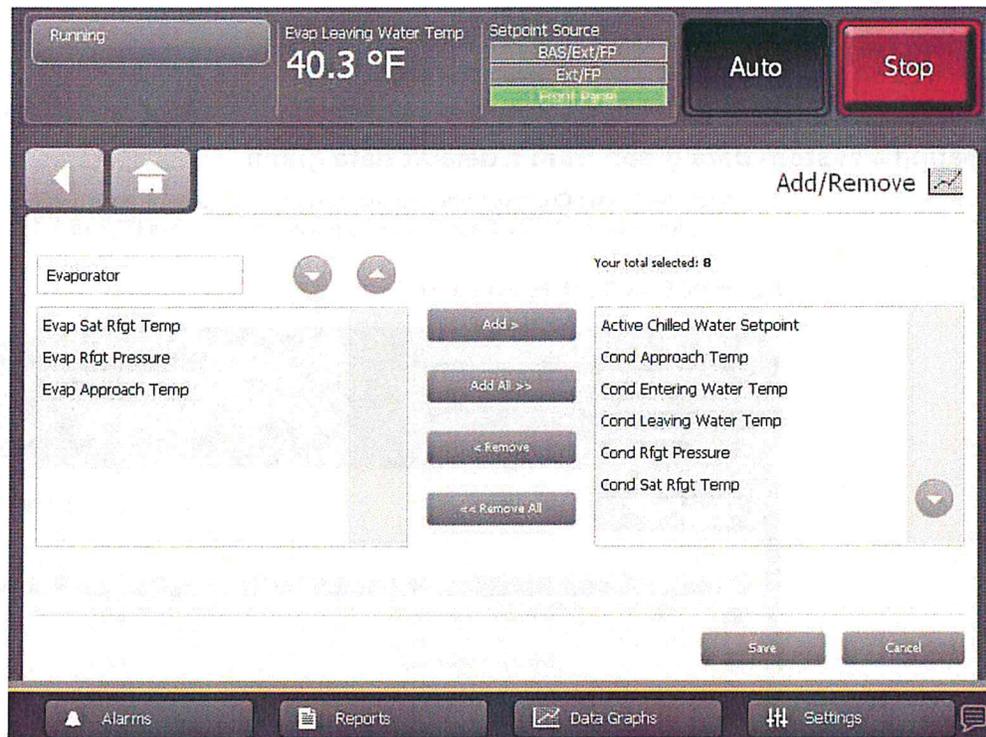
Figure 16. Data Graph Points screen



2. Touch the **Add/Remove Data Points** button at the bottom of the screen. The Add/Remove screen appears (Figure 17, p. 36), pre-populated with data points from the default data graph you chose.

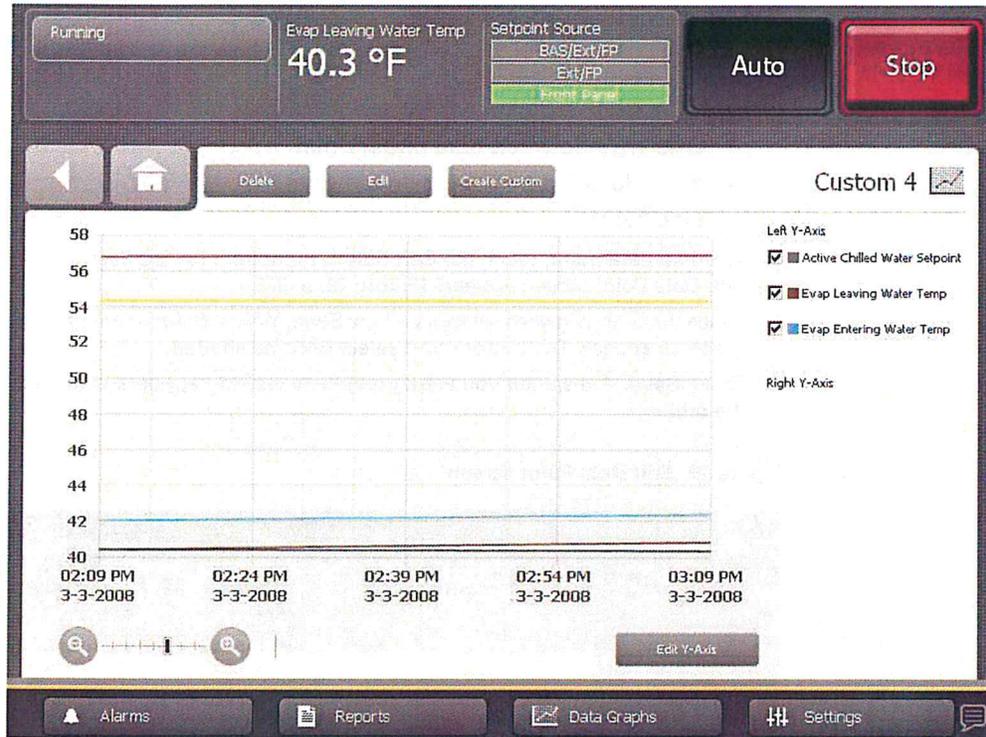
Note: When you save the graph, a new custom graph is created; the default data graph is not overwritten.

3. Touch the up/down arrows at the top of the left box on the Add/Remove screen to scroll through a list of chiller components. The list of items in the box just below the up/down arrows changes to correspond to the component choice. (For reference, these items are listed in "Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers," p. 64 and "Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers," p. 79).

Figure 17. Add/Remove screen example


4. To choose points to include in the custom data graph, you can do any of the following:
 - To add one item at a time, touch the item in the left box. It responds by changing to blue. Touch **Add** to move the selected item to the right box.
 - To add all of the items in the left box to the right box, touch **Add All**.
 - To remove one item at a time, touch the item in the right box. It responds by changing to blue. Touch **Remove** to move the selected item to the left box.
 - To remove all of the items in the right box to the left box, touch **Remove All**. A confirmation screen appears, asking you to verify your request.
5. When you are finished choosing data points, touch **Save**. The Data Graph Points screen appears. Touch the **Finished** button to view the custom data graph you have just created (Figure 18, p. 37).

Note: To edit the appearance of data points in the graph, see “Editing Custom Data Graphs,” p. 38.

Figure 18. Custom data graph example


Creating a custom data graph with no previously defined data graph points

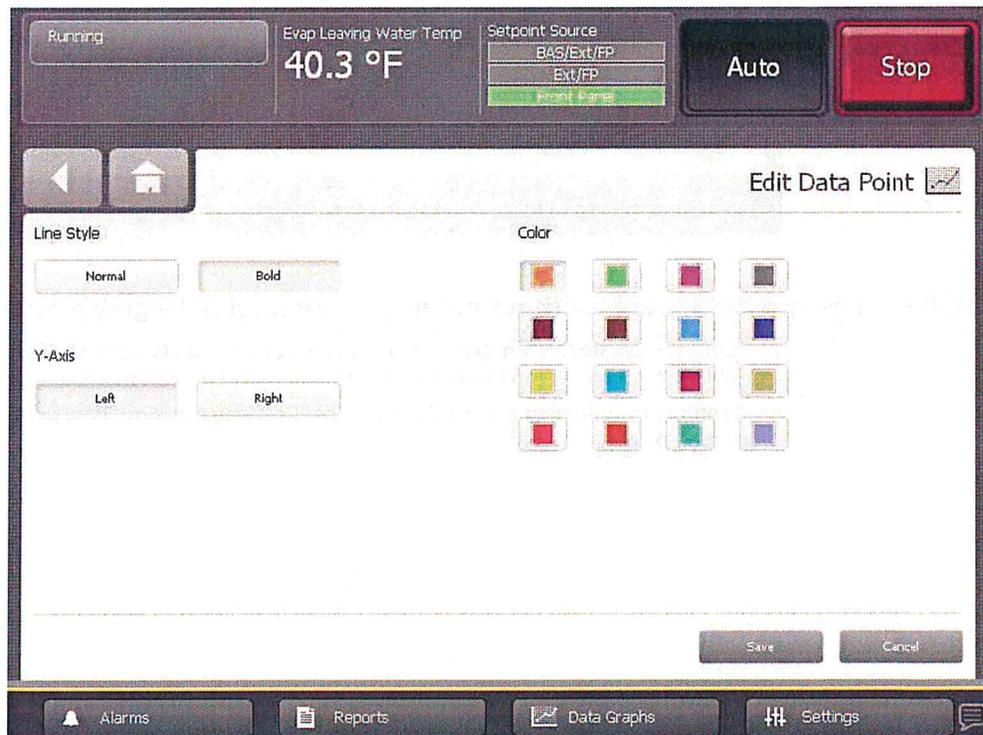
1. Touch the **Create Custom** button at the top left of the Data Graphs screen (Figure 13, p. 32). The Add/Remove screen appears (see Figure 17, p. 36), but with no data on the screen.
2. Continue by following steps 3 through 5 of "Creating a custom data graph from a default data graph," p. 35.

Editing Custom Data Graphs

You can edit custom data graphs by:

- Changing the scales of the X-axis and Y-axes (follow the procedures in “Changing the Scales on Data Graphs,” p. 33).
 - Changing the:
 - Line style between bold and normal
 - Y-axis location between left and right
 - Line color
1. To edit a data point, touch the **Edit** button in the row for the data point you want to edit. The Edit Data Point screen appears (Figure 19, p. 38).
 2. Touch the button in each category—Line Style, Y-Axis, Color—that represents how you want the graph to appear. The buttons you select become shaded.
 3. Touch **Save**. The screen you were previously viewing appears with your changes reflected in the table.

Figure 19. Edit Data Point screen



Deleting a Custom Data Graph

Touch the **Delete** button at the top of a custom graph screen to delete the custom graph.

Equipment Settings

You can use the Tracer AdaptiView display to monitor and change a variety of equipment settings.

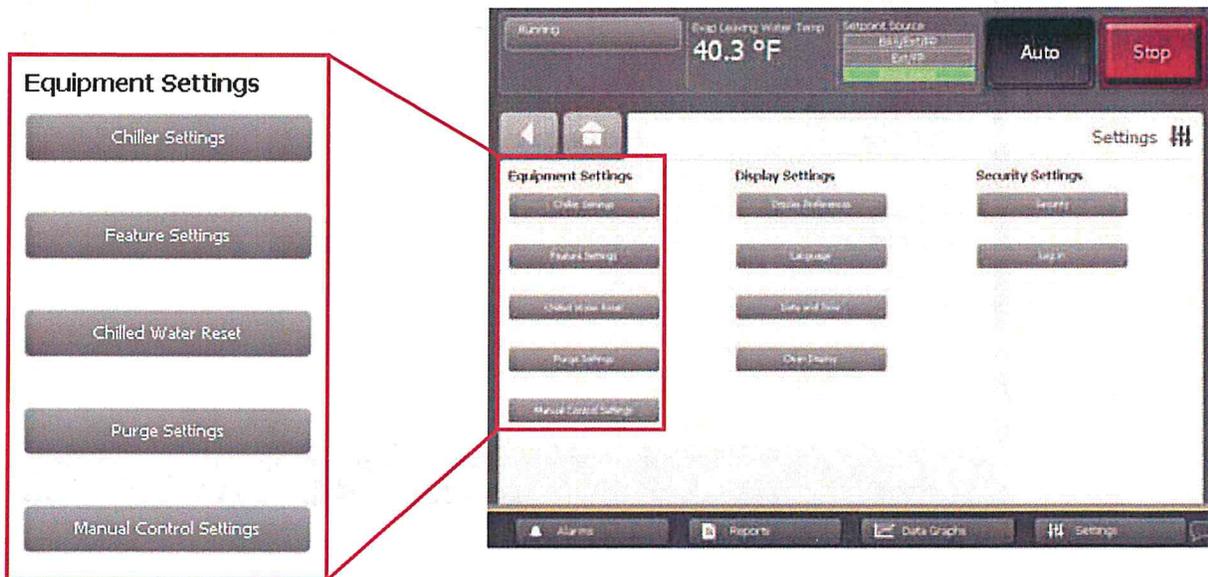
Viewing the Settings Screen

Touch the **Settings** button in the main menu area (see “Main Menu Area,” p. 15) to view the Settings screen. *Equipment Settings* identifies a column of buttons located on the screen (see the outlined column in Figure 20). The buttons are:

- Chiller Settings
- Feature Settings
- Chiller Water Reset
- Purge Settings
- Manual Control Settings

Each of these buttons provide access to a screen that contains additional buttons related to each topic. This section provides detailed information about these screens.

Figure 20. Settings screen with the Equipment Settings column highlighted

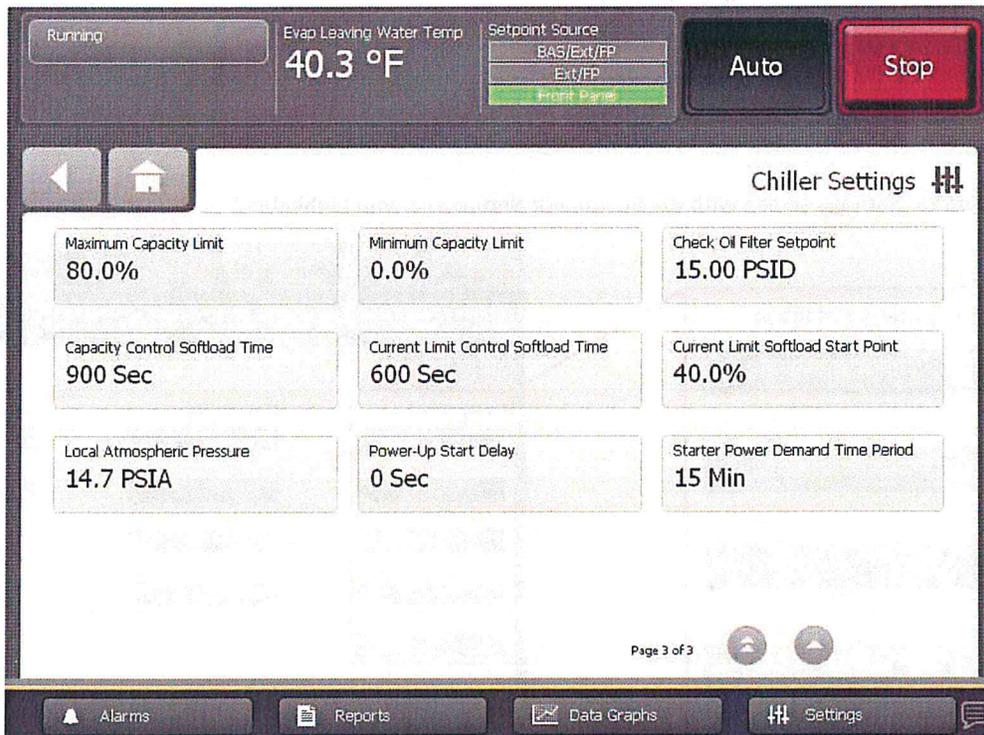


Viewing and Changing Equipment Settings

Each button in the Equipment Settings column on the Settings screen takes you to a menu screen that contains a group of buttons. Each button displays the name of a setting and its current value (Figure 21). Touch any button to view a screen where you can change the setting for the feature shown on the button.

Note: A page number appears in the lower right corner of the screen. If a screen contains more than one page, up/down arrows also appear for viewing the other pages, as in Figure 21.

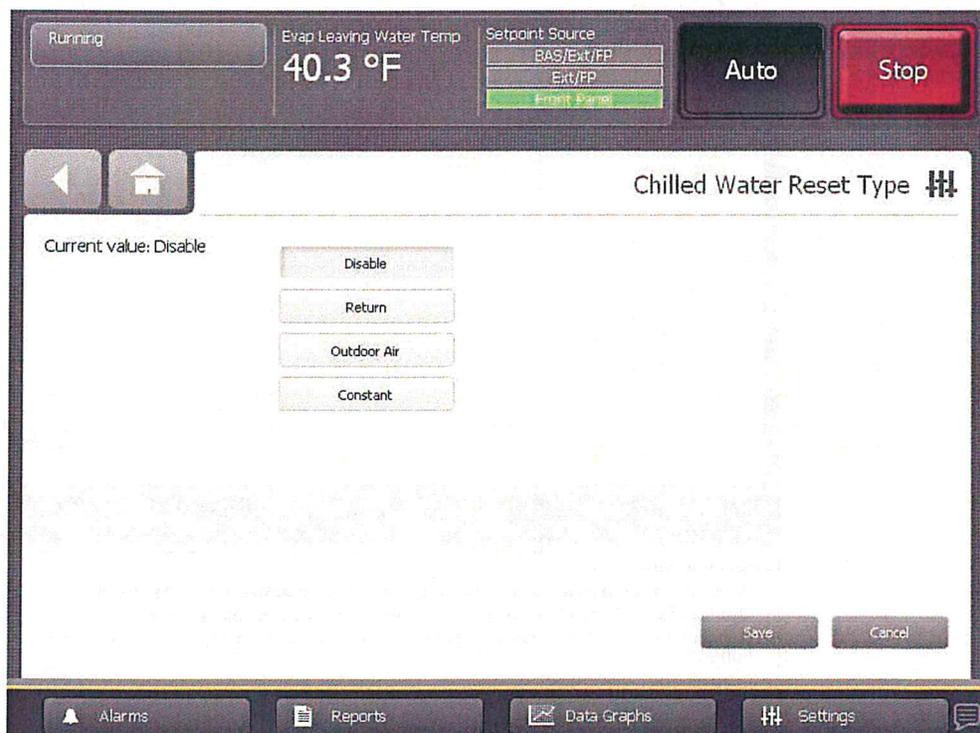
Figure 21. Example equipment settings screen (Chiller Settings shown)



To change an equipment setting, follow this procedure:

1. Touch one of the buttons in the Equipment Settings column on the Settings screen, such as Chiller Settings. The corresponding screen appears (in this case, the Chiller Settings screen).
2. Touch the button that shows the equipment setting you want to change. A screen that allows you to change the equipment setting appears. There are two types of these screens:
 - For screens with button selections (Figure 22), touch the button that represents the setting you want. The button becomes shaded, and a **Save** button appears at the bottom of the screen.

Figure 22. Example equipment settings screen with buttons for changing setting



- For screens with numerical keypads (Figure 23), touch the appropriate numbers to change the current value. The new value appears above the keypad.

Figure 23. Example equipment settings screen with keypad for changing setting



Keypad features:

- When you enter a new number, the value in the **New value** field is deleted and replaced with the new entry.
- The backspace (arrow) key deletes the characters you previously entered.
- If the keypad is used to enter a setpoint that is out of range, an error dialog will appear when you touch the **Save** button.
- Keypads that allow negative numbers have positive and negative number (+/-) keys.

3. Touch **Save** to complete the change. The current value is updated in the upper left side of the screen, demonstrating that the change has been communicated to the Tracer UC800 controller. The screen you were previously viewing appears.

Note: Manual Control Settings screens have **Apply** buttons in addition to **Save** buttons. See an example in "Manual Control Settings," p. 49. Touching **Apply** is the same as touching **Save**, except that you remain at the current screen after the change is communicated to the Tracer UC800 controller (Figure 26, p. 50).

Chiller Settings

Table 8 lists the settings that are available as buttons on the Chiller Settings menu screen, along with their corresponding setting options. The chiller configuration determines which of the settings appear.

Table 8. Chiller Settings menu screen: Buttons and available setting options

Buttons	Available setting options
Setpoint Source	<ul style="list-style-type: none"> • BAS/Ext/FP • Ext/FP • Front Panel
Front Panel Control Type	<ul style="list-style-type: none"> • Chilled Water • Hot Water
Front Panel Chilled Water Setpoint ^(a)	Valid numerical range appears on screen.
Front Panel Hot Water Setpoint ^(a)	Valid numerical range appears on screen.
Front Panel Ice Building Command	<ul style="list-style-type: none"> • Auto • On
Front Panel Ice Termination Setpoint ^(a)	Valid numerical range appears on screen.
Ice to Normal Cooling Timer Setpoint	Valid numerical range appears on screen.
Front Panel Current Limit Setpoint ^(a)	Valid numerical range appears on screen.
Front Panel Free Cooling Command Note: CVHE, CVHF, and CVHG chillers only	<ul style="list-style-type: none"> • Auto • On
Front Panel Base Loading Setpoint ^(a)	Valid numerical range appears on screen.
Front Panel Base Load Command	<ul style="list-style-type: none"> • Auto • On
Differential to Start	Valid numerical range appears on screen.
Differential to Stop	Valid numerical range appears on screen.
Evaporator Leaving Water Temperature Cutout	Valid numerical range appears on screen.
Low Refrigerant Temperature Cutout	Valid numerical range appears on screen.
Condenser Water Pump Off Delay	Valid numerical range appears on screen.
Evaporator Water Pump Off Delay	Valid numerical range appears on screen.
Evaporator Low Water Flow Warning Setpoint	Valid numerical range appears on screen.
Maximum Capacity Limit	Valid numerical range appears on screen.
Minimum Capacity Limit	Valid numerical range appears on screen.
Check Oil Filter Setpoint Notes: Ckt1 and Ckt2 for Duplex CDHF and CDHG chillers	Valid numerical range appears on screen.
Capacity Control Softload Time	Valid numerical range appears on screen.
Current Limit Control Softload Time	Valid numerical range appears on screen.
Current Limit Control Softload Start Point	Valid numerical range appears on screen.
Local Atmospheric Pressure	Valid numerical range appears on screen.
Power-Up Start Delay Time	Valid numerical range appears on screen.
Starter Power Demand Time Period	Valid numerical range appears on screen.



Equipment Settings

Table 8. Chiller Settings menu screen: Buttons and available setting options (continued)

Buttons	Available setting options
Staging On Boundary Notes: Duplex CDHF and CDHG chillers only	Valid numerical range appears on screen.
Staging Off Boundary Notes: Duplex CDHF and CDHG chillers only	Valid numerical range appears on screen.

(a) This is an arbitrated setpoint. For an complete explanation of arbitrated setpoints, see "Setpoint Sources," p. 44.

Setpoint Sources

Some setpoints can be controlled from more than one source. These are referred to as *arbitrated setpoints* and are identified by footnote (a) in Table 8. Arbitrated setpoints can be:

- Communicated from a building automation system (BAS)—Refers to a Trane or other BAS that can communicate with chiller controls over a network.
- Set by an external control source (Ext)—Refers to inputs that are hard-wired directly to local chiller controls, carrying low-voltage binary (On/Off) or analog (0–10 Vdc, 4–20 mA) signals.
- Set at the front panel (FP)—Refers to inputs that are entered by an operator using the Tracer AdaptiView display or by a technician using the Tracer TU service tool.

Setpoint Source Arbitration

The Tracer UC800 uses a process referred to as *setpoint source arbitration* to prioritize the selection of the setpoint source. See Table 9 for an explanation of how this process works.

Table 9. Setpoint source choices and corresponding arbitration

Priority	BAS/Ext/FP	Ext/FP	Front Panel
First	Setpoint from the BAS is used.	Setpoint from a external control source is used.	Setpoint from the front panel is used. Note: Any setpoint from a BAS or external control source is ignored.
Second	If no BAS setpoint is available (for example, BAS communication has never been established), a setpoint from an external control source is used.	If no externally controlled setpoint is available, a setpoint from the front panel is used. Note: Any setpoint from a BAS is ignored.	None
Third	If no BAS nor external setpoint is available (for example, BAS communication has never been established), a setpoint from the front panel is used.	None	None

1. For service or troubleshooting, it may be helpful to set the setpoint source to front panel to isolate the chiller from other control sources.
2. If BAS communication was established and then lost, in most instances the BAS values remain and can be used by the chiller controller.

Changing the Setpoint Source

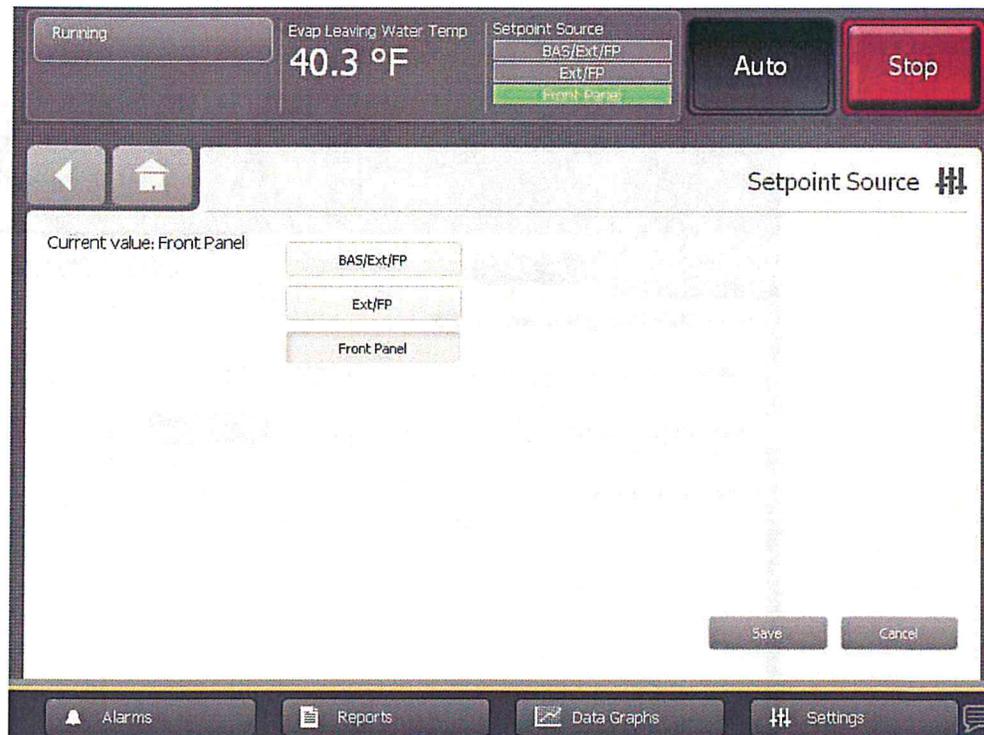
There are three ways to access the Setpoint Source screen. To change the setpoint source, follow one of these procedures:

Changing the setpoint source using the Setpoint Source button in the chiller status area

1. Touch the **Setpoint Source** button in the chiller status area (Figure 1, p. 7).
The Setpoint Source screen appears (Figure 24).
2. Touch the appropriate source button on the Setpoint Source screen.
3. Touch **Save** to complete the change.

Note: The change applies to all arbitrated setpoints.

Figure 24. Setpoint Source screen



Changing the setpoint source from the Setpoint Source button on the Chiller Settings screen

1. Touch the **Settings** button in the main menu area (Figure 1, p. 7). The Settings screen appears.
2. From the Settings screen, touch the **Chiller Settings** button. The Chiller Settings screen appears.
3. From the Chiller Settings screen, touch the button that is labeled "Setpoint Source" and displays the current source. The Setpoint Source screen appears (Figure 24).

4. Touch the button the appropriate source button on the Setpoint Source screen.
5. Touch **Save** to complete the change.

Note: The change applies to all arbitrated setpoints.

Changing the setpoint source from an arbitrated setpoint screen

1. Touch the **Settings** button in the main menu area (Figure 1, p. 7). The Settings screen appears.
2. From the Settings screen, touch the **Chiller Settings** button. The Chiller Settings screen appears.
3. From the Chiller Settings screen, touch an arbitrated setpoint. The setpoint screen for that specific arbitrated setpoint appears (see Figure 25 for an example).
4. On the arbitrated setpoint screen, touch the Setpoint Source button. The Setpoint Source Screen appears (Figure 24).
5. Touch the button the appropriate source button on the Setpoint Source screen.
6. Touch **Save** to complete the change.

Note: The change applies to all arbitrated setpoints.

Figure 25. Changing the setpoint source from an arbitrated setpoint screen



Feature Settings

Table 10 lists the settings that are available as buttons on the Feature Settings menu screen, along with their corresponding setting options. The chiller configuration determines which of the settings appear.

Table 10. Feature Settings menu screen: Buttons and available setting options

Feature	Available setting options
External Chilled Water Setpoint	<ul style="list-style-type: none"> • Enable • Disable
External Current Limit Setpoint	<ul style="list-style-type: none"> • Enable • Disable
Ice Building	<ul style="list-style-type: none"> • Enable • Disable
Staging Sequence Notes: Duplex CDHF and CDHG chillers only	<ul style="list-style-type: none"> • Balanced • Circuit 1 Lead • Circuit 2 Lead • Combined
Hot Gas Bypass Note: CVHE, CVHF, and CVHG chillers only	<ul style="list-style-type: none"> • Enable • Disable
Hot Gas Bypass Maximum Timer Note: CVHE, CVHF, and CVHG chillers only	<ul style="list-style-type: none"> • Enable • Disable
Minimum Capacity Timer	<ul style="list-style-type: none"> • Enable • Disable
Security	<ul style="list-style-type: none"> • Enable • Disable
LCI-C Diagnostic Encoding	<ul style="list-style-type: none"> • Text • Code
Ext Base Loading Setpoint Note: CVHE, CVHF, and CVHG chillers only	<ul style="list-style-type: none"> • Enable • Disable
Check Oil Filter Diagnostic	<ul style="list-style-type: none"> • Enable • Disable

Chilled Water Reset

Table 11 lists the settings that are available as buttons on the Chilled Water Reset menu screen, along with their corresponding setting options. The chiller configuration determines which of the settings appear.

Table 11. Chilled Water Reset menu screen: Buttons and available setting options

Buttons	Available setting options
Chilled Water Reset Type	<ul style="list-style-type: none"> • Disable • Return • Outdoor Air • Constant
Return Reset Ratio	Valid numerical range appears on screen.
Return Start Reset	Valid numerical range appears on screen.

Equipment Settings

Table 11. Chilled Water Reset menu screen: Buttons and available setting options (continued)

Buttons	Available setting options
Return Maximum Reset	Valid numerical range appears on screen.
Outdoor Reset Ratio	Valid numerical range appears on screen.
Outdoor Start Reset	Valid numerical range appears on screen.
Outdoor Maximum Reset	Valid numerical range appears on screen.

Purge Settings

Table 12 lists the settings that are available as buttons on the Purge Settings menu screen, along with their corresponding setting options. The chiller configuration determines which of the settings appear.

Table 12. Purge Settings menu screen: Buttons and available setting options

Buttons	Available setting options
Purge Operating Mode Notes: Ckt1 and Ckt2 for Duplex CDHF and CDHG chillers	<ul style="list-style-type: none"> • Stop • Auto • Adaptive • On
Daily Pumpout Limit Notes: Ckt1 and Ckt2 for Duplex CDHF and CDHG chillers	Valid numerical range appears on screen.
Disable Daily Pumpout Limit Notes: Ckt1 and Ckt2 for Duplex CDHF and CDHG chillers	Valid numerical range appears on screen.
Purge Liquid Temperature Inhibit Notes: Ckt1 and Ckt2 for Duplex CDHF and CDHG chillers	<ul style="list-style-type: none"> • Enable • Disable
Purge Liquid Temperature Limit Notes: Ckt1 and Ckt2 for Duplex CDHF and CDHG chillers	Valid numerical range appears on screen.

Manual Control Settings

Table 13, p. 49, lists the settings that are available as buttons on the Manual Control Settings menu screen, along with their corresponding setting options. The chiller configuration determines which of the settings appear.

Table 13. Manual Control settings menu screen: Buttons, available setting options, and status points

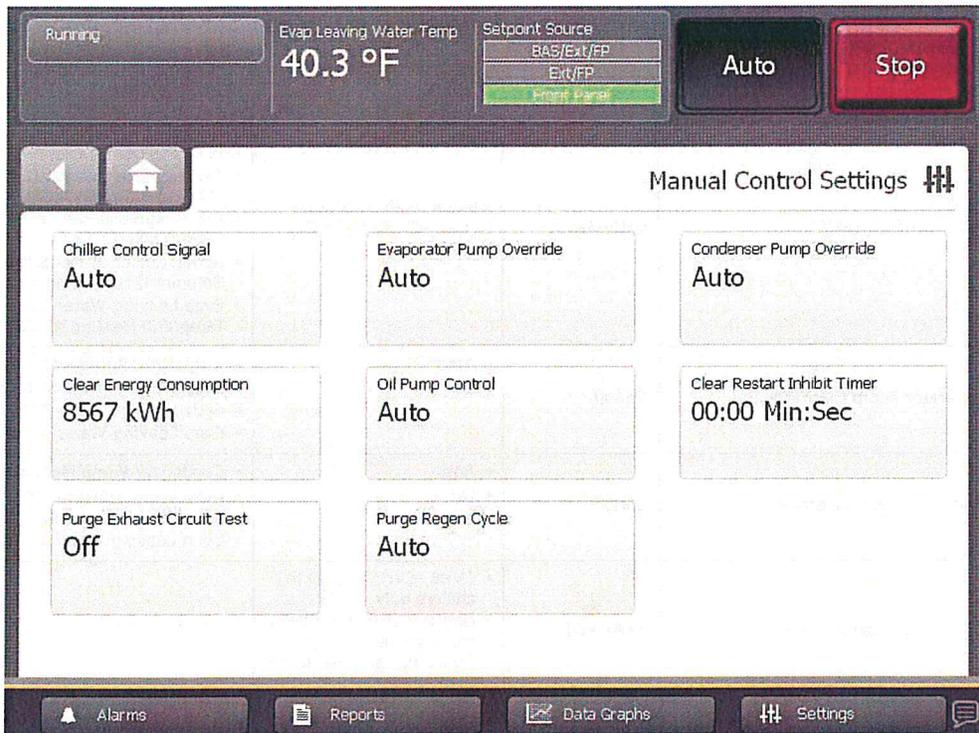
Feature	Current value	Available setting options	Status points
Chiller Control Signal	Auto/Manual	Manual mode: Up/down arrows for changing the setpoint	<ul style="list-style-type: none"> IGV1 Position (CVHE, CVHF, and CVHG chillers only) IGV2 Position (CVHE, CVHF, and CVHG chillers only) Average Line Current (Ckt1 and Ckt2 for Duplex CDHF and CDHG chillers) AFD Frequency (Ckt1 and Ckt2 for Duplex CDHF and CDHG chillers) Active Chilled Water Setpoint (Active Hot Water Setpoint if in Heating mode) Evap Leaving Water Temp (Cond Leaving Water Temp if in Heating mode)
Evaporator Pump Override	On/Off	<ul style="list-style-type: none"> Auto On 	<ul style="list-style-type: none"> Evaporator Pump Manual Override Time Remaining Evap Water Flow Switch Status Active Chilled Water Setpoint Evap Leaving Water Temp
Condenser Pump Override	On/Off	<ul style="list-style-type: none"> Auto On 	<ul style="list-style-type: none"> Condenser Pump Manual Override Time Remaining Cond Water flow Switch Status Active Hot Water Setpoint Cond Leaving Water Temp
Clear Energy Consumption	XXXX kWh	<ul style="list-style-type: none"> CVHE, CVHF, and CVHG chillers only: Clear Duplex CDHF and CDHG chillers only: Energy Consumption Resettable Ckt1, Ckt2 	
Oil Pump Control Notes: Ckt1 and Ckt2 for Duplex CDHF and CDHG chillers	On/Off	<ul style="list-style-type: none"> Auto On 	<ul style="list-style-type: none"> Oil Pump Manual Override Time Remaining Oil Differential Pressure Oil Pump Discharge Pressure Oil Tank Pressure
Clear Restart Inhibit Notes: Ckt1 and Ckt2 for Duplex CDHF and CDHG chillers	XX:XX min:sec	<ul style="list-style-type: none"> Clear 	
Purge Exhaust Circuit Test Notes: Ckt1 and Ckt2 for Duplex CDHF and CDHG chillers	Auto/On	<ul style="list-style-type: none"> Enable Disable 	<ul style="list-style-type: none"> Purge Rfght Cprsr Suction Temp Purge Liquid Temp
Purge Regen Cycle Notes: Ckt1 and Ckt2 for Duplex CDHF and CDHG chillers	On/Off	<ul style="list-style-type: none"> Auto On 	Carbon Tank Temp
Front Panel Lockout Notes: Duplex CDHF and CDHG chillers only; for Ckt1 and Ckt2.		<ul style="list-style-type: none"> Locked Out Not Locked Out 	

Equipment Settings

To change a manual control setting, follow this procedure:

1. In the Equipment Settings column on the Settings screen, touch **Manual Control Settings**. The Manual Control Settings screen appears (Figure 26).

Figure 26. Manual Control Settings screen



2. Touch the button that shows the manual control setting you want to change. A screen for changing the manual control setting appears (Figure 27, p. 51).
3. Touch the button that represents the setting you want. The button becomes shaded and **Apply** and **Save** buttons appear at the bottom of the screen.

Note: The Compressor Control Signal screen provides up/down arrow keys and numerical fields for selecting a value.

4. To save your change, do one of the following:
 - Touch **Apply**. The change is communicated to the Tracer UC800 controller. You can observe the status points in the lower half of the screen change in response to the setting change you just made. Also, a Manual Override button appears in the upper left corner of the screen (see Figure 27, p. 51).
 - Touch **Save**. The change is communicated to the Tracer UC800 controller. The screen you were previously viewing appears.

Figure 27. Manual Control Settings screen (Evaporator Pump Override shown)



Display Settings

You can use the Tracer AdaptiView display to change the format of the information that appears on the display, and to clean the touch screen.

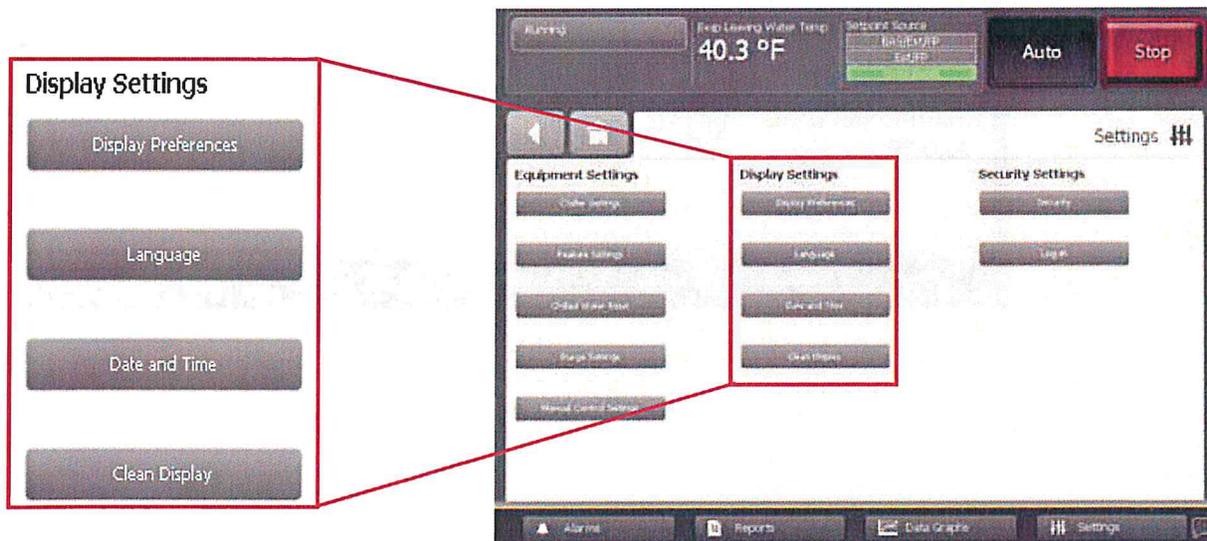
Viewing the Settings Screen

Touch the **Settings** button in the main menu area (see “Main Menu Area,” p. 15) to view the Settings screen. *Display Settings* identifies a column of buttons located on the screen (see Figure 28). The buttons are:

- Display Preferences
- Language
- Date and Time
- Clean Display

Each button provide access to a screen that is related to the button name.

Figure 28. Settings screen with the Display Settings column highlighted

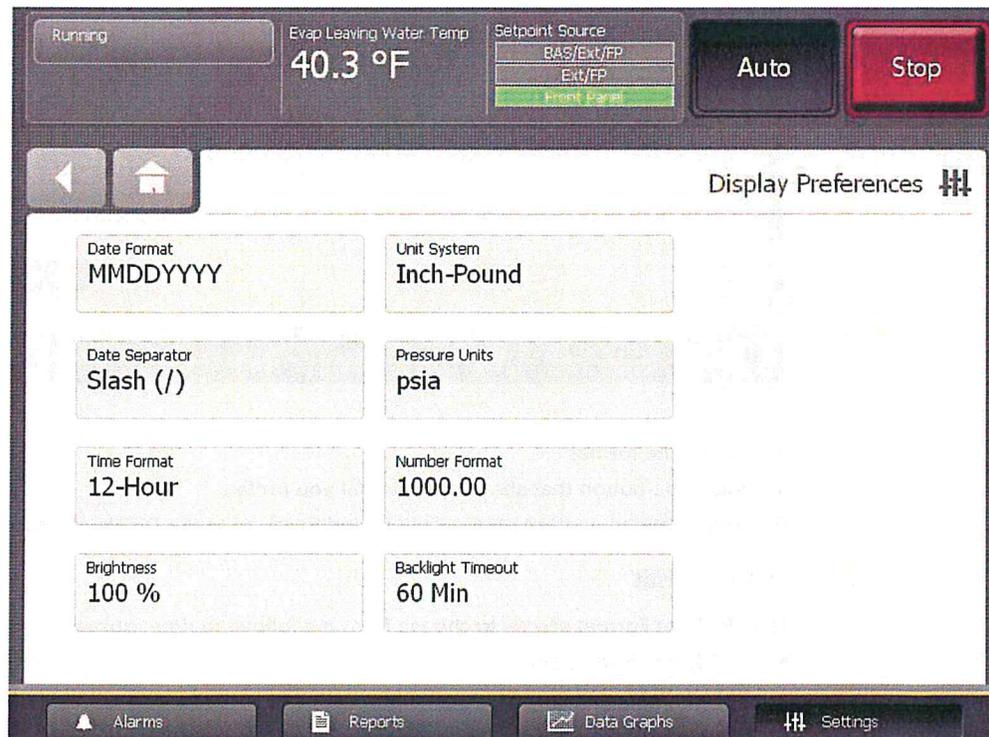


Viewing and Changing Display Preferences

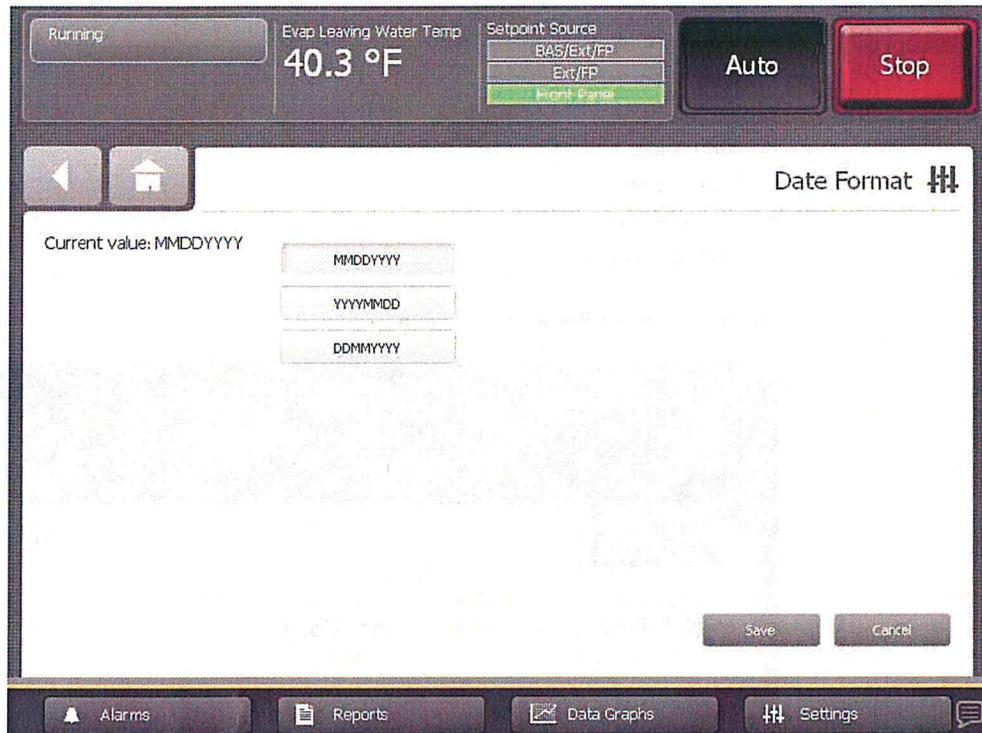
On the Settings screen, touch **Display Preferences** to view a screen containing these buttons (see [Figure 29](#)):

- Date Format
- Date Separator
- Time Format
- Brightness
- Unit System
- Pressure Units
- Backlight Timeout

Figure 29. Display Preferences screen



Each of the buttons in [Figure 29](#) shows the name of a display preference and its format (current value). Touch any of these buttons to view a screen where you can change the format (see [Figure 30](#), p. 54 for an example). The button representing the format currently used is shaded (see the “MMDDYYYY” button in [Figure 30](#)).

Figure 30. Example of a display preference screen

To change the format:

1. Touch the button that shows that format you prefer.
2. Touch **Save** to confirm your selection and to return to the Display Preferences screen.

Date Format

Use the Date Format screen to choose from the following date formats:

- MMDDYYYY (default)
- YYYYMMDD
- DDMMYYYY

Date Separator

Use the Date Separator screen to choose from the following date formats:

- None
- Slash (default)
- Hyphen

Time Format

Use the Time Format screen to choose from the following time formats:

- 12 hour (default)
- 24 hour

Brightness

Use the numerical keypad on the Brightness screen to change the brightness of the screen. (The default is 100%.)

Display Units

Use the Display Units screen to choose from the following display units:

- SI
- Inch-Pounds (default)

Pressure Units

Use the Pressure Units screen to choose from the following pressure units:

- kPaA (default if "SI" is chosen for display units)
- kPaG
- PSIA (default if "Inch-Pound" is chosen for display units)
- PSIG

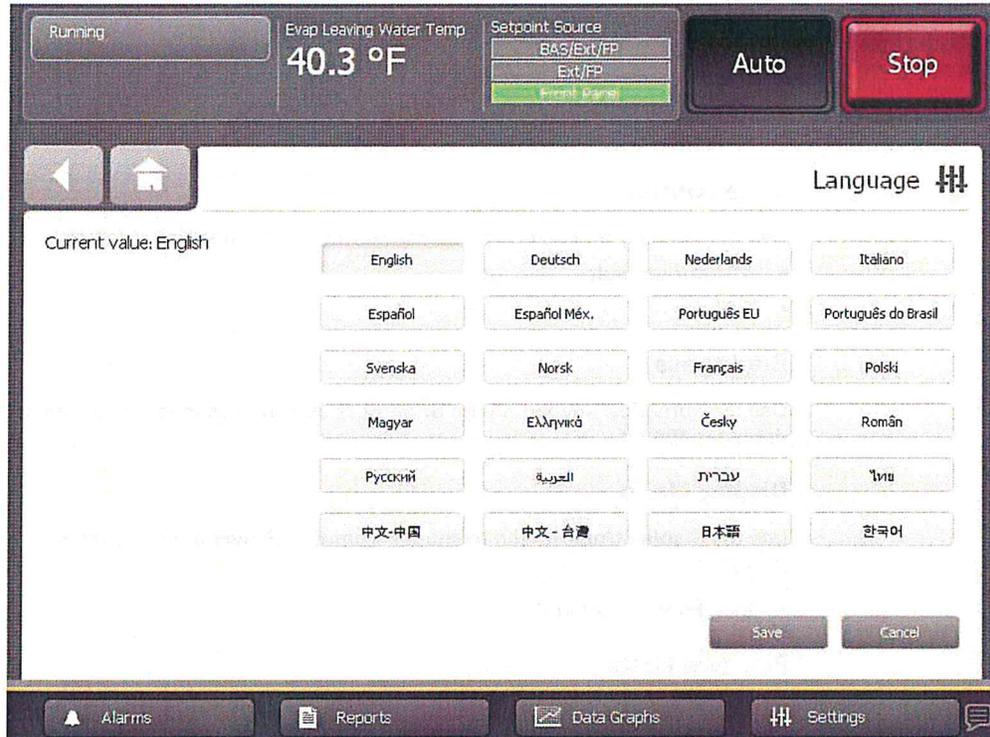
Backlight Timeout

Use the numerical keypad on the Backlight Timeout screen to change the number of minutes of inactivity that pass until the screen dims. (The default is 60 minutes.)

Viewing and Changing the Language Preference

On the Settings screen, touch **Languages** to view a screen containing the following buttons (see [Figure 31, p. 56](#)):

- Arabic (Gulf Regions)
- Chinese—China
- Chinese—Taiwan
- Czech
- Dutch
- English
- French
- German
- Greek
- Hebrew
- Hungarian
- Italian
- Japanese
- Korean
- Norwegian
- Portuguese (Portugal)
- Portuguese (Brazil)
- Russian
- Romanian
- Spanish (Europe)
- Spanish (Latin America)
- Swedish
- Thai

Figure 31. Language screen


The language that is currently in use on the display is expressed as the current value on the Language screen. The button that displays the current value is shaded (see the “English” button in Figure 31 as an example).

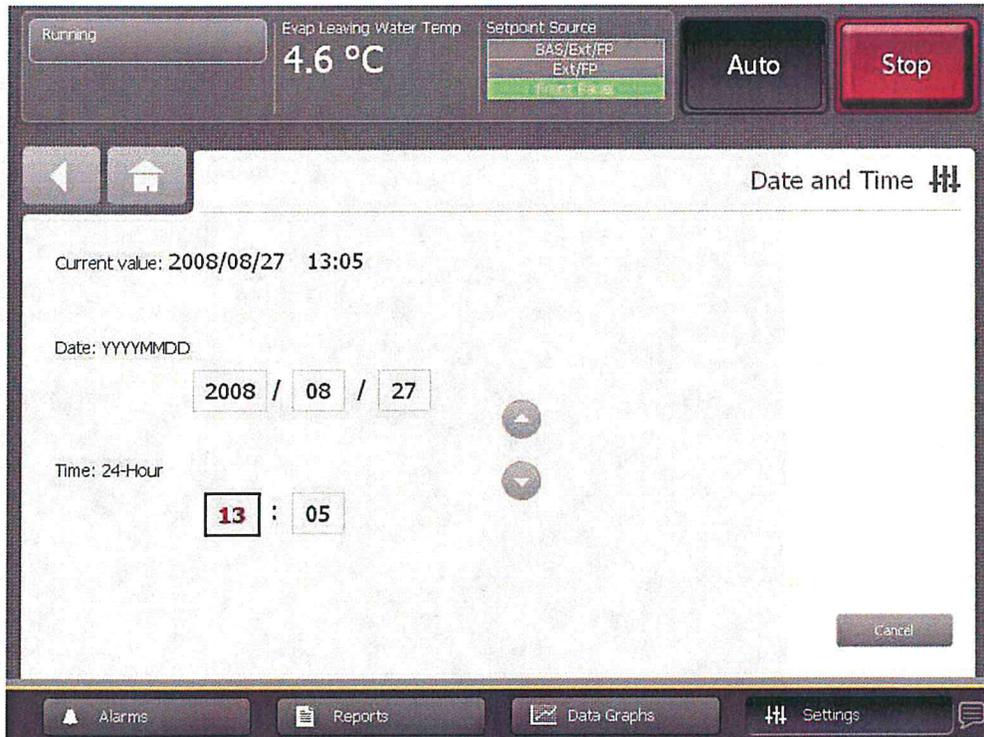
To change the language:

1. Touch the button that identifies the language you prefer.
2. Touch **Save** to confirm your selection and to return to the Settings screen.

Viewing and Changing Date and Time Preferences

On the Settings screen, touch **Date and Time** to view the Date and Time screen, shown in Figure 32.

Figure 32. Date and Time screen



The current date and time for the display is expressed as the current value. The current value appears below the center line on the screen.

Above the center line, the following date and time attributes appear:

- Month
- Day
- Year
- Hour
- Minute
- AM/PM

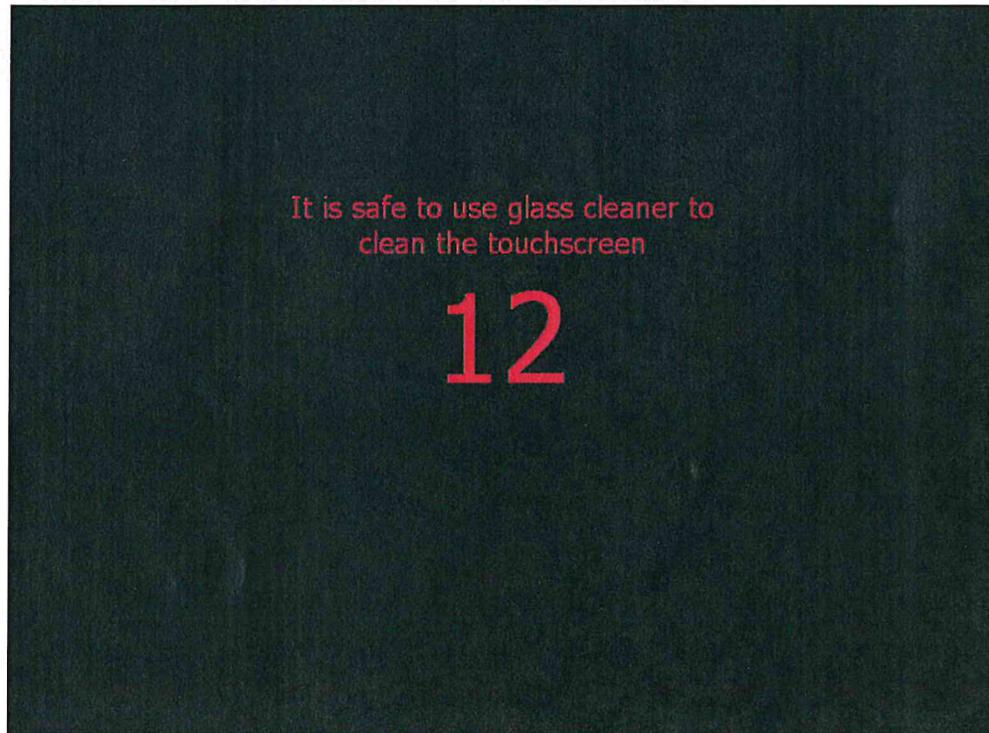
To change the date or time:

1. Touch the square presenting the attribute you want to change. The square becomes highlighted.
2. Touch the up or down arrow key on the screen until the your desired selection appears. Repeat the process for any other attributes you want to change.
3. Touch **Save** to confirm your selection and return to the Settings screen.

Cleaning the Display

On the Settings screen, touch **Clean Display** to disable the Tracer AdaptiView display screen for 15 seconds so that you can clean the screen without it responding to touch. During this time, the screen is black with a number in the center that counts down the seconds. After 15 seconds, the Settings screen re-appears (Figure 33).

Figure 33. Countdown screen



Security Settings

If security is enabled, the Tracer AdaptionView display requires that you log in with a four-digit security PIN to make setting changes that are protected by security. This feature prevents unauthorized personnel from doing so. There are two levels of security, each allowing specific changes to be made.

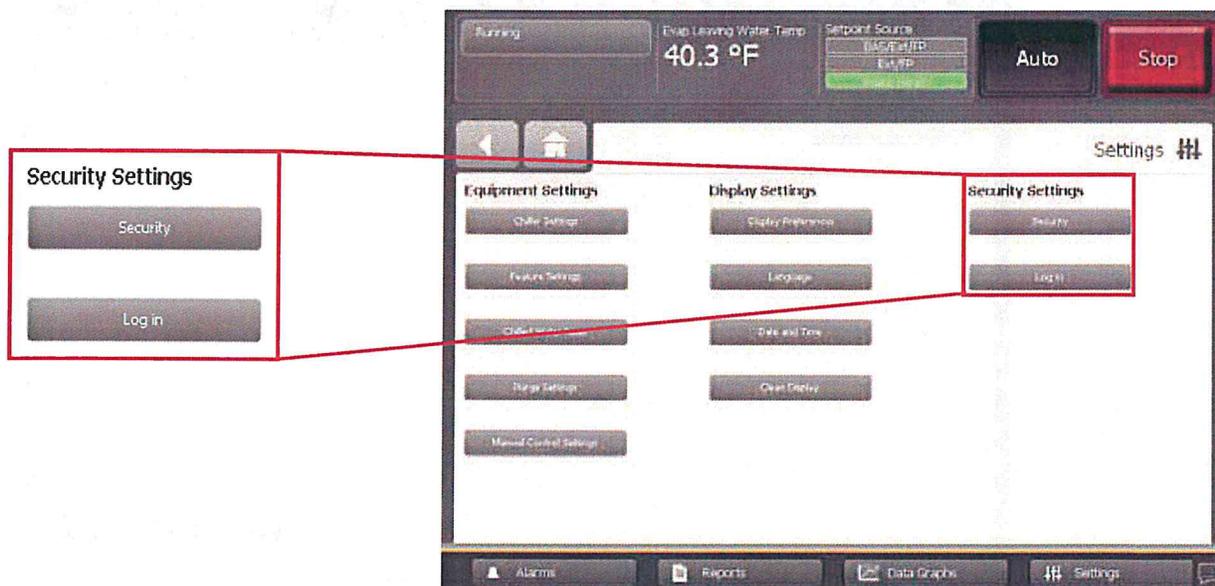
You can view all data without logging in. The log-in screen appears only when you try to change a setting that is protected by security, or when you touch the **Log in** button from the Settings screen.

Viewing the Settings Screen

Touch the **Settings** button in the main menu area (see “Main Menu Area,” p. 15) to view the Settings screen. *Security Settings* identifies a column on the right side of the screen that contains two buttons (see the outlined column in Figure 34):

- Security
- Log in (Log out)

Figure 34. Equipment Settings screen with the Display Settings column highlighted



Note: If security is disabled, the Log in/Log out button is not visible. See “Disabling/Enabling Security,” p. 60.

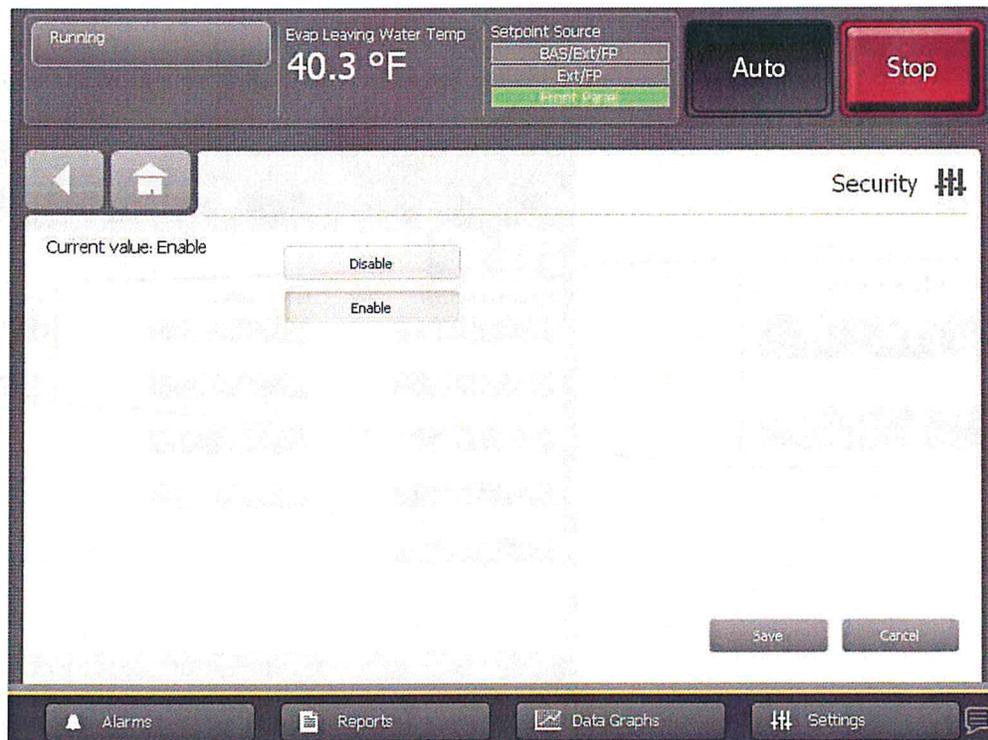
Disabling/Enabling Security

The Tracer AdaptiView display gives you the ability to disable or enable the security feature that allows a user to log in and log out.

To disable security, you must be logged in:

1. From the Settings screen, touch the **Security** button. The Security screen appears (Figure 35).
Note: *If you are logged out, the Log in screen appears.*
2. Touch the **Disable** button. The button becomes shaded.
3. Touch **Save**. The Settings screen appears with only the **Security** button visible. The **Log in/Log out** button is gone.

Figure 35. Security screen



To enable security:

1. From the Settings screen, touch the **Security** button. The Security screen appears (Figure 35).
2. Touch the **Enable** button. The button becomes shaded.
3. Touch **Save**. The Settings screen appears with a **Log out** button, in addition to the **Security** button.

Logging In

There are two levels of security:

- Security Level 1 allows users to change a limited group of secure settings. The default security PIN is 1111.
- Security Level 2 allows users to change all secure settings. The default security PIN is 7123.

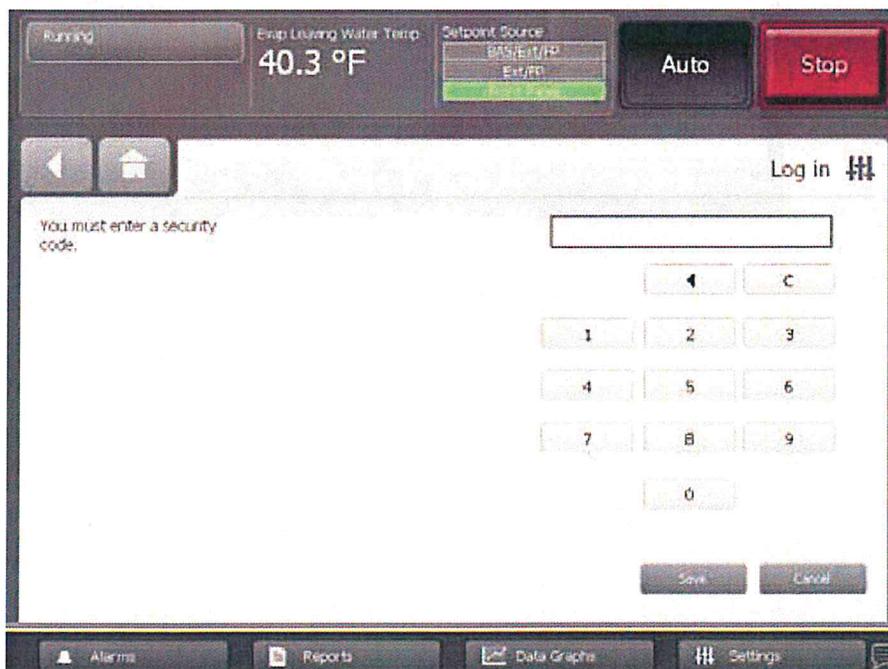
A technician must use the Tracer TU service tool to define a different PIN, or to recall a PIN that has been forgotten. When defining a PIN in Tracer TU, the technician enters a 4-digit PIN that corresponds with the desired level of security.

To log in:

1. Touch the **Log in** button. The Log in screen appears (Figure 36).
 2. Use the keypad to enter your PIN.
 - The PIN is a four-digit number, which was configured for your system with the Tracer TU service tool.
 - As you enter the number, the PIN remains hidden by asterisks.
- Note:** If you enter an invalid PIN, an error message appears on the Log in screen.
3. Touch **Save**.
 - If you viewed the Log in screen from touching **Log in** on the Settings screen, the Settings screen appears with a **Log out** button on it.
 - If the Log in screen appeared when you tried to change a setting, you return to that setting screen.

Note: The PIN is valid until 30 minutes of inactivity passes, or until you log out.

Figure 36. Log In Screen

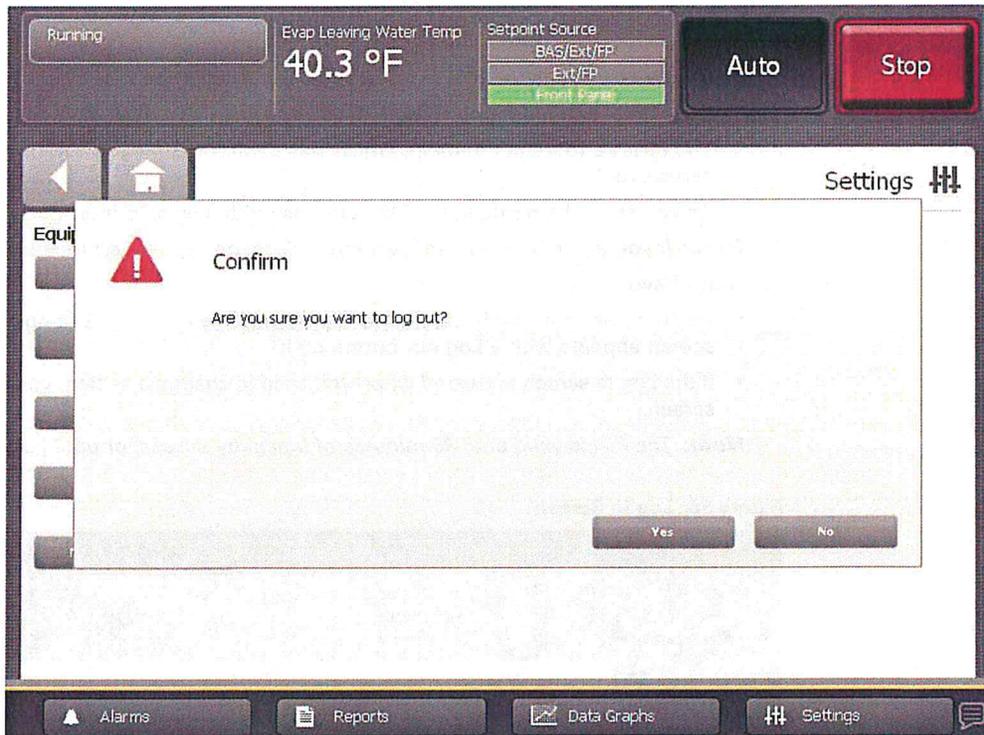


Logging Out

To log out:

1. Touch the **Log out** button. A confirmation screen appears (Figure 37).
2. Touch **Yes** to confirm that you want to log out. The Settings screen appears with a **Log in** button on it.

Figure 37. Log out confirmation screen



Troubleshooting

Table 14 contains information to help troubleshoot the Tracer AdaptiView displays.

Table 14. Tracer AdaptiView display troubleshooting guide

Issue	Possible causes/Solutions
<p>The screen only partially displays; the Auto and Stop buttons appear, but there is no text.</p>	<p>The UC800 configuration is invalid. Download a valid configuration using the Tracer TU service tool.</p>
<p>The following error message appears: <i>UC800 Configuration is Invalid</i></p> <ul style="list-style-type: none"> • <i>UC800 configuration must be updated with the Tracer TU technician utility</i> 	<p>Follow the error message instructions.</p>
<p>The following error message appears: <i>Communication lost with UC800</i></p> <ol style="list-style-type: none"> 1. <i>Check power and communication cables</i> 2. <i>Update the UC800 software with the Tracer TU technician utility</i> 	<p>Communication has been established and then lost, or the UC800 configuration is invalid. Follow the error message instructions.</p>
<p>The following error message appears: <i>Display Failed to Establish Communication</i></p> <ul style="list-style-type: none"> • <i>Check power and communication cables</i> • <i>Re-attempting connection in X seconds</i> 	<p>Communication is not established.</p> <ul style="list-style-type: none"> • The Ethernet cable and/or the power cable may be disconnected. Check the connections. • The UC800 may have an invalid configuration. Download a valid configuration using the Tracer TU service tool.
<p>The following error message appears: <i>[*Missing file name]</i></p> <ul style="list-style-type: none"> • <i>UC800 software must be updated with the Tracer TU technician utility</i> 	<p>A file is missing.</p> <ul style="list-style-type: none"> • The Tracer TU service tool is connected and the LLID binding screen is displayed. • UC800 has an invalid configuration. Download a valid configuration using the Tracer TU service tool. • Cycle power to the display and the UC800. Disconnect the USB cable and wait approximately 10 seconds before reconnecting the USB cable.
<p>The following error message appears: <i>The display is about to restart</i></p> <ul style="list-style-type: none"> • <i>Click No to continue working</i> • <i>Click Yes to reset immediately</i> 	<p>This message appears if all of the following conditions occur:</p> <ul style="list-style-type: none"> • It is 2:00AM, and • There has been no touchscreen activity for 30 minutes, and • A designated amount of continuous operation has occurred. <p>Follow the error message instructions.</p>



Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers

The following lists contain all of the data available for viewing on a Tracer AdaptiView display that is connected to a CenTraVac chiller CVHE, CVHG, or CVHG.

Component Screen Data

Chiller configuration determines which of the following settings and status points appear on the display. For more information, see "Component Screens," p. 13.

Component	Settings and status points
Evaporator	Active Chilled Water Setpoint (button links to the Active Chiller Water Setpoint screen)
	Evaporator Pump Override (button links to Evaporator Pump Override screen)
	Evap Water Flow Status
	Evap Leaving Water Temp
	Evap Entering Water Temp
	Calculated Chiller Capacity
	Evaporated Saturated Rfgt Temp
	Evaporator Rfgt Pressure
	Evap Approach Temp
	Approx Evap Water Flow
	Evap Differential Wtr Press
Condenser	Active Hot Water Setpoint (button links to the Active Hot Water Setpoint screen)
	Cond Condenser Pump Override (button links to the Condenser Pump Override screen)
	Cond Water Flow Status
	Cond Entering Water Temp
	Cond Leaving Water Temp
	Outdoor Air Temp
	Condenser Sat Rfgt Temp
	Condenser Refrigerant Pressure
	Condenser Approach Temperature
	Approx Cond Water Flow
	Cond Differential Wtr Press
	Second Condenser Lvg Wtr Temp
	Second Condenser Ent Wtr Temp

Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers

Component	Settings and status points
Compressor	Compressor Running Status
	Compressor Control Signal
	Oil Pump Control
	Average Line Current (%RLA)
	Oil Pump Status
	Oil Differential Pressure
	Compressor Starts
	Compressor Running Time
	Oil Pump Discharge Pressure
	Oil Tank Pressure
	Oil Tank Temperature
	Inboard Bearing Temperature
	Outboard Bearing Temperature
	IGV 1 Percent Open
	IGV 1 Position (Steps)
	IGV 2 Percent Open
	IGV 2 Position (Steps)
	Compressor Rfgt Discharge Temp
	HGBP Time
Motor	Active Current Limit Setpoint (button links to Active Current Limit Setpoint screen)
	Average Line Current (%RLA)
	ADF Frequency or Generator Frequency Command (based on configuration)
	Starter Current L1 (%RLA)
	Starter Current L2 (%RLA)
	Starter Current L3 (%RLA)
	Starter Current L1 (A)
	Starter Current L2 (A)
	Starter Current L3 (A)
	Starter Voltage Phase AB
	Starter Voltage Phase BC
	Starter Voltage Phase CA
	Motor Winding Temp 1
	Motor Winding Temp 2
	Motor Winding Temp 3



Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers

Component	Settings and status points
Motor (continued)	AFD Speed
	AFD Transistor Temp
	Starter Energy Consumption Resettable
	Starter Energy Consumption Last Reset
	Starter Energy Consump Non Reset
	Starter Power Demand
	Starter Load Power Factor
Purge	Purge Top Level Mode (button links to Purge Operating Modes screen)
	Purge Regen Cycle (button links to Purge Regen Cycle screen)
	Purge Fault Indicator (button links to Alarms screen)
	Daily Pumpout—24 Hours
	Average Daily Pumpout—7 Days
	Daily Pumpout Limit/Alarm
	Chiller On—7 Days
	Pumpout Chiller On—7 days
	Pumpout Chiller Off—7 days
	Time Until Next Purge Run
	Purge Rfgt Compressor Suction Temp
	Purge Liquid Temperature
	Pumpout—Life
	Purge Carbon Tank Temp

Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers

Reports

The following data can be viewed on the Reports screen. For more information, see "Reports," p. 21.

Log Sheet

Chiller component	Report item	Unit
Evaporator	Evaporator Entering Water Temperature	XXX.X °F/°C
	Evaporator Leaving Water Temp	XXX.X °F/°C
	Evaporator Sat Rfgt Temp	XXX.X °F/°C
	Evaporator Rfgt Pressure	XXX.X PSI/kPa
	Evaporator Approach Temp	XXX.X °F/°C
	Evaporator Water Flow Switch Status	Flow/No Flow
Condenser	Cond Entering Water Temp	XXX.X °F/°C
	Cond Leaving Water Temp	XXX.X °F/°C
	Cond Sat Rfgt Temp	XXX.X °F/°C
	Cond Rfgt Pressure	XXX.X PSI/kPa
	Cond Approach Temp	XXX.X °F/°C
	Cond Water Flow Switch Status	Flow/No Flow
Compressor	Starts	XXXX Starts
	Running Time	XX:XX Hr:Min
	Oil Tank Pressure	XXX.X PSI/kPa
	Oil Pump Discharge Pressure	XXX.X PSI/kPa
	Oil Differential Pressure	XXX.X PSI/kPa
	Oil Tank Temperature	XXX.X °F/°C
	IGV 1 Position	XXX.X %
	IGV 1 Position	Steps
	IGV 2 Position	XXX.X %
IGV 2 Position	Steps	



Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers

Chiller component	Report item	Unit
Motor	Starter Current L1	XXX.X %
	Starter Current L2	XXX.X %
	Starter Current L3	XXX.X %
	Starter Current L1	XXXX A
	Starter Current L2	XXXX A
	Starter Current L3	XXXX A
	Starter Voltage AB	XXXXX.X V
	Starter Voltage BC	XXXXX.X V
	Starter Voltage CA	XXXXX.X V
	Starter Power Demand	XXXX kW
	Starter Load Power Factor	XX.X
	Motor Winding Temp 1	XXX.X °F/°C
	Motor Winding Temp 2	XXX.X °F/°C
	Motor Winding Temp 3	XXX.X °F/°C
	AFD Frequency	XX Hz
	AFD Speed	XXXX RPM
	AFD Transistor Temp	XXX.X °F/°C
Purge	Time Until Next Purge Run	XXX.X min
	Daily Pumpout—24 Hours	XXX.X min
	Average Daily Pumpout—7 Days	XXX.X min
	Daily Pumpout Limit	XXX.X min
	Chiller On—7 Days	XXX.X min
	Pumpout Chiller On—7 Days	XXX.X min
	Pumpout Chiller Off—7 Days	XXX.X min
	Pumpout—Life	XXX.X min
	Purge Rfgt Compressor Suction Temp	XXX.X °F/°C
	Purge Liquid Temp	XXX.X °F/°C
	Purge Carbon Tank Temp	XXX.X °F/°C

Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers

ASHRAE Chiller Log

Note: The ASHRAE Chiller Log contains those items recommended by ASHRAE Std 147 Standard 147-2002, Reducing Release of Halogenated Refrigerants from Refrigeration and Air-Conditioning Equipment and Systems.

Data name	Value
Current Date/Time	User-selected date/time format
Chiller Top Level Mode	Dependent on chiller type
Starter Current L1	XXXX A
Starter Current L2	XXXX A
Starter Current L3	XXXX A
Starter Phase Voltage AB	XXXX V
Starter Phase Voltage BC	XXXX V
Starter Phase Voltage CA	XXXX V
Active Chilled Water Setpoint	XXX.X F°/C°
Active Current Limit Setpoint	XXX.X %
Refrigerant Monitor	XXX.X ppm
Purge Daily Pumpout—24 Hrs	XXX.X Min:Sec
Purge Daily Pumpout Limit	XXX.X Min
Pumpout—Life	XXX.XXX Min:Sec
Purge Top Level Mode	On/Auto/Adaptive/ Stop
Purge Mode	On/Auto/Adaptive/ Stop
Compressor Starts	XXXX
Compressor Running Time	XX:XX Hr:Min
Compressor Refrigerant Discharge Temperature	XXX.X °F/C°
Oil Pump Discharge Pressure	XXX.X PSIA/kPa
Oil Tank Pressure	XXX.X PSIA/kPa
Oil Differential Pressure	XXX.X PSID/kPaD
Oil Tank Temperature	XXX.X °F/C°
Inboard Bearing Temp	XXX.X °F/C°
Outboard Bearing Temp	XXX.X F°/C°
Evaporator Entering Water Temp	XXX.X °F/C°
Evaporator Leaving Water Temp	XXX.X °F/C°
Evaporator Saturated Rfgt Temp	XXX.X °F/C°
Evaporator Refrigerant Pressure	XXX.X PSI/kPaA
Evap Approach Temp	XXX.X °F/C°
Evap Water Flow Status	Flow/No Flow
Evap Differential Wtr Press	XXX.X PSID/kPaD



Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers

Data name	Value
Approx Evap Water Flow	XXX.X gpm/lpm
Calculated Chiller Capacity	XXXX tons/kW
Cond Entering Water Temp	XXX.X °F/C°
Cond Leaving Water Temp	XXX.X °F/C°
Condenser Saturated Rfght Temp	XXX.X °F/C°
Condenser Refrigerant Pressure	XXX.X PSIA/kPaA
Condenser Approach Temperature	XXX.X °F/C°
Cond Water Flow Status:	Flow/No Flow
Cond Differential Wtr Press	XXX.X PSID/kPaD
Approx Cond Water Flow	XXXX gpm/lpm
Second Condenser Ent Wtr Temp	XXX.X °F/C°
Second Condenser Lvg Wtr Temp	XXX.X °F/C°

Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers

Items available to include in custom reports

Subsystem	Description
Chiller	Active Base Loading Setpoint
	Active Base Loading Setpoint Source
	Application Part Number
	Version
	Chiller Heating or Cooling Mode
	Chiller Top Level Operating Mode
Compressor	Chiller Control Signal
	Compressor Refrigerant Discharge Temperature
	Compressor Running
	Compressor Running Time
	Compressor Starts
	Inboard Bearing Temperature
	IGV 1 Percent Open
	IGV 1 Position Steps
	IGV 2 Percent Open
	IGV 2 Position Steps
	Oil Differential Pressure
	Oil Differential Pressure Switch
	Oil Heater Command
	Oil Pump Control
	Oil Pump Discharge Pressure
	Oil Pump Override Time Remaining
	Oil Tank Pressure
	Oil Tank Temperature
	Outboard Bearing Temperature
	Condenser
Condenser Entering Water Temperature	
Condenser Leaving Water Temperature	
Condenser Refrigerant Pressure	
Condenser Saturated Refrigerant Temperature	
Condenser Water Flow Switch Status	
Condenser Pump Override Time Remaining	
Condenser Pump Override	



Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers

Subsystem	Description
Evaporator	Active Chilled Water Setpoint
	Active Chilled Water Setpoint Source
	BAS Chilled Water Setpoint
	Evaporator Approach Temperature
	Evaporator Entering Water Temperature
	Evaporator Leaving Water Temperature
	Evaporator Pump Override
	Evaporator Pump Override Time Remaining
	Evaporator Refrigerant Pressure
	Evaporator Saturated Refrigerant Temperature
	Evaporator Water Flow Status
	Motor
Active Current Limit Setpoint Source	
BAS Current Limit Setpoint	
Starter Power Consumption	
Starter Load Power Factor	
Average Line Current %RLA	
Motor Winding Temperature 1	
Motor Winding Temperature 2	
Motor Winding Temperature 3	
Restart Inhibit Time (MP)	
Starter Average Phase Voltage	
Starter Current L1 %RLA	
Starter Current L1	
Starter Current L2 %RLA	
Starter Current L2	
Starter Current L3 %RLA	
Starter Current L3	
Starter Energy Consumption Not Resettable	
Starter Energy Consumption Resettable	
Time of Last Reset	
Starter Load Power Factor	
Starter Power Consumption	
Starter Power Demand	
Starter Voltage Phase AB	
Starter Voltage Phase BC	
Starter Voltage Phase CA	

Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers

Subsystem	Description
Purge	Purge Top Level Mode
	Average Daily Pumpout—7 Days
	Carbon Regen Cycle
	Chiller On—7 Days
	Daily Pumpout—24 Hours
	Pumpout Chiller Off—7 Days
	Pumpout Chiller On—7 Days
	Pumpout—Life
	Purge Carbon Tank Temp
	Purge Liquid Temperature
	Purge Refrigerant Compressor Suction Temp
	Time at Last Regeneration
	Time Until Next Purge Run



Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers

Data Graph Data Points

This appendix contains:

- Data points used in the default data graphs, organized by graph
- Data points available to include in custom data graphs, organized by component

Data Points Used in Default Data Graphs

Chiller Overview 1

Graph data point	Axis
Active Chilled Water Setpoint	Left Y-axis
Active Hot Water Setpoint	Left Y-axis
Evaporator Leaving Evaporator Temperature	Left Y-axis
Evaporator Entering Water Temperature	Left Y-axis
Condenser Leaving Water Temperature	Left Y-axis
Condenser Entering Water Temperature	Left Y-axis
Calculated Chiller Capacity	Right Y-axis

Chiller Overview 2

Graph data point	Axis
Average Line Current %RLA	Left Y-axis
Frequency Hz	Left Y-axis
Differential Oil Pressure	Left Y-axis

Approach Temperature

Graph data point	Axis
Evaporator Approach Temperature	Left Y-axis
Condenser Approach Temperature	Left Y-axis
Approximate Evaporator Water Flow	Right Y-axis
Approximate Condenser Water Flow	Right Y-axis
Average Line Current	Right Y-axis

Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers

Evaporator

Graph data point	Axis
Active Chilled Water Setpoint	Left Y-axis
Evaporator Leaving Water Temperature	Left Y-axis
Evaporator Entering Water Temperature	Left Y-axis
Evaporator Saturated Refrigerant Temperature	Left Y-axis
Approximate Evaporator Water Flow	Right Y-axis

Motor

Graph data point	Axis
Starter Current L1 %RLA	Left Y-axis
Starter Current L2 %RLA	Left Y-axis
Starter Current L3 %RLA	Left Y-axis
Starter Voltage Phase AB	Right Y-axis
Starter Voltage Phase BC	Right Y-axis
Starter Voltage Phase CA	Right Y-axis

Condenser

Graph data point	Axis
Active Hot Water Setpoint	Left Y-axis
Condenser Leaving Water Temperature	Left Y-axis
Condenser Entering Water Temperature	Left Y-axis
Condenser Saturated Refrigerant Temperature	Left Y-axis
Approximate Condenser Water Flow	Right Y-axis

Motor Temperature

Graph data point	Axis
Motor Winding Temperature 1	Left Y-axis
Motor Winding Temperature 2	Left Y-axis
Motor Winding Temperature 3	Left Y-axis
AFD Transistor Temperature	Left Y-axis



Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers

Compressor

Graph data point	Axis
Average Line Current	Left Y-axis
Active Current Limit Setpoint	Left Y-axis
AFD Frequency	Left Y-axis
IGV 1 Position	Left Y-axis
Chiller Control Signal	Left Y-axis
Compressor Refrigerant Discharge Temperature	Right Y-axis

Purge

Graph data point	Axis
Daily Pumpout—24 Hours	Left Y-axis
Pumpout Chiller On—7 Days	Left Y-axis
Pumpout Chiller Off—7 Days	Left Y-axis
Purge Average Daily Pumpout—7 Days	Right Y-axis
Purge Refrigerant Compressor Suction Temperature	Right Y-axis
Purge Liquid Temperature	Right Y-axis

Oil System

Graph data point	Axis
Oil Differential Pressure	Left Y-axis
Oil Tank Pressure	Left Y-axis
Oil Pump Discharge Pressure	Left Y-axis
Oil Tank Temperature	Right Y-axis
Outboard Bearing Temperature	Right Y-axis
Inboard Bearing Temperature	Right Y-axis

Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers

Data Points Available to Include in Custom Data Graphs

Component	Graph data point
Evaporator	Active Chilled Water Setpoint
	Evaporator Leaving Evaporator Temperature
	Evaporator Entering Water Temperature
	Evaporator Saturated Refrigerant Temperature
	Evaporator Refrigerant Pressure
	Approximate Evaporator Water Flow
	Calculated Chiller Capacity
	Evaporator Approach Temperature
	Active Ice Termination Setpoint
Condenser	Active Hot Water Setpoint
	Condenser Leaving Water Temperature
	Condenser Entering Water Temperature
	Condenser Saturated Refrigerant Temperature
	Outdoor Air Temperature
	Condenser Refrigerant Pressure
	Condenser Approach Temperature
	Approximate Condenser Water Flow
	Second Condenser Leaving Water Temperature
	Second Condenser Entering Water Temperature
Compressor	Chiller Control Signal
	Oil Tank Pressure
	Oil Pump Discharge Pressure
Compressor (continued)	Oil Differential Pressure
	Oil Tank Temperature
	Inboard Bearing Temperature
	Outboard Bearing Temperature
	IGV 1 Percent Open
	IGV 2 Percent Open
	Compressor Refrigerant Discharge Temperature



Appendix A: Data for CenTraVac CVHE, CVHF, CVHG chillers

Component	Graph data point
Motor	Active Current Limit Setpoint
	Average Line Current %RLA
	AFD Frequency
	Current L1 (%)
	Current L2 (%)
	Current L3 (%)
	Current L1 (%)
	Current L1 (A)
	Current L2 (A)
	Current L3 (A)
	Starter Voltage AB
	Starter Voltage BC
	Starter Voltage CA
	Motor Winding Temperature 1
	Motor Winding Temperature 2
	Motor Winding Temperature 3
	AFD Transistor Temperature
	Power Demand
	Load Power Factor
	Average Phase Voltage
Purge	Generator Frequency Command
	Daily Pumpout—24 Hours
	Pumpout Chiller On—7 Days
	Pumpout Chiller Off—7 Days
	Purge Average Daily Pumpout—7 Days
	Purge Refrigerant Compressor Suction Temperature
	Purge Liquid Temperature
	Purge Carbon Tank Temperature



Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

The following lists contain all of the data available for viewing on a Tracer AdaptiView display that is connected to a CenTraVac Duplex chiller CDHF or CDHG.

Component Screen Data

Chiller configuration determines which of the following settings and status points appear on the display. For more information, see "Component Screens," p. 13.

Component	Settings and status points
Evaporator	Active Chilled Water Setpoint (button links to the Active Chiller Water Setpoint screen)
	Evaporator Pump Override (button links to Evaporator Pump Override screen)
	Evap Water Flow Status
	Evap Leaving Water Temp
	Evap Entering Water Temp
	Calculated Chiller Capacity
	Evaporator Saturated Rfgt Temp (Ckt1 and Ckt2)
	Evaporator Rfgt Pressure (Ckt1 and Ckt2)
	Evap Approach Temp (Ckt1 and Ckt2)
	Approx Evap Water Flow
	Evap Differential Wtr Press

Component	Settings and status points
Condenser	Active Hot Water Setpoint (button links to the Active Hot Water Setpoint screen)
	Condenser Pump Override (button links to the Condenser Pump Override screen)
	Cond Water Flow Status
	Cond Entering Water Temp
	Cond Leaving Water Temp
	Outdoor Air Temp
	Condenser Refrigerant Pressure (Ckt1 and Ckt2)
	Condenser Approach Temperature (Ckt1 and Ckt2)
	Approx Cond Water Flow
	Cond Differential Wtr Press
	Second Condenser Lvg Wtr Temp
	Second Condenser Ent Wtr Temp



Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

Component	Settings and status points
Compressor	Compressor Running (Ckt1 and Ckt2)
	Chiller Control Signal
	Oil Pump Control (Ckt1 and Ckt2)
	Average Line Current %RLA (Ckt1 and Ckt2)
	Compressor Starts (Ckt1 and Ckt2)
	Oil Pump Status (Ckt1 and Ckt2)
	Oil Differential Pressure (Ckt1 and Ckt2)
	Compressor Running Time (Ckt1 and Ckt2)
	Oil Pump Discharge Pressure (Ckt1 and Ckt2)
	Oil Tank Pressure (Ckt1 and Ckt2)
	Oil Tank Temperature (Ckt1 and Ckt2)
	Inboard Bearing Temperature (Ckt1 and Ckt2)
	Outboard Bearing Temperature (Ckt1 and Ckt2)
	IGV 1 Percent Open (Ckt1 and Ckt2)
	IGV 1 Position (Steps) (Ckt1 and Ckt2)
	IGV 2 Percent Open (Ckt1 and Ckt2)
	IGV 2 Position (Steps) (Ckt1 and Ckt2)
	Compressor Rfght Discharge Temp (Ckt1 and Ckt2)

Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

Component	Settings and status points
Motor	Active Current Limit Setpoint (button links to Active Current Limit Setpoint screen)
	Average Line Current (%RLA) (Ckt1 and Ckt2)
	ADF Frequency Ckt1 or Generator Frequency Command (based on configuration) (Ckt1 and Ckt2)
	Starter Current L1 %RLA (Ckt1 and Ckt2)
	Starter Current L2 %RLA (Ckt1 and Ckt2)
	Starter Current L3 %RLA (Ckt1 and Ckt2)
	Starter Current L1 (Ckt1 and Ckt2)
	Starter Current L2 (Ckt1 and Ckt2)
	Starter Current L3 (Ckt1 and Ckt2)
	Starter Voltage Phase AB (Ckt1 and Ckt2)
	Starter Voltage Phase BC(Ckt1 and Ckt2)
	Starter Voltage Phase CA (Ckt1 and Ckt2)
	Motor Winding Temp 1 (Ckt1 and Ckt2)
	Motor Winding Temp 2 (Ckt1 and Ckt2)
	Motor Winding Temp 3 (Ckt1 and Ckt2)
	AFD Speed (Ckt1 and Ckt2)
	AFD Transistor Temp (Ckt1 and Ckt2)
	Starter Energy Consumption Resettable (Ckt1 and Ckt2)
	Starter Energy Consumption Last Reset (Ckt1 and Ckt2)
	Starter Energy Consumption Non Reset (Ckt1 and Ckt2)
Starter Power Demand (Ckt1 and Ckt2)	
Starter Load Power Factor (Ckt1 and Ckt2)	



Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

Component	Settings and status points
Purge	Purge Top Level Mode (button links to Purge Operating Modes screen) (Ckt1 and Ckt2)
	Purge Regen Cycle (button links to PUrge Regen Cycle) (Ckt1 and Ckt2)
	Purge Fault Indicator (button links to Alarms screen) (Ckt1 and Ckt2)
	Daily Pumpout—24 Hours (Ckt1 and Ckt2)
	Average Daily Pumpout—7 Days (Ckt1 and Ckt2)
	Daily Pumpout Limit (Ckt1 and Ckt2)
	Chiller On—7 Days (Ckt1 and Ckt2)
	Pumpout Chiller On—7 days (Ckt1 and Ckt2)
	Pumpout Chiller Off—7 days (Ckt1 and Ckt2)
	Time Until Next Purge Run (Ckt1 and Ckt2)
	Purge Rfgt Compressor Suction Temp (Ckt1 and Ckt2)
	Purge Liquid Temperature (Ckt1 and Ckt2)
	Pumpout—Life (Ckt1 and Ckt2)
	Purge Carbon Tank Temp (Ckt1 and Ckt2)

Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

Reports

The following data can be viewed on the Reports screen. For more information, see “Reports,” p. 21.

Log Sheet

Chiller component	Report item	Unit
Evaporator	Evaporator Entering Water Temperature	XXX.X °F/°C
	Evaporator Leaving Water Temp	XXX.X °F/°C
	Evaporator Water Flow Status	Flow/No Flow
	Evaporator Sat Rfgt Temp (Ckt1 and Ckt2)	XXX.X °F/°C
	Evaporator Rfgt Pressure (Ckt1 and Ckt2)	XXX.X PSI/kPa
	Evaporator Approach Temp (Ckt1 and Ckt2)	XXX.X °F/°C
Condenser	Cond Entering Water Temp	XXX.X °F/°C
	Cond Leaving Water Temp	XXX.X °F/°C
	Cond Water Flow Status	Flow/No Flow
	Cond Sat Rfgt Temp (Ckt1 and Ckt2)	XXX.X °F/°C
	Cond Rfgt Pressure (Ckt1 and Ckt2)	XXX.X PSI/kPa
	Cond Approach Temp (Ckt1 and Ckt2)	XXX.X °F/°C
Compressor	Compressor Starts (Ckt1 and Ckt2)	XXXX Starts
	Compressor Running Time (Ckt1 and Ckt2)	XX:XX Hr:Min
	Oil Tank Pressure (Ckt1 and Ckt2)	XXX.X PSI/kPa
	Oil Pump Discharge Pressure (Ckt1 and Ckt2)	XXX.X PSI/kPa
	Oil Differential Pressure (Ckt1 and Ckt2)	XXX.X PSI/kPa
	Oil Tank Temperature (Ckt1 and Ckt2)	XXX.X °F/°C
	IGV 1 Percent Open (Ckt1 and Ckt2)	XXX.X %
	IGV 1 Position (Ckt1 and Ckt2)	Steps
	IGV 2 Percent Open (Ckt1 and Ckt2)	XXX.X %
	IGV 2 Position (Ckt1 and Ckt2)	Steps



Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

Chiller component	Report item	Unit
Motor	Starter Current L1 %RLA (Ckt1 and Ckt2)	XXX.X %
	Starter Current L2 %RLA (Ckt1 and Ckt2)	XXX.X %
	Starter Current L3 %RLA (Ckt1 and Ckt2)	XXX.X %
	Starter Current L1 (Ckt1 and Ckt2)	XXXX A
	Starter Current L2 (Ckt1 and Ckt2)	XXXX A
	Starter Current L3 (Ckt1 and Ckt2)	XXXX A
	Starter Voltage Phase AB (Ckt1 and Ckt2)	XXXXX.X V
	Starter Voltage Phase BC (Ckt1 and Ckt2)	XXXXX.X V
	Starter Voltage Phase CA (Ckt1 and Ckt2)	XXXXX.X V
	Starter Power Demand (Ckt1 and Ckt2)	XXXX kW
	Starter Load Power Factor (Ckt1 and Ckt2)	XX.X
	Motor Winding Temp 1 (Ckt1 and Ckt2)	XXX.X °F/°C
	Motor Winding Temp 2 (Ckt1 and Ckt2)	XXX.X °F/°C
	Motor Winding Temp 3 (Ckt1 and Ckt2)	XXX.X °F/°C
	AFD Frequency (Ckt1 and Ckt2)	XX Hz
	AFD Speed (Ckt1 and Ckt2)	XXXX RPM
	AFD Transistor Temp (Ckt1 and Ckt2)	XXX.X °F/°C
Purge	Time Until Next Purge Run (Ckt1 and Ckt2)	XXX.X min
	Daily Pumpout—24 Hours (Ckt1 and Ckt2)	XXX.X min
	Average Daily Pumpout—7 Days (Ckt1 and Ckt2)	XXX.X min
	Daily Pumpout Limit (Ckt1 and Ckt2)	XXX.X min
	Chiller On—7 Days (Ckt1 and Ckt2)	XXX.X min
	Pumpout Chiller On—7 Days (Ckt1 and Ckt2)	XXX.X min
	Pumpout Chiller Off—7 Days (Ckt1 and Ckt2)	XXX.X min
	Pumpout—Life (Ckt1 and Ckt2)	XXX.X min
	Purge Rfgt Compressor Suction Temp (Ckt1 and Ckt2)	XXX.X °F/°C
	Purge Liquid Temp (Ckt1 and Ckt2)	XXX.X °F/°C
	Purge Carbon Tank Temp (Ckt1 and Ckt2)	XXX.X °F/°C

Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

ASHRAE Chiller Log

Note: The ASHRAE Chiller Log contains those items recommended by ASHRAE Std 147 Standard 147-2002, Reducing Release of Halogenated Refrigerants from Refrigeration and Air-Conditioning Equipment and Systems.

Data name	Value
Current Date/Time	User-selected date/time format
Chiller Top Level Mode	Dependent on chiller type
Evap Entering Water Temp	XXX.X °F/C°
Evap Leaving Water Temp	XXX.X °F/C°
Evap Water Flow Status	Flow/No Flow
Evap Differential Wtr Press	XXX.X PSI/kPa
Approx Evap Water Flow	XXX.X gpm/lpm
Calculated Chiller Capacity	XXXX tons/kW
Refrigerant Type	R123
Refrigerant Monitor	XXX.X ppm
Active Chilled Water Setpoint	XXX.X F°/C°
Active Current Limit Setpoint	XXX.X %
Cond Entering Water Temp	XXX.X °F/C°
Cond Leaving Water Temp	XXX.X °F/C°
Cond Water Flow Status	Flow/No Flow
Cond Differential Wtr Press	XXX.X PSI/kPa
Approx Cond Water Flow	XXXX gpm/lpm
Top Level Operating Mode (Ckt1 and Ckt2)	Dependent on chiller type
Evaporator Saturated Rfght Temp (Ckt1 and Ckt2)	XXX.X °F/C°
Evaporator Refrigerant Pressure (Ckt1 and Ckt2)	XXX.X PSI/kPa
Evaporator Approach Temp (Ckt1 and Ckt2)	XXX.X °F/C°
Condenser Saturated Rfght Temp (Ckt1 and Ckt2)	XXX.X °F/C°
Condenser Refrigerant Pressure (Ckt1 and Ckt2)	XXX.X PSI/kPa
Condenser Approach Temperature (Ckt1 and Ckt2)	XXX.X °F/C°
Compressor Starts (Ckt1 and Ckt2)	XXXX
Compressor Running Time (Ckt1 and Ckt2)	XX:XX Hr:Min
Compressor Refrigerant Discharge Temperature (Ckt1 and Ckt2)	XXX.X °F/C°
Oil Pump Discharge Pressure (Ckt1 and Ckt2)	XXX.X PSI/kPa
Oil Tank Pressure (Ckt1 and Ckt2)	XXX.X PSI/kPa
Oil Differential Pressure (Ckt1 and Ckt2)	XXX.X PSI/kPa
Oil Tank Temperature (Ckt1 and Ckt2)	XXX.X °F/C°
Inboard Bearing Temp (Ckt1 and Ckt2)	XXX.X °F/C°
Outboard Bearing Temp (Ckt1 and Ckt2)	XXX.X F°/C°



Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

Data name	Value
Daily Pumpout—24 Hrs (Ckt1 and Ckt2)	XXX.X Min
Daily Pumpout Limit (Ckt1 and Ckt2)	XXX.X Min
Pumpout—Life (Ckt1 and Ckt2)	XXXXXX.X Hours
Purge Top Level Mode (Ckt1 and Ckt2)	On/Auto/Adaptive/Stop
Purge Operating Mode (Ckt1 and Ckt2)	On/Auto/Adaptive/Stop
Starter Current L1 (Ckt1 and Ckt2)	XXXX A
Starter Current L2 (Ckt1 and Ckt2)	XXXX A
Starter Current L3 (Ckt1 and Ckt2)	XXXX A
Starter Voltage Phase AB (Ckt1 and Ckt2)	XXXX V
Starter Voltage Phase BC (Ckt1 and Ckt2)	XXXX V
Starter Voltage Phase CA (Ckt1 and Ckt2)	XXXX V

Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

Items available to include in custom reports

Subsystem	Description
Chiller	Active Base Loading Setpoint
	Active Base Loading Setpoint Source
	Application Part Number
	Version
	Chiller Heating or Cooling Mode
	Chiller Top Level Mode
Evaporator	Active Chilled Water Setpoint
	Active Chilled Water Setpoint Source
	BAS Chilled Water Setpoint
	Evaporator Approach Temperature (Ckt1 and Ckt2)
	Evaporator Entering Water Temperature
	Evaporator Leaving Water Temperature
	Evaporator Pump Override
	Evaporator Pump Override Time Remaining
	Evaporator Refrigerant Pressure (Ckt1 and Ckt2)
	Evaporator Saturated Refrigerant Temperature (Ckt1 and Ckt2)
	Evaporator Water Flow Status
	Active Ice Termination Setpoint
	Active Ice Termination Setpoint Source
	Calculated Chiller Capacity
	Approx Evap Water Flow
	Evap Differential Wtr Pressure
	External Chilled Water Setpoint
	Front Panel Ice Building Command



Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

Subsystem	Description
Compressor	Chiller Control Signal
	Active Base Loading Setpoint
	Active Base Loading Setpoint Source
	Compressor Refrigerant Discharge Temperature (Ckt1 and Ckt2)
	Compressor Running Status (Ckt1 and Ckt2)
	Compressor Running Time (Ckt1 and Ckt2)
	Compressor Starts (Ckt1 and Ckt2)
	Inboard Bearing Temperature (Ckt1 and Ckt2)
	IGV1 Position (Ckt1 and Ckt2)
	IGV1 Percent Open (Ckt1 and Ckt2)
	IGV2 Position (Ckt1 and Ckt2)
	IGV2 Percent Open (Ckt1 and Ckt2)
	Oil Differential Pressure (Ckt1 and Ckt2)
	Oil Heater Command (Ckt1 and Ckt2)
	Oil Pump Control (Ckt1 and Ckt2)
	Oil Pump Command (Ckt1 and Ckt2)
	Oil Pump Discharge Pressure (Ckt1 and Ckt2)
	Oil Pump Override Time Remaining
	Oil Tank Pressure (Ckt1 and Ckt2)
	Oil Tank Temperature (Ckt1 and Ckt2)
Oil Pump Override Time Remaining (Ckt1 and Ckt2)	
Outboard Bearing Temperature (Ckt1 and Ckt2)	
Inboard Bearing Temperature (Ckt1 and Ckt2)	
Condenser	Condenser Approach Temperature (Ckt1 and Ckt2)
	Condenser Entering Water Temperature (Ckt1 and Ckt2)
	Condenser Leaving Water Temperature (Ckt1 and Ckt2)
	Condenser Refrigerant Pressure (Ckt1 and Ckt2)
	Condenser Saturated Refrigerant Temperature (Ckt1 and Ckt2)
	Condenser Water Flow Status
	Condenser Pump Override Time Remaining
	Condenser Pump Override
	Active Hot Water Setpoint
	Active Hot Water Setpoint Source
	Approx Cond Water Flow
	Cond Differential Wtr Press
	Outdoor Air Temperature

Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

Subsystem	Description
Motor	Active Current Limit Setpoint
	Active Current Limit Setpoint Source
	BAS Current Limit Setpoint
	External Current Limit Setpoint
	AFD DC Bus Voltage (Ckt1 and Ckt2)
	AFD Output Power (Ckt1 and Ckt2)
	AFD Transistor Temperature (Ckt1 and Ckt2)
	Starter Power Consumption (Ckt1 and Ckt2)
	Starter Load Power Factor (Ckt1 and Ckt2)
	Speed (Ckt1 and Ckt2)
	Frequency (Ckt1 and Ckt2)
	Generator Frequency Command (Ckt1 and Ckt2)
	Generator Speed Signal (Ckt1 and Ckt2)
	Average Line Current %RLA (Ckt1 and Ckt2)
	Motor Winding Temperature 1 (Ckt1 and Ckt2)
	Motor Winding Temperature 2 (Ckt1 and Ckt2)
	Motor Winding Temperature 3 (Ckt1 and Ckt2)
	Phase Unbalance (Ckt1 and Ckt2)
	Restart Inhibit Time (MP) (Ckt1 and Ckt2)
	Starter Average Phase Voltage (Ckt1 and Ckt2)
	Starter Current L1 %RLA (Ckt1 and Ckt2)
	Starter Current L1 (Ckt1 and Ckt2)
	Starter Current L2 %RLA (Ckt1 and Ckt2)
	Starter Current L2 (Ckt1 and Ckt2)
	Starter Current L3 %RLA (Ckt1 and Ckt2)
	Starter Current L3 (Ckt1 and Ckt2)
	Starter Energy Consumption Not Resettable (Ckt1 and Ckt2)
	Starter Energy Consumption Resettable (Ckt1 and Ckt2)
	Starter Energy Consumption Last Reset (Ckt1 and Ckt2)
	Starter Power Demand (Ckt1 and Ckt2)
	Starter Voltage Phase AB (Ckt1 and Ckt2)
	Starter Voltage Phase BC (Ckt1 and Ckt2)
	Starter Voltage Phase CA (Ckt1 and Ckt2)



Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

Subsystem	Description
Purge	Purge Top Level Mode (Ckt1 and Ckt2)
	Average Daily Pumpout—7 Days (Ckt1 and Ckt2)
	Carbon Regen Cycles (Ckt1 and Ckt2)
	Chiller On—7 Days (Ckt1 and Ckt2)
	Daily Pumpout—24 Hours (Ckt1 and Ckt2)
	Pumpout Chiller Off—7 Days (Ckt1 and Ckt2)
	Pumpout Chiller On—7 Days (Ckt1 and Ckt2)
	Pumpout—Life (Ckt1 and Ckt2)
	Purge Carbon Tank Temp (Ckt1 and Ckt2)
	Purge Liquid Temperature (Ckt1 and Ckt2)
	Purge Refrigerant Compressor Suction Temp (Ckt1 and Ckt2)
	Time at Last Regeneration (Ckt1 and Ckt2)
	Time Until Next Purge Run (Ckt1 and Ckt2)

Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

Data Graph Data Points

This appendix contains:

- Data points used in the default data graphs, organized by graph
- Data points available to include in custom data graphs, organized by component

Data Points Used in Default Data Graphs

Chiller Overview 1

Graph data point	Axis
Active Chilled Water Setpoint	Left Y-axis
Active Hot Water Setpoint	Left Y-axis
Evaporator Leaving Evaporator Temperature	Left Y-axis
Evaporator Entering Water Temperature	Left Y-axis
Condenser Leaving Water Temperature	Left Y-axis
Condenser Entering Water Temperature	Left Y-axis
Calculated Chiller Capacity	Right Y-axis

Chiller Overview 2

Graph data point	Axis
Average Line Current % RLA (Ckt1 and Ckt2)	Left Y-axis
Frequency (Hz) (Ckt1 and Ckt2)	Left Y-axis
Differential Oil Pressure (Ckt1 and Ckt2)	Left Y-axis

Evaporator

Graph data point	Axis
Active Chilled Water Setpoint	Left Y-axis
Evaporator Leaving Water Temperature	Left Y-axis
Evaporator Entering Water Temperature	Left Y-axis
Evaporator Saturated Refrigerant Temperature (Ckt1 and Ckt2)	Left Y-axis
Approximate Evaporator Water Flow	Right Y-axis



Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

Condenser

Graph data point	Axis
Active Hot Water Setpoint	Left Y-axis
Condenser Leaving Water Temperature	Left Y-axis
Condenser Entering Water Temperature	Left Y-axis
Condenser Saturated Refrigerant Temperature (Ckt1 and Ckt2)	Left Y-axis
Approximate Condenser Water Flow	Right Y-axis

Compressor

Graph data point	Axis
Average Line Current % RLA (Ckt1 and Ckt2)	Left Y-axis
Active Current Limit Setpoint	Left Y-axis
AFD Frequency (Ckt1 and Ckt2)	Left Y-axis
IGV 1 Percent Open (Ckt1 and Ckt2)	Left Y-axis
Chiller Control Signal (Ckt1 and Ckt2)	Left Y-axis
Compressor Refrigerant Discharge Temperature (Ckt1 and Ckt2)	Right Y-axis

Oil System

Graph data point	Axis
Oil Differential Pressure (Ckt1 and Ckt2)	Left Y-axis
Oil Tank Pressure (Ckt1 and Ckt2)	Left Y-axis
Oil Pump Discharge Pressure (Ckt1 and Ckt2)	Left Y-axis
Oil Tank Temperature (Ckt1 and Ckt2)	Right Y-axis
Outboard Bearing Temperature (Ckt1 and Ckt2)	Right Y-axis
Inboard Bearing Temperature (Ckt1 and Ckt2)	Right Y-axis

Motor

Graph data point	Axis
Starter Current L1 % RLA (Ckt1 and Ckt2)	Left Y-axis
Starter Current L2 % RLA (Ckt1 and Ckt2)	Left Y-axis
Starter Current L3 % RLA (Ckt1 and Ckt2)	Left Y-axis
Starter Voltage Phase AB (Ckt1 and Ckt2)	Right Y-axis
Starter Voltage Phase BC (Ckt1 and Ckt2)	Right Y-axis
Starter Voltage Phase CA (Ckt1 and Ckt2)	Right Y-axis

Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

Motor Temperature

Graph data point	Axis
Motor Winding Temperature 1 (Ckt1 and Ckt2)	Left Y-axis
Motor Winding Temperature 2 (Ckt1 and Ckt2)	Left Y-axis
Motor Winding Temperature 3 (Ckt1 and Ckt2)	Left Y-axis
AFD Transistor Temperature (Ckt1 and Ckt2)	Left Y-axis

Purge

Graph data point	Axis
Daily Pumpout—24 Hours (Ckt1 and Ckt2)	Left Y-axis
Pumpout Chiller On—7 Days (Ckt1 and Ckt2)	Left Y-axis
Pumpout Chiller Off—7 Days (Ckt1 and Ckt2)	Left Y-axis
Average Daily Pumpout—7 Days (Ckt1 and Ckt2)	Right Y-axis
Purge Refrigerant Compressor Suction Temperature (Ckt1 and Ckt2)	Right Y-axis
Purge Liquid Temperature (Ckt1 and Ckt2)	Right Y-axis

Approach Temperature

Graph data point	Axis
Evaporator Approach Temperature (Ckt1 and Ckt2)	Left Y-axis
Condenser Approach Temperature (Ckt1 and Ckt2)	Left Y-axis
Approximate Evaporator Water Flow (Ckt1 and Ckt2)	Right Y-axis
Approximate Condenser Water Flow (Ckt1 and Ckt2)	Right Y-axis
Average Line Current %RLA (Ckt1 and Ckt2)	Right Y-axis



Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

Data Points Available to Include in Custom Data Graphs

Component	Graph data point
Evaporator	Active Chilled Water Setpoint
	Evaporator Leaving Evaporator Temperature
	Evaporator Entering Water Temperature
	Evaporator Saturated Refrigerant Temperature (Ckt1 and Ckt2)
	Evaporator Refrigerant Pressure (Ckt1 and Ckt2)
	Approximate Evaporator Water Flow
	Evaporator Differential Water Pressure
	Calculated Chiller Capacity
	Evaporator Approach Temperature (Ckt1 and Ckt2)
	Active Ice Termination Setpoint
Condenser	Active Hot Water Setpoint
	Condenser Leaving Water Temperature
	Condenser Entering Water Temperature
	Condenser Saturated Refrigerant Temperature (Ckt1 and Ckt2)
	Outdoor Air Temperature
	Condenser Refrigerant Pressure (Ckt1 and Ckt2)
	Condenser Approach Temperature (Ckt1 and Ckt2)
	Approximate Condenser Water Flow (Ckt1 and Ckt2)
	Condenser Differential Water Pressure
Compressor	Chiller Control Signal
	Oil Tank Pressure (Ckt1 and Ckt2)
	Oil Pump Discharge Pressure (Ckt1 and Ckt2)
	Oil Differential Pressure (Ckt1 and Ckt2)
	Oil Tank Temperature (Ckt1 and Ckt2)
	Inboard Bearing Temperature (Ckt1 and Ckt2)
	Outboard Bearing Temperature (Ckt1 and Ckt2)
	IGV 1 Percent Open (Ckt1 and Ckt2)
	IGV 1 Position (Ckt1 and Ckt2)
	IGV 2 Percent Open (%) (Ckt1 and Ckt2)
	IGV 2 Position (Ckt1 and Ckt2)
	Compressor Refrigerant Discharge Temperature (Ckt1 and Ckt2)

Appendix B: Data for CenTraVac Duplex CDHF and CDHG Chillers

Component	Graph data point
Motor	Active Current Limit Setpoint
	AFD Frequency (Ckt1 and Ckt2)
	Average Line Current (% RLA) (Ckt1 and Ckt2)
	Starter Current L1 % RLA (Ckt1 and Ckt2)
	Starter Current L2 % RLA (Ckt1 and Ckt2)
	Starter Current L3 % RLA (Ckt1 and Ckt2)
	Starter Current L1 (Ckt1 and Ckt2)
	Starter Current L2 (Ckt1 and Ckt2)
	Starter Current L3 (Ckt1 and Ckt2)
	Starter Voltage AB (Ckt1 and Ckt2)
	Starter Voltage BC (Ckt1 and Ckt2)
	Starter Voltage CA (Ckt1 and Ckt2)
	Motor Winding Temperature 1 (Ckt1 and Ckt2)
	Motor Winding Temperature 2 (Ckt1 and Ckt2)
	Motor Winding Temperature 3 (Ckt1 and Ckt2)
	AFD Transistor Temperature (Ckt1 and Ckt2)
	Starter Power Demand (Ckt1 and Ckt2)
	Starter Load Power Factor (Ckt1 and Ckt2)
	Starter Average Phase Voltage (Ckt1 and Ckt2)
Generator Frequency Command (Ckt1 and Ckt2)	
Purge	Daily Pumpout—24 Hours (Ckt1 and Ckt2)
	Pumpout Chiller On—7 Days (Ckt1 and Ckt2)
	Pumpout Chiller Off—7 Days (Ckt1 and Ckt2)
	Average Daily Pumpout—7 Days (Ckt1 and Ckt2)
	Purge Refrigerant Compressor Suction Temperature (Ckt1 and Ckt2)
	Purge Liquid Temperature (Ckt1 and Ckt2)
	Purge Carbon Tank Temperature (Ckt1 and Ckt2)



Trane optimizes the performance of homes and buildings around the world. A business of Ingersoll Rand, the leader in creating and sustaining safe, comfortable and energy efficient environments, Trane offers a broad portfolio of advanced controls and HVAC systems, comprehensive building services, and parts. For more information, visit www.Trane.com.

Trane has a policy of continuous product and product data improvement and reserves the right to change design and specifications without notice.

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Supersedes CTV-SVU01C-EN 14 Jul 2008





Integration Guide

BACnet® and Modbus® Communication Interfaces for Agility™ Water-cooled Chillers with Tracer® AdaptiView™ Control



X13641458001

⚠ SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

May 2018

BAS-SVP036A-EN



Introduction

Interoperability provides the capability for building control systems or devices from multiple vendors to communicate with each other through open, standard protocols. Trane has adopted open, standard inter-operable protocols to give customers the flexibility to choose the best possible vendor for their building subsystems and easily incorporate Trane products into legacy systems in existing buildings.

Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.



Indicates a situation that could result in equipment or property-damage only accidents.

⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.

All field wiring **MUST** be performed by qualified personnel. Improperly installed and grounded field wiring poses **FIRE** and **ELECTROCUTION** hazards. To avoid these hazards, you **MUST** follow requirements for field wiring installation and grounding as described in **NEC** and your local/state/national electrical codes.

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury.

Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, **MUST** follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- Before installing/servicing this unit, technicians **MUST** put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). **ALWAYS** refer to appropriate Material Safety Data Sheets (MSDS)/Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.
- When working with or around hazardous chemicals, **ALWAYS** refer to the appropriate MSDS/SDS and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.
- If there is a risk of energized electrical contact, arc, or flash, technicians **MUST** put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, **PRIOR** to servicing the unit. **NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

⚠ WARNING**Follow EHS Policies!**

Failure to follow instructions below could result in death or serious injury.

- All Ingersoll Rand personnel must follow Ingersoll Rand Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. All policies can be found on the [BOS site](#). Where local regulations are more stringent than these policies, those regulations supersede these policies.
- Non-Ingersoll Rand personnel should always follow local regulations.

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Protocols

BACnet Protocol

The Building Automation and Control Network (BACnet®) protocol is ANSI/ASHRAE Standard 135. This standard allows building automation systems or components from different manufacturers to share information and control functions. BACnet® provides building owners the capability to connect various types of building control systems or subsystems together for many uses. Multiple vendors can use this protocol to share information for monitoring and supervisory control between systems and devices in a multi-vendor interconnected system. The BACnet® protocol defines standard objects (data points) called BACnet® objects. Each object has a defined list of properties that provide context information about that object. In addition, BACnet® defines a number of application services that are used to interact with objects in a BACnet® device.

BACnet Testing Laboratory (BTL) Certification

The UC800 Controller supports the BACnet® communication protocol. In addition, some revisions of the UC800 firmware have been tested and have achieved BTL certification by an official BACnet® testing laboratory. For more details, refer to the BTL web site at www.bacnetinternational.org.

Modbus Protocol

Modicon Communication Bus (Modbus®) is a layer-messaging protocol application which, like BACnet®, provides client/server communication between devices over a variety of networks. During communications on a Modbus® RTU network, the protocol determines how each controller knows its device address, recognizes a message addressed to its device, determines what action to take, and extracts any data or other information contained in the message. Controllers communicate using a master/slave technique, whereby, only one device (master) can initiate transactions (queries). Other devices (slaves) respond by supplying the requested data to the master or by taking the action requested in the query. The master can address individual slaves or it can initiate a broadcast message to all slaves. In turn, the slaves respond to queries that are addressed to them individually or broadcasted. The Modbus® RTU protocol establishes the format for the master query by placing into it the device address, a function code defining the requested action, any data to be sent, and an error-checking field.

LonTalk Protocol

LonTalk™ is a communicating building automation system protocol. The LonTalk™ protocol is an open control networking standard in the ISO/IEC 14908 family of standards. LonTalk™ is published through ISO/IEC JTC 1/SC 6. The UC800 for Agility™ chillers use a separate LonTalk™ LLID (1K5) to network the chiller over twisted pair physical layer.

Note: For more information, refer to Hardware and Software Installation Guide: LonTalk Communication Interface for Trane Chillers with Tracer AdaptiView Control (ACC-SVN100*-EN)



UC800 Rotary Switches

Communication Interfaces

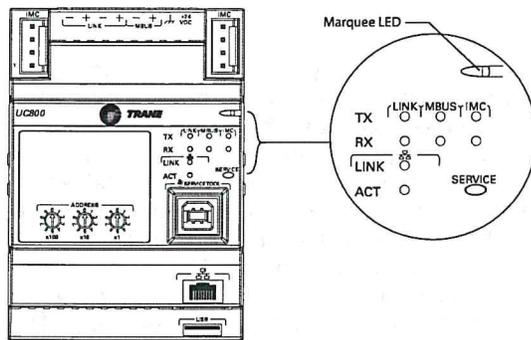
The UC800 supports the communication interfaces listed below. There is one set of terminations (link) for BACnet® and Modbus®. LonTalk™ communication interfaces connect to the IPC3 bus which is labeled as the MBUS connection.

- BACnet® MS/TP
- Modbus® Slave
- LonTalk™ using LCI-C (from the IPC3 bus)

Rotary Switches

There are three (3) rotary switches on the front of the UC800 (shown below) used to define a three-digit address when the UC800 is installed in a BACnet® or Modbus® RTU system (for example, 107, 127, and so on). Valid MAC addresses are 001 to 127 for BACnet® and 001 to 247 for Modbus® RTU. For additional information about setting higher addresses, refer to the section, Device ID.

Figure 1. Rotary switches and LEDs



- **Marquee LED**
 - Shows solid green when the UC800 is powered and operating normally.
 - Shows solid red when the UC800 is powered, but represents low power or a malfunction.
 - Blinks red when an alarm exists.
- **LINK, Machine Bus (MBUS), IMC**
 - The TX LED blinks green at the data transfer rate when the UC800 transfers data to other devices on the link.
 - The RX LED blinks yellow at the data transfer rate when the UC800 receives data from other devices on the link.
- **Ethernet Link**
 - The LINK LED shows solid green if the Ethernet link is connected and communicating.
 - The ACT LED blinks yellow at the data transfer rate when data flow is active on the link.
- **Service**
 - Service button.



Equivalent Data Points

Agility Chillers for BACnet/Modbus RTU

The following table provides a quick reference to equivalent data point objects names for Agility™ chillers when using either BACnet® or Modbus® RTU communications.

Note: The table is sorted alphabetically by data point names.

Table 1. Agility chiller BACnet/Modbus equivalents

Data Point Object Name	BACnet Type	Instance	BACnet Property Values	Relinquish Default	Modbus Reg	Modbus Reg Type
Active Base Loading Setpoint	AI	1	Real		30003	Percent
Active Base Loading Setpoint Source	MI	2	1 = Front Panel 2 = External 3 = Ice Machine 4 = BAS	1 = Front Panel	30077	Enum 0 = Front Panel 1 = External 2 = Ice Machine 3 = BAS
Active Chilled Water Setpoint Source	MI	3	1 = Front Panel 2 = External 3 = Ice Machine 4 = BAS	1 = Front Panel	30078	Enum 0 = Front Panel 1 = External 2 = Ice Machine 3 = BAS
Active Cool/Heat Setpoint Temperature	AI	3	Real		30004	Temp
Active Demand Limit Setpoint	AI	4	Real		30005	Percent
Active Demand Limit Setpoint Source	MI	4	1 = Front Panel 2 = External 3 = Ice Machine 4 = BAS	1 = Front Panel	30079	Enum 0 = Front Panel 1 = External 2 = Ice Machine 3 = BAS
Active Hot Water Setpoint Source	MI	5	1 = Front Panel 2 = External 3 = Ice Machine 4 = BAS	1 = Front Panel	30080	Enum 0 = Front Panel 1 = External 2 = Ice Machine 3 = BAS
AFD Average Motor Current % RLA	AI	5	Real		30006	Percent
AFD Calculated Motor Voltage	AI	6	Real		30007	Voltage
AFD DC Bus Voltage	AI	7	Real		30008	Voltage
AFD Frequency Command	AI	8	Real		30009	Percent
AFD Heatsink Temperature	AI	9	Real		30010	Temp
AFD Motor Current U	AI	10	Real		30011	Current
AFD Motor Current U % RLA	AI	11	Real		30012	Percent
AFD Motor Current V	AI	12	Real		30013	Current
AFD Motor Current V % RLA	AI	13	Real		30014	Percent
AFD Motor Current W	AI	14	Real		30015	Current
AFD Motor Current W % RLA	AI	15	Real		30016	Percent
AFD Output Power	AI	16	Real		30017	Power
AFD Percent Speed	AI	17	Real		30018	Percent
Alarm Present	BI	10	0 = No 1 = Yes	0 = No	30060	BINARY
Approx Cond Water Flow	AI	18	Real		30019	Flow, water
Approx Evap Water Flow	AI	19	Real		30020	Flow, water
BAS Base Loading Enable	BV	1	0 = Disable 1 = Enable	0 = Disable	40007	Binary
BAS Base Loading Setpoint	AV	1	Real	50	40006	Percent
BAS Chilled Water Setpoint	AV	2	Real	6.7	40003	Temp
BAS Chiller Auto Stop Command	MV	1	1 = Stop 2 = Auto	2 = Auto	40001	Binary 0 = Stop 1 = Auto
BAS Chiller Mode Command	MV	2	1 = Cool 2 = Heat 3 = Ice	1 = Cool	40002	Enum 0 = Cool 1 = Heat 2 = Ice

Equivalent Data Points

Table 1. Agility chiller BACnet/Modbus equivalents (continued)

Data Point Object Name	BACnet Type	Instance	BACnet Property Values	Relinquish Default	Modbus Reg	Modbus Reg Type
BAS Demand Limit Setpoint	AV	3	Real	100	40004	Percent
BAS Diagnostic Reset	BV	2	0 = False 1 = True	0 = False	40008	Binary
BAS Hot Water Setpoint	AV	4	Real	54.4	40005	Temp
Base Loading	BI	13	0 = Inactive 1 = Active	0 = Inactive	30061	BINARY
Calculated Chiller Capacity	AI	20	Real		30021	Power
Chiller Control Mode	MI	1	1 = Cool 2 = Heat 3 = Ice	1 = cool	30081	Enum 0 = Cool 1 = Heat 2 = Ice
Chiller Running State	BI	14	0 = No 1 = Yes	0 = no	30062	BINARY
Chiller Running Status	MI	6	1 = Not Running 2 = Starting 3 = Running 4 = Stopping	1 = Not Running	30082	Enum 0 = Not Running 1 = Starting 2 = Running 3 = Stopping
Compressor Bearing Temperature 1	AI	21	Real		30022	Temp
Compressor Bearing Temperature 2	AI	22	Real		30023	Temp
Compressor Refrigerant Discharge Temperature	AI	23	Real		30024	Temp
Compressor Running	MI	7	0 = Off 1 = On	0 = Off	30083	Enum 0 = Stopped 1 = Running 2 = Alarm
Compressor Running Time	AI	24	Real		30025, 30026	Time
Compressor Starts	AI	25	Real		30027, 30028	Count
Cond Differential Wtr Press	AI	26	Real		30029	Differential Pressure
Condenser Entering Water Temperature	AI	27	Real		30030	Temp
Condenser Leaving Water Temperature	AI	28	Real		30031	Temp
Condenser Refrigerant Pressure	AI	29	Real		30032	Pressure
Condenser Saturated Rfgt Temp	AI	30	Real		30033	Temp
Condenser Water Flow	BI	66	0 = No Flow 1 = Flow	0 = No Flow	30063	BINARY
Condenser Water Pump Command	BI	70	0 = Off (Pump Off) 1 = On (Pump On)	0 = Off	30064	BINARY
Differential Refrigerant Pressure	AI	31	Real		30034	Differential Pressure
Emergency Stop	BI	75	0 = Inactive 1 = Active	0 = Inactive	30065	BINARY
Evap Differential Wtr Press	AI	32	Real		30035	Differential Pressure
Evaporator Entering Water Temperature	AI	33	Real		30036	Temp
Evaporator Leaving Water Temperature	AI	34	Real		30037	Temp
Evaporator Refrigerant Pressure	AI	35	Real		30038	Pressure
Evaporator Saturated Rfgt Temp	AI	36	Real		30039	Temp
Evaporator Water Flow	BI	79	0 = No Flow 1 = Flow	0 = No Flow	30066	BINARY
Evaporator Water Pump Command	BI	83	0 = Off (Pump Off) 1 = On (Pump On)	0 = Off	30067	BINARY
External Auto Stop	MI	8	0 = Stop 1 = Auto	0 = Stop	30084	BINARY
External Base Loading Setpoint	AI	37	Real		30040	Percent
External Chilled Water Setpoint	AI	38	Real		30041	Temp
External Demand Limit Setpoint	AI	39	Real		30042	Percent
Front Panel Auto/Stop	MI	9	0 = Stop 1 = Auto	0 = Stop	30085	BINARY

Table 1. Agility chiller BACnet/Modbus equivalents (continued)

Data Point Object Name	BACnet Type	Instance	BACnet Property Values	Relinquish Default	Modbus Reg	Modbus Reg Type
Front Panel Base Loading Command	BI	88	0 = Auto 1 = On	0 = Auto	30068	BINARY
Front Panel Base Loading Setpoint	AI	40	Real		30043	Percent
Front Panel Chilled Water Setpoint	AI	41	Real		30044	Temp
Front Panel Chiller Mode	MI	10	1 = Cool 2 = Heat 3 = Ice	1 = Cool	30086	Enum 0 = Cool 1 = Heat 2 = Ice
Front Panel Demand Limit Setpoint	AI	42	Real		30045	Percent
Front Panel Hot Water Setpoint	AI	43	Real		30046	Temp
Head Relief Request Relay	BI	89	0 = Inactive 1 = Active	0 = Inactive	30069	BINARY
IGV Percent Open	AI	44	Real		30047	Percent
Last Logged Diagnostic Spec ID	Not applicable	Not applicable	Not applicable		30088/30089	Enum
Limit Mode Relay Status	BI	104	0 = Inactive 1 = Active	0 = Inactive	30070	BINARY
Local Setpoint Control	BI	105	0 = No 1 = Yes	0 = No	30071	BINARY
Manual Override Exists	BI	114	0 = No 1 = Yes	0 = No	30072	BINARY
Maximum Capacity Relay	BI	115	0 = Inactive 1 = Active	0 = Inactive	30073	BINARY
Motor Winding Temp #1	AI	45	Real		30048	Temp
Motor Winding Temp #2	AI	46	Real		30049	Temp
Motor Winding Temp #3	AI	47	Real		30050	Temp
Number of Circuits	AI	48	Real		30051	Count
Number of Compressors, Circuit 1	AI	49	Real		30052	Count
Number of Compressors, Circuit 2	AI	50	Real		30053	Count
Outdoor Air Temperature	AI	51	Real		30054	Temp
Refrigerant Monitor	AI	52	Real		30055	Concentration
Refrigerant Type	MI	12	1 = R134a 15 = R513A	1 = R134a	30090	0 = R134a 14 = R513A
Run Enable	BI	139	0 = No 1 = Yes	0 = No	30074	BINARY
Setpoint Source	MI	11	1 = BAS/Ext/FP 2 = Ext/FP 3 = Front Panel	1 = BAS/Ext/FP	30087	Enum 0 = BAS/Ext/FP 1 = Ext/FP 2 = Front Panel
Software Revision	Not applicable	Not applicable	Real		30002	Not applicable
Software Type	Not applicable	Not applicable	Real		30001	Not applicable
Unit Power Consumption	AI	53	Real		30056	Power



BACnet

The Tracer® UC800 controller is an equipment unit controller that provides the equipment system sequences and performs closed-loop control. In addition, the UC800 integrates with other BACnet® systems and devices using BACnet® MS/TP.

BACnet Protocol Implementation Conformance Statement (PICS)

Standardized Device Profile (Annex L)

BACnet Operator Workstation (B-OWS)	
BACnet Building Controller (B-BC)	
BACnet Advanced Application Controller (B-AAC)	
BACnet Application Specific Controller (B-ASC)	X
BACnet Smart Sensor (B-SS)	
BACnet Smart Actuator (B-SA)	

Interoperability Building Blocks (Annex K)

Data Sharing	Supported
ReadProperty-B (DS-RP-B)	X
ReadPropertyMultiple-B (DS-RPM-B)	X
WriteProperty-B (DS-WP-B)	X
WritePropertyMultiple-B (DS-WPM-B)	X
Alarm and Event Management	Supported
Notification Internal-B (AE-N-I-B)	X
Alarm and Event-Information-B (AE-INFO-B)	X
Device Management Description	Supported
Dynamic Device Binding-A (DM-DDB-A)	X
Dynamic Device Binding-B (DM-DDB-B)	X
Dynamic Object Binding-B (DM-DOB-B)	X
Time Synchronization-A (DM-TS-B)	X
UTC Time Synchronization-A (DM-UTC-B)	X

Object Types for Agility Chillers

Table 2. Descriptions and configurations

Object Type	Required Properties Read	Properties Written	Optional Properties Read	Ability to Create	Ability to Delete
Analog Input	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Units 	<ul style="list-style-type: none"> Object_Name Out_Of_Service 	Reliability	None	None
Analog Output	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Units Priority_Array Relinquish_Default 	<ul style="list-style-type: none"> Object_Name Present_Value Out_Of_Service Relinquish_Default 	Reliability	None	None
Analog Value	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Units 	<ul style="list-style-type: none"> Object_Name Present_Value Out_Of_Service Relinquish_Default 	<ul style="list-style-type: none"> Priority_Array Relinquish_Default Reliability 	None	None
Binary Input	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Polarity 	<ul style="list-style-type: none"> Object_Name Out_Of_Service Inactive_Text Active_Text 	<ul style="list-style-type: none"> Inactive_Text Active_Text Time_Delay Notification_Class Alarm_Value Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps Reliability 	None	None
Binary Output	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Polarity Priority_Array Relinquish_Default 	<ul style="list-style-type: none"> Object_Name Present_Value Out_Of_Service Relinquish_Default Inactive_Text Active_Text 	<ul style="list-style-type: none"> Inactive_Text Active_Text Reliability 	None	None

Table 2. Descriptions and configurations (continued)

Object Type	Required Properties Read	Properties Written	Optional Properties Read	Ability to Create	Ability to Delete
Binary Value	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service 	<ul style="list-style-type: none"> Object_Name Present_Value Out_Of_Service Inactive_Text Active_Text Relinquish_Default 	<ul style="list-style-type: none"> Inactive_Text Active_Text Priority_Array Relinquish_Default Reliability 	None	None
Device	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type System_Status Vendor_Name Vendor_Identifier Model_Name Firmware_Revision Application_Software_Version Protocol_Version Protocol_Revision Protocol_Services_Supported Protocol_Object_Types_Supported Object_List Max_APDU_Length_Accepted Segmentation_Supported APDU_Timeout Number_Of_APDU_Retries Device_Address_Binding Database_Revision 	Object_Name	<ul style="list-style-type: none"> Max_Segments_Accepted APDU_Segment_Timeout Max_Master Max_Info_Frames Local_Time Local_Date UTC_Offset Daylight_Savings_Status 	None	None
Multistate Input	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Number_Of_States 	<ul style="list-style-type: none"> Object_Name State_Text 	<ul style="list-style-type: none"> State_Text Reliability 	None	None
Multistate Output	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Number_Of_States Priority_Array Relinquish_Default 	<ul style="list-style-type: none"> Object_Name Present_Value Relinquish_Default State_Text 	<ul style="list-style-type: none"> State_Text Reliability 	None	None

Table 2. Descriptions and configurations (continued)

Object Type	Required Properties Read	Properties Written	Optional Properties Read	Ability to Create	Ability to Delete
Multistate Value	<ul style="list-style-type: none"> • Object_Identifier • Object_Name • Object_Type • Present_Value • Status_Flags • Event_State • Out_Of_Service • Number_Of_States 	<ul style="list-style-type: none"> • Object_Name • Present_Value • State_Text • Relinquish_Default 	<ul style="list-style-type: none"> • State_Text • Priority_Array • Relinquish_Default • Reliability 	None	None
Notification Class	<ul style="list-style-type: none"> • Object_Identifier • Object_Name • Object_Type • Notification_Class • Priority • Ack_Required • Recipient_List 	<ul style="list-style-type: none"> • Object_Name • Recipient_List 	None	None	None

Baud Rate, Device ID, and Supported Character Sets

- **Baud Rate**

MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400 (default), 76800, and 115200

- **Device ID**

The Device ID is used to uniquely identify each BACnet® device and it can be in the range of 0 to 4194302. There cannot be more than one device using the same Device ID. Each of the sample applications operates as a device and requires its own Device ID which defaults to the rotary dial settings.

- Current Device ID—The default Device ID is set to the Tracer® UC800 MAC address set on the rotary dials. The device ID can also be soft set using the Tracer® TU service tool.
- Soft Set Device ID—If the BACnet® protocol is being used, you can enter a soft set device ID using the Tracer® TU software.

Note: This is required if a device ID larger than 127 is needed.

- **Character Sets**

- ANSI X3.4
- ISO 10646 (UCS2)
- SO 8859-1

- **Units and Conversion Factors For Agility**

The UC800 communicates all units in System International (SI).

Measurement	UC800 Units	Conversion Factor
Concentration	PPM	Not applicable
Current	Amps	Not applicable
Flow, Air	Liters/Second	cfm = value x 2.12
Flow, Water	Liters/Minute	gpm = value x 0.264
Frequency	Hz	Not applicable
Power, Electrical	kW	Not applicable
Power, Cooling	kW	Tons = value x 0.284
Pressure	kPa	psi = value x 0.145
Temperature	°C	°F = (value x 1.8) + 32
Time	Seconds	Not applicable
Voltage	V	Not applicable



BACnet Agility Object Data Points and Configurations

Device Object

Object Name	Instance	Property Values
UC800 (Dev Instance)	Configurable	Non-applicable

Notification Class Objects

Trane Severity Level	Instance	Notification State and Priority
Warning	1	Events/Priority TO_OFFNORMAL 192 TO_FAULT 192 TO_NORMAL 192
Normal Shutdown	2	Events/Priority TO_OFFNORMAL 129 TO_FAULT 129 TO_NORMAL 129
Immediate Shutdown	3	Events/Priority TO_OFFNORMAL 128 TO_FAULT 128 TO_NORMAL 128

Read/Write Values (Sorted by Object Type and Instance)

Table 3. Agility chiller read/write values

Object Name	Object Type	Instance	Property Values	Relinquish Default	Range
BAS Chiller Auto Stop Command	MV	1	1 = Stop 2 = Auto	2 = Auto	1 or 2
BAS Chiller Mode Command	MV	2	1 = Cool 2 = Heat 3 = Ice	1 = Cool	1 to 3
BAS Base Loading Setpoint	AV	1	Real	50%	0 to 100%
BAS Chilled Water Setpoint	AV	2	Real	6.7°C/44°F	-17.78° to 23.9°C (0°F to 75°F)
BAS Demand Limit Setpoint	AV	3	Real	100%	0 to 100%
BAS Hot Water Setpoint	AV	4	Real	48.9°C/120°F	26.7°C to 60°C (80°F to 140°F)
BAS Base Loading Enable	BV	1	0 = Disable 1 = Enable	0 = Disable	0 or 1
BAS Diagnostic Reset	BV	2	0 = False 1 = True	0 = False	0 or 1

Read-Only Values (Sorted by Object Type and Instance)

Table 4. Agility chiller read-only values

Object Name	Object Type	Instance	Property Values	Relinquish Default
Chiller Control Mode	MI	1	1 = Cool 2 = Heat 3 = Ice	1 = Cool
Active Base Loading Setpoint Source	MI	2	1 = Front Panel 2 = External 3 = Ice Machine 4 = BAS	1 = Front Panel
Active Chilled Water Setpoint Source	MI	3	1 = Front Panel 2 = External 3 = Ice Machine 4 = BAS	1 = Front Panel

Table 4. Agility chiller read-only values (continued)

Object Name	Object Type	Instance	Property Values	Relinquish Default
Active Demand Limit Setpoint Source	MI	4	1 = Front Panel 2 = External 3 = Ice Machine 4 = BAS	1 = Front Panel
Active Hot Water Setpoint Source	MI	5	1 = Front Panel 2 = External 3 = Ice Machine 4 = BAS	1 = Front Panel
Chiller Running Status	MI	6	1 = Not Running 2 = Starting 3 = Running 4 = Stopping	1 = Not Running
Compressor Running	MI	7	0 = Off 1 = On	0 = Off
External Auto Stop	MI	8	0 = Stop 1 = Auto	0 = Stop
Front Panel Auto/Stop	MI	9	0 = Stop 1 = Auto	0 = Stop
Front Panel Chiller Mode	MI	10	1 = Cool 2 = Heat 3 = Ice	1 = Cool
Setpoint Source	MI	11	1 = BAS/Ext/FP 2 = Ext/FP 3 = Front Panel	1 = BAS/Ext/FP
Refrigerant Type	MI	12	1 = R-134a 15 = R-513A	1 = R-134a
Active Base Loading Setpoint	AI	1	%	
Active Cool/Heat Setpoint Temperature	AI	3	°C	
Active Demand Limit Setpoint	AI	4	%	
AFD Average Motor Current % RLA	AI	5	%	
AFD Calculated Motor Voltage	AI	6	V	
AFD DC Bus Voltage	AI	7	V	
AFD Frequency Command	AI	8	%	
AFD Heatsink Temperature	AI	9	°C	
AFD Motor Current U	AI	10	Amps	
AFD Motor Current U % RLA	AI	11	%	
AFD Motor Current V	AI	12	Amps	
AFD Motor Current V % RLA	AI	13	%	
AFD Motor Current W	AI	14	Amps	
AFD Motor Current W % RLA	AI	15	%	
AFD Output Power	AI	16	kW	
AFD Percent Speed	AI	17	%	
Approx Cond Water Flow	AI	18	lpm	
Approx Evap Water Flow	AI	19	lpm	
Calculated Chiller Capacity	AI	20	kW	
Compressor Bearing Temperature 1	AI	21	°C	
Compressor Bearing Temperature 2	AI	22	°C	
Compressor Refrigerant Discharge Temperature	AI	23	°C	
Compressor Running Time	AI	24	Secs	
Compressor Starts	AI	25	-	
Cond Differential Wtr Press	AI	26	kPa	
Condenser Entering Water Temperature	AI	27	°C	
Condenser Leaving Water Temperature	AI	28	°C	
Condenser Refrigerant Pressure	AI	29	kPa	
Condenser Saturated Rfgt Temp	AI	30	°C	

BACnet Agility Object Data Points and Configurations

Table 4. Agility chiller read-only values (continued)

Object Name	Object Type	Instance	Property Values	Relinquish Default
Differential Refrigerant Pressure	AI	31	kPa	
Evap Differential Wtr Press	AI	32	kPa	
Evaporator Entering Water Temperature	AI	33	°C	
Evaporator Leaving Water Temperature	AI	34	°C	
Evaporator Refrigerant Pressure	AI	35	kPa	
Evaporator Saturated Rfgt Temp	AI	36	°C	
External Base Loading Setpoint	AI	37	%	
External Chilled Water Setpoint	AI	38	°C	
External Demand Limit Setpoint	AI	39	%	
Front Panel Base Loading Setpoint	AI	40	%	
Front Panel Chilled Water Setpoint	AI	41	°C	
Front Panel Demand Limit Setpoint	AI	42	%	
Front Panel Hot Water Setpoint	AI	43	°C	
IGV Percent Open	AI	44	%	
Motor Winding Temp #1	AI	45	°C	
Motor Winding Temp #2	AI	46	°C	
Motor Winding Temp #3	AI	47	°C	
Number of Circuits	AI	48	Not applicable	
Number of Compressors, Circuit 1	AI	49	Not applicable	
Number of Compressors, Circuit 2	AI	50	Not applicable	
Outdoor Air Temperature	AI	51	°C	
Refrigerant Monitor	AI	52	ppm	
Unit Power Consumption	AI	53	kW	
Alarm Present	BI	10	0 = No 1 = Yes	0 = No
Base Loading	BI	13	0 = Inactive 1 = Active	0 = Inactive
Chiller Running State	BI	14	0 = No 1 = Yes	0 = No
Condenser Water Flow	BI	66	0 = No Flow 1 = Flow	0 = No Flow
Condenser Water Pump Command	BI	70	0 = Off (Pump Off) 1 = On (Pump On)	0 = Off
Emergency Stop	BI	75	0 = Inactive 1 = Active	0 = Inactive
Evaporator Water Flow	BI	79	0 = No Flow 1 = Flow	0 = No Flow
Evaporator Water Pump Command	BI	83	0 = Off (Pump Off) 1 = On (Pump On)	0 = Off
Front Panel Base Loading Command	BI	88	0 = Auto 1 = On	0 = Auto
Head Relief Request Relay	BI	89	0 = Inactive 1 = Active	0 = Inactive
Limit Mode Relay Status	BI	104	0 = Inactive 1 = Active	0 = Inactive
Local Setpoint Control	BI	105	0 = No 1 = Yes	0 = No
Manual Override Exists	BI	114	0 = No 1 = Yes	0 = No
Maximum Capacity Relay	BI	115	0 = Inactive 1 = Active	0 = Inactive
Run Enable	BI	139	0 = No 1 = Yes	0 = No



Diagnostics: Inputs With Alarming Capabilities (Sorted by Instance)

Table 5. Agility chiller diagnostics

Text (Display Text)	Object Type	Instance	Property Values	Relinquish Default	Diagnostic Reset Level
AFD Comm Loss: Main Processor	BI	1	0 = Off 1 = On	0 = Off	Remote
AFD Failure to Arm or Start	BI	2	0 = Off 1 = On	0 = Off	Local
AFD Fault	BI	3	0 = Off 1 = On	0 = Off	Local
AFD Ground Fault	BI	4	0 = Off 1 = On	0 = Off	Local
AFD Interrupt Failure	BI	5	0 = Off 1 = On	0 = Off	Local
AFD Mains Phase Loss	BI	6	0 = Off 1 = On	0 = Off	Local
AFD Motor Current Overload	BI	7	0 = Off 1 = On	0 = Off	Local
AFD Safe Stop	BI	8	0 = Off 1 = On	0 = Off	Local
AFD Short Circuit	BI	9	0 = Off 1 = On	0 = Off	Local
BAS Communication Lost	BI	11	0 = Off 1 = On	0 = Off	Remote
BAS Failed to Establish Communication	BI	12	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Adaptive Frequency Drive	BI	15	0 = Off 1 = On	0 = Off	Local
Comm Loss: Chiller % Capacity Output	BI	16	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Cprsr Discharge Rfgt Temp	BI	17	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Condenser Rfgt Pressure	BI	19	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Condenser Rfgt Pressure Output	BI	20	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Condenser Entering Water Temp	BI	21	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Condenser Leaving Water Temp	BI	22	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Condenser Liquid Level Sensor	BI	23	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Condenser Water Flow Measurement Sensor	BI	24	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Condenser Water Flow Switch	BI	25	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Condenser Water Pump Relay	BI	26	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Drive Cooling Supply Temperature	BI	27	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Drive Cooling Valve	BI	28	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Economizer Pressure	BI	29	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Economizer Temperature	BI	30	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Economizer Valve	BI	31	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Emergency Stop	BI	32	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Evap Entering Water Temp	BI	33	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Evap Leaving Water Temp	BI	34	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Evaporator EXV	BI	35	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Evaporator Refrigerant Pressure	BI	36	0 = Off 1 = On	0 = Off	Remote

BACnet Agility Object Data Points and Configurations

Table 5. Agility chiller diagnostics (continued)

Text (Display Text)	Object Type	Instance	Property Values	Relinquish Default	Diagnostic Reset Level
Comm Loss: Evaporator Water Flow Measurement Sensor	BI	37	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Evaporator Water Flow Switch	BI	38	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Evaporator Water Pump Relay	BI	39	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Ext Base Loading Command	BI	40	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Ext Base Loading Setpoint	BI	41	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Ext Chilled/Hot Water Setpoint	BI	42	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Ext Demand Limit Setpoint	BI	43	0 = Off 1 = On	0 = Off	Remote
Comm Loss: External Auto/Stop	BI	44	0 = Off 1 = On	0 = Off	Remote
Comm Loss: External Hot Water Command	BI	45	0 = Off 1 = On	0 = Off	Remote
Comm Loss: External Ice Building Command	BI	46	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Ice Building Status Relay	BI	47	0 = Off 1 = On	0 = Off	Remote
Comm Loss: IGV First Stage Actuator	BI	48	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Local BAS Interface	BI	49	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Magnetic Bearing Controller	BI	50	0 = Off 1 = On	0 = Off	Remote
Comm Loss: MBC Cooling Valve	BI	51	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Motor Cooling Valve	BI	52	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Motor Winding Temperature 1	BI	53	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Motor Winding Temperature 2	BI	54	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Motor Winding Temperature 3	BI	55	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Outdoor Air Temperature	BI	56	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Programmable Relay Board 1	BI	57	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Programmable Relay Board 2	BI	58	0 = Off 1 = On	0 = Off	Remote
Comm Loss: Refrigerant Monitor Input	BI	59	0 = Off 1 = On	0 = Off	Remote
Comm Loss: UPS Fault	BI	60	0 = Off 1 = On	0 = Off	Remote
Compressor Discharge Refrigerant Temp Sensor	BI	61	0 = Off 1 = On	0 = Off	Remote
Condenser Entering Water Temp Sensor	BI	62	0 = Off 1 = On	0 = Off	Remote
Condenser Leaving Water Temp Sensor	BI	63	0 = Off 1 = On	0 = Off	Remote
Condenser Liquid Level Sensor	BI	64	0 = Off 1 = On	0 = Off	Remote
Condenser Refrigerant Pressure Sensor	BI	65	0 = Off 1 = On	0 = Off	Remote
Condenser Water Flow Lost	BI	67	0 = Off 1 = On	0 = Off	Remote
Condenser Water Flow Measurement Sensor	BI	68	0 = Off 1 = On	0 = Off	Remote
Condenser Water Flow Overdue	BI	69	0 = Off 1 = On	0 = Off	Remote
Drive Cooling Supply Temperature Sensor	BI	71	0 = Off 1 = On	0 = Off	Remote
Economizer Pressure Sensor	BI	72	0 = Off 1 = On	0 = Off	Remote

Table 5. Agility chiller diagnostics (continued)

Text (Display Text)	Object Type	Instance	Property Values	Relinquish Default	Diagnostic Reset Level
Economizer Temperature Sensor	BI	73	0 = Off 1 = On	0 = Off	Remote
Emergency Stop	BI	74	0 = Off 1 = On	0 = Off	Local
Evaporator Entering Water Temp Sensor	BI	76	0 = Off 1 = On	0 = Off	See Criteria
Evaporator Leaving Water Temp Sensor	BI	77	0 = Off 1 = On	0 = Off	Remote
Evaporator Refrigerant Pressure Sensor	BI	78	0 = Off 1 = On	0 = Off	Remote
Evaporator Water Flow Lost	BI	80	0 = Off 1 = On	0 = Off	Remote
Evaporator Water Flow Measurement Sensor	BI	81	0 = Off 1 = On	0 = Off	Remote
Evaporator Water Flow Overdue	BI	82	0 = Off 1 = On	0 = Off	Remote
Extended Compressor Surge	BI	84	0 = Off 1 = On	0 = Off	Remote
External Base Loading Setpoint	BI	85	0 = Off 1 = On	0 = Off	Remote
External Chilled/Hot Water Setpoint	BI	86	0 = Off 1 = On	0 = Off	Remote
External Demand Limit Setpoint	BI	87	0 = Off 1 = On	0 = Off	Remote
High Compressor Refrigerant Discharge Temperature	BI	90	0 = Off 1 = On	0 = Off	Remote
High Condenser Liquid Level	BI	91	0 = Off 1 = On	0 = Off	Remote
High Condenser Pressure	BI	92	0 = Off 1 = On	0 = Off	Local
High Evaporator Refrigerant Pressure	BI	93	0 = Off 1 = On	0 = Off	Local
High Evaporator Water Temperature	BI	94	0 = Off 1 = On	0 = Off	Remote
High Motor Winding Temperature 1	BI	95	0 = Off 1 = On	0 = Off	Local
High Motor Winding Temperature 2	BI	96	0 = Off 1 = On	0 = Off	Local
High Motor Winding Temperature 3	BI	97	0 = Off 1 = On	0 = Off	Local
High Vacuum Lockout	BI	98	0 = Off 1 = On	0 = Off	Remote
Inverted Condenser Approach Temperature	BI	99	0 = Off 1 = On	0 = Off	Remote
Inverted Condenser Water Temperature	BI	100	0 = Off 1 = On	0 = Off	Remote
Inverted Evaporator Approach Temperature	BI	101	0 = Off 1 = On	0 = Off	Remote
Inverted Evaporator Water Temperature	BI	102	0 = Off 1 = On	0 = Off	Remote
LCI-C Software Mismatch: Use BAS Tool	BI	103	0 = Off 1 = On	0 = Off	Remote
Loss of Drive Cooling Control	BI	106	0 = Off 1 = On	0 = Off	Remote
Loss of MBC Cooling Control	BI	107	0 = Off 1 = On	0 = Off	Remote
Loss of Motor Cooling Control	BI	108	0 = Off 1 = On	0 = Off	Remote
Low Condenser Liquid Level	BI	109	0 = Off 1 = On	0 = Off	Remote
Low Evap Leaving Water Temp: Unit On	BI	110	0 = Off 1 = On	0 = Off	Remote
Low Evap Leaving Water Temp: Unit Off	BI	111	0 = Off 1 = On	0 = Off	Remote
Low Evaporator Refrigerant Temperature	BI	112	0 = Off 1 = On	0 = Off	Local
Low Evaporator Water Flow	BI	113	0 = Off 1 = On	0 = Off	Remote

BACnet Agility Object Data Points and Configurations

Table 5. Agility chiller diagnostics (continued)

Text (Display Text)	Object Type	Instance	Property Values	Relinquish Default	Diagnostic Reset Level
MBC Bearing Temperature 1	BI	116	0 = Off 1 = On	0 = Off	Remote
MBC Bearing Temperature 2	BI	117	0 = Off 1 = On	0 = Off	Remote
MBC Failed Centering	BI	118	0 = Off 1 = On	0 = Off	Local
MBC Failed Clearance Check	BI	119	0 = Off 1 = On	0 = Off	Remote
MBC Not Ready To Rotate	BI	121	0 = Off 1 = On	0 = Off	Remote
MBC Over Voltage	BI	122	0 = Off 1 = On	0 = Off	Remote
MBC Overspeed	BI	123	0 = Off 1 = On	0 = Off	Remote
MBC Parameter Table Not Set	BI	124	0 = Off 1 = On	0 = Off	Local
MBC PCB Temperature	BI	125	0 = Off 1 = On	0 = Off	Remote
MBC Rotation Detected Without Levitation	BI	126	0 = Off 1 = On	0 = Off	Remote
MBC Rotor Unbalance Alarm	BI	128	0 = Off 1 = On	0 = Off	Remote
MBC Shutdown Request	BI	129	0 = Off 1 = On	0 = Off	Remote
MBC Speed Sensor	BI	130	0 = Off 1 = On	0 = Off	Remote
MBC Under Voltage	BI	131	0 = Off 1 = On	0 = Off	Remote
Motor Winding Temperature 1 Sensor	BI	132	0 = Off 1 = On	0 = Off	Remote
Motor Winding Temperature 2 Sensor	BI	133	0 = Off 1 = On	0 = Off	Remote
Motor Winding Temperature 3 Sensor	BI	134	0 = Off 1 = On	0 = Off	Remote
MP: Invalid Configuration	BI	135	0 = Off 1 = On	0 = Off	N/A
MP: Reset Has Occurred	BI	136	0 = Off 1 = On	0 = Off	Remote
Outdoor Air Temp Sensor	BI	137	0 = Off 1 = On	0 = Off	Remote
Refrigerant Monitor Input	BI	138	0 = Off 1 = On	0 = Off	Remote
Software Error 1001: Call Trane Service	BI	140	0 = Off 1 = On	0 = Off	Local
Software Error 1002: Call Trane Service	BI	141	0 = Off 1 = On	0 = Off	Local
Software Error 1003: Call Trane Service	BI	142	0 = Off 1 = On	0 = Off	Local
Unexpected Starter Shutdown	BI	144	0 = Off 1 = On	0 = Off	Remote
UPS Fault	BI	145	0 = Off 1 = On	0 = Off	Remote
AFD UC800 Speed Mismatch	BI	146	0 = Off 1 = On	0 = Off	Local



Modbus

The Tracer® UC800 controller is an equipment unit controller which provides the equipment system sequences and performs closed-loop control. In addition, the UC800 integrates with Modbus® systems and devices using Modbus® RTU protocol.

Baud Rate, Device ID, and Supported Character Sets

- **Baud Rate**
300, 1200, 2400, 4800, 9600, 19200 (default), 38400, 57600, and 115200.
- **Parity**
Even (default) or None.
- **Stop Bits**
One (default) or two.



Modbus Agility Chiller Data Points Descriptions and Configurations

Holding Registers; Read/Write (Sorted by Register)

This function code is used to read the contents of a contiguous block of holding registers in a remote device.

Table 6. Modbus Agility chiller read/write

Register Object Name	Register	Register Type	Register Value	Valid Range
BAS Chiller Auto Stop Command	40001	Binary		0,1
BAS Chiller Mode Command	40002	Enumeration	0= Cool 1= Heat 2= Ice	0 to 2
BAS Chilled Water Setpoint	40003	Temperature		0°F to 75°F depending on installed options (-17.78°C to 23.9°C)
BAS Demand Limit Setpoint	40004	Percent		0-120
BAS Hot Water Setpoint	40005	Temperature		80°F to 140°F (26.7°C to 60°C)
BAS Base Loading Setpoint	40006	Percent		0-100
BAS Base Loading Enable	40007	Binary		0,1
BAS Diagnostic Reset	40008	Binary		0,1

Input Registers; Read Only (Sorted by Register)

This function code is used to read from 1 to 125 contiguous input registers in a remote device.

Table 7. Modbus Agility chiller read-only

Text (Display Text)	Modbus Reg	Reg Type
Software Type	30001	Not applicable
Software Revision	30002	Not applicable
Active Base Loading Setpoint	30003	Percent
Active Cool/Heat Setpoint Temperature	30004	Temp
Active Demand Limit Setpoint	30005	Percent
AFD Average Motor Current % RLA	30006	Percent
AFD Calculated Motor Voltage	30007	Voltage
AFD DC Bus Voltage	30008	Voltage
AFD Frequency Command	30009	Percent
AFD Heatsink Temperature	30010	Temp
AFD Motor Current U	30011	Current
AFD Motor Current U % RLA	30012	Percent
AFD Motor Current V	30013	Current
AFD Motor Current V % RLA	30014	Percent
AFD Motor Current W	30015	Current
AFD Motor Current W % RLA	30016	Percent
AFD Output Power	30017	Power
AFD Percent Speed	30018	Percent
Approx Cond Water Flow	30019	Flow, water
Approx Evap Water Flow	30020	Flow, water
Calculated Chiller Capacity	30021	Power
Compressor Bearing Temperature 1	30022	Temp
Compressor Bearing Temperature 2	30023	Temp



Modbus Agility Chiller Data Points Descriptions and Configurations

Table 7. Modbus Agility chiller read-only (continued)

Text (Display Text)	Modbus Reg	Reg Type
Compressor Refrigerant Discharge Temperature	30024	Temp
Cond Differential Wtr Press	30029	Differential Pressure
Condenser Entering Water Temperature	30030	Temp
Condenser Leaving Water Temperature	30031	Temp
Condenser Refrigerant Pressure	30032	Pressure
Condenser Saturated Rfgt Temp	30033	Temp
Differential Refrigerant Pressure	30034	Differential Pressure
Evap Differential Wtr Press	30035	Differential Pressure
Evaporator Entering Water Temperature	30036	Temp
Evaporator Leaving Water Temperature	30037	Temp
Evaporator Refrigerant Pressure	30038	Pressure
Evaporator Saturated Rfgt Temp	30039	Temp
External Base Loading Setpoint	30040	Percent
External Chilled Water Setpoint	30041	Temp
External Demand Limit Setpoint	30042	Percent
Front Panel Base Loading Setpoint	30043	Percent
Front Panel Chilled Water Setpoint	30044	Temp
Front Panel Demand Limit Setpoint	30045	Percent
Front Panel Hot Water Setpoint	30046	Temp
IGV Percent Open	30047	Percent
Motor Winding Temp #1	30048	Temp
Motor Winding Temp #2	30049	Temp
Motor Winding Temp #3	30050	Temp
Number of Circuits	30051	Count
Number of Compressors, Circuit 1	30052	Count
Number of Compressors, Circuit 2	30053	Count
Outdoor Air Temperature	30054	Temp
Refrigerant Monitor	30055	Concentration
Unit Power Consumption	30056	Power
Alarm Present	30060	BINARY
Base Loading	30061	BINARY
Chiller Running State	30062	BINARY
Condenser Water Flow	30063	BINARY
Condenser Water Pump Command	30064	BINARY
Emergency Stop	30065	BINARY
Evaporator Water Flow	30066	BINARY
Evaporator Water Pump Command	30067	BINARY
Front Panel Base Loading Command	30068	BINARY
Head Relief Request Relay	30069	BINARY
Limit Mode Relay Status	30070	BINARY
Local Setpoint Control	30071	BINARY
Manual Override Exists	30072	BINARY
Maximum Capacity Relay	30073	BINARY
Run Enable	30074	BINARY
Active Base Loading Setpoint Source	30077	Enum 0 = Front Panel 1 = External 2 = Ice Machine 3 = BAS

Modbus Agility Chiller Data Points Descriptions and Configurations

Table 7. Modbus Agility chiller read-only (continued)

Text (Display Text)	Modbus Reg	Reg Type
Active Chilled Water Setpoint Source	30078	Enum 0 = Front Panel 1 = External 2 = Ice Machine 3 = BAS
Active Demand Limit Setpoint Source	30079	Enum 0 = Front Panel 1 = External 2 = Ice Machine 3 = BAS
Active Hot Water Setpoint Source	30080	Enum 0 = Front Panel 1 = External 2 = Ice Machine 3 = BAS
Chiller Control Mode	30081	Enum 0 = Cool 1 = Heat 2 = Ice
Chiller Running Status	30082	Enum 0 = Not Running 1 = Starting 2 = Running 3 = Stopping
Compressor Running	30083	Enum 0 = Stopped 1 = Running 2 = Alarm
External Auto Stop	30084	BINARY
Front Panel Auto/Stop	30085	BINARY
Front Panel Chiller Mode	30086	Enum 0 = Cool 1 = Heat 2 = Ice
Setpoint Source	30087	Enum 0 = BAS/Ext/FP 1 = Ext/FP 2 = Front Panel
Refrigerant Type	30090	0 = R-134a 14 = R-513A
Compressor Running Time	30025, 30026	Time
Compressor Starts	30027, 30028	Count
Last Logged Diagnostic Spec ID	30088/30089	Enum

Determining Input Register Type

Table 8. Modbus Agility chiller input register types

Register Type	Data Format	Units
Binary	u16	0 = False/Off/No/Disabled/Stop 1 = True/On/Yes/Enabled/Auto
Concentration	u16	ppm
Current	U16	Amps
Enumeration	u16	Not applicable
Flow, Air	u16	Liters/Second (100 = 212 cfm)
Flow, Water	u16	Liters/Minute (1,000 = 264 gpm)
Frequency	u16	0.1 Hz (600 = 60 Hz)
Percent	s16	0.005% (20,000 = 100%)
Power	u16	kW (3517 = 1,000 tons)
Power Factor	s16	0.005 (200 = 1)
Pressure	u16	0.1 kPa Absolute (1,000 = 14.5 psi)

Modbus Agility Chiller Data Points Descriptions and Configurations

Table 8. Modbus Agility chiller input register types (continued)

Register Type	Data Format	Units
Differential Pressure	s16	0.1 kPa Absolute (1,000 = 14.5 psi)
Temperature	s16	0.01 °C (100 = 1 °C); $^{\circ}F = \left[\frac{\text{Register} \times 1.8}{100} \right] + 32$
Time Interval	u32	Seconds
Voltage	u16	Volts
None	u16	Not applicable



Resources

- *Installation, Operation, and Maintenance: HDWA Water-cooled Agility Chillers with Tracer AdaptiView Control (HDWA-SVX001*-EN)*
- *Diagnostics Manual: Diagnostic Descriptions, Troubleshooting Tables, and Control Component Overview Diagnostics Manual for Water-cooled Agility Chillers with Tracer AdaptiView Control (HDWA-SVD001*-EN)*
- *Hardware and Software Installation Guide: LonTalk Communication Interface for Trane Chillers with Tracer AdaptiView Control (ACC-SVN100*-EN)*
- *Tracer TU Online Help*
- *Getting Started Guide: Tracer TU Service Tool (TTU-SVN02*-EN)*
- *Programming Guide: Tracer TU Service Tool for Water-cooled Agility Chillers with Tracer AdaptiView Control (HDWA-SVP001*-EN)*

Note: For further assistance, contact your local Trane sales office.



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Type Commercial License
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Effective 04/17/2018
Expiration 04/16/2021
First Issued 04/16/1998

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BUILDING CONSTRUCTION	Eric Sidler Snyder	ALL
BUSINESS AND LAW	Clifford C. Graham	ALL
BUSINESS AND LAW	David Andrew Vienneau	ALL
BUSINESS AND LAW	Eric Patrick Alphonso Sr.	ALL
BUSINESS AND LAW	Eric Sidler Snyder	ALL
ELECTRICAL WORK (STATEWIDE)	Paul Kenneth Buchan	ALL
ELECTRICAL WORK (STATEWIDE)	Troy Viator	ALL
MECHANICAL WORK (STATEWIDE) ✓	Clifford C. Graham	ALL
MECHANICAL WORK (STATEWIDE)	Eric Patrick Alphonso Sr.	ALL



MICHAEL BARBOT 504-434-3838

BiQ# 50-00123954

PURCHASE OF WATER COOLED CHILLER

BiQ DATE 10/2/2018 2PM

STATE LICENSES # 33486