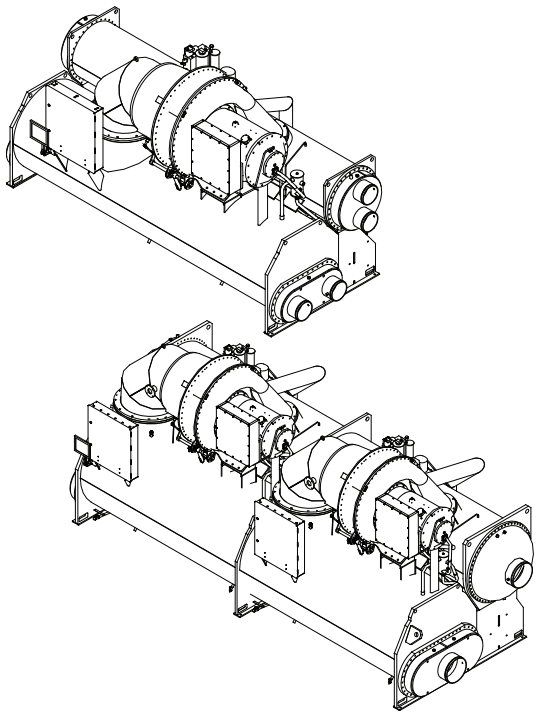
Installation Guide
CenTraVac™ Water-cooled Chillers
Disassembly and Reassembly



50 Hz Models: CDHG, CVHE, CVHG
60 Hz Models: CDHF, CVHE, CVHF

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⚠ 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.

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CVHE-SVN04R-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:

⚠ 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.

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.

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 Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate 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 Trane personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.**
- **Non-Trane personnel should always follow local regulations.**

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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 requires disassembly or partial disassembly, and reassembly—which could include but is not limited to the evaporator, condenser, control panel, compressor/motor, economizer, purge, 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.

Revision History

Updated literature numbers in Reassembly chapter.

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General Information

⚠ WARNING

Refrigerant May Be Under Positive 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 and may be under positive pressure; system may also contain oil. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or non-approved refrigerant additives.

NOTICE

Equipment Damage!

Mixing refrigerants or oils could result in equipment damage including bearing damage, introduction of acids into the chiller, or continuous purge pump-out in high-head/high ambient applications.

CenTraVac™ chillers are manufactured with different refrigerant/oil systems: 1) chillers using R-123 refrigerant and OIL00022 compressor oil, and 2) chillers using R-514A refrigerant and various Trane POE-based compressor oils.

Always verify proper refrigerant and oil for your chiller. Do NOT mix refrigerants and oils.

This *Installation, Operation, and Maintenance* manual applies to CenTraVac™ chillers with two different refrigerant and oil systems:

- R-123 and OIL00022.
- R-514A refrigerant and Trane OIL00379/OIL00380 compressor oil.

NOTICE

Equipment Damage!

Failure to follow instructions below could result in equipment damage.

Follow oil use instructions for post-service compressor air-run procedures.

For post-service compressor air-run procedures on CenTraVac™ chillers that use R-514A refrigerant and POE oil:

1. Use Trane OIL00381/OIL00382 compressor oil for the air-run procedure.
2. Upon completion of the air-run procedure, drain the OIL00381/OIL00382 from the sump.
3. After unit final assembly and evacuation, refill the sump with Trane OIL00379/OIL00380.

Important: *Verify proper refrigerant and oil for your chiller before proceeding!*

The information and procedures in this document are to facilitate unit disassembly *for clearance and access reasons during the installation process*.

The understanding is that the chiller has what is referred to as the "*compressor doweling option*" or "*separable shell option*" (which includes compressor doweling). Compressor doweling sets up the compressor for removal. The separable shell option includes a bolt together design between the evaporator and condenser and allows the shells to be separated in the field.

Important: *These procedures do NOT apply to units that have been installed and electrical supply wiring has been completed.*

Contractor Responsibilities

⚠ WARNING

Heavy Objects!

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

Loads can shift and become off-center during shipping. Ensure that components are centered before lifting and always test lift each component to verify center of gravity using lifting equipment rated for the task. Only experienced riggers should perform unit disassembly/reassembly.

- Handle/lift and rig equipment
- Protect all internal components from exposure to elements, which could contaminate or corrode chiller components
- Chiller reassembly
- Replace all gaskets with new gaskets or O-rings and sealing compound; the contractor should assist a qualified Trane Technician with this responsibility

NOTICE

Compressor Damage!

POE oil is hygroscopic – it absorbs water directly from the air. This water is nearly impossible to remove from the compressor oil and can result in compressor failures.

To prevent POE oil from absorbing water, the system should not remain open for longer than necessary. When open, dry nitrogen should flow through the piping. Only new oil containers should be used for service and maintenance. Always use the smallest container size required for the job requirements. Always leave the oil container tightly sealed until time of use. Do not reuse oil that has been opened.

- Change the compressor oil; the contractor should assist a qualified Trane Technician with this responsibility
- Evacuate the chiller under 1000 microns; the contractor should assist a qualified Trane Technician with this responsibility
- Recharge the chiller with dry nitrogen to 5 psig; the contractor should assist a qualified Trane Technician with this responsibility
- Replace and/or repair insulation
- Reconnect electrical connections
- Spot paint the chiller if necessary

Metric Conversions

English	Metric
ft·lb x 1.3558	Newton·meter
lb x 0.4536	kg
in x 25.4000	mm

Device Descriptions

Device	Description
CPTF	Optional control power transformer (INDP units only)
FRCL	Optional free cooling
HGBP	Optional hot gas bypass
INDP	Optional industrial control package
SMP	Optional supplemental motor protection (INDP units only)
UAFD	Unit-mounted Adaptive Frequency™ drive
UATR	Unit-mounted medium-voltage auto transformer
UPIR	Unit-mounted medium-voltage primary reactor
UXL	Unit-mounted medium-voltage across-the-line starter
USID	Unit-mounted low-voltage solid state starter
USTR	Unit-mounted low-voltage wye-delta starter

Dimensions and Weights

Dimensions

Single Compressor Chillers: Models CVHE, CVHF, and CVHG

The following table shows dimensional data for Figure 1, p. 12 and Figure 2, p. 13.

Table 1. Dimensional data for CVHE, CVHF, and CVHG CenTraVac chillers

Model	NTON	Shell Size	Comp Size	A	B	C	D	E	F	G	H	J	K	L	M
CVHE	190–270	032	320	66.7	53.1	N/A	N/A	84.9	49.2	49.7	70.8	45.5	53.1	37.9	34.5
	230–320	050	320	75.4	53.6	N/A	N/A	73.4	49.2	52.4	77.1	45.5	52.5	43.9	38.7
	300–420	050	500	73.7	52.7	N/A	N/A	87.8	51.7	54.4	77.1	45.5	52.5	42.3	38.7
	360–500	080	500	93.5	77.1	101.3	42.0	87.8	51.7	58.6	93.8	45.5	62.2	63.5	44.3
	300–450	050/080	500	84.1	66.0	90.4	42.0	87.8	51.7	58.6	82.7	46.0	54.9	49.32	41.3
CVHF	350–570	050	480	75.4	52.7	N/A	N/A	78.3	51.3	54.4	77.1	45.5	52.5	43.9	38.7
		050/080	480	84.1	64.6	90.4	42.0	78.3	51.3	59.1	82.7	46.0	54.9	49.32	41.3
		080	480	93.5	75.7	101.3	42.0	78.3	51.3	59.1	93.8	45.5	62.2	63.5	44.3
	620–870	080	870	93.5	75.0	101.3	42.0	81.2	59.7	73.2	93.8	45.5	63.9	63.5	44.3
		080/142	870	101.3	79.4	107.5	[a]	81.3	59.7	73.2	102.0	45.5	67.9	63.59	46.0
		142	870	98.1	80.4	121.9	[a]	81.2	59.7	73.2	110.9	46.9	65.4	62.5	50.5
	650–910	080	910	93.5[b]	76.5	101.3	42.0	81.2	54.6	66.7	93.8	45.5	63.9	63.5	44.3
		080/142	910	101.3	79.4	107.5	[a]	81.3	54.6	66.7	102.0	45.5	64.6	63.59	46.0
		142	910	98.1	83.0	111.0	[a]	81.2	54.6	66.7	105.5	46.9	69.8	62.5	46.0
	1070–1300	080/142	1300	102.2	80.5	107.5	[a]	80.5	59.1	72.4	102.0	45.5	65.7	63.59	46.0
		142	1300	120.9	80.4	121.9	[a]	80.2	54.6	72.6	110.9	46.9	64.2	76.5	50.5
		142/210	1300	106.0	88.2	109.7	[a]	80.5	59.1	72.4	105.4	46.9	73.1	62.5	52.4
		210	1300	106.5	94.5	116.0	[a]	80.2	59.7	72.6	116.4	50.5	84.5	68.2	50.5
		250	1300	120.9	98.6	121.9	[a]	80.2	59.7	72.6	116.4	54.5	84.5	76.7	56.6
	1470–1720	142/210	1720	106.0	86.5	109.7	[a]	93.8	63.1	75.6	105.4	46.9	73.1	62.5	52.4
		210	1720	106.5	92.8	116.0	[a]	91.2	63.1	75.6	110.9	50.5	78.2	68.2	50.5
		250	1720	120.9	96.9	121.9	[a]	91.2	63.1	75.6	116.4	54.5	84.4	76.7	56.6

Table 1. Dimensional data for CVHE, CVHF, and CVHG CenTraVac chillers (continued)

Model	NTON	Shell Size	Comp Size	A	B	C	D	E	F	G	H	J	K	L	M
CVHG	480–565	050	565	75.4	52.6	N/A	N/A	93.8	53.0	57.5	77.1	45.5	52.5	43.9	38.7
		080	565	93.5	74.6	101.3	42.0	94.3	53.0	62.8	93.8	45.5	62.2	63.5	44.3
		050/080	565	82.6[c]	63.4	90.2	42.0	94.5	52.9	62.8	82.7	46.0	57.6	49.32	40.0
	670–780	080	780	93.5	76.5	101.3	42.0	94.0	54.3	66.6	93.8	45.5	63.9	63.5	44.3
		080/142	780	101.3	79.4	107.5	[a]	91.9	54.3	66.6	102.0	45.5	66.8	63.59	46.0
		142	780	98.1	83.0	111.0	[a]	94.0	54.3	66.6	105.5	46.9	69.8	62.5	46.0
	920–1067	080/142	920	102.2	82.0	107.5	[a]	90.9	54.6	68.7	102.0	45.5	64.3	63.59	46.0
		142	920	98.1	84.0	111.0	[a]	93.2	54.3	68.0	105.5	46.9	69.8	62.5	46.0
		142/210	920	106.0	89.7	109.7	[a]	93.3	54.6	68.7	105.4	46.9	76.2	62.5	52.4
		210	920	106.5	96.0	116.0	[a]	93.2	54.3	68.0	110.9	50.5	81.5	68.2	50.5
	1100	080/142	1100	102.2	80.5	107.5	[a]	93.2	59.1	72.4	102.0	45.5	65.7	63.59	46.0
		142	1100	98.8	80.4	107.4	[a]	93.2	59.7	71.8	101.9	46.9	62.0	62.3	46.0
		142/210	1100	106.0	88.2	109.7	[a]	93.2	59.1	72.4	105.4	46.9	76.2	62.5	52.4
		210	1100	106.5	94.5	116.0	[a]	93.2	59.7	72.6	110.9	50.5	78.2	68.2	50.5

Note: All dimensions are in inches (±0.5 inch).

[a] Does not extend beyond the condenser tube unit.
[b] Add 1 in. to overall width for compressor.
[c] Add 0.4 in. to overall width for compressor.

The following table shows dimensional data for Figure 1, p. 12 and Figure 2, p. 13.

Table 2. Dimensional data for CVHE, CVHF, and CVHG CenTraVac chillers

Model	NTON	Shell Size	Comp Size	N	Std	Exp	R	S	T	U	V	Short	Long	X
					P							W		
CVHE	190–270	032	320	60.1	71.4	81.9	29.7	17.0	26.5	68.6	93.9	47.0	47.0	N/A
	230–320	050	320	64.6	71.4	81.9	29.7	17.0	23.4	80.5	98.4	63.4	54.9	N/A
	300–420	050	500	62.8	71.4	81.9	29.8	17.3	26.5	80.5	98.7	63.4	54.9	N/A
	360–500	080	500	79.0	71.4	81.9	29.8	17.3	26.5	97.1	114.9	80.8	80.8	66.3
	300–450	050/080	500	68.1	71.8	82.3	29.0	16.3	26.5	90.1	103.8	N/A	N/A	N/A
CVHF	350–570	050	480	64.3	71.4	81.9	29.0	16.3	26.5	80.5	100.0	60.7	54.9	N/A
		050/080	480	68.1	71.8	82.3	29.0	16.3	26.5	90.1	103.7	N/A	N/A	N/A
		080	480	79.0	71.4	81.9	29.0	16.3	26.5	97.1	114.9	75.0	75.0	66.3
	620–870	080	870	75.7	71.4	81.9	30.5	17.8	29.0	97.1	117.1	82.4	82.4	63.9
		080/142	870	79.0	71.3	81.8	N/A	18.5	29.0	120.9	121.6	N/A	N/A	72.7
		142	870	93.8	72.8	83.3	30.5	17.8	29.0	117.4	121.5	82.4	82.4	72.7
	650–910	080	910	75.7	71.4	81.9	30.5	17.8	29.0	97.1	114.9	82.4	82.4	63.9
		080/142	910	79.0	71.3	81.8	N/A	18.5	29.0	120.9	117.8	N/A	N/A	72.7
		142	910	82.1	72.8	83.3	30.5	17.8	29.0	115.4	121.3	84.4	84.4	72.7
	1070–1300	080/142	1300	80.5	71.3	81.8	N/A	18.6	36.8	121.8	121.6	N/A	N/A	72.7
		142	1300	93.8	72.8	83.3	N/A	21.1	36.8	117.4	121.5	78.1	78.1	72.7
		142/210	1300	87.7	72.8	83.3	N/A	21.1	36.8	126.9	129.0	N/A	N/A	72.7
		210	1300	93.8	76.4	86.9	N/A	21.1	36.8	124.7	135.2	87.2	87.2	82.4
		250	1300	97.9	80.4	90.9	N/A	18.6	36.8	137.2	139.4	N/A	N/A	82.7
	1470–1720	142/210	1720	86.5	72.8	83.3	N/A	25.8	36.8	126.9	130.9	N/A	N/A	72.7
		210	1720	92.6	76.4	86.9	N/A	25.8	33.3	124.7	137.2	92.9	92.9	76.4
		250	1720	96.8	80.4	90.9	N/A	23.3	33.3	137.2	141.4	N/A	N/A	82.7
CVHG	480–565	050	565	66.4	71.4	81.9	32.4	19.9	26.5	80.5	103.0	63.4	54.9	N/A
		080	565	68.4	71.8	82.3	32.4	19.9	29.0	91.4	104.7	N/A	N/A	N/A
		050/080	565	79.2	71.4	81.9	33.6	21.2	29.0	98.1	115.8	81.7	81.7	N/A
	670–780	080	780	75.7	71.4	81.9	33.5	21.1	32.8	98.1	114.7	82.4	82.4	N/A
		080/142	780	79.0	71.3	81.8	N/A	18.5	32.8	120.9	117.6	N/A	N/A	72.7
		142	780	82.1	72.8	83.3	27.8	17.8	32.8	115.4	121.2	84.4	84.4	N/A
	920–1067	080/142	920	80.5	71.3	81.8	N/A	18.6	36.8	121.8	119.4	N/A	N/A	72.7
		142	920	82.1	72.8	83.3	28.0	18.0	36.8	115.4	121.2	84.4	84.4	N/A
		142/210	920	87.7	72.8	83.3	N/A	21.3	36.8	126.9	126.7	N/A	N/A	72.7
		210	920	93.8	76.4	86.9	33.7	21.3	36.8	124.7	132.8	92.9	92.9	N/A
	1100	080/142	1100	80.5	71.3	81.8	N/A	18.6	36.8	121.8	121.6	N/A	N/A	72.7
		142	1100	80.1	72.8	83.3	28.0	18.0	36.8	117.4	121.5	78.1	78.1	72.7
		142/210	1100	87.7	72.8	83.3	N/A	21.3	36.8	126.9	129.0	N/A	N/A	72.7
		210	1100	93.8	76.4	86.9	33.7	21.3	36.8	124.7	135.2	87.2	87.2	82.4

Note: All dimensions are in inches (±0.5 inch).

The following table shows dimensional data for Figure 1, p. 12 and Figure 2, p. 13.

Table 3. Dimensional data for CVHE, CVHF and CVHG CenTraVac chillers

Model	NTON	Shell Size	Comp Size	USID USTR	UATR UPIR UXL	USID USTR	UATR UPIR UXL	AFDE UAFD					
								405–608A			900–1210A		
				Y1		Y2		Y1	Y2	AD	Y1	Y2	AD
CVHE	190–270	032	320	79.8	N/A	49.1	N/A	94.9	64.2	N/A	N/A	N/A	N/A
	230–320	050	320	94.1	N/A	57.5	N/A	101.2	64.6	N/A	N/A	N/A	N/A
	300–420	050	500	92.5	N/A	55.9	N/A	101.2	64.6	N/A	N/A	N/A	N/A
	360–500	080	500	(a)	(a)	(a)	(a)	110.6	77.0	N/A	N/A	N/A	N/A
	300–450	050/080	500	(a)	(a)	(a)	(a)	111.5	70.63	N/A	N/A	N/A	N/A
CVHF	350–570	050	480	92.7	N/A	56.1	N/A	101.2	64.6	N/A	N/A	N/A	N/A
		050/080	480	(a)	(a)	(a)	(a)	111.5	70.63	N/A	N/A	N/A	N/A
		080	480	(a)	(a)	(a)	(a)	110.6	77.0	N/A	N/A	N/A	N/A
	620–870	080	870	(a)	(a)	(a)	(a)	125.8	92.2	7.0	133.3	99.8	4.8
		080/142	870	(a)	(a)	(a)	(a)	140.0	81.75	N/A	147.0	88.8	5.8
		142	870	(a)	(a)	(a)	(a)	139.9	77.5	N/A	144.0	91.0	4.6
	650–910	080	910	(a)	(a)	(a)	(a)	119.3	85.7	N/A	126.8	93.3	4.8
		080/142	910	(a)	(a)	(a)	(a)	132.7	75.33	N/A	146.2	88.8	5.8
		142	910	(a)	(a)	(a)	(a)	130.4	77.5	N/A	144.0	91.0	4.6
	1070–1300	080/142	1300	(a)	(a)	(a)	(a)	140.0	81.75	N/A	147.0	88.8	6.3
		142	1300	(a)	(a)	(a)	(a)	139.9	77.5	N/A	146.0	91.0	4.6
		142/210	1300	(a)	(a)	(a)	(a)	147.9	83.6	3.5	154.9	90.6	5.6
		210	1300	(a)	(a)	(a)	(a)	N/A	N/A	N/A	152.4	95.9	3.9
		250	1300	140.7	(b)	80.2	(a)	N/A	N/A	N/A	160.0	99.5	3.1
	1470–1720	142/210	1720	(a)	(a)	(a)	(a)	N/A	N/A	N/A	155.0	90.7	5.6
		210	1720	(a)	(a)	(a)	(a)	N/A	N/A	N/A	152.4	95.9	3.9
		250	1720	140.7	(a)	80.2	(a)	N/A	N/A	N/A	160.0	99.5	3.1
CVHG	480–565	050	565	93.3	N/A	56.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		080	565	(a)	(a)	(a)	(a)	N/A	N/A	N/A	N/A	N/A	N/A
		050/080	565	(a)	(a)	(a)	(a)	N/A	N/A	N/A	N/A	N/A	N/A
	670–780	080	780	(a)	(a)	(a)	(a)	N/A	N/A	N/A	N/A	N/A	N/A
		080/142	780	(a)	(a)	(a)	(a)	N/A	N/A	N/A	N/A	N/A	N/A
		142	780	(a)	(a)	(a)	(a)	N/A	N/A	N/A	N/A	N/A	N/A
	920–1067	080/142	920	(a)	(a)	(a)	(a)	N/A	N/A	N/A	N/A	N/A	N/A
		142	920	(a)	(a)	(a)	(a)	N/A	N/A	N/A	N/A	N/A	N/A
		142/210	920	(a)	(a)	(a)	(a)	N/A	N/A	N/A	N/A	N/A	N/A
		210	920	(a)	(a)	(a)	(a)	N/A	N/A	N/A	N/A	N/A	N/A
	1100	080/142	1100	(a)	(a)	(a)	(a)	N/A	N/A	N/A	N/A	N/A	N/A
		142	1100	(a)	(a)	(a)	(a)	N/A	N/A	N/A	N/A	N/A	N/A
		142/210	1100	(a)	(a)	(a)	(a)	N/A	N/A	N/A	N/A	N/A	N/A
		210	1100	(a)	(a)	(a)	(a)	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

1. Refer to Table 6, p. 15.
2. All dimensions are in inches (±0.5 inch).

(a) When indicated, see Note 1 (above).

(b) Does not extend beyond the main unit control panel.

Table 4. Dimensional data for CVHE, CVHF, and CVHG CenTraVac chillers

Model	NTON	Shell Size	Comp Size	AFDN UAFD						Z	AA	AB	AC
				318A			530–636A						
				Y1	Y2	AD	Y1	Y2	AD				
CVHE	190–270	032	320	98.0	64.8	2.9	N/A	N/A	N/A	N/A	N/A	65.7	35.0
	230–320	050	320	104.3	65.2	6.0	106.3	67.2	3.1	N/A	N/A	78.1	41.5
	300–420	050	500	104.2	65.1	5.6	106.2	67.1	2.4	N/A	N/A	78.1	41.5
	360–500	080	500	113.9	77.8	5.7	115.9	79.8	6.4	45.3	(a)	88.2	54.6
	300–450	050/080	500	114.9	71.6	6.2	114.9	71.6	5.2	N/A	N/A	82.3	41.5
CVHF	350–570	050	480	104.3	65.2	6.1	106.3	67.2	3.2	N/A	N/A	78.1	41.5
		050/080	480	114.9	71.6	6.2	114.9	71.6	5.2	N/A	N/A	82.3	41.5
		080	480	113.9	77.8	5.7	115.9	79.8	6.4	45.3	(a)	88.2	54.6
	620–870	080	870	128.9	92.8	6.0	128.9	92.8	6.4	42.9	4.8	88.2	54.6
		080/142	870	N/A	N/A	N/A	142.2	82.4	6.2	51.8	N/A	112.0	54.6
		142	870	N/A	N/A	N/A	142.0	84.6	6.4	51.8	1.8	113.9	59.0
	650–910	080	910	122.4	86.3	6.0	122.4	86.3	6.4	42.9	4.8	88.2	54.6
		080/142	910	N/A	N/A	N/A	139.2	79.3	6.5	51.8	N/A	112.0	54.6
		142	910	N/A	N/A	N/A	140.0	84.6	6.5	51.8	1.7	111.9	59.0
	1070–1300	080/142	1300	N/A	N/A	N/A	143.0	82.4	6.2	51.8	N/A	112.8	54.6
		142	1300	N/A	N/A	N/A	142.0	84.6	6.5	51.8	1.8	113.9	59.0
		142/210	1300	N/A	N/A	N/A	150.9	86.6	4.9	51.8	1.8	123.3	59.0
		210	1300	N/A	N/A	N/A	147.5	88.5	5.5	61.5	(a)	124.2	67.7
		250	1300	N/A	N/A	N/A	157.8	94.8	4.3	61.8	0.2	136.7	76.2
	1470–1720	142/210	1720	N/A	N/A	N/A	N/A	N/A	N/A	51.8	1.8	123.4	59.0
		210	1720	N/A	N/A	N/A	N/A	N/A	N/A	55.5	3.4	124.2	67.7
		250	1720	N/A	N/A	N/A	N/A	N/A	N/A	61.8	0.2	136.7	76.2
CVHG	480–565	050	565	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	78.1	41.5
		080	565	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	83.6	41.5
		050/080	565	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	88.2	54.6
	670–780	080	780	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	88.2	54.6
		080/142	780	N/A	N/A	N/A	N/A	N/A	N/A	51.8	N/A	112.0	54.6
		142	780	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	111.9	59.0
	920–1067	080/142	920	N/A	N/A	N/A	N/A	N/A	N/A	51.8	N/A	112.8	54.6
		142	920	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	111.9	59.0
		142/210	920	N/A	N/A	N/A	N/A	N/A	N/A	51.8	1.8	123.4	59.0
		210	920	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	124.2	67.7
	1100	080/142	1100	N/A	N/A	N/A	N/A	N/A	N/A	51.8	N/A	112.8	54.6
		142	1100	N/A	N/A	N/A	N/A	N/A	N/A	51.8	1.8	113.9	59.0
		142/210	1100	N/A	N/A	N/A	N/A	N/A	N/A	51.8	1.8	123.3	59.0
		210	1100	N/A	N/A	N/A	N/A	N/A	N/A	61.5	(a)	124.2	67.7

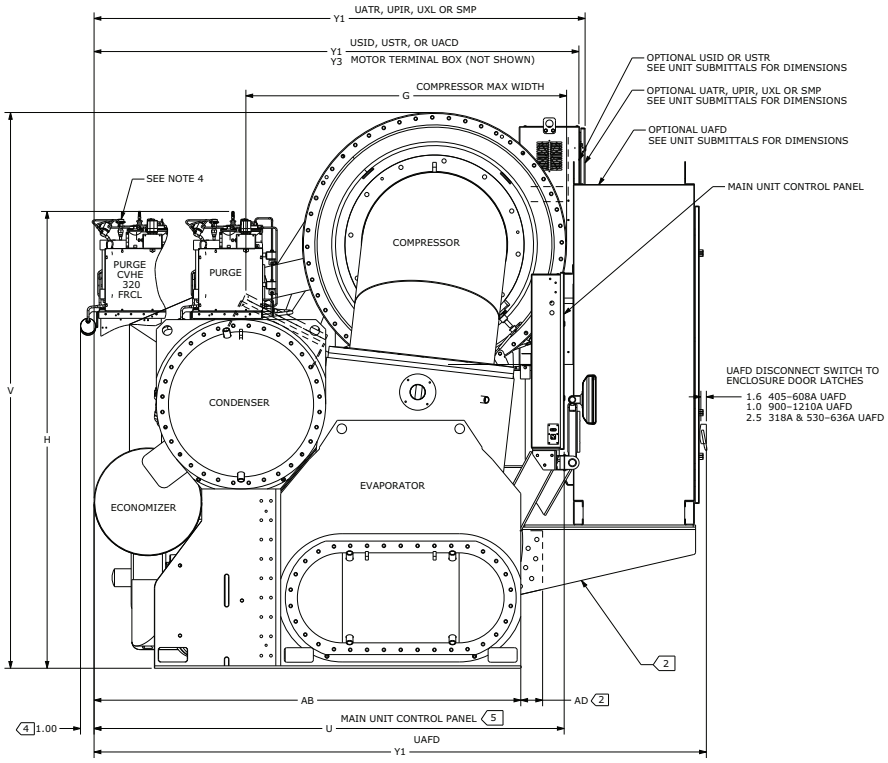
Note: All dimensions are in inches (±0.5 inch).

(a) Does not extend beyond the main unit control panel.

Dimensions and Weights

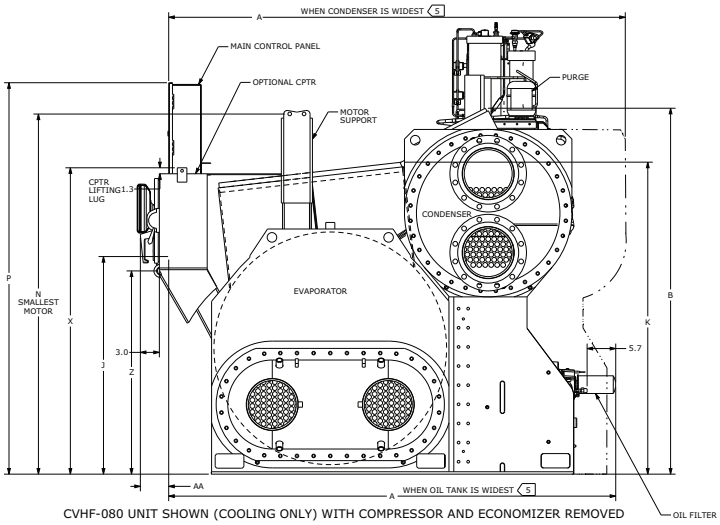
See Table 1, p. 7 through for dimensional data regarding the following figure.

Figure 1. Assembly for CVHE, CVHF, and CVHG CenTraVac chillers



Notes:

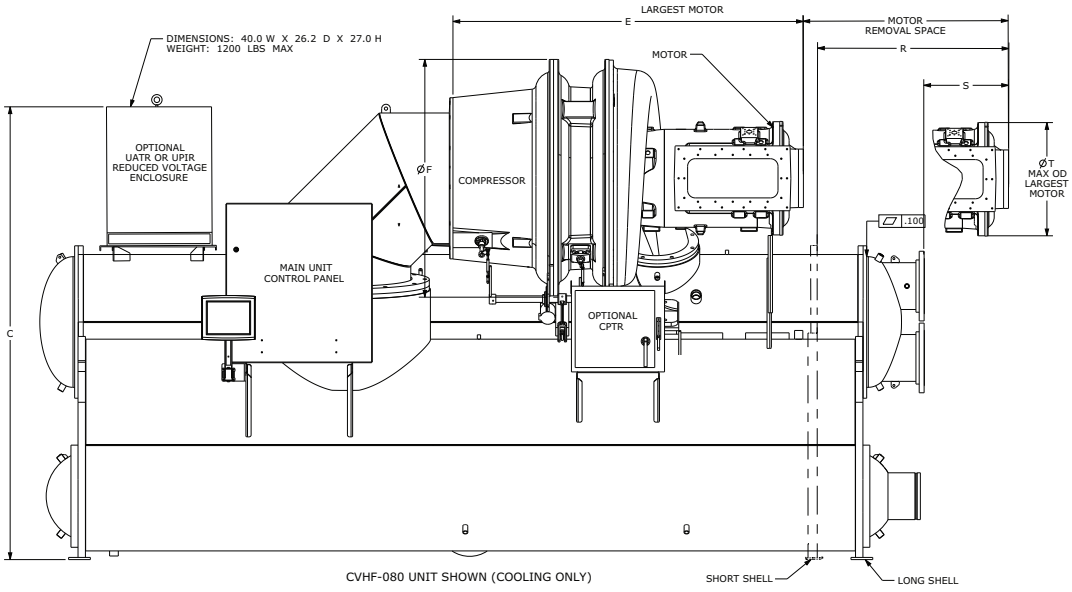
1. *All dimensions are in inches (±0.5 inch). See Table 1, p. 7 through Table 6, p. 15 for dimension tables.*
2. *UAFD brackets and supports shown are bolt-on and removable. Most brackets and supports on 405–608A UAFD are welded on and non-removable. See Table 6, p. 15 for applicable dimensions.*
3. *Applies only to CVHE 190–320 NTON on 032 shells with free-cooling option.*
4. *Add 1.5 inch for distance to Tracer AdaptiView™ display mounting arm in stowed position.*



CVHF-080 UNIT SHOWN (COOLING ONLY) WITH COMPRESSOR AND ECONOMIZER REMOVED

See Table 1, p. 7 through for dimensional data for the following figure.

Figure 2. Assembly for CVHE, CVHF, and CVHG CenTraVac chillers (CVHF-080 shown)



Notes:

1. *All dimensions are in inches (±0.5 inch). See Table 1, p. 7 through Table 6, p. 15 for dimension tables.*
2. *UAFD brackets and supports shown are bolt-on and removable. Most brackets and supports on 405–608A UAFD are welded on and non-removable. See Table 6, p. 15 for application dimensions.*
3. *Applies only to CVHE 190–320 NTON on 032 shells with free-cooling option.*
4. *Add 1.5 inch for distance to Tracer Adaptiview™ display mounting arm in stowed position.*

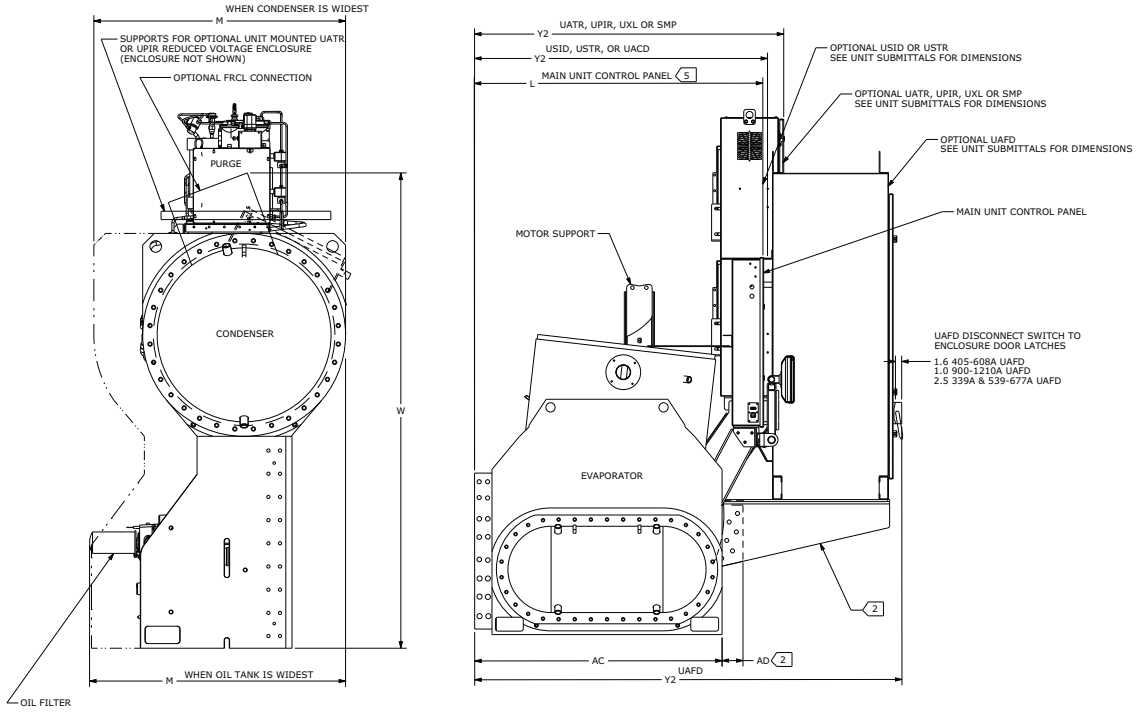


Table 5. Motor terminal boxes for CVHE, CVHF, and CVHG CenTraVac chillers

Shell Size	Comp Size	Motor Size	Low Voltage		Medium Voltage	
			Std	INDP	Std	INDP
			Y3		Y3	
032	320	360	(a)	N/A	N/A	N/A
		400	(a)	N/A	N/A	N/A
		440E	N/A	N/A	78.1	N/A
050	320	360	(a)	N/A	N/A	N/A
		400	(a)	N/A	N/A	N/A
	480	400	(a)	N/A	N/A	N/A
		440E	(a)	N/A	87.9	N/A
	500	400	(a)	N/A	N/A	N/A
		440E	(a)	N/A	87.7	N/A
	565	400	(a)	N/A	N/A	N/A
		440E	(a)	N/A	88.5	N/A
080	480 500	400	(a)	(a)	N/A	N/A
		440E	(a)	(a)	(a)	(a)
	565	400	(a)	N/A	N/A	N/A
		440E	(a)	N/A	100.8	N/A
		5000	(a)	N/A	102.3	N/A
	780	440E	(a)	N/A	106.9	N/A
		5000	(a)	N/A	108.4	N/A
		5800	100.2	N/A	110.2	N/A
	870 910	440E	(a)	(a)	105.9	106.1
		5000	(a)	(a)	107.4	107.6
050/080	480	400	(a)	N/A	N/A	N/A
		440E	(a)	N/A	97.2	N/A
	500	400	(a)	N/A	N/A	N/A
		440E	(a)	N/A	97.2	N/A
	565	400	(a)	N/A	N/A	N/A
		440E	(a)	N/A	100.9	N/A
		5000	92.4	N/A	102.4	N/A
080/142	780	440E	(a)	N/A	(a)	N/A
		5000	(a)	N/A	(a)	N/A
		5800	(a)	N/A	122.6	N/A
	910	440E	(a)	(a)	(a)	(a)
		5000	(a)	(a)	(a)	121.08
	920 1100	440E	(a)	N/A	(a)	N/A
		5000	(a)	N/A	(a)	N/A
		5800	(a)	N/A	123.4	N/A
	870 1300	440E	(a)	(a)	(a)	(a)
		5000	(a)	(a)	(a)	(a)
		5800	(a)	(a)	123.4	123.7

Table 5. Motor terminal boxes for CVHE, CVHF, and CVHG CenTraVac chillers (continued)

Shell Size	Comp Size	Motor Size	Low Voltage		Medium Voltage	
			Std	INDP	Std	INDP
			Y3		Y3	
142	780 910 920	440E	(a)	(a)	(a)	(a)
		5000	(a)	(a)	118.5	118.8
		5800	(a)	(a)	120.3	120.6
	870 1100 1300	440E	(a)	(a)	(a)	(a)
		5000	(a)	(a)	120.5	120.8
		5800	(a)	(a)	122.3	122.6
142/210	920 1100	440E	(a)	N/A	128.2	N/A
		5000	(a)	N/A	129.7	N/A
		5800	(a)	N/A	131.5	N/A
	1300	440E	(a)	(a)	128.2	128.3
		5000	(a)	(a)	129.7	129.8
		5800	(a)	(a)	131.5	131.6
		6200	N/A	N/A	137.1	N/A
	1300 1720	6800	N/A	N/A	137.1	N/A
	1720	5000	(a)	(a)	(a)	(a)
		5800	131.6	131.7	131.6	131.7
		5800L	131.6	131.7	131.6	131.7
210	920 1100	440E	(a)	N/A	(a)	N/A
		5000	(a)	N/A	(a)	N/A
		5800	(a)	N/A	127.8	N/A
	1300	440E	(a)	(a)	(a)	(a)
		5000	(a)	(a)	(a)	(a)
		5800	(a)	(a)	127.8	128.1
	1720	5000	(a)	(a)	(a)	(a)
		5800	(a)	(a)	127.8	128.1
		5800L	(a)	(a)	127.8	128.1
250	1300	440E	(a)	(a)	(a)	(a)
		5000	(a)	(a)	(a)	(a)
		5800	(a)	(a)	(a)	(a)
	1720	5000	(a)	(a)	(a)	(a)
		5800	(a)	(a)	(a)	(a)
		5800L	(a)	(a)	(a)	(a)

Note: All dimensions are in inches (±0.5 inch).

(a) Does not extend beyond the main unit control panel.

Table 6. Unit mounted starters for CVHE, CVHF, and CVHG CenTraVac chillers

Shell Size	Comp Size	Motor Size	USID, USTR	UATR, UPIR, UXL, SMP	USID, USTR	UATR, UPIR, UXL, SMP
			Y1		Y2	
080	480	400	103.3	N/A	69.7	N/A
		440E	(a)	100.7	(a)	67.1
	500	400	103.3	N/A	69.7	N/A
		440E	(a)	100.7	(a)	67.1
	565	400	103.7	N/A	70.1	N/A
		440E	(a)	102.0	(a)	68.4
		5000	96.8	103.5	63.2	69.9
	780	440E	101.3	108.0	67.8	74.4
		5000	102.8	108.7	69.3	75.1
		5800	104.6	111.3	71.0	77.7
	870	440E	107.8	114.5	74.3	80.9
		5000	109.3	116.0	75.8	82.4
	910	440E	101.3	108.0	67.8	74.4
		5000	102.8	109.5	69.3	75.9
050/080	480	400	92.4	N/A	51.59	N/A
		440E	94.9	101.6	54.09	60.85
	500	400	92.4	N/A	51.59	N/A
		440E	94.9	101.6	54.09	60.85
	565	440E	96.2	103.0	54.09	60.85
		5000	97.7	104.3	55.59	62.19
080/142	780, 910	440E	(a)	121.2	(a)	63.89
		5000	(a)	122.9	(a)	65.54
	780	5800	(a)	124.5	(a)	67.19
	870, 920, 1100, 1300	440E	(a)	122.2	(a)	63.96
		5000	(a)	123.7	(a)	65.46
		5800	(a)	125.5	(a)	67.26
142	780, 910, 920	440E	(a)	119.1	(a)	66.2
		5000	(a)	120.6	(a)	67.7
		5800	(a)	122.4	(a)	69.5
	870, 1100, 1300	440E	(a)	121.1	(a)	66.2
		5000	(a)	122.6	(a)	67.7
		5800	(a)	124.4	(a)	69.5
142/210	920, 1100, 1300	440E	(a)	133.6	(a)	69.3
		5000	(a)	135.0	(a)	70.7
		5800	127.0	136.9	62.6	72.6
	1720	5000	131.2	141.1	66.8	76.8
		5800	127.0	136.9	62.6	72.6
		5800L	127.0	136.9	62.6	72.6

Table 6. Unit mounted starters for CVHE, CVHF, and CVHG CenTraVac chillers (continued)

Shell Size	Comp Size	Motor Size	USID, USTR	UATR, UPIR, UXL, SMP	USID, USTR	UATR, UPIR, UXL, SMP
			Y1		Y2	
210	920, 1100, 1300	440E	[a]	126.6	[a]	70.1
		5000	[a]	128.1	[a]	71.6
		5800	[a]	129.9	[a]	73.4
	1720	5000	127.4	134.1	70.9	77.6
		5800	[a]	129.9	[a]	73.4
		5800L	[a]	129.9	[a]	73.4

Note: All dimensions are in inches (±0.5 inch).

[a] Does not extend beyond the main unit control panel.

Duplex Chillers: Models CDHF and CDHG

Table 7. Dimensional data for CDHF and CDHG CenTraVac chillers

Model	NTON	Shell Size	A	B	C	D	E	F	G	H	J	K	L	M	N
CDHF	1500–2000 (2-Comp)	2100	107.4	-0.2	108.2	66.6	78.5	54.3	116.0	110.9	50.2	81.0	68.9	50.5	94.2
	2170 and 2550 (2-Comp)	2500	120.9	0.5	121.6	73.2	81.8	59.7	120.6	116.4	54.5	87.6	76.9	56.8	97.8
CDHG	1250–1750 (2-Comp)	2100	107.4	-0.2	108.2	66.6	95.0	54.3	116.0	110.9	50.2	81.3	68.9	50.5	94.2
	2250 (2-Comp)	2100	110.5	2.7	111.3	73.2	94.2	59.7	116.0	110.9	50.5	74.7	71.9	52.4	93.8
	2250 (2-Comp)	2500	120.9	0.5	121.6	73.2	94.2	59.7	120.6	116.4	54.5	79.7	76.9	56.8	94.6
CDHF	3000 (2-Comp)	250M	120.9	0.5	121.6	76.3	92.3	63.1	120.6	116.4	54.5	84.3	76.9	56.8	96.8
	3500 (2-Comp)	250X	120.9	0.5	121.6	76.3	92.3	63.1	120.6	116.4	54.5	84.3	76.9	56.8	96.8

Table 8. Dimensional data for CDHF and CDHG CenTraVac chillers

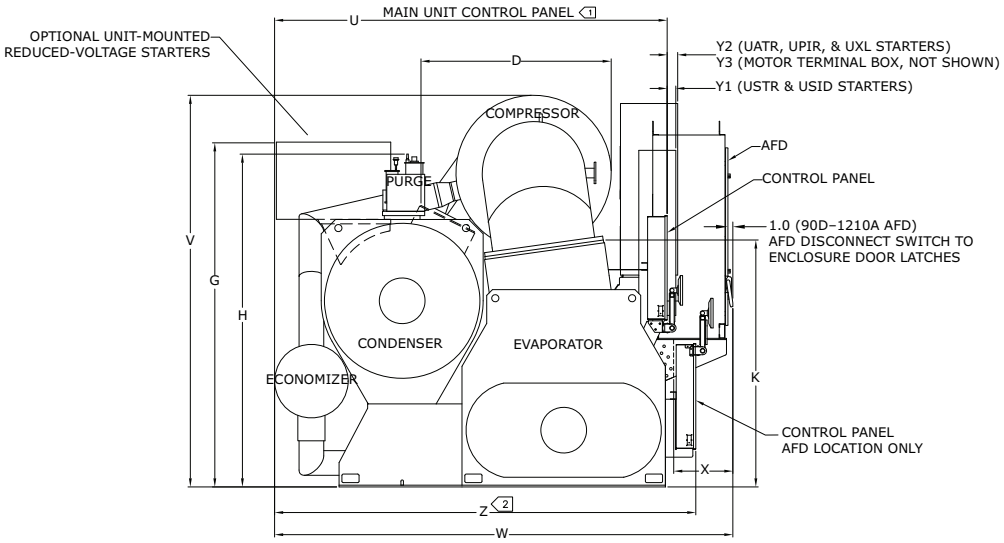
Model	NTON	Shell Size	P	R	S	T	U	V	AFD 900–1210A		UAFD Low Mount Control Panel					
									W	X	Z	AA	BB	CC	DD	EE
CDHF	1500–2000 (2-Comp)	2100	86.9	51.3	45.0	28.5	124.7	132.8	152.4	24.3	135.5	118.2	10.6	119.0	9.2	79.7
	2170 and 2550 (2-Comp)	2500	90.9	57.5	46.0	36.8	137.2	139.3	160.0	20.2	147.2	130.9	10.5	131.6	135.	86.9
CDHG	1250–1750 (2-Comp)	2100	86.9	51.3	45.0	32.4	124.7	132.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2250 (2-Comp)	2100	86.9	53.2	46.0	36.8	127.7	135.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2250 (2-Comp)	2500	90.6	57.5	46.0	36.8	137.2	139.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CDHF	3000 (2-Comp)	250M	90.9	57.5	37.0	33.3	137.2	141.3	160.0	20.2	147.2	130.9	10.5	131.6	13.5	86.9
	3500 (2-Comp)	250X	90.9	57.5	37.0	33.3	137.2	141.3	160.0	20.2	147.2	130.9	10.5	131.6	13.5	86.9

Table 9. Motor terminal boxes and unit mounted starters for CDHF and CDHG CenTraVac chillers

Shell Size	Comp Size	Motor Size	Y1 USTR, USID	Y2 UATR, UPIR, UXL	Y3 LV Motor Terminal Box	Y3 MV Motor Terminal Box
2100	091	440E	9.7	11.4	-10.2	-0.2
		5000	9.7	12.9	-8.7	1.3
	078	440E	9.7	11.4	-10.2	-0.2
		5000	9.7	12.9	-8.7	1.3
	092 1100	440E	6.8	11.8	-13.1	-3.1
		5000	6.8	11.8	-11.6	-1.6
		5800	6.8	11.8	-9.8	0.2
2500	130	440E	3.6	0.5	-21.1	-11.1
		5000	3.6	2.0	-19.6	-9.6
		5800	3.6	3.8	-17.8	-7.8
	092 110	440E	3.6	5.5	-21.1	-11.1
		5000	3.6	7.0	-19.6	-9.6
		5800	3.6	8.8	-17.8	-7.8
250M	147	5000	3.6	1.9	-13.6	-13.6
		5800	3.6	3.7	-7.9	-7.9
		5800L	3.6	3.7	-7.9	-7.9
250X	172	5000	3.6	1.9	-13.6	-13.6
		5800	3.6	3.7	-7.9	-7.9
		5800L	3.6	3.7	-7.9	-7.9

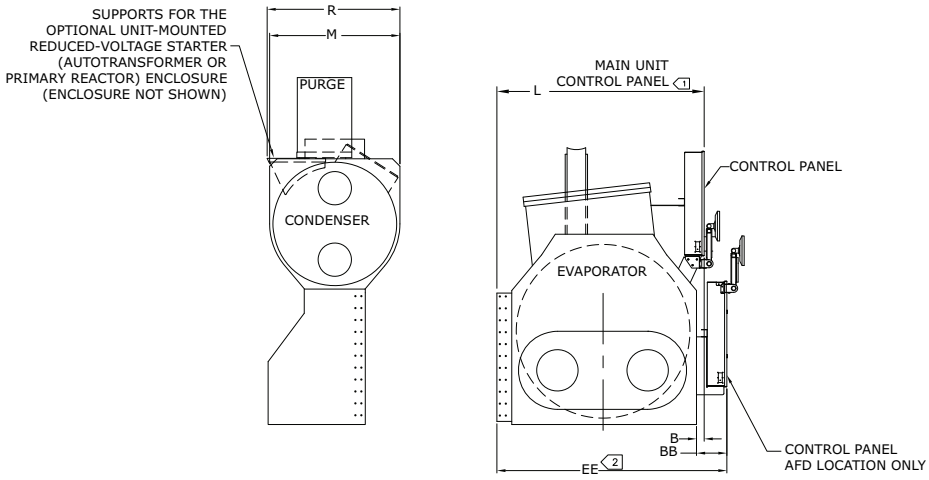
Data for the following figure is found in Table 7, p. 16 and Table 8, p. 16.

Figure 3. Assembly for CDHF and CDHG CenTraVac chillers (CDHF shown)



NOTES:

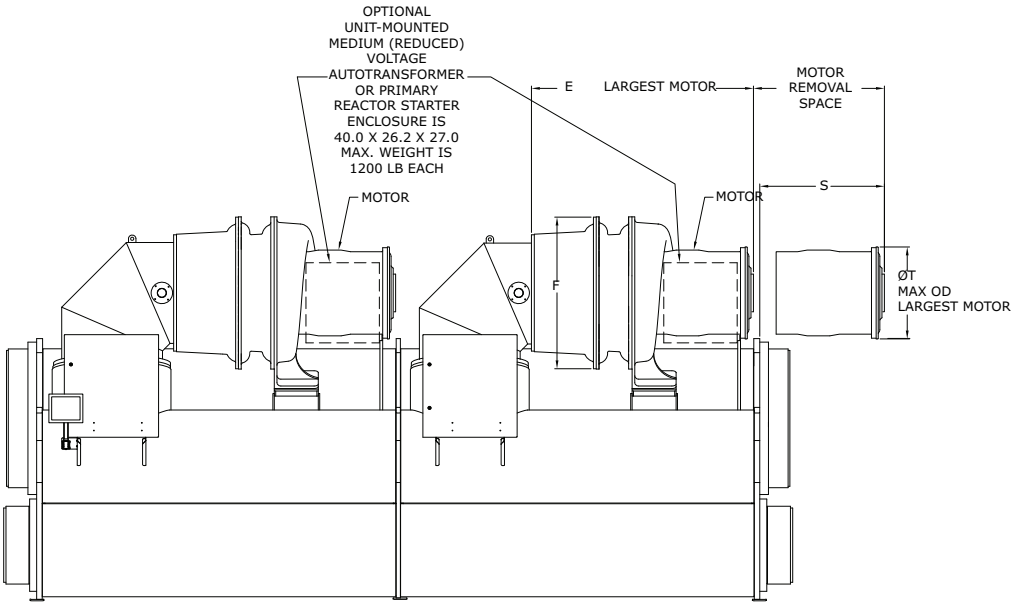
1. ADD 1.5″ FOR DISTANCE TO TRACER ADAPTIVIEW™ DISPLAY MOUNTING ARM IN STOWED POSITION.
2. ADD 2.2″ FOR DISTANCE TO TRACER ADAPTIVIEW DISPLAY MOUNTING ARM IN STOWED POSITION (AFD UNITS).
3. BRACKETS ARE WELDED TO EVAPORATOR ON 900–1210A AFD. SUPPORTS CAN BE UNBOLTED FROM BRACKETS.



SHELL SEPARATION DIMENSIONS (INCHES)

Data for the following figure is found in Table 7, p. 16 and Table 8, p. 16.

Figure 4. Assembly for CDHF and CDHG CenTraVac chillers (CDHF shown)

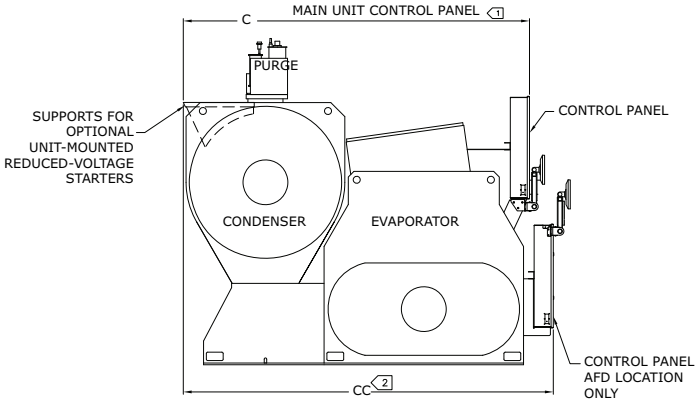


CDHF UNIT SHOWN (COOLING ONLY)

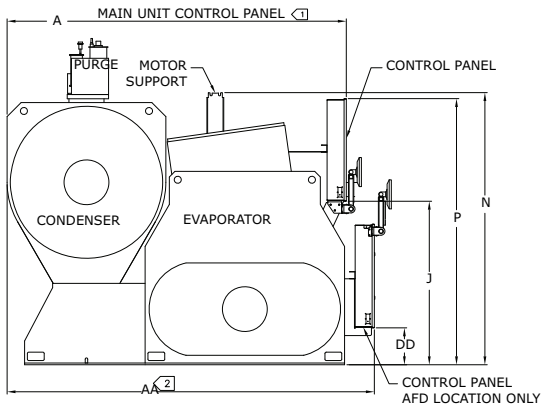
CHILLER DIMENSIONS (INCHES)

NOTES:

1. ADD 1.5" FOR DISTANCE TO TRACER ADAPTIVIEW™ DISPLAY MOUNTING ARM IN STOWED POSITION.
2. ADD 2.2" FOR DISTANCE TO TRACER ADAPTIVIEW DISPLAY MOUNTING ARM IN STOWED POSITION (AFD UNITS)
3. BRACKETS ARE WELDED TO EVAPORATOR ON 900–1210A AFD. SUPPORTS CAN BE UNBOLTED FROM BRACKETS.



CHILLER DIMENSIONS (INCHES)
W/REDUCED-VOLTAGE STARTER OPTION



RIGHT-HAND VIEW (INCHES)

Weights

Single Compressor and Duplex Chillers: Models CVHE, CVHF, CVHG CDHF, and CDHG

Table 10. Compressor and motor weights

Model	NTON	CPKW[a]	Volts	Hz	Motor Weight		Compressor and Motor Weight	
					lb	kg	lb	kg
CVHE	190–270	242	6600	50	2558	1160	7294	3308
	230–320	287	4160	60	2530	1147	7266	3295
	300–420	379	6600	50	2767	1255	8185	3712
	360–500	453	6600	60	3385	1535	8803	3992
CVHF	350–485	453	6600	60	3385	1535	8013	3634
	350–570	588	480	60	2803	1271	7431	3370
	620–870	957	2300	60	3862	1751	9900	4490
	650–910	957	2300	60	3862	1751	9900	4490
	1060–1280	1228	4160	60	4559	2067	10597	4806
	1070–1300	1228	4160	60	4559	2067	10714	4859
	1470–1720	1340	2400	60	5196	2356	13932	6319
CVHG	480–565	489	6600	50	3794	1720	10000	4535
	670–780	621	6600	50	4685	2125	11311	5130
	920–1067	621	6600	50	4685	2125	12151	5511
CDHF[b]	1500–2000	745	460	60	3460	1569	9498	4308
	2100–2500	1062	460	60	4296	1948	10334	4687
	3500	1340	2400	60	5196	2356	13911	6309
CDHG[b]	1250–1750	621	6600	50	4685	2125	11311	5130
	2150	621	6600	50	4685	2125	12151	5511

Note: All weights are nominal and ±10%.

[a] Heaviest motor used; does not include the weight of the suction elbow.
[b] For Duplex™ chillers, weights shown are for individual components; multiply by two for total component weights (for Duplex chillers only).

Table 11. Component weights

Model	Evap Shell Size	Control Panel		Purge		Oil Tank		Suction Elbow[a]		Economizer without Free Cooling		Economizer with Free Cooling	
		lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
CVHE	032	119	54	140	64	350	159	279	127	404	183	564	256
CVHE CVHG	050	119	54	140	64	350	159	280	127	635	288	885	401
	080	119	54	140	64	350	159	519	235	976	443	1296	588
CVHF	050	119	54	140	64	350	159	280	127	420	191	670	304
	080	119	54	140	64	350	159	519	135	735	333	1055	479
	142/210/250	119	54	140	64	350	159	722	327	878	398	1348	611
CVHG	142/210	119	54	140	64	350	159	722	327	1433	650	1903	863
CDHF[b]	210/250D/250M/250X	119	54	140	64	350	159	683	310	878	398	1348	611
CDHG	210/250	119	54	140	64	350	159	1350	612	1433	650	1903	863

Note: All weights are nominal and ±10%.

[a] Suction elbow weights include flanges and assume largest compressor available for that size.
[b] For Duplex chillers, weights shown are for individual components; multiply by two for total component weights (for Duplex chillers only)

Table 12. Evaporator and condenser bundle weights

Model	Shell Size	Bundle Size[a]	Evaporator				Condenser			
			Shell[b]		Waterbox[c]		Shell[d]		Waterbox[c]	
			lb	kg	lb	kg	lb	kg	lb	kg
CVHE	032S	320	2778	1260	653	296	2458	1115	644	292
	032L	320	3483	1579	653	296	3006	1363	644	292
CVHE CVHF CVHG	050S	700	4897	2221	1061	481	3526[e]	1599	1328	602
	050L	700	5984	2714	1061	481	4436[e]	2012	1328	602
	080S	1400	7884	3283	2490	1129	5280	2394	2565	1164
	080L	1400	9653	4066	2490	1129	6776	3073	2565	1164
	142M	1420	11036	5005	3701	1679	N/A	N/A	5330	2418
	142L	1420	11938	5414	3701	1679	10995	4987	5330	2418
	142E	1420	12921	5860	3701	1679	N/A	N/A	5330	2418
	210L	2100	14755	6692	6403	2904	14154	6420	7319	3320
	250	2500	20068	9102	8343	3784	17200	7801	9144	4148
CDHF CDHG	210D	2100	22437	10177	8382[f]	3802[f]	22635	10267	8928[f]	4050[f]
	250D	2500	24610	11162	10954[f]	4969[f]	25853	11726	11442[g]	5190[f]
	250M	2500	28679	13008	10954[f]	4969[f]	29817	13524	11442[f]	5190[f]
	250X	2500	31902	14470	10954[f]	4969[f]	33486	15188	11442[f]	5190[f]

Note: All weights are nominal and ±10%.

[a] Bundle weights are for the maximum bundle size for chiller family with TECU.035 tubes.
[b] Evaporator shell weight includes: Evaporator + Control Panel + Legs; waterbox weight is NOT included.
[c] Based on two-pass marine, 300 lb (136 kg); includes supply and return.
[d] Condenser shell weight includes: Condenser + Oil Tank + Purge + Legs; waterbox weight is NOT included.
[e] Condenser bundle is a 500.
[f] Based on 1-pass marine, 300 lb (136 kg); includes supply and return.

Table 13. Unit-mounted starters/Adaptive Frequency™ drives

		lb	kg
Low Voltage (less than 600 volts)	Wye Delta	557	252
	Solid State	557	252
Adaptive Frequency Drive (less than 600 volts)	405 amp	1680	762
	608 amp	1680	762
	900 amp	3000	1360
	1210 amp	3000	1360
Medium Voltage (2300–6600 volts)	Across the line	557	252
	Primary Reactor	1586	719
	Autotransformer	1639	743

Note: All weights are nominal and ±10%.

Disassembly

Remove Nitrogen Charge

⚠ WARNING

Refrigerant May Be Under Positive 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 and may be under positive pressure; system may also contain oil. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or non-approved refrigerant additives.

NOTICE

Equipment Damage!

Mixing refrigerants or oils could result in equipment damage including bearing damage, introduction of acids into the chiller, or continuous purge pump-out in high-head/high ambient applications.

CenTraVac™ chillers are manufactured with different refrigerant/oil systems: 1) chillers using R-123 refrigerant and OIL00022 compressor oil, and 2) chillers using R-514A refrigerant and various Trane POE-based compressor oils.

Always verify proper refrigerant and oil for your chiller. Do NOT mix refrigerants and oils.

This *Installation Guide* applies to CenTraVac™ chillers with two different refrigerant and oil systems:

- R-123 and OIL00022.
- R-514A refrigerant and Trane OIL00379/OIL00380 compressor oil.

Important: *Verify proper refrigerant and oil for your chiller before proceeding!*

Note: *This manual applies to model CDHF, CDHG, CVHE, CVHF, and CenTraVac chillers.*

Important: *Remove the nitrogen charge from the chiller vessel before starting any disassembly procedures.*

Note: *New units ship with a 5 psig (34.5 kPag) dry nitrogen holding charge at nominal 72°F (22°C).*

Important: *New units that have been factory run-tested contain residual refrigerant; vent discharge outdoors.*

Check to make sure there is a positive pressure holding charge.

Introduction

The disassembly and reassembly procedures described in this manual should be performed only on chillers that have been ordered with this shell option. The process is to be initiated by experienced service technicians. Contact your local Trane Service office for assistance if required.

This section discusses a typical disassembly process. Proper lifting techniques vary based on mechanical room layout.

- It is the responsibility of the person(s) performing the work to be properly trained in the safe practice of rigging, lifting, securing, and fastening the components involved.
- It is the responsibility of the person(s) providing and using the rigging and lifting devices to inspect these devices to ensure they are free from defect and are rated to meet or exceed the published weights.
- Always use rigging and lifting devices in accordance with the applicable instructions for such devices.

Note: *Additional gaskets and O-rings are shipped with the chiller when compressor doweling and/or separable shells are selected.*

⚠ 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.

NOTICE

Equipment Damage!

Failure to remove the strain relief with the sensor could result in equipment damage.

Do NOT attempt to pull sensor bulb through the strain relief; always remove the entire strain relief with the sensor.

Wiring Disassembly

Before separating shells, remove the purge, the compressor, and the various unit mounted sensors (frame LLIDs) as indicated. If possible, the best method is to remove the sensor and carefully coil the wire after labeling the device and its location to aid in reinstallation. All sensors connect to the buss wiring with a universal plug.

This allows easy disconnection and reconnection of the sensors.

Purge Unit Removal

⚠ WARNING

Refrigerant May Be Under Positive 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 and may be under positive pressure; system may also contain oil. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or non-approved refrigerant additives.

⚠ 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.

To remove the purge assembly from the top of the condenser:

1. Isolate the purge unit from the condenser shell by closing the vapor and liquid line valves.
2. Disconnect and mark all piping and wiring attached to the purge unit. Sand all paint off at points and use a tubing cutter where cuts are to be made. See Figure 5, p. 23, and Figure 6, p. 23.
3. Remove the fasteners connecting the purge unit base to its mounting bracket.
4. Two people will be needed to lift purge unit clear of the chiller. Refer to Table 11, p. 20 for purge unit weight. Store the purge unit in a clean dry area.

Reassemble the purge unit in reverse order when the process is complete.

Figure 5. Example purge unit

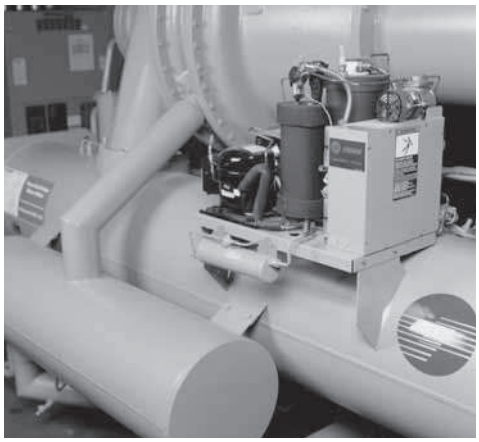
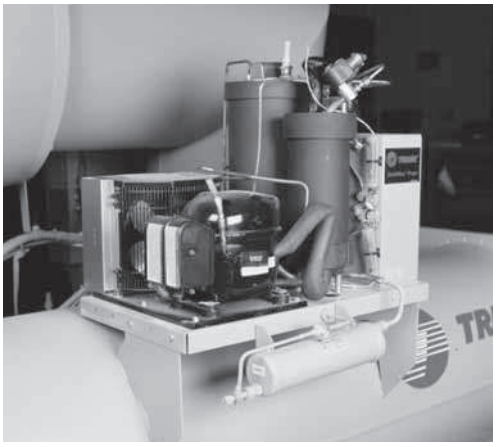


Figure 6. Purge unit detail



Note: *Purge unit may appear slightly different than example shown here.*

Compressor Motor Assembly Removal

NOTICE

Compressor Damage!

Failure to follow instructions below could cause the internal components to shift which could result in serious compressor damage upon starting the unit. The compressor motor assembly must not be removed from the chiller unless special doweling has been installed at the factory. Doweling must be installed to prevent the interstage casings from shifting. If the compressor/motor assembly is lifted without doweling installed, the internal alignment may shift. It would then be necessary to disassemble and then reassemble the compressor making sure that all internal clearances and specifications are proper. If doweling is not factory installed, and it is necessary to install doweling, contact the local Trane Service Company. The compressor discharge flange and mounting foot are also doweled at the factory to provide proper alignment during reassembly.

Figure 7, p. 24 through Figure 10, p. 24 show factory-installed compressor doweling. If components are not factory doweled, doweling must be installed before proceeding. Contact the local Trane Service Company.

Figure 7. Compressor dowelings on casings

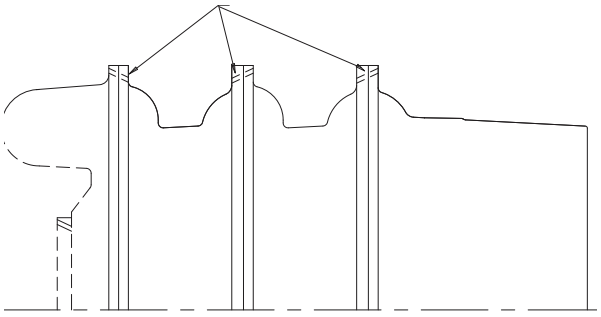


Figure 8. Compressor doweling on evaporator foot (these are standard on all CenTraVac™ chillers)

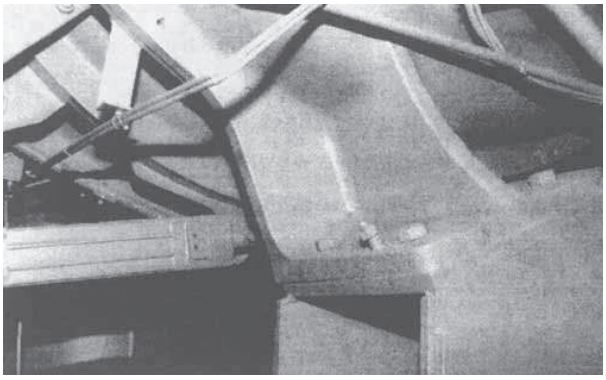
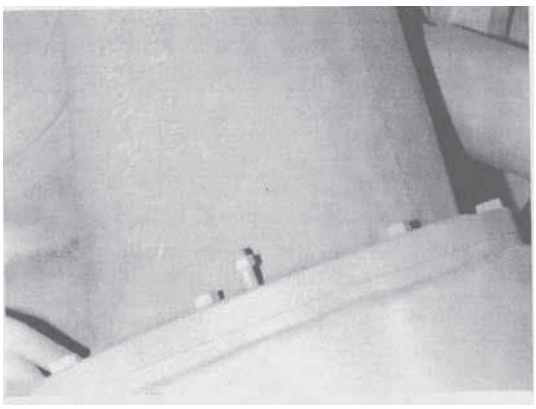


Figure 9. Compressor doweling on condenser discharge flange (these are standard on all CenTraVac chillers)



1. Disconnect the inlet vane linkage.
   a. Disconnect the rod end bearings connecting the inlet vane operator levers to the guide vane links as in Figure 10, p. 24 and Figure 11, p. 25. Leave the rod end bearing connecting the guide vane links to the main drive levers attached.

      Note: *Do not rotate the rod end bearings on the shaft as this will alter the inlet guide vane operations and compressor performance.*

   b. Remove the cotter pin securing the vane operator stud to the vane drive and slide the stud out of the main drive. See Figure 12, p. 25.
   c. Remove the hex head bolts securing the vane drive support assemblies to the compressor castings and remove the main drive and inlet vane levers from the compressor as a unit. See Figure 12, p. 25.
   d. Remove the hex head bolts securing the vane drive support assemblies to the compressor castings and remove the main drive and inlet vane levers from the compressor as a unit. See Figure 12, p. 25.

Figure 10. Vane actuator level on suction cover

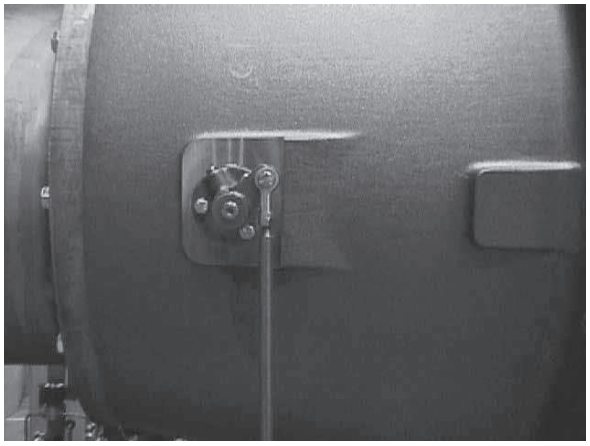


Figure 11. Vane actuator level on interstage

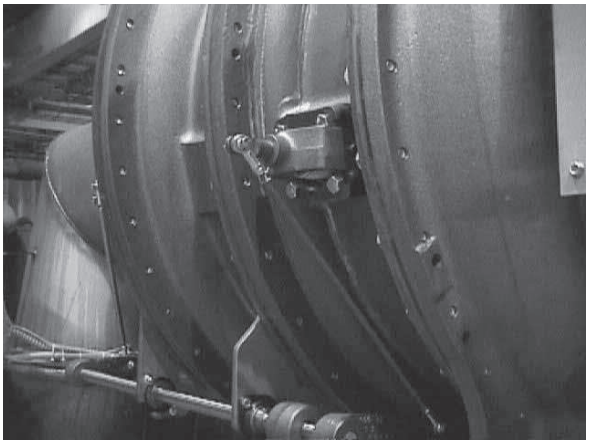
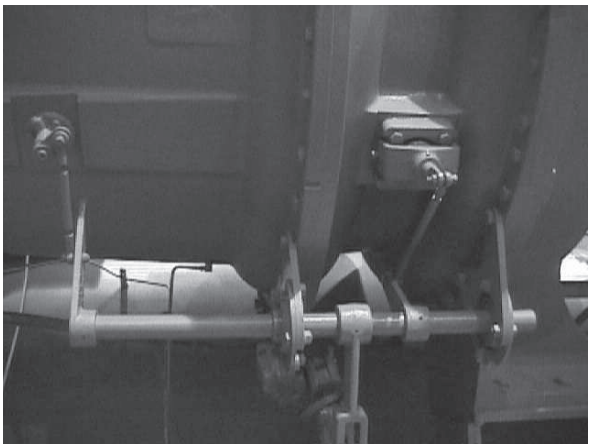


Figure 12. Vane actuator operator mechanism



⚠ WARNING

Refrigerant May Be Under Positive 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 and may be under positive pressure; system may also contain oil. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or non-approved refrigerant additives.

2. Disconnect all external vent lines, motor cooling supply and drain lines, and oil supply and drain lines which are connected to the compressor and compressor motor. Sand all paint off the points where cuts are to be made. Use a tubing cutter to ensure that cuts are smooth and square. Figure 13, p. 25 and Figure 14, p. 25 illustrate these lines. Couplings will be used to reconnect the lines when reassembling the chiller. Cap open lines to prevent entry of foreign material.

Note: *Cover all open connections to avoid prolonged exposure of oil to humid air. Remove oil if a chiller is kept in a disassembled condition for an extended time.*

Figure 13. Lubrication system supply, drain, and vent lines

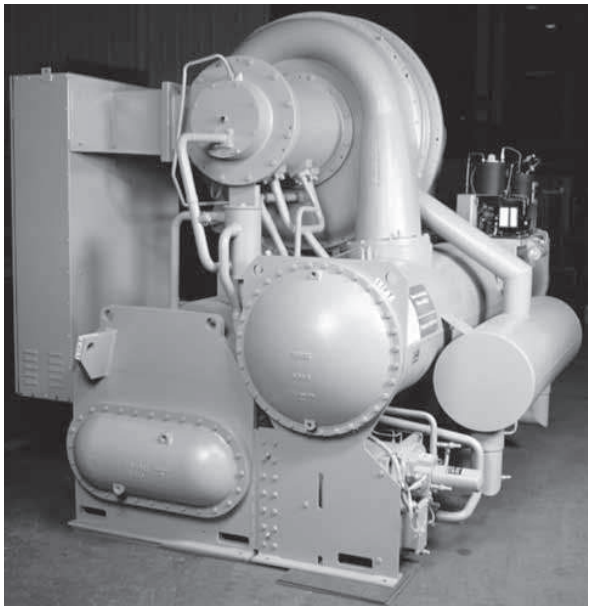


Figure 14. Lubrication system motor cooling lines

3. Remove the control panel if necessary. Also, disconnect and remove the unit mounted starter, if so equipped. See "Control Panel Removal," p. 29 for instructions.
4. Remove the economizer vent pipe flange bolts at the compressor connection. See "Economizer Removal," p. 27 for instructions.

⚠ 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.

5. Only Trane Service Agencies have access to the certified lifting plates to allow safe compressor/motor assembly removal. Before removing the compressor/motor assembly, consult with a rigging specialist. Employ rigging specialist procedures when removing the compressor motor/assembly.

⚠ WARNING

Improper Unit Lift!

Using the elbow lifting tab to lift chiller could result in chiller dropping which could result in death, serious injury, or equipment damage.

- **Do NOT lift chiller using elbow lifting tab. Elbow lifting tab and approved clevis are used ONLY when removing elbow from chiller.**
- **Do not lift chiller utilizing waterbox lifting lug. Waterbox lifting lug is to be used only for removing waterbox from chiller.**

6. Remove the suction elbow.

   There are two styles of suction elbows, a 90° elbow and a three-piece elbow, that can be found in the disassembly process.

   Note: *Apply oil on steel compressor internal parts for rust prevention. Only a thin layer of oil is necessary. Avoid over applying. Use POE break-in oil.*

   a. Use a sling to support the 90° elbow style suction elbow. Apply slight lifting pressure.

   b. Three-piece suction elbows have a lifting tab. You will need a lifting clevis to remove the elbow. A Crosby screw pin shackle, model S-209, stock number 1018482 with a 5/8-in. pin is acceptable as shown in Figure 15, p. 26.

Figure 15. Lifting clevis on the suction elbow lifting tab (three-piece elbow style)

   c. Remove the bolts from the control mounting bracket on the back of the control panel.

   d. Remove the suction elbow bolts at the compressor and evaporator connections..

   e. Lift the suction elbow from the chiller being careful to avoid damage to flange surfaces.

   f. Install protective covers on the evaporator and compressor connections. Plastic secured with duct tape makes an adequate cover if no heavy objects are set on the openings.

7. Support the compressor/motor assembly as indicated by the rigging specialist (see Step 5). Do not lift the assembly; instead support the assembly to prevent it from slipping as the compressor foot and discharge connection flange bolts are removed.

NOTICE

Equipment Damage!

Failure to follow instructions below could result in equipment damage.

The cast iron foot of the compressor and the discharge flange of the volute can be broken easily if rough handling of the compressor/motor assembly is allowed. Take great care to prevent this breakage when removing the compressor/motor assembly and setting it down, or when moving it laterally on the floor (e.g., on rollers, etc). Take extra care to gently sit the compressor/motor assembly down and avoid letting it swing or drop into an obstruction while lifting or moving it.

NOTICE

Equipment Damage!

Properly support the compressor casting foot to avoid prevent breakage and equipment damage.

Note: *Plan ahead where the compressor will be secured. Build a suitable platform to support the assembly before the lift. Gently set compressor onto prefabricated pre-formatted support. Use care not to damage the cast compressor foot (see foot in Figure 8, p. 24). Similarly, avoid damage to the discharge volute flange (see discharge flange in Figure 9, p. 24).*

8. Remove the compressor/motor assembly. Remove the locating dowel pins from the compressor foot and discharge flange connections as shown in Figure 8, p. 24 and Figure 9, p. 24. To remove the dowel pin, first remove the nut on the dowel pin, place a bushing on the pin, and then reinstall the nut. As the nut is tightened, the dowel pin should pull out of its hole; at this point, remove the compressor/motor assembly.

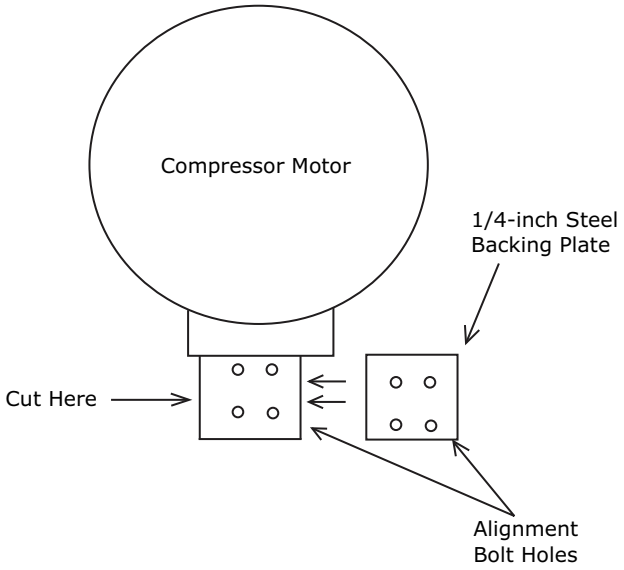
Compressor Motor Mount Disassembly

If additional vertical clearance is required, the height of the compressor motor mount can be reduced. Use the following procedure:

1. Before cutting off the motor mount, first fabricate a 1/4-inch steel backing plate.
   a. Cut the backing plate to shape and clamp it to the motor mount.
   b. Drill four 1/4-inch holes through the motor mount and the backing plate as shown in Figure 16, p. 27. These holes with bolts or roll pins installed will be used to align the components during reassembly.
   c. Remove the backing plate.
2. Using an oxyacetylene torch, cut the mount as shown in Figure 16, p. 27.

During reassembly, use the backing plate with bolts or roll pins to locate the pieces properly. After the pieces are located, Trane recommends welding the mount and backing plate in place.

Figure 16. Motor support detail



Economizer Removal

⚠ WARNING

Refrigerant May Be Under Positive 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 and may be under positive pressure; system may also contain oil. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or non-approved refrigerant additives.

⚠ 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.

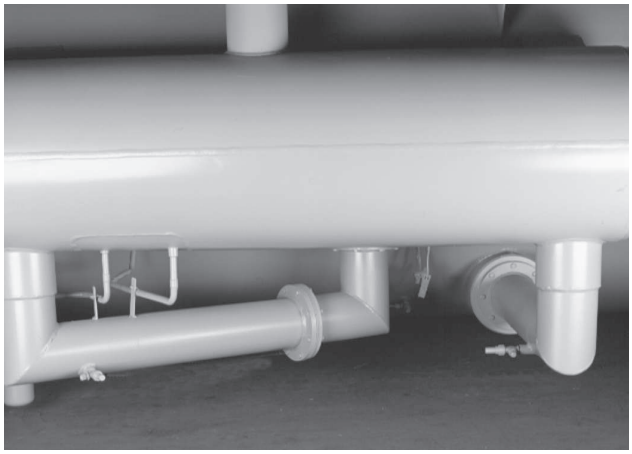
Use the following steps to remove the economizer if additional horizontal clearance is required.

1. Support the weight of the economizer with a movable floor jack. Do not lift the economizer; simply support it. Economizer weights are provided in Table 11, p. 20;

also see submittal. It is recommended that larger size economizers be lifted using overhead rigging.

2. If the unit has insulation, remove the insulation and loosen the bolts on the condenser liquid line flange. See Figure 17, p. 28. Do not remove the bolts at this time. Cut the motor cooling drain line(s) if present and cut entering and leaving 5/8 inch OD copper oil cooler lines. Refer to Figure 17, p. 28.

Figure 17. Condenser liquid line flange



NOTICE

Angle Valves Damage!

Rigging, handling, and placing chiller components on uneven surfaces can cause damage to angle valves.

Remove angle valves to avoid breakage during handling if it is necessary to remove the economizer.

Note: *Take care to avoid damage to angle valves during handling and transfer of economizer.*

3. Loosen the bolts on the evaporator liquid line flange. This connection is near the bottom of the evaporator. See Figure 17, p. 28. Do not remove the bolts at this time.
4. Economizers are connected to the condenser shell via a bolted flange. See Figure 22, p. 31. Remove the bolts at this flanged connection.
5. Loosen the economizer vent pipe bolts that secure the vent pipes to the compressor interstage castings (unless the compressor has already been removed to gain vertical clearance.)
6. Secure economizer with appropriate rigging.
7. Remove the bolts from the condenser and evaporator liquid line connection flanges. Adjust the floor jack as necessary to support the weight of the economizer.
8. Remove the economizer vent pipe flange bolts to loosen the economizer. When the bolts are free, back the economizer away from the chiller. The economizer may tend to rotate off the jack towards the chiller. Be prepared to offset the rotation.
9. Remove the economizer orifice plates and mark them so they are reinstalled in their original position. The orifice with the greatest number of holes is to be located between the economizer and the evaporator. The orifice with fewer holes is to be located between the condenser and economizer.
10. Move the economizer away from the chiller and set it on a pallet. Cover all openings to prevent the entry of foreign material into the economizer, condenser and compressor.
11. Use the reverse order to reassemble the economizer on the chiller. Be sure to install new gaskets at the appropriate joints.
12. Torque all bolts to specifications. Consult with your Trane service group for specific torques for your economizer design.

Tracer AdaptiView Display Arm Removal

⚠ 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.

Use the following steps to remove the Tracer AdaptiView™ display arm if additional clearance is required.

1. Cut tie wraps holding wires inside of control arm and remove wires from arm.
2. Remove 3-3/8-in. bolts from the angle bracket attached to the control panel mounting bracket.
3. Use the reverse order to re-attach the arm to the control panel mounting bracket.

Control Panel Removal

⚠ WARNING

Hazardous Voltage w/Capacitors!

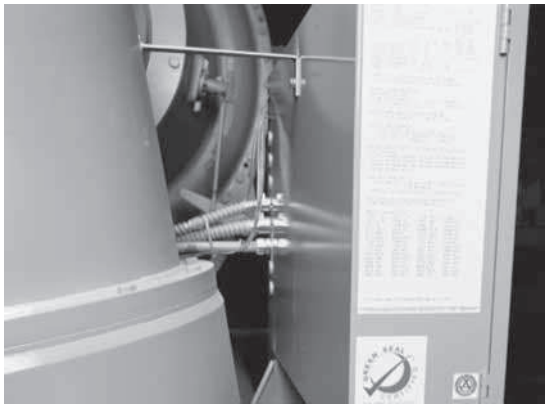
Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

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.

Use the following steps to remove the control panel if additional horizontal clearance is required.

1. Mark and disconnect incoming wiring to the control panel.
2. Remove the bolts from the bottom of the panel which secure the panel to the lower mounting bracket.
3. Loosen the bolts on the back of the panel which secure the panel to the top (suction elbow) mounting bracket. See Figure 18, p. 29.

Figure 18. Control panel mounting bracket



4. Two people will be needed to lift the panel clear of the chiller. Refer to Table 11, p. 20 for control panel weight. Steady the panel as the top retaining bolts are removed. Then lift the panel clear. Store the panel in a clean dry area.
5. Use the reverse order to reassemble the control panel.

Unit-mounted Starter Removal

Additional horizontal and vertical clearances may be obtained by removing the unit-mounted starter on chillers so equipped. See Figure 19, p. 29 and Figure 20, p. 29.

Note: *Unless otherwise stated, lift only vertically on starter-provided devices. Refer to all starter-related manuals prior to lifting. If needed, use a spreader bar to avoid angles in chains and reduce required lifting height clearance.*

Figure 19. Unit-mounted starter

Figure 20. Starter mounting bracket

The following procedure assumes the chiller is new and has never been installed and therefore there is no electrical power connected to the chiller. If there is power to the unit, follow proper lockout/tagout procedures, and any other applicable safety regulations regarding electric power.

⚠ 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.

1. Mark and disconnect the power wiring at the compressor motor terminal lugs inside the starter panel.
2. Mark and disconnect control wiring entering the starter panel.
3. Remove the bolts securing the bottom of the starter to the brackets on the evaporator.
4. To move the starter panel away from the chiller, it is recommended that a fork truck be used. Position the truck so that it is ready to take up the weight of the starter panel. The panel is top-heavy and must be adequately secured before moving. Refer to Table 13, p. 21 for starter weights.

⚠ WARNING

Heavy Objects!

Placing, assembling, and/or suspending more than one module/subassembly at a time could result in death, serious injury, or equipment damage.

Always place, assemble, and suspend modules/subassemblies one at a time.

5. Loosen the bolts which hold the starter to the flange on the motor. Steady the starter panel as the retaining bolts are removed because the panel will tip forward. See Figure 19, p. 29.
6. Support the weight of the starter panel with the fork truck and carefully remove the starter panel from the chiller. Store the panel in a clean dry area free of any corrosive agents. When ready, reassemble the panel on the chiller in reverse order.

Condenser/Evaporator Disassembly

After the compressor assembly has been removed on separable shell units, the condenser and evaporator shells can be taken apart at flanged connections to reduce the horizontal clearance required for the chiller installation.

⚠ 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.

NOTICE

Condenser Legs Damage!

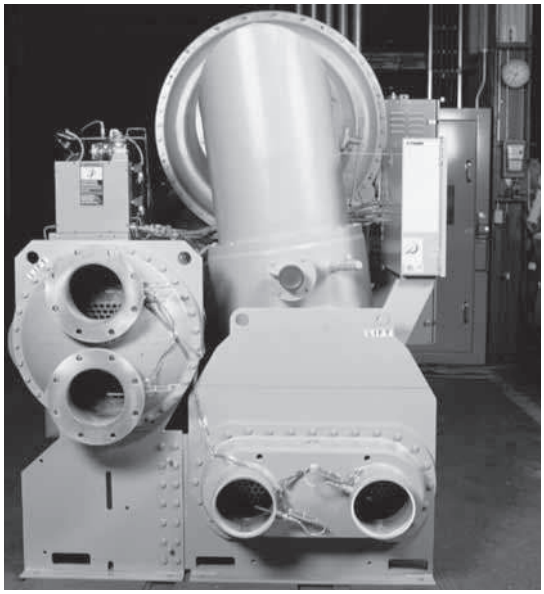
Failure to follow instructions below could result in condenser legs damage.

Condenser legs are designed for vertical support only! Additional bracing is required if it is necessary to move the condenser horizontally. Contact your local Trane Service agency for assistance.

Note: *Brace condenser legs to prevent flexing. Do not move the condenser horizontally without bracing legs.*

1. Ensure that condenser and evaporator shells are securely supported on level ground. If not, shim under the bases.
2. Support the condenser with rigging using the lifting holes on the tube sheets. See Figure 21, p. 30. Do not lift the shell, simply support it to avoid slipping as the bolts are removed from the connecting flange.

Figure 21. Separable shell unit (end view)



3. Remove the bolts from the flanges connecting the evaporator tube sheet and condenser shell support

(see Figure 22, p. 31). Then remove the bolts from the flanges connecting the shells.

Note: *Some small shell combinations do not have flanged connections between shells.*

4. Remove the two dowel pins located in the flange on each end of the shell tube sheet connections and lift the condenser clear of the evaporator.
5. Reassemble the evaporator and condenser shells in the reverse order.
6. Torque all bolts to specifications listed in Table 14, p. 34.

Figure 22. Separable shell unit (flange connection)

Disassembly of Chillers with Options

Heat Recovery

Use the following steps when disassembling chillers with auxiliary or heat recovery condenser shells to reduce the vertical clearance required for the chiller installation.

⚠ WARNING

Refrigerant May Be Under Positive 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 and may be under positive pressure; system may also contain oil. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or non-approved refrigerant additives.

⚠ 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.

1. Support the auxiliary or heat recovery condenser with rigging using the lifting holes on the tube sheets. Do not lift the shell; simply support it to avoid slipping as the bolts are removed from the connecting flanges.
2. Remove the bolts from the flanges on the interconnecting piping and flanges connecting the auxiliary heat recovery condenser and condenser tube sheets.
3. Remove the bolts from the flanges on the interconnecting piping and the flanges connecting the shells.
4. Lift the condenser clear of the unit.
5. Reassemble the condenser in the reverse order. Install new gaskets at the appropriate joints.
6. Torque all bolts to torque specifications listed in Table 14, p. 34.
7. Remove and coil up sensors.

Free Cooling

Use the following steps on free cooling units to reduce the vertical clearance required for chiller installation.

1. Support the piping and free cooling valve between the condenser and suction elbow with rigging similar to that used for removing the suction elbow. Do not lift the piping; simply support it to avoid slipping as the bolts are removed from the connecting flanges. (Typical rigging for lifting the suction elbow can be seen in Figure 15, p. 26.

2. Remove the bolts from the flanges.
3. Lift the piping clear of the unit.
4. Reassemble the piping in the reverse order. Install new gaskets at the appropriate joints.
5. Torque all bolts to torque specifications listed in Table 14, p. 34.

Reassembly

NOTICE

Equipment Damage!

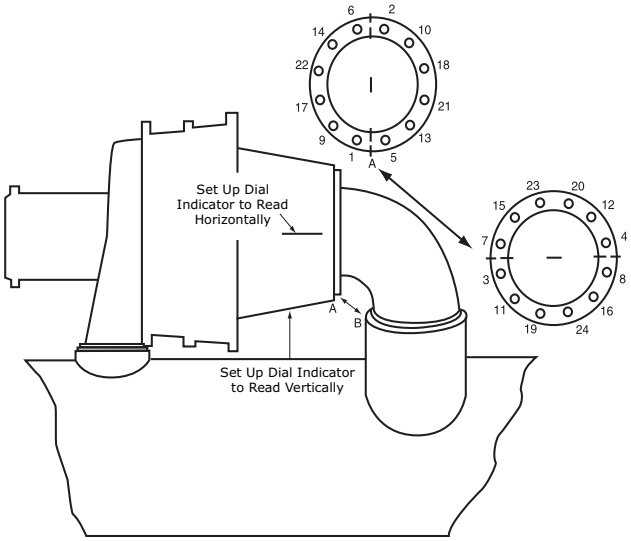
Failure to remove the strain relief with the sensor could result in equipment damage.
Do NOT attempt to pull sensor bulb through the strain relief; always remove the entire strain relief with the sensor.

It is important to remove used O-rings and gaskets and clean joints before reassembling the compressor with new O-rings and gaskets. All necessary replacement O-rings and gaskets are supplied by the factory when the compressor doweling or separable shell options are ordered.

Use the following procedure to reattach the compressor/motor assembly to the chiller.

1. Remove the protective covers on all compressor, condenser, and evaporator connections. Clean all mating surfaces using Loctite® “Chisel” cleaner or CRC® Industrial Gasket Remover. Completely remove old sealing compound from O-ring grooves. Use Loctite “N” primer for final surface preparation.
2. Refer to CTV-SB-66F (*General Service Bulletin: CenTraVac O-Ring and Flange Sealant*), or the most recent version, for proper installation of gaskets, O-Rings, and Loctite sealant. Install a new O-ring on the compressor discharge connection mating surfaces. Use Loctite 515 “Gasket Eliminator” to lubricate the O-ring and provide additional sealing. This is the only sealing compound recommended by Trane for use on O-ring joints. To use this sealing compound, apply a light bead (approximately 1/8-in. in diameter) to the O-ring groove, insert the O-ring and then apply a light bead to the O-ring. Also apply a 1/8-in. bead of sealing compound between the O-ring groove and the bolt hole circle. The parts can now be assembled.
3. Lift the compressor/motor assembly into place. Insert the bolts in the compressor foot and discharge flange connections. Before tightening any of these bolts, reinstall the dowel pins in the compressor foot and discharge flange.
4. Tighten the compressor foot and discharge flange bolts. See Table 14, p. 34 for bolt torque specifications.
5. Install and tighten the motor mount bolts. See Table 14, p. 34 for bolt torque specifications.
6. Remove the lifting equipment.
7. Set up dial indicators on the compressor end of the compressor/motor assembly. See Figure 23, p. 33. The dial indicators are used to monitor horizontal and vertical movement of the compressor/motor assembly when the suction elbow retaining bolts are tightened. Support the dial indicators from the condenser or from a floor stand.

Figure 23. Suction elbow flange bolts



8. Clean the suction elbow flange surfaces and O-ring grooves per Step 1. For the evaporator to suction elbow joint, use Loctite 515 per Step 2. For the suction elbow to compressor joint, use 1/8-in. GORE-TEX® Joint Sealant placed approximately 1/8-in. in board of the O-ring groove. This is used in addition to the O-ring. As an option, Loctite 515 may be used in place of GORE-TEX. However, great care must be taken to prevent the sealant from entering the first stage IGV housing. Refer to CTV-SB-66F (*General Service Bulletin: CenTraVac O-Ring and Flange Sealant*), or the most recent version.
9. Lift the suction elbow into place using a sling or chain-fall hoist.
10. Install the suction elbow retaining bolts.
11. Tighten the retaining bolts only “hand tight”. Tighten two retaining bolts, 180 degrees apart at the compressor connection. Then tighten two bolts, 180 degrees apart at the evaporator connection. Alternate between connections until all retaining bolts are tight. Monitor the dial indicators to ensure that there is no more than 0.010 inches of compressor movement. If there is more movement than this, loosen all of the bolts, “zero” the dial indicators and repeat the procedure. Figure 23, p. 33 illustrates the bolt tightening sequence.
12. Reconnect the economizer vent pipes. Be sure to clean the mating surfaces and use new gaskets on the connections. Tighten the flange bolts just enough so that the gasket material just begins to extrude from between the flanges.
13. Reinstall all other chiller components which were removed. Reconnect the inlet vane linkages.
14. Torque all bolts to specifications listed in Table 14, p. 34.

Table 14. Bolt torques

Non-gasket Joints Bolt Torques		
Bolt Size (in)	**Torque (ft·lb)**	
1/2	70	
5/8	150	
3/4	250	
All Other Metal Joints (O-Ring Joins) Shall Use the Following Torques		
Bolt Size (in)	**Torque (ft·lb)**	
	Min.	**Max**
1/4	5	7
5/16	11	15
3/8	22	27
1/2	55	75
5/8	120	165
3/4	200	280
1	400	550
All Joints with Flat Elastomeric Gaskets Shall Use the Following Bolt Torque		
Bolt Size (in)	**Torque (ft·lb)**	
	Min.	**Max**
5/16	8	12
3/8	12	18
1/2	33	50
5/8	70	90
3/4	105	155

15. Reconnect the previously cut compressor/motor oil supply and return lines and the motor cooling lines using the factory-supplied couplings.

Brazing

⚠ WARNING

Explosion Hazard and Deadly Gases!

Failure to follow all proper safe refrigerant handling practices could result in death or serious injury. Never solder, braze or weld on refrigerant lines or any unit components that are above atmospheric pressure or where refrigerant may be present. Always remove refrigerant by following the guidelines established by the EPA Federal Clean Air Act or other state or local codes as appropriate. After refrigerant removal, use dry nitrogen to bring system back to atmospheric pressure before opening system for repairs. Mixtures of refrigerants and air under pressure may become combustible in the presence of an ignition source leading to an explosion. Excessive heat from soldering, brazing or welding with refrigerant vapors present can form highly toxic gases and extremely corrosive acids.

Except as noted in the following, braze with the following filler metals:

- Braze all copper-to-copper joints with A.W.S. BcuP-6 filler metal.
- Braze all copper-to-brass joints with A.W.S. BcuP-6 filler metal using white or black brazing flux.
- Braze all other joints with A.W.S. Bag-28 filler metal.

Bleed dry nitrogen through the lines while brazing to prevent the formation of oxides which can contaminate the oil and refrigerant systems.

Note: *Use silver soldering with 96% Sn-4% Ag (for example, J.W. Harris Co. Stay Brite®) to replace brazing when the heat from brazing would be detrimental to the immediate or nearby parts.*

Examples:

1. Joints next to threaded joints in which the copper or brass threads become too soft and/or Loctite® loses its sealing capability due to excess heat.
2. Joints next to valves in which the valves cannot be taken apart or are not recommended for brazing.

Final Installation Procedures

After the chiller has been moved to the equipment room and reassembled under Trane supervision, leak testing, and evacuation can be performed by Trane or under Trane supervision. Upon verification of leak tightness, installation can proceed for unit piping, wiring, etc. After installation has been completed, fill out *CenTraVac™ Water-cooled Chillers Installation Completion and Request for Trane Service – Form* (CTV-ADF001*-EN) to schedule the startup; the chiller commissioning process can be completed by Trane or under the supervision of authorized Trane personnel.

Note: *CTV-ADF001*-EN is also included in the* ***Forms*** *section of CenTraVac™ Water-cooled Chillers Model CVHH With Symbio™ Controls – Installation, Operation, and Maintenance (CVHH-SVX003*-EN) and CenTraVac™ Water-cooled Chillers Model CDHH With Symbio™ Controls – Installation, Operation, and Maintenance (CDHH-SVX003*-EN).*

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