TRANE®

General Service Bulletin

RTHC-SB-2

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Product Section	**Refrigeration**
Product	**Rotary Liquid Chillers - W/C**
Model	**RTHC**
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Subject: RTHC Separable Shell Procedures

Introduction:

The RTHC units can be disassembled for applications with limited access. This bulletin covers the disassembly and reassembly instructions for the RTHC units.

Discussion:

This bulletin will cover the procedures for removing the starter/control panel, compressor, oil separators, liquid-vapor separator and all interconnecting piping plus separating the evaporator and condenser.

Since the Trane Company has a policy of continuous product improvement, it reserves the right to change specifications and designs without notice. The installation and servicing of equipment referred to into this booklet should be done by qualified experienced technicians.

IMPORTANT NOTICE

Effective July 1, 1992, all service operations must use recovery systems to minimize losses of refrigerant to the atmosphere when servicing units with Class I and Class II refrigerants.

Class I (CFC) and Class II (HCFC) refrigerants include CFC-12, HCFC-22, CFC-500, CFC-502, CFC-11, CFC113 and HCFC-123. Deliberate venting is prohibited by Section 608 of the Clean Air Act.

In the normal service of air conditioning systems, there are three major activities mandated by the EPA regulations: recovery, recycling and reclaiming.

1. **Recovery** - the act of removing refrigerant from the air conditioning unit so that losses of refrigerant to the atmosphere are minimized.

Whenever a refrigeration circuit is opened, the recovery of the refrigerant is required. If there is no reason to believe that the refrigerant is “bad”, such as during service of gaskets, expansion valves or solenoid valves, the refrigerant is often returned to the unit without treatment. (Note: Always follow the equipment manufacturers recommendations regarding replacement of unit filter driers during service.)

If there is reason to suspect that the refrigerant is bad, such as with a compressor failure, the refrigerant should either be replaced or recycled,

Recovery is also required when a piece of equipment is decommissioned. This prevents the loss of refrigerant upon disposal of the unit. The recovered refrigerant usually is sold to refrigerant reclaimers rather than reused in the customer's new equipment.

2. **Recycling** - the act of cleaning recovered refrigerant for use in the customer’s equipment.

First, the refrigerant is boiled to separate the oil. Then it is run through a filter drier to separate moisture and acid.

Because of limited field testing capability, the quality and identity of any recycled refrigerant is suspect. For this reason, the EPA will most likely allow recycling of refrigerant only when it is returned to its original owner. Resale of the recycled refrigerant to third parties will not be allowed.

As a result, most servicers will only recycle refrigerant when the quantity of the refrigerant to be recycled and the expertise of the technician make it attractive to do so. Most suspect refrigerant will be sold to a reclaimer rather than be serviced in the field.

3. **Reclaiming** - the act of purifying refrigerant and testing it to ARI 700 “new” refrigerant standards. With reclamation, each batch of refrigerant undergoes extensive laboratory tests and the waste streams are disposed of according to environmental regulations.

Most reclamation will be done at centralized processing facilities because of the testing, waste handling and EPA certification requirements for reclamation. The Trane Company and others offer reclamation services for most refrigerants.

Reclamation is probably the most attractive alternative for users with salvaged and suspect refrigerant.

REFRIGERANT EMISSION CONTROL

Evidence from environmental scientists indicates that the ozone in our upper atmosphere is being reduced, due to the release of CFC fully halogenated compounds.

The Trane Company encourages every effort to eliminate, if possible, or vigorously reduce the emission of CFC, HCFC and HFC refrigerants into the atmosphere that result from installation, operation, routine maintenance, or major services on this equipment. Always act in a responsible manner to conserve refrigerants for continued use, even when acceptable alternatives are available. Conservation and emission reduction can be accomplished by following recommended Trane operation, maintenance and service procedures, with specific attention to the following:

1. Refrigerant used in any type of air conditioning or refrigerating equipment should be recovered for reuse, recovered and/or recycled for reuse, reprocessed (reclaimed), or properly destroyed, whenever it is removed from equipment by an EPA certified Type 11 or Universal Technician. Never release refrigerant into the atmosphere.
2. Always determine possible recycle or reclaim requirements of the recovered refrigerant before beginning recovery by any method. Questions about recovered refrigerants and acceptable refrigerant quality standards are addressed in ARI Standard 700.
3. Use approved containment vessels and safety standards. Comply with all applicable transportation standards when shipping refrigerant containers.
4. To minimize emissions while recovering refrigerant, use recycling equipment. Always use methods which will pull the required vacuum while recovering and condensing refrigerant into containment.
5. When leak checking with trace refrigerant and nitrogen, use R-134a, rather than CFC-12 (R-12) or any other fully halogenated refrigerants. Be aware of any new leak test methods which eliminate refrigerant as a trace gas.
6. When cleaning system components or parts, avoid using CFC-11 (R-11) or CFC-113 (R-113). Refrigeration system cleanup methods which use filters and dryers are preferred. Do not use solvents which have ozone depletion factors. Properly dispose of used materials.
7. Take extra care to properly maintain all service equipment that directly supports refrigeration service work, such as gauges, hoses, vacuum pumps and recycling equipment.
8. Stay aware of unit enhancements, conversion refrigerants, compatible parts and manufacturer's recommendations which will reduce refrigerant emissions and increase equipment operating efficiencies. Follow manufacturer's specific guidelines for conversion of existing systems.
9. In order to assist in reducing power generation emissions, always attempt to improve equipment performance with improved maintenance and operations that will help conserve energy resources.

READ IMPORTANT NOTICES BEFORE SERVICING THE RTHC

Warnings and Cautions

Warnings are provided to alert personnel to potential hazards that can result in personal injury or death; they do not replace the manufacturer's recommendations.

Cautions alert personnel to conditions that could result in equipment damage.

Your personal safety and reliable operation of this machine depend upon strict observance of these precautions. The Trane Company assumes no liability for installation or service procedures performed by unqualified personnel.

To prevent injury or death due to electrocution, use care when performing control setup, adjustments or any other service related operation when the electrical power is on. Position all electrical disconnects in the "OPEN" position and lock them.

WARNING

Disconnect and Lockout or Tagout all electrical power, including remote disconnects, before servicing. Failure to do so can cause severe personal injury or death.

CAUTION:It is essential to confirm that proper phase rotation is established - Phase A to Ll, Phase B to L2, and Phase C to L3. Phase rotation must be checked with a phase sequence indicator before start-up, otherwise catastrophic damage to the compressor may result.

CAUTION: Do not check the unit oil level with the unit operating. Severe oil loss will occur. Protective clothing must be worn when checking the oil level.

CAUTION: The compressor sump heater must be energized for a minimum of 24 hours prior to unit operation, to prevent compressor damage caused by liquid refrigerant in the compressor at start-up.

CAUTION: Do not use untreated or improperly treated water. To do so may result in equipment damage.

CAUTION: Proper water flow through the evaporator must be established prior to unit operation.

CAUTION: Do not charge the compressor with liquid refrigerant.

Section 1
Refrigerant Handling

1-1. General

If the entire unit must be disassembled be certain to follow each section in order. Attempting to split the chiller in two halves will result in two assemblies that are top heavy.

WARNING

To avoid personal injury, death or equipment damage, do not attempt to move the unit in two halves. Follow each section in the order outlined below.

It is assumed that electrical power has not been in any way connected to the unit control/starter panel.

1-2. Dimensions and Weights

Refer to the following schematics and tables to determine which components need to be removed to allow access into the mechanical room.

1-3. Refrigerant and Oil Removal

Prior to disassembly, the refrigerant needs to either be isolated in the condenser or removed from the system. The oil needs to be removed from the system also.

There is an option to ship the unit with a nitrogen charge. With this option the unit still ships with the entire oil charge and approx. 20 psi nitrogen. Refer to the sales order to determine how the unit was ordered.

Refrigerant Isolation

If the unit has isolation valves, use the following steps to store the charge in the condenser.

1. Close the butterfly valve(s) on the top of the condenser.
2. Close the large angle valve at the bottom of the condenser.
3. Close the two (2) service valves at the back of the condenser that have 1/4” lines tied to the oil sump and the gas pump.
4. Connect one end of a refrigerant hose to the bottom of the evaporator on the evaporator charging valve and the other end to a liquid transfer pump. From the liquid transfer pump, connect another hose to the 5/8” charging valve on bottom of the condenser.
5. After the liquid is in the condenser, remove the vapor using the same connection points and a recovery system.

Refrigerant Removal

If no isolation valves are installed, remove the entire charge from the system.

1. Open all valves.
2. Connect a liquid transfer pump to the 5/8” charging valve on the evaporator.
3. Use the same point to remove the vapor.

CAUTION:The POE oil used in the system is very hygroscopic. To ensure the oil does not absorb too much water, store in a clean and dry metal container that is sealed.

Oil Charge Removal

Regardless of where the refrigerant is stored, the oil needs to be removed from the system and stored in a sealed metal container.

1. Drain the oil from the oil charging valve located at the bottom of the oil sump.

CAUTION:Before draining the remaining oil, described in step 2 be certain all pressure is relieved off of the oil line.

2. Approximately 2 more gallons will reside in the oil lines. To drain the lines, slowly remove the optical sensor’s prism and allow the oil to drain into a disposable container. Discard the oil per local codes.

Section 2
Starter/Control Panel Removal

2-1. General

The refrigerant and oil does not need to be removed for this process. If the starter/control panel needs to be removed as well as removal of the refrigerant, the two processes can occur simultaneously.

2-2. Removal

NOTE: While the refrigerant and oil is being removed, preparation for removing the starter panel can begin.

1. Label and record all wiring and conduit so that it can be reconnected correctly.
2. Remove temperature sensors from thermal wells, label the cable for identification purposes, wipe the grease from the probe, coil up leads, and tie the coiled leads to the back of the starter/control panel. The sensors that need to be removed from their respective thermal wells are:

- Saturated evaporator temperature sensor
- Saturated condensing temperature sensor
- Discharge temperature sensor
- Leaving and entering water temperature sensors for the evaporator and condenser

3. Disconnect the two hot leads and one common lead for the compressor load/unload solenoids at the solenoid valves and coil the flexible conduit at the panel.
4. Disconnect the master lube circuit solenoid valve at the valve, and coil the flexible conduit at the panel.
5. Disconnect the wiring to the two differential pressure switches at the switches, and coil the cables at the panel.
6. Disconnect the oil optical sensor on the lube system by disconnecting the cable inside the panel. Coil the cable up at the lube circuit near the sensor. Label each of the four leads as they are removed from the terminals.
7. Disconnect the high pressure control at the panel. The flexible conduit should be coiled up at the pipe where the HPCO is installed.
8. Disconnect and label the low pressure control at the panel and coil the leads near the LPC on the top side of the evaporator shell.
9. Disconnect and label the four leads from the electronic expansion valve (EXV) and coil the flexible conduit at the panel.
10. Disconnect the oil sump heater wires inside the starter/control panel, disconnect the flexible conduit from the panel, and coil it up at the condenser shell.
11. Disconnect the gas pump wires inside the starter/control panel, disconnect the flexible conduit from the panel, and coil it up at the evaporator shell.
12. Disconnect and label the leads for the evaporator liquid level sensor at the panel and coil the cable up at evaporator near the sensor and its housing.
13. Label and remove the motor terminal leads.

CAUTION:When loosening retaining nuts on the motor terminals use backup wrench to avoid applying excessive torque to the motor terminals. Failure to use backup wrench may cause terminals to develop a leak path between the copper conductor and porcelain.

14. Install two 1/2” eyebolts to the top of the starter/control panel. Secure the eyebolts to an overhead support to avoid dropping the panel on the motor terminals.

CAUTION:DO NOT hit the motor terminals when removing the starter/control panel. If the motor terminals are cracked or develop a leak the entire compressor must be removed and opened to repair the terminals.

15. Remove two of the bolts that secure the starter panel to the motor housing and insert two M10 all thread guide pins. These are located near T1

and T6 compressor motor terminals.

16. Remove the remaining bolts.
17. Lift the panel only about 1/8” to unload the weight of the panel from the five isolators situated under the panel. Be careful not to lift the panel too much causing the panel cutout to hit the motor terminals.
18. Pull the starter/control panel horizontally along the guide pins, until the panel clears the motor terminal plugs.
19. Lower and secure the starter/control panel.
20. Follow the steps in reverse to reassemble the starter/control panel.

Section 3
Compressor Removal

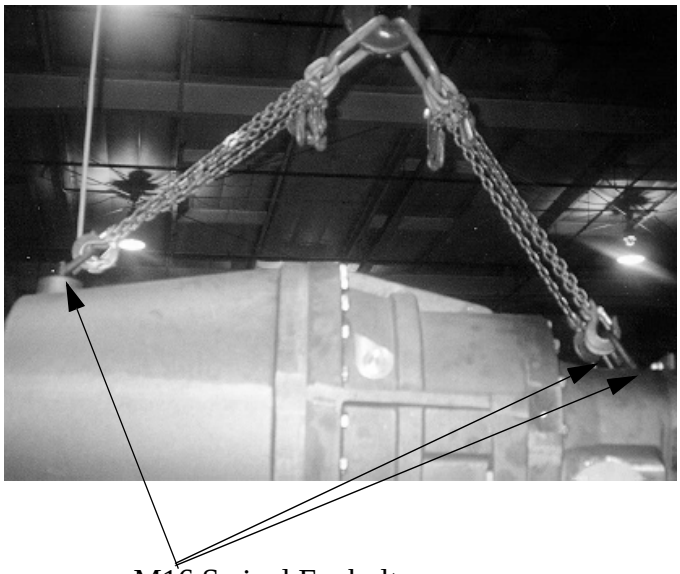
3-1. General

If the compressor needs to be removed, first follow the “Refrigerant and Oil Removal” procedures and the “Starter/Control Panel Removal” then proceed with the steps outlined below.

1. Disconnect both oil line flange joints - one for the oil injection line and a second for the bearing feed line. Temporarily plug the flange openings to keep debris out.
2. Disconnect the oil return line at the compressor by loosening the nut and set the line assembly aside.
3. Disconnect the joint for the oil injection line under the compressor by loosening the nut, and set the line aside.
4. Securely attach the A-frame to the suction line which weighs approximately 150-200 pounds.
5. Remove the suction flange bolts at the evaporator.
6. Remove the bolts connecting the 5” vapor line to the suction line. Unbolt the opposite end of the vapor line from the liquid/vapor separator flange (on top of the liquid/vapor separator), and set the pipe aside.
7. Remove the bolts connecting the suction line to the compressor and carefully set the suction line aside.
8. Attach the A-frame to the compressor. Refer to Figure 3-2 and Figure 9-1.
9. Remove the shipping bolts from under the compressor. There are four (except on B compressors, which use three) located above the discharge end support, and one located above the motor end support.
10. Remove the three isolator bolts under the discharge end of the compressor, and the two isolator bolts under the motor housing.
11. Unbolt and remove both discharge pipes running between the compressor and the oil separators.
12. Three M16 eye-bolts should be installed on the top side of the compressor to lift it with a 3-point lift. Refer to the “Rigging” section.
13. Lift the compressor from the evaporator shell.

CAUTION:Take care in providing some protection for the machined surface on the suction line flange. Provide blocks under the compressor rotor and motor housings, sufficient to keep the compressor from resting on the suction flange.

Figure 3-2.Compressor Rigging



Section 4
Remove the Liquid/Vapor Separator Tank

4-1. General

If the entire unit is being disassembled, be certain to follow each section in order. Before the shells can be separated the liquid/vapor separator (LVS) must be removed. The evaporator assembly is too top heavy to move with the LVS still attached.

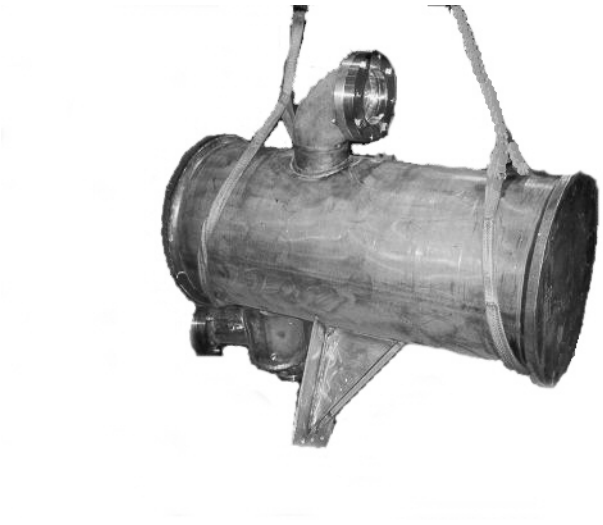
If just the LVS needs to be removed, follow the "Refrigerant Handling" procedures first and then skip to this section.

4-2. Removal of Liquid/Vapor Separator

1. Connect an overhead hoist to the liquid/vapor separator tank. Use two slings around the LVS evenly spaced around the 1/3 points along the length of the tank. Refer to the "Rigging" Section.
2. Unbolt the support between the liquid vapor separator and the condenser tube sheet.
3. Remove the liquid line connecting the bottom of the liquid/vapor separator to the evaporator and set it aside.

With the overhead hoist carrying the weight of the liquid/vapor separator tank, unbolt the support under the liquid/vapor separator from the bracket on the top of the evaporator shell. The liquid/vapor separator is now free to set aside.

Figure 4-3.LVS Rigging



Section 5
Uncouple the Evaporator and Condenser Shell Assemblies

5-1. General

WARNING

To avoid personal injury, death or equipment damage, do not split the unit into two halves with the compressor and liquid/vapor separator still mounted. The two halves are top heavy and will tip upon trying to move.

Refer to the tables and figures through out this bulletin, for weights and dimensions.

5-2. Separating the Evaporator and the Condenser

All sections prior must be completed before attempting this procedure.

1. Cut the oil return line between the gas pump and the filter inlet at a convenient location. Plan to later splice this connection by brazing. Tie the end of this line to the evaporator assembly to prevent it from getting bent or otherwise damaged.
2. If an oil cooler is present, disconnect the 7/8" copper line, which is located between the oil cooler outlet and the evaporator. A hex fitting can be loosened at the evaporator.
3. Disconnect the gas pump vapor line at the condenser service valve connection. Carefully tie the end of this line to the evaporator to keep it from getting bent or damaged.

Note: If charge is being stored in the condenser using the isolation valve option, the gas pump valve will already be closed.

4. Disconnect the oil return line near the filter outlet. This line will not be supported adequately, so it is best to remove it, and rebraze it later.
5. Disconnect the oil return line near the filter inlet. Tie this line to the evaporator shell so that it is not bent or otherwise damaged. This will need to be rebrazed later.

NOTE: Some units have two 2-bolt flanges on the oil circuit. If this joint leaks after reassembly, the 2-bolt flanges can be removed from the line and the line can be brazed.

6. Unbolt and remove the liquid line from the EXV and from the condenser.

NOTE: Unbolt the liquid line from the service valve, if the refrigerant charge is being stored in the condenser. Otherwise, unbolt the line from the condenser outlet connection.

7. Unbolt the shell supports connecting both shells together. The condenser shell / oil separator assembly is now able to be moved away from the evaporator shell assembly.
8. The evaporator and condenser shells have holes near the top of both tubesheets so that a 4-point lifting procedure can be used. Refer to the Sections 8 and 9 for further details.

Section 6
Component Weights

The easiest way to move the components into the equipment room, or final location for the installation, is to set the components on carts and roll them into place. If stairwells are involved more creative ideas for installation may be required. Overhead hoists may be used to pick up the compressor, the evaporator, the condenser and the liquid/vapor separator tank.

WARNING
To avoid personal injury, death or equipment damage, do not use cables (chains or slings) except as stated.

Lifting
If the components must be lifted use the following:

- 3 point lift on compressor
- 4 point lift on evaporator and condenser
- Lift the LVS using two slings evenly spaced around the 1/3 points along the length of the tank.

Refer to Table 6-1 for specific component weights.

Table 6-1: RTHC Component Weights

Unit description	COMP lbs (kg)	EVAP - without heads lbs (kg)	150 PSIG Evap Head lbs (kg)	COND - without heads lbs (kg)	150 PSIG Cond Heads lbs (kg)	LVS lbs (kg)	Both Oil Sep. lbs (kg)	Oil Sump lbs (kg)	Ref. Charge lbs (kg)	Oil Charge no oil cooler/ with oil cooler lbs (kg)	Starter/ Control lbs (kg)	Inter-connecting piping, supports, etc lbs (kg)	Unit Shipping Weight lbs (kg)
E3G3G3	5750 (2608)	5491 (2491)	984 (446)	4121 (1869)	532 (241)	317 (144)	560 (254)	62 (28)	850 (386)	89/97 (40/44)	450 (204)	1144 (519)	20350 (9231)
E3F2F3	5750 (2608)	4677 (2121)	620 (281)	2934 (1331)	396 (180)	317 (144)	560 (254)	62 (28)	740 (336)	81/89 (37/40)	450 (204)	1063 (482)	17650 (8006)
E3D2E2	5750 (2608)	3267 (1482)	504 (229)	2366 (1073)	396 (180)	317 (144)	560 (254)	42 (19)	575 (261)	49/57 (22/26)	500 (227)	924 (419)	15250 (6917)
D3G3G3	5500 (2495)	5491 (2491)	984 (446)	4121 (1869)	532 (241)	317 (144)	560 (254)	62 (28)	850 (386)	89/97 (40/44)	450 (204)	1144 (519)	20100 (9117)
D3F2F3	5500 (2495)	4677 (2121)	620 (281)	2934 (1331)	396 (180)	317 (144)	560 (254)	62 (28)	740 (336)	81/89 (37/40)	450 (204)	1063 (482)	17400 (7892)
D3D2E2	5500 (2495)	3267 (1482)	504 (229)	2366 (1073)	396 (180)	317 (144)	560 (254)	42 (19)	575 (261)	49/57 (22/26)	500 (227)	924 (419)	15000 (6804)
D2G3G3	5500 (2495)	5491 (2491)	984 (446)	4121 (1869)	532 (241)	317 (144)	560 (254)	62 (28)	850 (386)	89/97 (40/44)	450 (204)	1144 (519)	20100 (9117)
D2F2F3	5500 (2495)	4677 (2121)	620 (281)	2934 (1331)	396 (180)	317 (144)	560 (254)	62 (28)	740 (336)	81/89 (37/40)	450 (204)	1063 (482)	17400 (7892)
D2D2E2	5500 (2495)	3267 (1482)	504 (229)	2366 (1073)	396 (180)	317 (144)	560 (254)	42 (19)	575 (261)	49/57 (22/26)	500 (227)	924 (419)	15000 (6804)
D1G2G2	5500 (2495)	5597 (2539)	984 (446)	3936 (1785)	532 (241)	317 (144)	560 (254)	62 (28)	850 (386)	89/97 (40/44)	450 (204)	723 (328)	19600 (8890)
D1F1F2	5500 (2495)	4149 (1882)	620 (281)	2829 (1283)	396 (180)	317 (144)	560 (254)	62 (28)	740 (336)	81/89 (37/40)	450 (204)	996 (452)	16700 (7575)

Notes:
1. All weights +/- 5%

Table 6-1: RTHC Component Weights

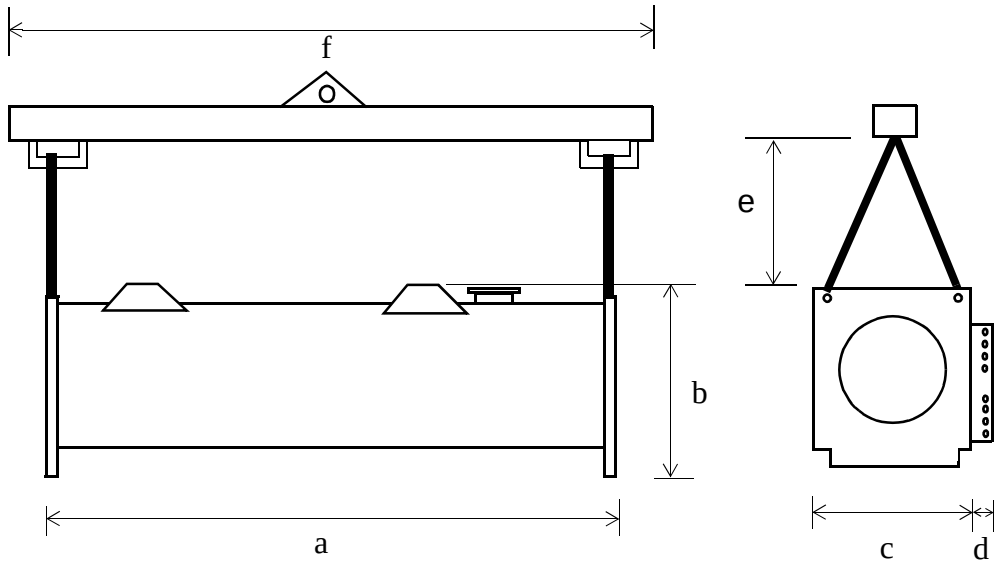
Unit description	COMP lbs (kg)	EVAP - without heads lbs (kg)	150 PSIG Evap Head lbs (kg)	COND - without heads lbs (kg)	150 PSIG Cond Heads lbs (kg)	LVS lbs (kg)	Both Oil Sep. lbs (kg)	Oil Sump lbs (kg)	Ref. Charge lbs (kg)	Oil Charge no oil cooler/ with oil cooler lbs (kg)	Starter/ Control lbs (kg)	Inter-connecting piping, supports, etc lbs (kg)	Unit Shipping Weight lbs (kg)
D1D1E1	5500 (2495)	3205 (1454)	504 (229)	2297 (1041)	396 (179)	317 (144)	560 (254)	42 (19)	575 (261)	49/47 (22/26)	450 (204)	1105 (501)	15000 (6804)
C2G1G1	4840 (2195)	5491 (2491)	984 (446)	4121 (1869)	532 (241)	317 (144)	560 (254)	62 (28)	850 (386)	85/93 (39/42)	450 (204)	208 (94)	18500 (8394)
C2D3E3	4840 (2195)	3388 (1537)	504 (229)	2405 (1091)	396 (180)	279 (127)	560 (254)	42 (19)	575 (261)	50/58 (23/26)	450 (204)	1111 (504)	14600 (6624)
C2B3C2	4840 (2195)	2939 (1333)	380 (172)	2051 (930)	288 (131)	279 (127)	560 (254)	42 (19)	420 (191)	40/48 (18/22)	450 (204)	1211 (549)	13500 (6125)
C1E1F1	4840 (2195)	3502 (1588)	984 (446)	2635 (1195)	532 (241)	279 (127)	560 (254)	62 (28)	600 (272)	75/83 (34/38)	450 (204)	781 (354)	15300 (6942)
C1B3C2	4840 (2195)	2939 (1333)	380 (172)	2052 (931)	288 (131)	279 (127)	560 (254)	42 (19)	420 (191)	40/48 (18/22)	450 (204)	1310 (594)	13600 (6171)
C1B2C1	4840 (2195)	2846 (1291)	380 (172)	1952 (885)	288 (131)	279 (127)	560 (254)	42 (19)	420 (191)	40/48 (18/22)	450 (204)	1203 (546)	13300 (6034)
B2C2D2	2830 (1284)	2625 (1191)	394 (179)	2037 (924)	288 (131)	224 (102)	280 (127)	42 (19)	450 (204)	57/59 (26/27)	450 (204)	773 (351)	10450 (4750)
B2B2B2	2830 (1284)	2306 (1046)	394 (179)	1805 (819)	288 (131)	224 (102)	280 (127)	42 (19)	410 (186)	57/59 (26/27)	450 (204)	714 (324)	9800 (4445)
B1C1D1	2830 (1284)	2569 (1165)	394 (179)	1977 (897)	288 (131)	224 (102)	280 (127)	42 (19)	450 (204)	57/59 (26/27)	450 (204)	739 (335)	10300 (4672)
B1B1B1	2830 (1284)	2244 (1018)	394 (179)	1757 (797)	288 (131)	224 (102)	280 (127)	42 (19)	410 (186)	57/59 (26/27)	450 (204)	724 (328)	9700 (4400)

Notes:

1. All weights +/- 5%

Section 7
RTHC Evaporator Dimensions

Figure 7-1.Evaporator Dimensions

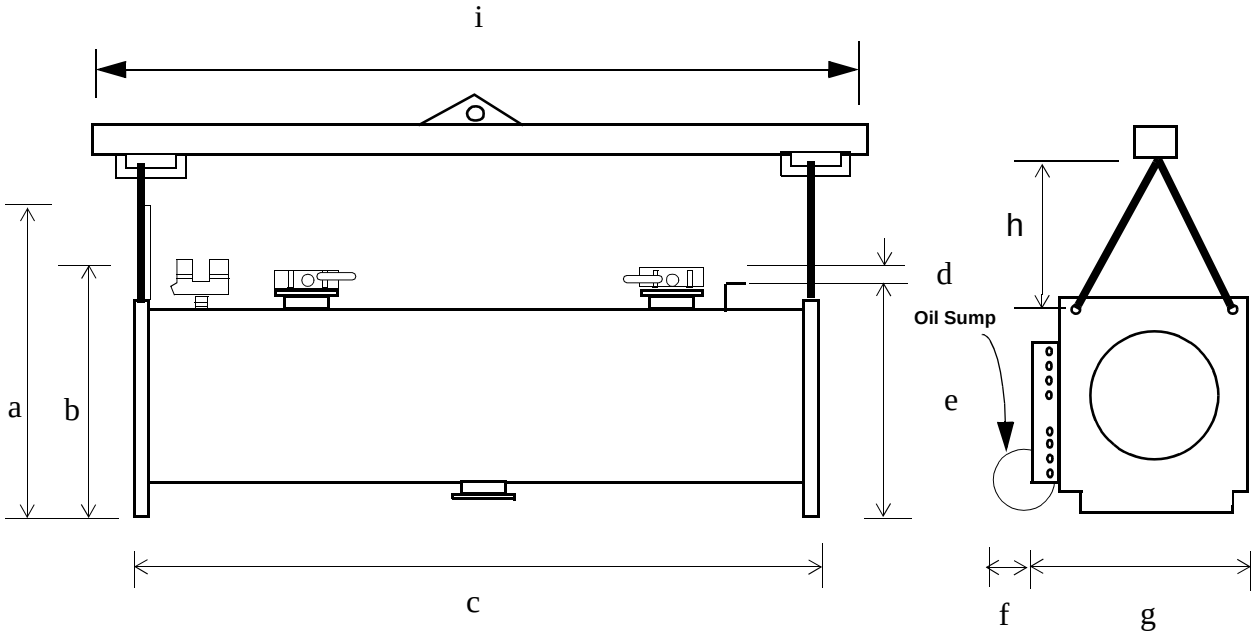


		Evaporator Frame Size (model # digit 12)					
Dimensions	Description	G inches (mm)	F inches (mm)	E inches (mm)	D inches (mm)	C inches (mm)	B inches (mm)
a	length of barrel from tubesheet to tubesheet	128.8 (3272)	126.0 (3200)	126.0 (3200)	107.6 (2733)	125.9 (3198)	107.6 (2733)
b	from bottom of tubesheet to top of highest welded support	49.5 (1257)	46.0 (1168)	45.1 (1146)	45.1 (1146)	45.2 (1148)	41.8 (1062)
c	width of tubesheet	37.25 (946)	32.4 (823)	28.8 (732)	29.0 (737)	26.7 (678)	26.7 (678)
d	from tubesheet to outside edge of welded bolt plate	3.5 (89)	3.5 (89)	6.3 (160)	6.3 (160)	5.8 (147)	5.8 (147)
e	minimum height from tubesheet to lifting bar	36 (914)	36 (914)	36 (914)	36 (914)	36 (914)	36 (914)
f	minimum length of lifting bar to perform four point lift	134.8 (3424)	132 (3353)	132 (3353)	113.6 (2885)	131.9 (3350)	113.6 (2885)

Note:
1. Dimensions +/- 0.5 inches

Section 8
RTHC Condenser Dimensions

Figure 8-1.Condenser Dimensions

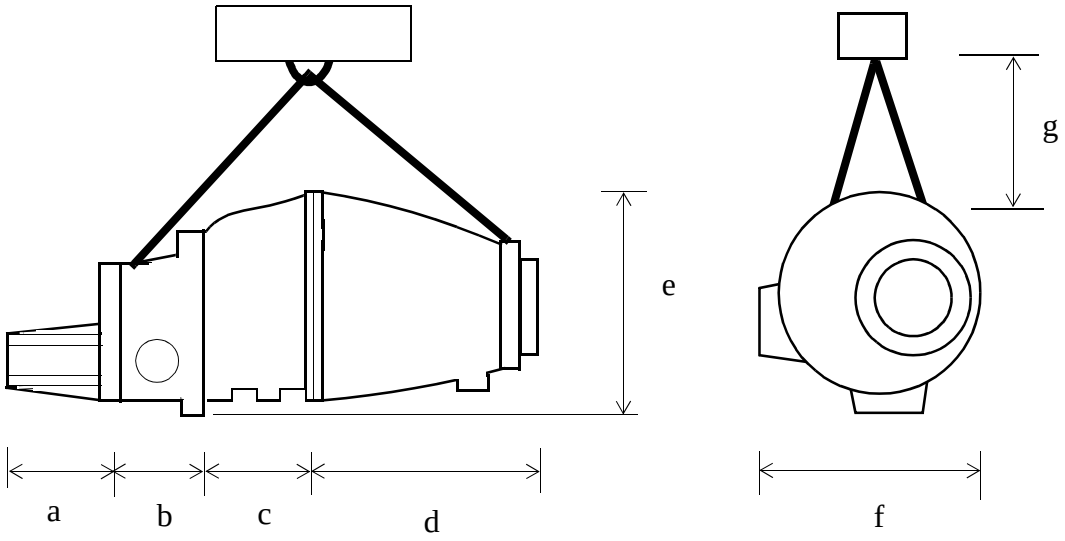


		Condenser Frame Size (model # digit 16)					
Dimensions	Description	G inches (mm)	F inches (mm)	E inches (mm)	D inches (mm)	C inches (mm)	B inches (mm)
a	from bottom of tubesheet to top of LVS support	50.3 (1276)	46.5 (1181)	46.5 (1181)	n/a	37.7 (958)	n/a
b	from bottom of tubesheet to top of relief valves	45.3 (1149)	41.4 (10512)	41.4 (10512)	37.8 (960)	38.3 (972)	37.8 (960)
c	length of barrel from tubesheet to tubesheet	129.8 (3295)	118.00 (2997)	97.50 (2476)	118.0 (2997)	118.00 (2997)	97.5 (2477)
d	from top of oil separator support to top of isolation valve	0.8 (19)	0.2 (5)	0.2 (5)	1.5 (38)	1.5 (38)	1.5 (38)
e	from bottom of tubesheet to top of oil separator support	38.3 (971)	34.2 (869)	34.2 (869)	32.0 (813)	32.5 (826)	32.5 (826)
f	from edge of bolt plate to outer edge of oil sump	3.0 (76)	1.6 (41)	1.8 (46)	1.7 (43)	1.7 (43)	1.7 (43)
g	width of condenser from edge of tubesheet to edge of bolt plate. *NOTE: Bolt plate is welded to vessels and can not be removed.*	34.0 (864)	29.6 (752)	29.6 (752)	24.8 (630)	24.8 (630)	24.8 (630)
h	minimum height from tubesheet to lifting bar	36.0 (914)	36.0 (914)	36.0 (914)	36.0 (914)	36.0 (914)	36.0 (914)
i	minimum length of lifting bar to perform four point lift	135.8 (3449)	124 (3150)	103.5 (2629)	124 (3150)	124 (3150)	103.5 (2629)

Note:
1. Dimensions +/- 0.5 inches

Section 9
RTHC Compressor Dimensions

Figure 9-1.Compressor Dimensions



		Compressor Frame Size (model digit 6)			
Dimensions	Description	B inches (mm)	C inches (mm)	D inches (mm)	E inches (mm)
a	length of piston housing	10.3 (262)	11.0 (279)	12.0 (305)	12.1 (307)
b	length of bearing housing	11.0 (279)	13.0 (330)	13.5 (343)	13.0 (330)
c	length of rotor housing	14.0 (356)	16.1 (409)	17.6 (447)	20.3 (516)
d	length of motor housing	24.3 (617)	25.0 (635)	28.0 (711)	28.0 (711)
e	height of compressor	24.0 (610)	29.0 (737)	29.0 (737)	29.0 (737)
f	width of compressor	24.3 (617)	29.0 (737)	29.8 (757)	29.2 (742)
g	minimum height from compressor to lifting bar	48.0 (1219)	48.0 (1219)	48.0 (1219)	48.0 (1219)

Note: Dimensions +/- 0.5 inches.

Section 10
RTHC Unit Dimensions

Figure 10-1.Dimensions for BBB and BCD Units

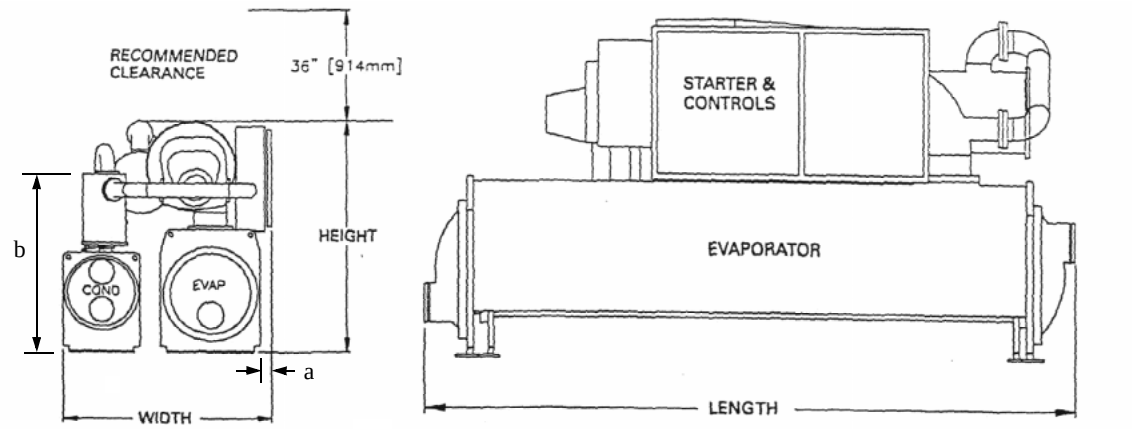


Table 10-1: BBB and BCD Units

Compressor Code (digits 6&7)	Evaporator Code (digits 12 &13)	Condenser code (digits 16 &17)	Length inches (mm)	Width inches (mm)	Height inches (mm)	a (from tubesheet to edge of control panel) inches (mm)	b (from floor to top of oil sep) inches (mm)
B1	B1	B1	125 (3175)	65 (1651)	71 (1803)	9.6 (244)	56.2 (1427)
B1	C1	D1	143 (3632)	65 (1651)	71 (1803)	9.7 (266)	56.2 (1427)
B2	B2	B2	125 (3175)	65 (1651)	71 (1803)	9.6 (244)	56.2 (1427)
B2	C2	D2	143 (3632)	65 (1651)	71 (1803)	9.7 (266)	56.2 (1427)

NOTES:
Dimensions are based on 3 pass evap/2 pass cond and LH/LH water connections. Refer to submittals for exact job site configuration.

Section 11

Figure 11-1.Dimensions for DDE,CBC, CDE and EDE Units

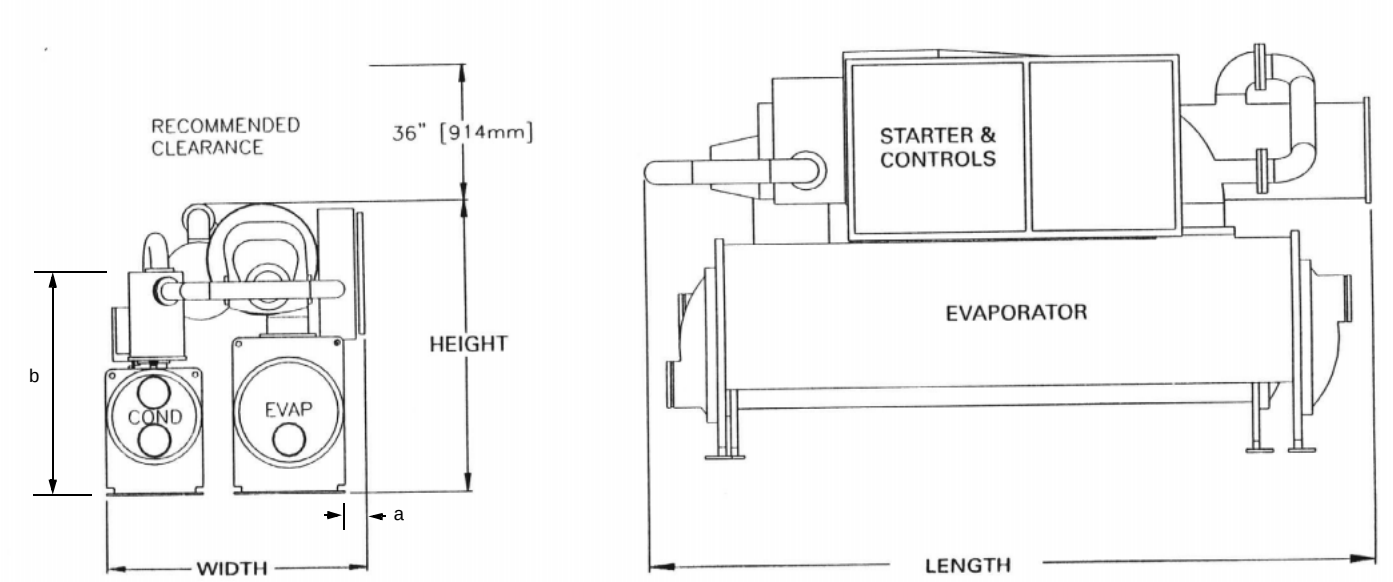


Table 11-1: DDE,CBC,CDE and EDE Units

Compressor Code (digits 6&7)	Evaporator Code (digits 12 &13)	Condenser code (digits 16 &17)	Length inches (mm)	Width inches (mm)	Height inches (mm)	a (from tubesheet to edge of control panel) inches (mm)	b (from floor to top of oil sep) inches (mm)
C1	B2	C1	129 (3277)	68 (1727)	72 (1829)	6.6 (168)	54.5 (1384)
C1	B3	C2	129 (3277)	68 (1727)	72 (1829)	6.6 (168)	54.5 (1384)
C2	B3	C2	129 (3277)	68 (1727)	72 (1829)	6.6 (168)	54.5 (1384)
C2	D3	E3	129 (3277)	68 (1727)	76 (1930)	5.6 (142)	57.8 (1468)
D1	D1	E1	134 (3404)	68 (1727)	76 (1930)	5.75 (146)	58.50 (1486)
D2	D2	E2	134 (3404)	68 (1727)	76 (1930)	5.75 (146)	58.50 (1486)
D3	D2	E2	134 (3404)	68 (1727)	76 (1930)	5.6 (142)	57.9 (1471)
E3	D2	E2	137 (3480)	68 (1727)	76 (1930)	5.5 (140)	57.9 (1471)

NOTES:
Dimensions are based on 3 pass evap/2 pass cond and LH/LH water connections. Refer to submittals for exact job site configuration.

Figure 11-2.CEF, DFF and EFF Units

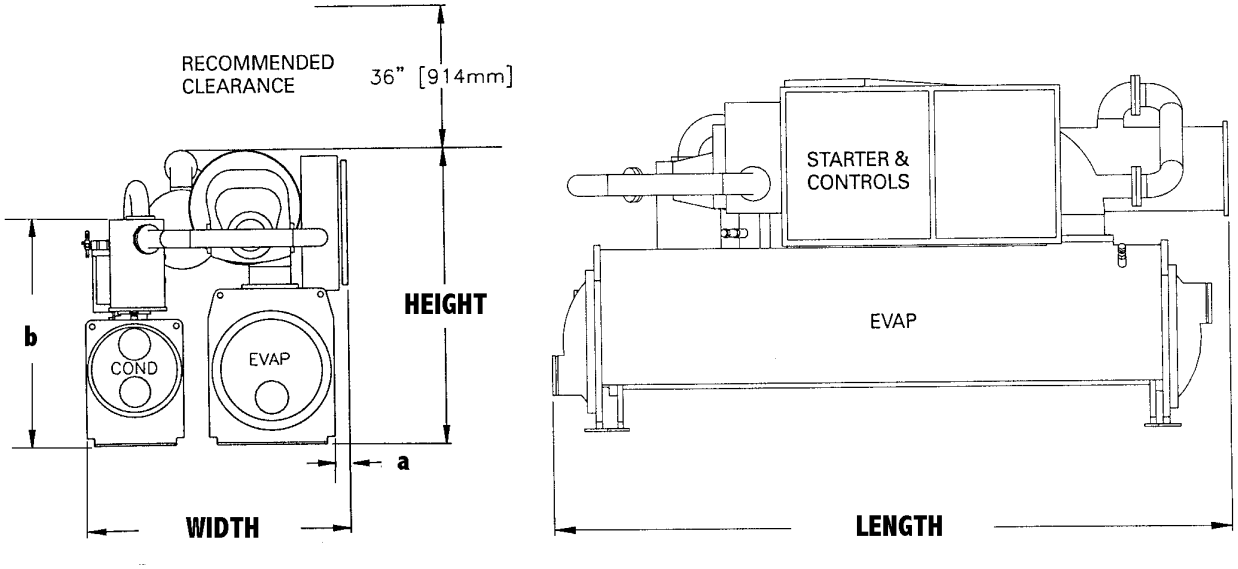


Table 11-1: CEF, DFF and EFF Units

Compressor Code (digits 6&7)	Evaporator Code (digits 12 &13)	Condenser code (digits 16 &17)	Length inches (mm)	Width inches (mm)	Height inches (mm)	a (from tubesheet to edge of control panel) inches (mm)	b (from floor to top of oil sep) inches (mm)
C1	E1	F1	145 (3683)	68 (1727)	76 (1930)	5.6 (142)	57.8 (1468)
D1	F1	F2	149 (3785)	69 (1753)	76 (1930)	4.3 (109)	58.5 (1486)
D2	F2	F3	149 (3785)	69 (1753)	76 (1930)	4.3 (109)	58.5 (1486)
D3	F2	F3	149 (3785)	69 (1753)	76 (1930)	3.8 (97)	57.9 (1471)
E3	F2	F3	149 (3785)	69 (1753)	76 (1930)	3.8 (97)	57.9 (1471)

NOTES:
Dimensions are based on 3 pass evap/2 pass cond and LH/LH water connections. Refer to submittals for exact job site configuration.

Figure 11-3.CGG, DGG and EGG Units

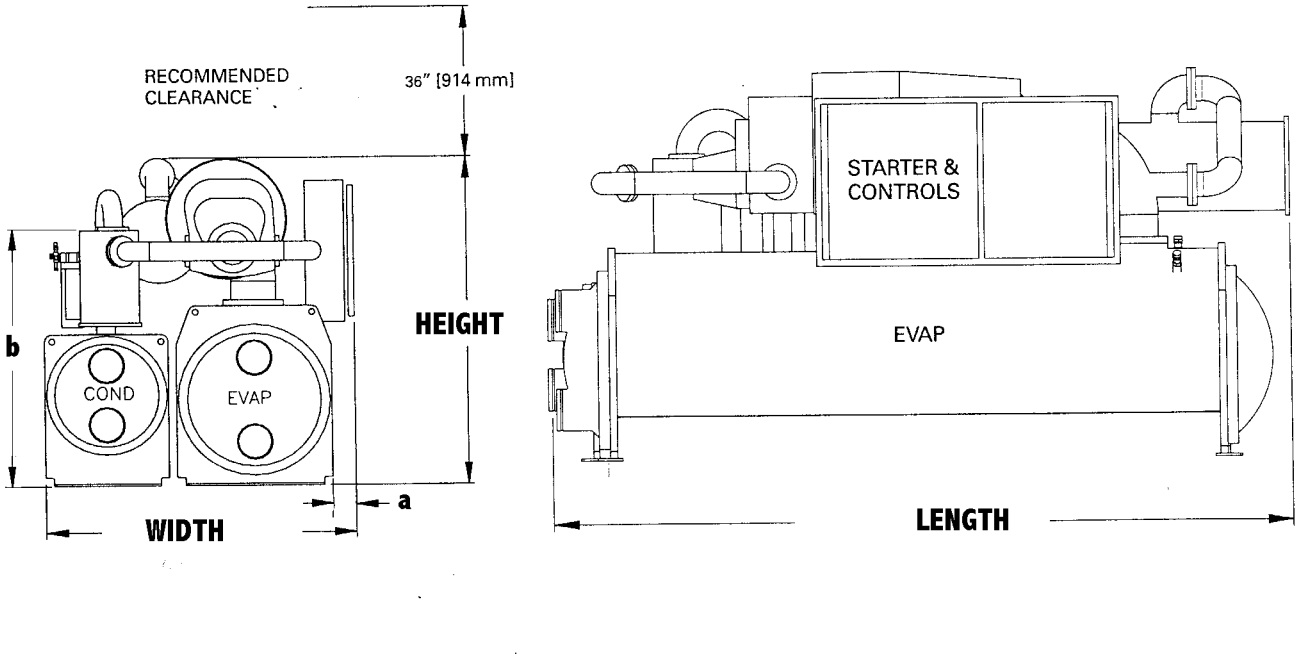


Table 11-1: CGG, DGG and EGG Units

Compressor Code (digits 6&7)	Evaporator Code (digits 12 &13)	Condenser code (digits 16 &17)	Length inches (mm)	Width inches (mm)	Height inches (mm)	a (from tubesheet to edge of control panel) inches (mm)	b (from floor to top of oil sep) inches (mm)
C2	G1	G1	149 (3785)	70 (1778)	80 (2032)	1.3 (33)	61.2 (1555)
D1	G2	G2	153 (3886)	70 (1778)	80 (2032)	1.5 (38)	62.8 (1595)
D2	G3	G3	153 (3886)	70 (1778)	80 (2032)	1.5 (38)	62.8 (1595)
D3	G3	G3	153 (3886)	70 (1778)	80 (2032)	1.4 (36)	61.7 (1567)
E3	G3	G3	153 (3886)	70 (1778)	80 (2032)	1.4 (36)	61.7 (1567)

NOTES:
Dimensions are based on 4 pass evap/2 pass cond and LH/LH water connections. Refer to submittals for exact job site configuration.

Section 12
Reassembly

12-1. General

Once the unit is completely disassembled, it should be stored and moved with all ports, connections and openings sealed. This can be done with tape and plastic. The tighter the unit is sealed, the less moisture will need to be removed on reassembly.

While reassembling the unit, follow all previous procedures in reverse. Use new o-rings and gaskets on all joints after thoroughly cleaning each flange.

CAUTION:Be certain to remove all coverings from connections prior to reassembling.

12-2. Sealants

Use Tight or Loc-tite 515 on all threaded connections on reassembling.

Lightly coat all o-rings with the unit POE oil on reassembly

12-3. Evacuation

Once the unit is completely reassembled, test the unit for any leaks. Pressurize the unit with 100 psi of nitrogen and a trace of HFC-134a. Leak test all joints and confirm all leaks with a soap bubble test. Once all leaks are repaired, connect a vacuum pump and pull the system down to 500 microns.

Once the system has pulled down, perform a standing rise test for at least one hour. The pressure should not rise anymore than 150 microns, the pressure does rise more than 150 microns there is either a leak or moisture in the system.

Table 12-1: Torque Values

Connection Point	Compr Family (digit 6)	Size	Qty	Hexhead size (mm)	Max Torque (ft-lbs)	Sealing Material
discharge line leaving compressor	E, D, C, B	M12x50 mm	4	19	65	o-ring
discharge line entering oil separator	E, D, C, B	M12x65mm with nut	4	19	65	o-ring
discharge line leaving oil separator	E, D, C, B	M12x40mm	4	19	65	o-ring
discharge line entering condenser (without isolation valves)	E, D, C, B	M12x40mm	4	19	65	o-ring
discharge line entering condenser (with isolation valves)	E, D, C, B	M12x100mm	4	19	65	o-ring
liquid line leaving condenser (without isolation valves)	D and E	5/8”x2” course thread	4	n/a	125	gasket
	C (except CBC units)	5/8” X 1 1/2” course thread	4	n/a	125	gasket
	B and CBC units	5/8”x2” course thread	4	n/a	125	gasket
liquid line with angle valve leaving condenser (with isolation valves)	E, D and C (except CBC units)	3/4”x2 1/2” course thread	4	n/a	150	gasket
	CBC units and B	5/8” X 1 1/2” course thread	4	n/a	125	gasket
liquid line entering EXV	E, D, C, B	M12x40mm	4	socket-head screw	65	o-ring
liquid line leaving EXV	E, D, C, B	M12x40mm	4	socket-head screw	65	o-ring

Table 12-1: Torque Values

Connection Point	Compr Family (digit 6)	Size	Qty	Hexhead size (mm)	Max Torque (ft-lbs)	Sealing Material
liquid line entering LVS	E, D, C, B	M12x40mm	4	19	65	o-ring
liquid line leaving LVS	E, D, C, B	M12x65mm with nut	4	19	65	o-ring
liquid line entering evap	E, D, C, B	M12x40mm	8	19	65	o-ring
suction line leaving evap	E, D, C, B	M16x60mm	12	24	125	o-ring
suction line entering compressor	E, D and C	M16x50mm	12	24	125	o-ring
	B	M12 X 50 mm	16	19	65	o-ring
LVS vent line leaving LVS	E, D, C, B	M12x65mm	8	19	65	o-ring
LVS vent line entering suction line	E, D, C, B	M12x65mm	8	19	65	o-ring
LVS overflow line leaving LVS	E and D	M12x90mm with nut	4	19	65	o-ring
	C and B	M12x70mm	4	19	65	o-ring
LVS overflow line entering evap	E, D, C, B	Braze joint				
oil line leaving oil separator	E, D, C, B	1 7/8 - 12 x 2-12 2-25 x 2-12	2 adapters 2 nuts	n/a n/a	120 105	o-ring boss nut
oil line entering oil sump	E, D, C, B	Braze joint				
oil line leaving oil sump	E, D, C, B	Braze joint				
oil line entering oil cooler (if applicable)	E, D, C, B	Braze joint				
oil cooler refrigerant line leaving liquid line (if applicable)	E, D, C, B	Braze joint				

Table 12-1: Torque Values

Connection Point	Compr Family (digit 6)	Size	Qty	Hexhead size (mm)	Max Torque (ft-lbs)	Sealing Material
oil cooler refrigerant line entering oil cooler (if applicable)	E, D, C, B	Braze joint				
oil cooler refrigerant line leaving oil cooler (if applicable)	E, D, C, B	Braze joint				
oil cooler refrigerant line entering evaporator coupling	E, D, C, B	1 5/16-12 x 1 7/16-12 1 7/16-12	1 1	adapter nut	110 100	o-ring boss
oil line leaving oil cooler (if applicable)	E, D, C, B	Braze joint				
oil line entering compressor (bearing injection)	E, D, C, B	1 5/16-12 x 1 7/16-12 1 7/16-12	1 1	adapter nut	110 100	o-ring boss
oil line entering compressor (rotor injection)	E, D, C, B	1 5/16-12 x 1 7/16-12 1 7/16-12	1 1	adapter nut	110 100	o-ring boss
oil line leaving evaporator	E, D, C, B	Braze joint				
oil line entering gas pump	E, D, C, B	Braze joint				
oil line leaving gas pump	E, D, C, B	Braze joint				
gas pump oil line entering oil filter	E, D, C, B	Braze joint				
gas pump oil line entering compressor	E, D, C, B	1 5/16-12 x 1 7/16-12 1 7/16-12	1 1	adapter nut	110 100	o-ring boss
gas pump hot gas line leaving condenser	E, D, C, B	Braze joint				
gas pump hot gas line entering gas pump	E, D, C, B	Braze joint				

Table 12-1: Torque Values

Connection Point	Compr Family (digit 6)	Size	Qty	Hexhead size (mm)	Max Torque (ft-lbs)	Sealing Material
gas pump vent line leaving gas pump	E, D, C, B	Braze joint				
gas pump vent line entering evap (with oil cooler)	E, D, C, B	7/8-14 x 1-14 1-13 x 1-14	1 1	adapter nut	60 55	o-ring boss

12-4. Parts Ordering

Refer to Table 12-2 for a list of part numbers available.

Table 12-2: Parts Required

Unit Description*	Kit Description	Part Number	Qty Per Unit
EGG	RTHC seal kit	KIT06285	1
EFF	RTHC seal kit	KIT06285	1
EDE	RTHC seal kit	KIT06285	1
DGG	RTHC seal kit	KIT06285	1
DFF	RTHC seal kit	KIT06285	1
DDE	RTHC seal kit	KIT06285	1
CGG	RTHC seal kit	KIT06285	1
CDE	RTHC seal kit	KIT06285	1
CEF	RTHC seal kit	KIT06285	1
CBC	RTHC seal kit	KIT06567	1
BCD	RTHC seal kit	KIT06567	1
BBB	RTHC seal kit	KIT06567	1

NOTE: * Unit Description - refers to digits 6, 12, 16 of the unit model number.

To obtain the parts identified in this bulletin, order from your local Trane Service Parts Center.