

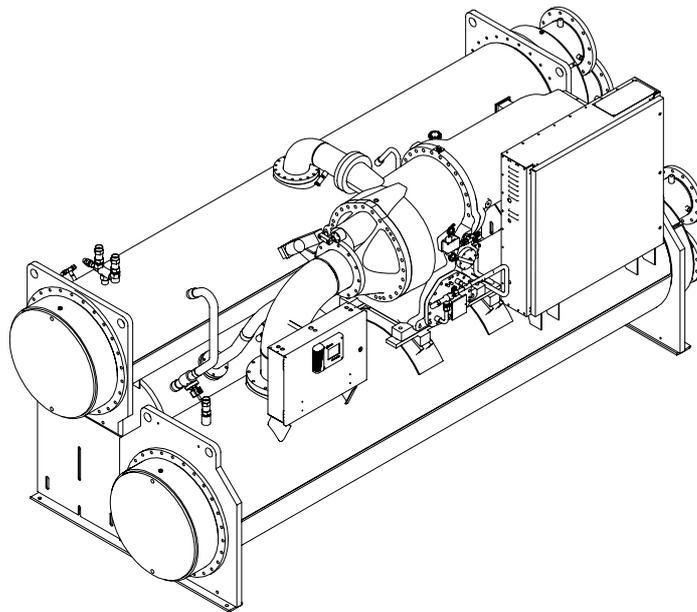


**TRANE®**

# Installation Manual

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## **Gear-Driven Centrifugal Water- Cooled Liquid Chillers**



**Unit Model  
CVGF 400-1000 Ton Units  
(50 and 60 Hz)**

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**X39640686020**

**CVGF-SVN02B-E4**

# Warnings and Cautions

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**NOTICE:** Warnings and Cautions appear at appropriate sections throughout this manual.  
Read these carefully.

**⚠ 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, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

**CAUTION** - Indicates a situation that may result in equipment or property-damage-only accidents.

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# General Information

## Conversion Chart

SI	Multiply by	METRIC
psi	6.89	kPa
psi	.069	Bar
psi	.070	kg/cm <sup>2</sup>
degrees °F	(F-32)x5/9	Degrees C
pound-ft	1.36	Nm
pound-ft	0.138	kg-m
pound-ft	0.0014	kN-m
gpm (US)	0.063	L/s
gpm (US)	6.309	m <sup>3</sup> /sec
gpm (US)	63.09	cm <sup>3</sup> /sec
in-H <sub>2</sub> O	0.249	kPa
in-H <sub>2</sub> O	0.0361	psi
in-H <sub>2</sub> O	0.0736	in-Hg
inches	25.4	mm
inches	2.54	cm
feet	0.305	meters
feet <sup>2</sup>	0.093	meters <sup>2</sup>
Microns	0.001	mm Hg

## Safety Control Settings Chart

Control	Settings I-P	Settings SI
Oil pressure control	Cut-in 12 psi, Cut-out 9 psi	Cut-in 151 kPa, Cut-out 124 kPa
High pressure control	Cut-out 195 psi	Cut-out 1344 kPa
High oil temperature	Cut-out 165°F	Cut-out 74°C
Low oil temperature	Cut-out 5°F below set point	Cut-out 2.8°C below set point
High motor temperature	Cut-out 265°F ± 15°F	Cut-out 130°C ± 8°C

## Oil Chart

USA	Europe
Oil 0037	Oil 021E
Oil 0049	Oil 0020E

# General Information

## Literature Change History CVGF-SVX001-E4 (July 2000)

This manual describes the installation, operation, and maintenance of CVGF units.

## CVGF-SVN02A-E4 (2002)

Replaces CVGF-SVX001-E4.

## About this Manual

This manual describes proper installation of Model CVGF, 50 Hz and 60 Hz chillers with the Tracer CH530 Controls platform. See Figures 2 and 3 for an illustration of a CVGF Centrifugal Chiller with the Tracer CH530 Unit Control Panel.

These chillers are equipped with microcomputer-based control systems. A careful review of this information along with the submittal package provided for the unit will assure that the chiller is correctly installed.

## Unit Identification - Nameplates

When the unit arrives, compare all nameplate data with order, submittal and shipping information. A typical unit nameplate is shown in Figure 1.

Figure 1. Typical unit nameplate

MODEL: CVGF500						
MODEL NO: CVGF0500RA0U33809405C1B5C1C23A1A201E3AA0						
SERIAL NO:			S.O. NO:			
ELECTRICAL CHARACTERISTICS:						
RATED VOLTAGE:	380 VOLTS	50HZ	3PH			
NAMEPLATE NMKW:	338 kW					
VOLTAGE UTILIZATION RANGE:	345- 422 VAC					
MINIMUM CIRCUIT AMPACITY:	726 AMPS					
MAXIMUM FUSE:	1200 AMPS					
MAXIMUM CIRCUIT BREAKER	1200 AMPS					
MAXIMUM OVERLOAD TRIP:	617 AMPS					
	MAX	MAX				
	VOLTS-AC	HZ	PH	RLA	LRAY	
LRAD						
COMPRESSOR MOTOR	380	50	3	577	1048	3286
OIL PUMP MOTOR	380	50		31.43 FLA		
OIL TANK HEATER	115	50		1000 WATTS TOTAL		
CONTROL CIRCUIT	115	50		1500 VA MAX		
WHEN MOTOR CONTROLLER PROVIDED BY OTHERS TRANE ENGINEERING SPEC. S6516-0360 APPLIES						
GENERAL CHARACTERISTICS:						
REFRIGERANT SYSTEM						
TO BE FIELD CHARGED	ACTUALLY CHARGED					
WITH 340 KG OF R-134A	WITH KG OF R-134A					
MAXIMUM REFRIGERANT WORKING PRESSURE						
HI SIDE 15.2 BAR	LOW SIDE 15.2 BAR					
FACTORY TEST PRESSURE						
HI SIDE 16.7 BAR	LOW SIDE 16.7 BAR					
FIELD LEAK TEST PRESSURE			82.50 BAR MAX.			
TESTED AT	BAR					
LEAK TEST AND CHARGING SPECIFICATION ARE SUPPLIED IN CONTROL PANEL (SERVICE LITERATURE MANUAL)						
MANUFACTURED UNDER ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 4686834 4689967 4715190 5056032 5058031 5434738 5563489 5836382						
SERVICE LITERATURE INSTALLATION, OPERATION AND MAINTENANCE MANUAL: CVGF-SVN02A-EN AND CVGF-SVU02A-EN						
"FOR INSTALLATION REQUIREMENTS, USE ELECTRICAL CHARACTERISTICS NOT PRODUCT DESCRIPTION"						
PRODUCT DESCRIPTION:						
MODL CVGF	DSEQ A0	NTON 500	VOLT 380			
HRTZ 50	CPKW 338	CPIM 940	EVSZ 500			
EVBS C	EVTB TE25	EFLD WATE	EVWB NM15			
EVWP 2	EVCO FLGE	EVWA RERE	CDSZ 500			
CDBS C	CDTB TE28	CFLD WATE	CDWB NM15			
CDCO FLGE	CDWA RERE	ORSZ 23	AGLT UL			
SPKGEXPS	INSL YES	OPTM YES	WVUO YES			
TRMM TRMS	LCLD CLDC	LANG ENGL	SRTY USTR			
SRRL 952	PNCO DISC	TEST PTR3				

# General Information

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## Unit Nameplates

The CVGF unit nameplate (Figure 2 shows the nameplate location) is applied to the exterior surface of the control panel. The starter nameplate is located inside the starter panel.

The unit nameplate provides the following information:

- Unit model
- Unit serial number
- Unit device number - identifies unit electrical requirements
  - Lists correct operating charges of HFC-134a and lubrication oil
  - Lists unit test pressures and maximum working pressures

The starter nameplate provides the following information:

- Panel model number
- Rated load amps
- Voltage
- Electrical characteristics - starter type, wiring
- Options included

## Unit Inspection

When the unit is delivered, verify that it is the correct unit and that it is properly equipped.

Inspect all exterior components for visible damage. Report any apparent damage or material shortage to the carrier and make a "unit damage" notation on the carrier's delivery receipt. Specify the extent and type of damage found and notify the appropriate Trane Sales Office.

Do not proceed with installation of a damaged unit without sales office approval.

## Inspection Checklist

To protect against loss due to damage incurred in transit, complete the pre-commissioning checklist, which can be obtained from your Trane representative.

- Inspect the individual pieces of the shipment before accepting the unit. Check for obvious damage to the unit or packing material.

- Inspect the unit for concealed damage as soon as possible after delivery and before it is stored. Concealed damage must be reported within 10 days after receipt.
- If concealed damage is discovered, stop unpacking the shipment. Do not remove damaged material from the receiving location. Take photos of the damage, if possible. The owner must provide reasonable evidence that the damage did not occur after delivery.
- Notify the Trane sales representative and arrange for repair. Do not repair the unit, however, until damage is inspected by the transportation representative.

# General Information

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## Loose Parts Inventory

The loose parts items ship in the motor junction box for units without a unit-mounted starter, or in the starter panel for units equipped with a unit-mounted starter. This includes the isolation pads, extra oil filter, and any optional factory-shipped items.

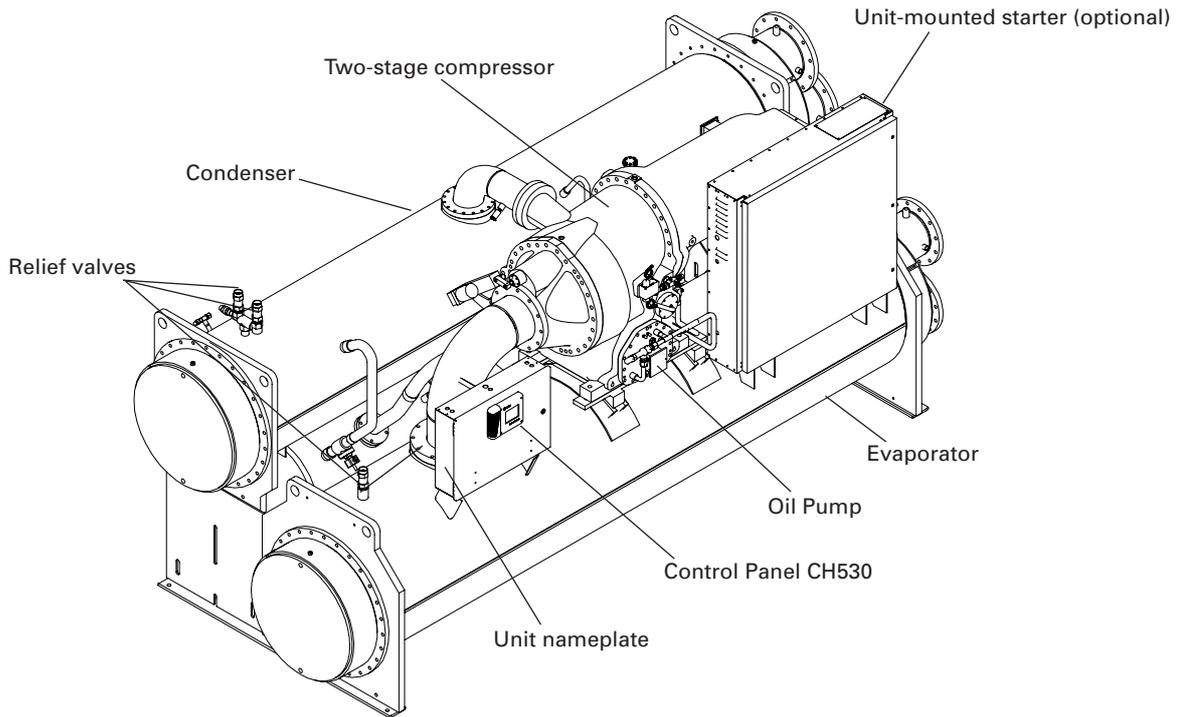
## Unit Description

The CVGF units are single-compressor, gear-type, water-cooled liquid chillers designed for installation indoors. Each unit is a completely assembled, hermetic package that is factory-piped, wired, leak-tested, dehydrated, oil-charged, and tested for proper control operation before shipment. Note: high-voltage starters are not unit-mounted before shipment.

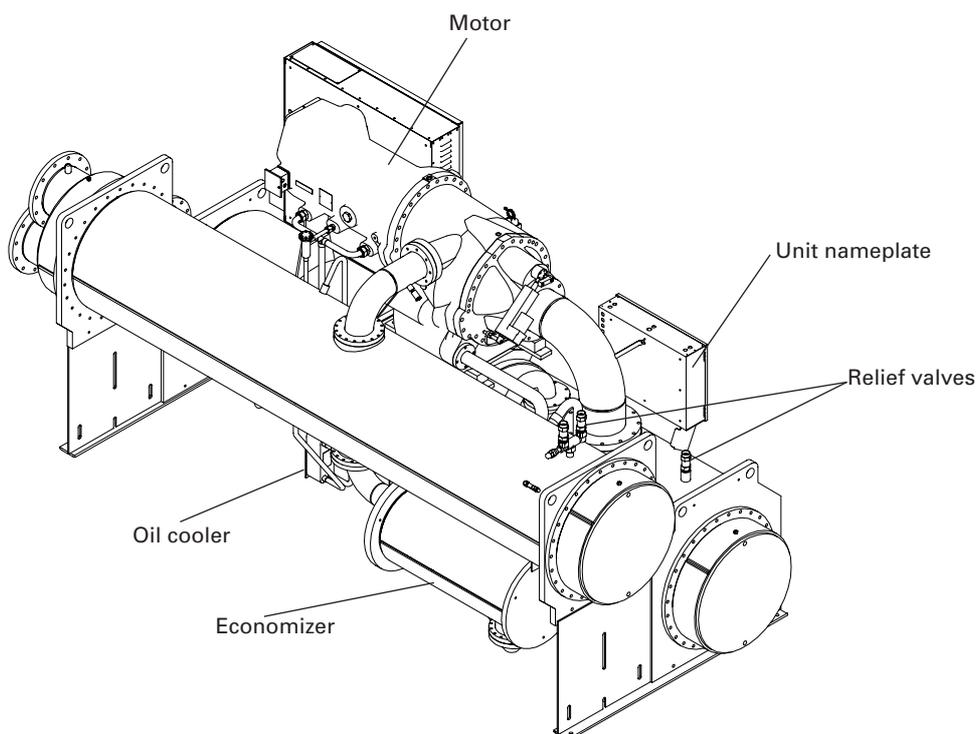
Figure 2 and Figure 3 show a typical CVGF unit and its components. Water inlet and outlet openings are covered before shipment. The oil tank is factory-charged with 15 gallons (56.8L) of Trane Oil 37 and a holding charge of 5 psig (34 kPa) of dry nitrogen at 70°F (21°C). (See the Operation Maintenance Manual for equivalent oil specification.)

# General Information

**Figure 2. Component location for typical CVGF unit**



**Figure 3. Component location for typical CVGF unit (back view)**



# General Information

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Model number digits are selected and assigned in accordance with the following definitions using the typical model number example shown below:

**CVGF0500HA0C31609005B1B5B1  
C2306G4A1E2CC0A0CL**

**C = (1st digit)**

**V = (2nd digit) Hermetic Centrifugal Compressor**

**G = (3rd digit) Gear Drive**

**F = (4th digit) Development sequence**

**0500 = (5th, 6th, 7th, and 8th digit) Nominal compressor tonnage**

0400 = 400 tons

0500 = 500 tons

0650 = 650 tons

0800 = 800 tons

1000 = 1000 tons

SSSS = Special

**H = (9th digit) Unit Voltage**

D = 380V-60 Hz

F = 460V-60 Hz

H = 575V-60 Hz

N = 4160V-60 Hz

P = 3300V-60 Hz

R = 380V-50 Hz

T = 400V-50 Hz

U = 415V-50 Hz

V = 3300V-50 Hz

X = 6600V-60 Hz

Z = 6600V-50 Hz

S = Special

**A0 = (10th and 11th digit) Design Sequence**

**C = (12th digit) Control Enclosure**

C = Standard Control Enclosure

S = Special

**316 = (13th, 14th, and 15th digit) Compressor Motor Power (kw)**

221 = 221 CPKW

254 = 254 CPKW

285 = 285 CPKW

316 = 316 CPKW

357 = 357 CPKW

401 = 401 CPKW

240 = 240 CPKW

266 = 266 CPKW

301 = 301 CPKW

338 = 338 CPKW

374 = 374 CPKW

430 = 430 CPKW

444 = 444 CPKW

484 = 484 CPKW

511 = 511 CPKW

532 = 532 CPKW

574 = 574 CPKW

594 = 594 CPKW

641 = 641 CPKW

674 = 674 CPKW

719 = 719 CPKW

751 = 751 CPKW

808 = 808 CPKW

SSS = Special

**0900 = (16th, 17th, 18th, and 19th digit) Compressor Impeller Cutback**

0880 CPIM

0890 CPIM

0900 CPIM

0910 CPIM

0920 CPIM

0930 CPIM

0940 CPIM

0950 CPIM

0960 CPIM

0970 CPIM

0980 CPIM

0990 CPIM

1000 through 1510 = Cutback is the same as the FCOD for impeller cutback

SSSS = Special

**5 = (20th digit) Evaporator Shell Size**

1 = 1000 ton evaporator

5 = 500 ton evaporator

7 = 700 ton evaporator

S = Special

**B = (21st digit) Evaporator Tube Bundle**

A = Small bundle

B = Medium bundle

C = Large bundle

D = Extra large bundle

S = Special

**1 = (22nd digit) Evaporator Tubes**

1 = .75 diameter .025 wall internally enhanced cu tube

2 = 1.00 diameter .025 wall internally enhanced cu tube

S = Special

# General Information

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**B = (23rd digit) Evaporator Waterbox**

B = 150 PSI Non-Marine - 2 pass  
 C = 150 PSI Non-Marine - 3 pass  
 D = 150 PSI Marine - 2 pass  
 E = 150 PSI Marine - 3 pass  
 H = 300 PSI Marine - 2 pass  
 J = 300 PSI Marine - 3 pass  
 L = 300 PSI Non-Marine - 2 pass  
 M = 300 PSI Non-Marine - 3 pass  
 S = Special

**5 = (24th digit) Condenser Shell Size**

1 = 1000 ton condenser  
 5 = 500 ton condenser  
 7 = 700 ton condenser  
 S = Special

**B = (25th digit) Condenser Tube Bundle**

A = Small bundle  
 B = Medium bundle  
 C = Large bundle  
 D = Extra large bundle  
 S = Special

**1 = (26th digit) Condenser Tubes**

1 = .75 diameter .028 wall internally enhanced cu tube  
 2 = 1.00 diameter .028 wall internally enhanced cu tube  
 3 = .75 diameter .035 wall 90/10 cu/ni tube  
 4 = .75 diameter .028 wall titanium tube  
 S = Special

**C = (27th digit) Condenser Waterbox**

A = 150 PSI Marine - 2 pass  
 C = 150 PSI Non-Marine - 2 pass  
 E = 300 PSI Marine - 2 pass  
 G = 300 PSI Non-Marine - 2 pass  
 S = Special

**23 = (28th and 29th digit) Orifice Series**

13 Orifice series  
 14 Orifice series  
 15 Orifice series  
 16 Orifice series  
 17 Orifice series  
 18 Orifice series  
 19 Orifice series  
 20 Orifice series  
 22 Orifice series  
 23 Orifice series  
 25 Orifice series  
 27 Orifice series  
 28 Orifice series  
 30 Orifice series  
 31 Orifice series  
 33 Orifice series  
 35 Orifice series  
 38 Orifice series  
 40 Orifice series  
 42 Orifice series  
 44 Orifice series  
 47 Orifice series  
 49 Orifice series  
 51 Orifice series  
 56 Orifice series  
 SS = Special

**0 = (30th digit) Factory Installed Insulation**

0 = None  
 A = Factory installed insulation

**1 = (31st digit) Control: Operating Status**

0 = None  
 1 = Operating Status

**G = (32nd digit) Control: Generic BAS**

0 = None  
 G = Generic BAS

**4 = (33rd digit) Tracer Communication Interface**

0 = None  
 4 = COMM 4  
 5 = COMM 5

**A = (34th digit) Chilled Water Reset - Outdoor Air Temperature Sensor**

0 = None  
 A = Chilled Water Reset – With Outdoor Air Temp Sensor

**1 = (35th digit) Control: Extended Operation**

0 = None  
 1 = Extended Operation

**E = (36th digit) Language**

E = English  
 F = French  
 G = German  
 T = Italian  
 P = Spanish  
 S = Special

# General Information

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**2 = (37th digit) Motor Frame Size**

2 = 400 Frame  
3 = 440E Frame  
4 = 5000 Frame  
S = Special

**C = (38th digit) Impeller Rim Diameter 1st Stage**

A = 9.5 Rim diameter  
B = 10.0 Rim diameter  
C = 10.6 Rim diameter  
D = 11.1 Rim diameter  
E = 11.6 Rim diameter  
F = 9.8 Rim diameter  
G = 10.4 Rim diameter  
H = 11.0 Rim diameter  
J = 11.7 Rim diameter  
K = 12.7 Rim diameter  
L = 13.5 Rim diameter  
M = 14.3 Rim diameter  
N = 15.1 Rim diameter  
S = Special

**C = (39th digit) Impeller Rim Diameter 2nd Stage**

A = 9.5 Rim diameter  
B = 10.0 Rim diameter  
C = 10.6 Rim diameter  
D = 11.1 Rim diameter  
E = 11.6 Rim diameter  
F = 9.8 Rim diameter  
G = 10.4 Rim diameter  
H = 11.0 Rim diameter  
J = 11.7 Rim diameter  
K = 12.7 Rim diameter  
L = 13.5 Rim diameter  
M = 14.3 Rim diameter  
N = 15.1 Rim diameter  
S = Special

**0 = (40th digit) Special Options**

0 = None  
S = Special option

**A = (41st digit) Starter Type**

A = Star-Delta - unit mounted  
B = Solid State - unit mounted  
C = Star-Delta - remote mounted  
E = X-line full volt - remote mounted  
F = Autotransformer - remote mounted  
G = Primary reactor - remote mounted  
M = Solid State Floor Mounted  
N = Solid State Wall Mounted  
R = Customer supplied

**0 = (42nd digit) Additional Pressure Vessel Compliance**

0 = None  
N = Non-destructive Examination for China  
K = KHK Japanese pressure vessel code

**C = (43rd digit) Control: Condenser Refrigerant Pressure**

0 = None  
C = Condenser Refrigerant Pressure

**L = (44th digit) Manufacturing Location**

L = La Crosse, Wisconsin  
T = Tai Cang, China

# General Information

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## Service Model Numbers – Solid State Motor Starter

An example of a typical Solid State “IT” starter model number is:

**CVSR0035FAA01EA0E1**

Model Number Digit Identification - Model number digits are selected and assigned in accordance with the following definitions using the model number example shown above.

**C = (1st digit)**

**V = 2nd digit)**

**S = (3rd digit)**

**R = (4th digit) Development Sequence**

R = Cutler Hammer Solid State “IT” starter for gear drive centrifugal chillers with CH530 controls  
0035 = (5th, 6th, 7th, and 8th digit) Starter Size

**Use Rated Load Amps (RLA) value**

**F = (9th digit) Unit Voltage**

D = 380V-60Hz-3Ph

F = 460V-60Hz-3Ph

H = 575V-60Hz-3Ph

R = 380V-50Hz-3Ph

T = 400V-50Hz-3Ph

U = 415V-50Hz-3Ph

S = Special

**A = (10th digit) Design Sequence**

A = Original Design

**A = (11th digit) Starter Type**

B = Unit Mounted

M = Remote Floor Mounted

N = Remote Wall Mounted

S = Special

**0 = (12th digit) Connection Type**

0 = Terminal Block

1 = Disconnect Switch - Non-Fused

2 = Circuit Breaker

3 = Circuit Breaker Current Limiting

4 = Circuit Breaker High Interrupt

Cap

5 = Circuit Breaker Higher Interrupt

Cap

S = Special

**1 = (13th digit) Agency Listing**

1 = UL & cUL Listed (Standard on all units)

2 = CE

**E = (14th Digit) Power Factor**

**Correction Capacitor**

0 = None

D = 25 KVAR

E = 30 KVAR

F = 35 KVAR

G = 40 KVAR

H = 45 KVAR

J = 50 KVAR

K = 60 KVAR

L = 70 KVAR

M = 75 KVAR

N = 80 KVAR

P = 90 KVAR

R = 100 KVAR

T = 120 KVAR

U = 125 KVAR

V = 150 KVAR

S = Special

**A = (15th Digit) Ground Fault Protection**

0 = None

A = Ground Fault Protection

S = Special

**0 = (16th digit) Special Options**

0 = None

S = Special Options ( See Sales Order)

**E = (17th digit) Literature Language**

E = English

F = French

G = German

P = Spanish

T = Italian

S = Special

**1 = (18th digit) Oil Pump Starter Circuit**

1 = 1 HP Oil Pump Motor

2 = 1.5 HP Oil Pump

# General Information

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## Service Model Numbers - Wye-delta Motor Starter

An example of a typical chiller starter model number is:

**CVSN0035FAA01EA0E1**

Model Number Digit Identification - Model number digits are selected and assigned in accordance with the following definitions using the model number example shown above.

**C = (1st digit)**

**V = 2nd digit)**

**S = (3rd digit)**

**N = (4th digit) Development Sequence**

N = Cutler-Hammer electrical-mechanical starter for gear drive centrifugal chillers with CH530 controls

**0035 = (5th, 6th, 7th, and 8th digit) Starter Size**

**F = (9th digit) Unit Voltage**

D = 380V-60Hz-3Ph

F = 460V-60Hz-3Ph

H = 575V-60Hz-3Ph

R = 380V-50Hz-3Ph

T = 400V-50Hz-3Ph

U = 415V-50Hz-3Ph

S = Special

**A = (10th digit) Design Sequence**

A = Original Design

**A = (11th digit) Starter Type**

A = Star-Delta - Unit Mounted

C = Star-Delta - Remote Mounted

S = Special

**0 = (12th digit) Connection Type**

0 = Terminal Block

1 = Disconnect Switch - Non-Fused

2 = Circuit Breaker

3 = Circuit Breaker Current Limiting

4 = Circuit Breaker High Interrupt

Cap

5 = Circuit Breaker Higher Interrupt

Cap

S = Special

**1 = (13th digit) Agency Listing**

1 = UL & cUL Listed (Standard on all units)

2 = CE.

**E = (14th Digit) Power Factor Correction Capacitor**

0 = None

D = 25 KVAR

E = 30 KVAR

F = 35 KVAR

G = 40 KVAR

H = 45 KVAR

J = 50 KVAR

K = 60 KVAR

L = 70 KVAR

M = 75 KVAR

N = 80 KVAR

P = 90 KVAR

R = 100 KVAR

T = 120 KVAR

U = 125 KVAR

V = 150 KVAR

S = Special

**A = (15th Digit) Ground Fault Protection**

0 = None

A = Ground Fault Protection

S = Special

**0 = (16th digit) Special Options**

0 = None

S = Special Options (See Sales Order)

**E = (17th digit) Literature Language**

E = English

F = French

G = German

P = Spanish

T = Italian

S = Special

**1 = (18th digit) Oil Pump Starter Circuit**

1 = 1 HP Oil Pump Motor

2 = 1.5 HP Oil Pump Motor



# General Information

## Installation Overview

For convenience, Table 1 summarizes responsibilities that are typically associated with the CVGF chiller installation process.

**Table 1. Installation responsibility chart for CVGF units**

Requirement	Trane-supplied, Trane-installed	Trane-supplied, Field-installed	Field-supplied, Field-installed
Rigging			Safety chains Clevis connectors Lifting beam equipment, skates, rollers, and other lifting operations
Isolation		Isolation pads Spring isolators	Spring isolators
Electrical	Circuit breakers or non-fused disconnects (optional) Unit-mounted starter (optional)	Remote-mounted starter (optional) Temperature sensor (optional outdoor air)	Circuit breakers or fusible disconnects (optional) Terminal lugs Ground connection(s) Jumper bars BAS wiring (optional) IPC wiring Control voltage wiring Chilled-water-pump contactor and wiring Condenser-water-pump contactor and wiring Optional relays and wiring
Water piping		Flow switches (may be field-supplied)	Thermometers Water flow pressure gauges Isolation and balancing valves water piping Vent and drain valves Pressure relief valves (for water boxes as required)
Pressure Relief	Relief valves		Vent line and flexible connector
Insulation	Insulation (optional)		Insulation

# General Information

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Refer to the Mechanical and Electrical sections of this manual for detailed instructions.

- Locate and maintain the loose parts such as, isolators, bulb wells, temperature sensors, flow sensors or other factory-ordered field-installed options, as required. Loose parts are located in the starter panel if equipped with a unit-mounted starter. If not equipped with a unit-mounted starter, loose parts are shipped in the motor junction box.
- Install the unit on a foundation with flat support surfaces, level within 1/4" (6 mm) and of sufficient strength and mass to support the chiller operating weight. Place the manufacturer-supplied isolation-pad assemblies under the unit.
- Install the unit per the instructions outlined in the Mechanical Installation section.
- Complete all water piping and electrical connections.

**Note:** Field piping must be arranged and supported to avoid stress on the equipment. It is strongly recommended that the piping contractor provide at least 3 feet (914 mm) of clearance between the pre-installation piping and the planned location of the unit. This will allow for the proper fit upon arrival of the unit at the installation site. All necessary piping adjustments can be made at that time.

- Where specified, supply and install valves in the water piping, upstream and downstream of the evaporator and condenser water boxes, in order to isolate the shells for maintenance and to balance and trim the system.
- Supply and install flow switches or equivalent devices in both the chilled-water piping and the condenser-water piping. Interlock each switch with the proper pump starter, to ensure that the unit can only operate when water flow is established.

**Note:** reference graphs 1-16 in the Installation Mechanical section for proper water flow.

- Supply and install taps for thermometers and a pressure gauge manifold in the water piping, adjacent to the inlet and outlet connections of both the evaporator and the condenser.
- Supply and install drain valves on each water box.
- Supply and install vent cocks on each water box.
- Where specified, supply and install strainers ahead of all pumps and automatic modulating valves.
- Supply and install refrigerant pressure-relief piping from the pressure-relief valve to the atmosphere.
- If necessary, supply enough HFC-134a refrigerant (1 pound = .45 kg) and dry nitrogen (75 psig = 517 kPa maximum) for leak testing.
- Evacuate the unit to less than 500 microns (0.5 mm Hg) or according to local code.
- Charge with refrigerant 134a.
- Go over the pre-commissioning check sheet and ensure that all items have been completed.
- Start the unit under the supervision of a qualified service technician.

# General Information

**Table 2. General data: 400 and 500 ton units**

Nominal Tonnage	400	400	400	400	500	500	500	500
Tube Outside Diameter (inch)	1.0	1.0	0.75	0.75	1.0	1.0	0.75	0.75
Evaporator Water Pass	Two	Three	Two	Three	Two	Three	Two	Three
Refrigerant Type	R134a							
Refrigerant Charge - pounds (kg)	650 (295)	650 (295)	650 (295)	650 (295)	750 (295)	750 (295)	750 (295)	750 (295)
Oil Charge (gallon (l))	15 (56.8)							
Overall Dimensions - Feet-Inch (mm)								
Length	15'- 10 13/16" (4800)							
Width	6' - 6 19/64" (1989)							
Height	6' - 10 1/2" (2096)							
Evaporator Inside Diameter	2' - 7 1/8" (791)							
Evaporator Water Connection (NPS)	8" (203)							
Condenser Inside Diameter	2' - 1 1/2" (3060)							
Condenser Nominal Connector Size (NPS)	10" (254)							
Weight - pounds (kg) except Waterboxes								
Compressor/Motor	6220 (2821)							
Evaporator	3948 (1791)	3948 (1791)	4228 (1918)	4228 (1918)	4193 (1902)	4193 (1902)	4568 (2072)	4568 (2072)
Condenser	2857 (1296)	2857 (1296)	3472 (1575)	3472 (1575)	3152 (1430)	3152 (1430)	3877 (1759)	3877 (1759)
Economizer	535 (243)							
Starter Panel	500 (227)							
Control Panel	70 (318)							
Miscellaneous Item	2127 (965)							
Shipping Weight	17867 (8104)							
Operating Weight	21460 (9734)	21460 (9734)	21460 (9734)	21460 (9734)	22564 (10235)	22564 (10235)	22564 (10235)	22564 (10235)
Operational Data								
Minimum Evaporator Flow in gpm (l/sec)	447 (28)	298 (20)	407 (25.6)	271 (17)	550 (34)	367 (23)	511 (32)	340 (21)
Maximum Evaporator Flow in gpm (l/sec)	1638 (103)	1092 (69)	1493 (94)	995 (63)	2018 (127)	1346 (85)	1873 (118)	124895 (79)
Minimum Condenser Flow in gpm (l/sec)	499 (31)	499 (31)	487 (31)	487 (31)	606 (38)	606 (38)	586 (37)	586 (37)
Maximum Condenser Flow in gpm (l/sec)	1831 (115)	1831 (115)	1786 (113)	1786 (113)	2221 (140)	2221 (140)	2148 (135)	2148 (135)

# General Information

**Table 2. General data: 400 and 500 ton units (continued)**

Nominal Tonnage	400	400	400	400	500	500	500	500
Tube Outside Diameter (inch)	1.0	1.0	0.75	0.75	1.0	1.0	0.75	0.75
Evaporator Water Pass	Two	Three	Two	Three	Two	Three	Two	Three
<b>Water Volume - 150 pound Waterboxes</b>								
Evaporator Water Storage gallon (l)	101.7 (385)	101.49 (384)	95.7 (361)	95.4 (361)	117.2 (444)	116.9 (443)	111.2 (421)	110.9 (420)
Condenser Water Storage gallon (l)	112 (424)	112 (424)	110.4 (418)	110.4 (418)	127.8 (484)	127.8 (484)	125.0 (473)	125.0 (473)
<b>Evaporator 2-pass Weight</b>								
Supply - pound (kg)	304 (138)	304 (138)	304 (138)	304 (138)	304 (138)	304 (138)	304 (138)	304 (138)
Return - pound (kg)	337 (153)	337 (153)	337 (153)	337 (153)	337 (153)	337 (153)	337 (153)	337 (153)
<b>Evaporator 3-pass Weight</b>								
Supply - pound (kg)	314 (142)	314 (142)	314 (142)	314 (142)	314 (142)	314 (142)	314 (142)	314 (142)
Return - pound (kg)	332 (151)	332 (151)	332 (151)	332 (151)	332 (151)	332 (151)	332 (151)	332 (151)
<b>Condenser 2-pass Weight</b>								
Supply - pound (kg)	304 (138)	304 (138)	304 (138)	304 (138)	304 (138)	304 (138)	304 (138)	304 (138)
Return - pound (kg)	341 (155)	341 (155)	341 (155)	341 (155)	341 (155)	341 (155)	341 (155)	341 (155)
<b>300 pound Waterboxes</b>								
Evaporator Water Storage gallon (l)	101.9 (386)	101.6 (385)	95.9 (363)	95.6 (362)	117.4 (444)	117.0 (443)	111.4 (422)	111.1 (421)
Condenser Water Storage gallon (l)	112.3 (425)	112.3 (425)	110.6 (419)	110.6 (419)	128.0 (485)	128.0 (485)	125.3 (474)	125.3 (474)
<b>Evaporator 2-pass Weight</b>								
Supply - pound (kg)	427 (194)	427 (194)	427 (194)	427 (194)	427 (194)	427 (194)	427 (194)	427 (194)
Return - pound (kg)	446 (202)	446 (202)	446 (202)	446 (202)	446 (202)	446 (202)	446 (202)	446 (202)
<b>Evaporator 3-pass Weight</b>								
Supply - pound (kg)	448 (203)	448 (203)	448 (203)	448 (203)	448 (203)	448 (203)	448 (203)	448 (203)
Return - pound (kg)	448 (203)	448 (203)	448 (203)	448 (203)	448 (203)	448 (203)	448 (203)	448 (203)
<b>Condenser 2-pass Weight</b>								
Supply - pound (kg)	421 (191)	421 (191)	421 (191)	421 (191)	421 (191)	421 (191)	421 (191)	421 (191)
Return - pound (kg)	436 (198)	436 (198)	436 (198)	436 (198)	436 (198)	436 (198)	436 (198)	436 (198)

# General Information

**Table 3. General data: 650 ton units**

Nominal Tonnage	650			
Tube Outside Diameter (inch)	1.0		0.75	
Evaporator Water Pass	Two	Three	Two	Three
Refrigerant Type	R134a	R134a	R134a	R134a
Refrigerant Charge - pounds (kg)	975 (442.3)	975 (442.3)	975 (442.3)	975 (442.3)
Oil Charge gallon (l)	15 (56.8)	15 (56.8)	15 (56.8)	15 (56.8)
<b>Overall Dimensions - Feet-Inch (mm)</b>				
Length	16' 4877	16' 4877	16' 4877	16' 4877
Width	6' - 9 3/4 (2076)			
Height	7' - 5 11/32" (2270)			
Evaporator Inside Diameter	3' - 1/4" (921)	3' - 1/4" (921)	3' - 1/4" (921)	3' - 1/4" (921)
Evaporator Water Connection (NPS)	10" (254)	8" (203)	10" (254)	8" (203)
Condenser Inside Diameter	2' - 1 1/2" (648)			
Condenser Nominal Connector Size (NPS)	12" (300)	12" (300)	12" (300)	12" (300)
<b>Weight - pounds (kg) except Waterboxes</b>				
Compressor/Motor	6800 (3084)	6800 (3084)	6800 (3084)	6800 (3084)
Evaporator	5461 (2477)	5834 (2643)	5461 (2477)	5834 (2643)
Condenser	3937 (1786)	4763 (2161)	3937 (1786)	4763 (2161)
Economizer	799 (362)	799 (362)	799 (362)	799 (362)
Starter Panel	542 (246)	542 (246)	542 (246)	542 (246)
Control Panel	70 (318)	70 (318)	70 (318)	70 (318)
Miscellaneous Item	2745 (1245)	2745 (1245)	2745 (1245)	2745 (1245)
Shipping Weight	24140 (10950)	24140 (10950)	24140 (10950)	24140 (10950)
Operating Weight	28344 (12857)	28344 (12857)	28344 (12857)	28344 (12857)
<b>Operational Data</b>				
Minimum Evaporator Flow in gpm (l/sec)	625 (39)	417 (26)	566 (36)	378 (24)
Maximum Evaporator Flow in gpm (l/sec)	2501 (158)	1529 (97)	1493 (94)	995 (63)
Minimum Condenser Flow in gpm (l/sec)	682 (43)	682 (43)	668 (42)	668 (42)
Maximum Condenser Flow in gpm (l/sec)	2501 (158)	2501 (258)	2450 (155)	2450 (155)

# General Information

**Table 3. General data: 650 ton units (continued)**

Nominal Tonnage	650			
Tube Outside Diameter (inch)	1.0		0.75	
Evaporator Water Pass	Two	Three	Two	Three
<b>Water Volume - 150 pound Waterboxes</b>				
Evaporator Water Storage gallon (l)	163.2 (618)	158.2 (599)	154.1 (583)	149.1 (564)
Condenser Water Storage gallon (l)	185.1 (701)	185.1 (701)	188.5 (714)	188.5 (714)
<b>Evaporator 2-pass Weight</b>				
Supply - pound (kg)	304 (138)	304 (138)	304 (138)	304 (138)
Return - pound (kg)	337 (153)	337 (153)	337 (153)	337 (153)
<b>Evaporator 3-pass Weight</b>				
Supply - pound (kg)	314 (142)	314 (142)	314 (142)	314 (142)
Return - pound (kg)	332 (151)	332 (151)	332 (151)	332 (151)
<b>Condenser 2-pass Weight</b>				
Supply - pound (kg)	304 (138)	304 (138)	304 (138)	304 (138)
Return - pound (kg)	341 (155)	341 (155)	341 (155)	341 (155)
<b>300 pound Waterboxes</b>				
Evaporator Water Storage (gallon (l))	163.2 (618)	158.2 (599)	154.1 (583)	149.1 (564)
Condenser Water Storage gallon (l)	185.1 (701)	185.1 (701)	189.4 (717)	189.4 (717)
<b>Evaporator 2-pass Weight</b>				
Supply - pound (kg)	427 (194)	427 (194)	427 (194)	427 (194)
Return - pound (kg)	446 (202)	446 (202)	446 (202)	446 (202)
<b>Evaporator 3-pass Weight</b>				
Supply - pound (kg)	448 (203)	448 (203)	448 (203)	448 (203)
Return - pound (kg)	448 (203)	448 (203)	448 (203)	448 (203)
<b>Condenser 2-pass Weight</b>				
Supply - pound (kg)	421 (191)	421 (191)	421 (191)	421 (191)
Return - pound (kg)	436 (198)	436 (198)	436 (198)	436 (198)

# General Information

**Table 4. General data: 700 ton family**

Nominal Tonnage	560	560	560	560	630	630	630	630
Tube Outside Diameter (inch)	1.0	1.0	0.75	0.75	1.0	1.0	0.75	0.75
Evaporator Water Pass	Two	Three	Two	Three	Two	Three	Two	Three
Refrigerant Charge - pounds (kg)	875 (397)	875 (397)	875 (397)	875 (397)	925 (420)	925 (420)	925 (420)	925 (420)
Oil charge - gallons (l)	15 (56.8)							
Overall Dimensions - Feet-Inch (mm)								
Length	16'11" (5153)							
Width	6'10" (2075)							
Height	7'5" (2269)							
Evaporator Inside Diameter	36-1/4" (921)							
Evaporator Water Connection size (NPS)	10" (254)	8" (203)	10" (254)	8" (203)	10" (254)	8" (203)	10" (254)	8" (203)
Condenser Inside Diameter	29-1/2" (749)							
Condenser Nominal Connector size (NPS)	12" (304)							
Weight- pound (kg) 150 Lb. Waterboxes								
Compressor weight	6440 (2921)							
Evaporator weight	5949 (2698)	5949 (2698)	6283 (2850)	6283 (2850)	5940 (2694)	5940 (2694)	6480 (2939)	6480 (2939)
Condenser weight	4651 (2110)	4651 (2110)	5515 (2502)	5515 (2502)	4875 (2211)	4875 (2211)	5824 (2642)	5824 (2642)
Economizer weight	904 (410)							
Starter panel weight	542 (246)							
Control panel weight	70 (318)							
I/C Piping and Supports	1216 (552)							
Waterboxes	1867 (847)	1891 (858)	1867 (847)	1891 (858)	1867 (847)	1891 (858)	1867 (847)	1891 (858)
Miscellaneous Item	298 (135)							
Total Shipping Weight	22,024 (9990)	22,048 (10001)	23,222 (10553)	23,246 (10544)	22,239 (10541)	22,263 (10552)	23,728 (10763)	23,750 (10773)
Total Water Volume	2608 (1183)	2575 (1168)	2519 (1143)	2486 (1128)	2809 (1274)	2776 (1259)	2689 (1220)	2656 (1205)
Refrigerant and Oil	997 (452)	997 (452)	997 (452)	997 (452)	1047 (475)	1047 (475)	1047 (475)	1047 (475)
Total Weight	25,629 (11625)	25,620 (11621)	26,738 (12128)	26,729 (12124)	26,095 (11836)	26,086 (11832)	27,464 (12457)	27,453 (12452)

# General Information

**Table 4. General data: 700 ton family (continued)**

Nominal Tonnage	560	560	560	560	630	630	630	630
Tube Outside Diameter (inch)	1.0	1.0	0.75	0.75	1.0	1.0	0.75	0.75
Evaporator Water Pass	Two	Three	Two	Three	Two	Three	Two	Three
<b>Operational Data</b>								
Minimum Evaporator Flow GPM (l/s)	625 (39.4)	417 (26.3)	566 (35.7)	378 (23.8)	706 (44.5)	471 (29.7)	628 (39.6)	419 (26.4)
Maximum Evaporator Flow GPM (l/s)	2293 (144.6)	1529 (96.4)	2077 (131)	1385 (87.4)	2581 (162.8)	1726 (108.9)	2304 (145.3)	1536 (96.9)
Minimum Condenser Flow GPM (l/s)	682 (43)	682 (43)	668 (42.1)	668 (42.1)	764 (48.2)	764 (48.2)	744 (47)	744 (47)
Maximum Condenser Flow GPM (l/s)	2501 (157.7)	2501 (157.7)	2450 (154.5)	2450 (154.5)	2801 (176.7)	2801 (176.7)	2727 (172)	2727 (172)
<b>150 pound waterboxes</b>								
Evaporator Water Storage gallons (l)	150.7 (570.4)	146.4 (554.2)	141.8 (537)	137.5 (520.5)	162.7 (616)	158.4 (600)	151 (572)	146.7 (555.3)
Condenser Water Storage gallons (l)	162.8 (616.3)	162.8 (616.3)	161 (609.5)	161 (609.5)	174.9 (662.1)	174.9 (662.1)	172.2 (652)	172.2 (652)
<b>Evaporator 2-pass Weight</b>								
Supply - pound (kg)	492.7 (223.5)							
Return - pound (kg)	435.2 (197.4)							
<b>Evaporator 3-pass Weight</b>								
Supply - pound (kg)	476.6 (216.2)							
Return - pound (kg)	478.9 (217.2)							
<b>Condenser 2-pass Weight</b>								
Supply - pound (kg)	500.2 (226.9)							
Return - pound (kg)	437.6 (198.5)							
<b>300 pound Waterboxes</b>								
Evaporator Water Storage gallons (l)	151 (571.6)	146.6 (554.9)	142.1 (537.9)	137.7 (521.3)	163 (617)	158.6 (600.4)	151.3 (572.7)	146.9 (556.1)
Condenser Water Storage gallons (l)	163.4 (618.5)	163.4 (618.5)	161.6 (611.7)	161.6 (611.7)	175.5 (664.3)	175.5 (664.3)	172.8 (654.1)	172.8 (654.1)
<b>Evaporator 2-pass Weight</b>								
Supply - pound (kg)	625.9 (283.9)							
Return - pound (kg)	590.5 (267.8)							
<b>Evaporator 3-pass Weight</b>								
Supply - pound (kg)	624.9 (283.4)							
Return - pound (kg)	627.2 (284.5)							
<b>Condenser 2-pass Weight</b>								
Supply - pound (kg)	625.1 (283.5)							
Return - pound (kg)	594.4 (269.6)							

# General Information

**Table 4. General data: 700 ton family (continued)**

Nominal Tonnage	700			
Tube Outside Diameter (inch)	1.0		0.75	
Evaporator Water Pass	Two	Three	Two	Three
Refrigerant Charge - pounds (kg)	975 (442)	975 (442)	975 (442)	975 (442)
Oil charge - gallons (l)	15 (56.8)	15 (56.8)	15 (56.8)	15 (56.8)
<b>Overall Dimensions - Feet-Inch (mm)</b>				
Length	16'11" (5153)	16'11" (5153)	16'11" (5153)	16'11" (5153)
Width	6'10" (2075)	6'10" (2075)	6'10" (2075)	6'10" (2075)
Height	7'5" (2269)	7'5" (2269)	7'5" (2269)	7'5" (2269)
Evaporator Inside Diameter	36-1/4" (921)	36-1/4" (921)	36-1/4" (921)	36-1/4" (921)
Evaporator Water Connection size (NPS)	10" (254)	8" (203)	10" (254)	8" (203)
Condenser Inside Diameter	29-1/2" (749)	29-1/2" (749)	29-1/2" (749)	29-1/2" (749)
Condenser Nominal Connector size (NPS)	12" (304)	12" (304)	12" (304)	12" (304)
<b>Weight- pound (kg) 150 Lb. Waterboxes</b>				
Compressor weight	6440 (2921)	6440 (2921)	6440 (2921)	6440 (2921)
Evaporator weight	6320 (2867)	6320 (2867)	6701 (3040)	6701 (3040)
Condenser weight	5077 (2303)	5077 (2303)	6122 (2777)	6122 (2777)
Economizer weight	904 (410)	904 (410)	904 (410)	904 (410)
Starter panel weight	542 (246)	542 (246)	542 (246)	542 (246)
Control panel weight	70 (318)	70 (318)	70 (318)	70 (318)
I/C Piping and Supports	1216 (552)	1216 (552)	1216 (552)	1216 (552)
Waterboxes	1867 (847)	1891 (858)	1867 (847)	1891 (858)
Miscellaneous Item	298 (135)	298 (135)	298 (135)	298 (135)
Total Shipping Weight	22,821 (10351)	22,845 (10362)	24,247 (10998)	24,271 (11009)
Total Water Volume	2999 (1360)	2966 (1345)	2866 (1300)	2833 (1285)
Refrigerant and Oil	1097 (498)	1097 (498)	1097 (498)	1097 (498)
Total Weight	26,917 (12209)	26,908 (12205)	28,210 (12796)	28,201 (12792)

# General Information

**Table 4. General data: 700 ton family (continued)**

Nominal Tonnage	700			
Tube Outside Diameter (inch)	1.0		0.75	
Evaporator Water Pass	Two	Three	Two	Three
<b>Operational Data</b>				
Minimum Evaporator Flow GPM (l/s)	784 (49.5)	523 (33)	698 (44)	465 (29.3)
Maximum Evaporator Flow GPM (l/s)	2874 (181.3)	1916 (120.9)	2559 (161.4)	1706 (107.6)
Minimum Condenser Flow GPM (l/s)	838 (52.9)	838 (52.9)	816 (51.5)	816 (51.5)
Maximum Condenser Flow GPM (l/s)	3071 (193.7)	3071 (193.7)	2993 (188.8)	2993 (188.8)
<b>150 pound waterboxes</b>				
Evaporator Water Storage gallons (l)	174.4 (660.2)	170.1 (644)	161.5 (611.3)	157.2 (595.1)
Condenser Water Storage gallons (l)	185.8 (703.3)	185.8 (703.3)	183 (693)	183 (693)
<b>Evaporator 2-pass Weight</b>				
Supply - pound (kg)	492.7 (223.5)	492.7 (223.5)	492.7 (223.5)	492.7 (223.5)
Return - pound (kg)	435.2 (197.4)	435.2 (197.4)	435.2 (197.4)	435.2 (197.4)
<b>Evaporator 3-pass Weight</b>				
Supply - pound (kg)	476.6 (216.2)	476.6 (216.2)	476.6 (216.2)	476.6 (216.2)
Return - pound (kg)	478.9 (217.2)	478.9 (217.2)	478.9 (217.2)	478.9 (217.2)
<b>Condenser 2-pass Weight</b>				
Supply - pound (kg)	500.2 (226.9)	500.2 (226.9)	500.2 (226.9)	500.2 (226.9)
Return - pound (kg)	437.6 (198.5)	437.6 (198.5)	437.6 (198.5)	437.6 (198.5)
<b>300 pound Waterboxes</b>				
Evaporator Water Storage gallons (l)	174.7 (661.3)	170.3 (644.7)	161.8 (612.5)	157.4 (595.8)
Condenser Water Storage gallons (l)	186.4 (705.6)	186.4 (705.6)	183.6 (695)	183.6 (695)
<b>Evaporator 2-pass Weight</b>				
Supply - pound (kg)	625.9 (283.9)	625.9 (283.9)	625.9 (283.9)	625.9 (283.9)
Return - pound (kg)	590.5 (267.8)	590.5 (267.8)	590.5 (267.8)	590.5 (267.8)
<b>Evaporator 3-pass Weight</b>				
Supply - pound (kg)	624.9 (283.4)	624.9 (283.4)	624.9 (283.4)	624.9 (283.4)
Return - pound (kg)	627.2 (284.5)	627.2 (284.5)	627.2 (284.5)	627.2 (284.5)
<b>Condenser 2-pass Weight</b>				
Supply - pound (kg)	625.1 (283.5)	625.1 (283.5)	625.1 (283.5)	625.1 (283.5)
Return - pound (kg)	594.4 (269.6)	594.4 (269.6)	594.4 (269.6)	594.4 (269.6)

# General Information

**Table 5. General data: 800 ton units**

Nominal Tonnage	800		0.75	
Tube Outside Diameter (Inch)	1.0		0.75	
Evaporator Water Pass	Two	Three	Two	Three
Refrigerant Type	R134a	R134a	R134a	R134a
Refrigerant Charge-pounds (kg)	975 (442.3)	975 (442.3)	975 (442.3)	975 (442.3)
Oil Charge gallon (l)	15 (56.8)	15 (56.8)	15 (56.8)	15 (56.8)
<b>Overall Dimensions - Feet-Inch (mm)</b>				
Length	16' 4877	16' 4877	16' 4877	16' 4877
Width	6' - 9 3/4" (2076)			
Height	7' - 5 11/32" (2270)			
Evaporator Inside Diameter	3' - 1/4" (9208)	3' - 1/4" (9208)	3' - 1/4" (9208)	3' - 1/4" (9208)
Evaporator Water Connection (NPS)	10" (250)	8" (203)	10" (250)	8" (203)
Condenser Inside Diameter	2' - 5 1/2" (749)			
Condenser Nominal Connector Size (NPS)	12" (305)	12" (305)	12" (305)	12" (305)
<b>Weight - pounds (kg) except Waterboxes</b>				
Compressor/Motor	6800 (3084)	6800 (3084)	6800 (3084)	6800 (3084)
Evaporator	5835 (2647)	6275 (2846)	5835 (2647)	6275 (2846)
Condenser	4375 (1985)	5400 (2449)	4375 (1985)	5400 (2449)
Economizer	799 (362)	799 (362)	799 (362)	799 (362)
Starter Panel	542 (246)	542 (246)	542 (246)	542 (246)
Control Panel	70 (318)	70 (318)	70 (318)	70 (318)
Miscellaneous Item	2745 (1245)	2745 (1245)	2745 (1245)	2745 (1245)
Shipping Weight	25218 (11439)	25218 (11439)	25218 (11439)	25218 (11439)
Operating Weight	29924 (13573)	29924 (13573)	29924 (13573)	29924 (13573)
<b>Operational Data</b>				
Minimum Evaporator Flow in gpm (l/sec)	784 (50)	523 (33)	698 (44)	465 (29)
Maximum Evaporator Flow in gpm (l/sec)	3071 (194)	1916 (121)	1873 (118)	1248 (79)
Minimum Condenser Flow in gpm (l/sec)	838 (53)	838 (53)	816 (52)	816 (52)
Maximum Condenser Flow in gpm (l/sec)	3071 (194)	3071 (194)	2993 (189)	2993 (189)

# General Information

**Table 5. General data: 800 ton units (continued)**

Nominal Tonnage	800			
Tube Outside Diameter (inch)	1.0		0.75	
Evaporator Water Pass	Two	Three	Two	Three
<b>Water Volume - 150 pound Waterboxes</b>				
Evaporator Water Storage gallon (l)	190.4 (721)	185.4 (702)	177.4 (672)	172.4 (653)
Condenser Water Storage gallon (l)	213.5 (808)	213.5 (808)	218.0 (828)	218.0 (828)
Evaporator 2-pass Weight				
Supply - pound (kg)	303.57 (137.7)	303.57 (137.7)	303.57 (137.7)	303.57 (137.7)
Return - pound (kg)	337.16 (152.9)	337.16 (152.9)	337.16 (152.9)	337.16 (152.9)
Evaporator 3-pass Weight				
Supply - pound (kg)	313.56 (142.2)	313.56 (142.2)	313.56 (142.2)	313.56 (142.2)
Return - pound (kg)	331.72 (150.5)	331.72 (150.5)	331.72 (150.5)	331.72 (150.5)
Condenser 2-pass Weight				
Supply - pound (kg)	303.69 (137.8)	303.69 (137.8)	303.69 (137.8)	303.69 (137.8)
Return - pound (kg)	340.67 (154.5)	340.67 (154.5)	340.67 (154.5)	340.67 (154.5)
<b>300 pound Waterboxes</b>				
Evaporator Water Storage gallon (l)	190.4 (721)	185.4 (702)	177.4 (672)	172.4 (653)
Condenser Water Storage gallon (l)	214.5 (812)	214.5 (812)	219.0 (829)	219.0 (829)
Evaporator 2-pass Weight				
Supply - pound (kg)	426.69 (193.5)	426.69 (193.5)	426.69 (193.5)	426.69 (193.5)
Return - pound (kg)	446.20 (202.4)	446.20 (202.4)	446.20 (202.4)	446.20 (202.4)
Evaporator 3-pass Weight				
Supply - pound (kg)	447.81 (203.1)	447.81 (203.1)	447.81 (203.1)	447.81 (203.1)
Return - pound (kg)	447.98 (203.2)	447.98 (203.2)	447.98 (203.2)	447.98 (203.2)
Condenser 2-pass Weight				
Supply - pound (kg)	421.43 (191.2)	421.43 (191.2)	421.43 (191.2)	421.43 (191.2)
Return - pound (kg)	436.11 (197.8)	436.11 (197.8)	436.11 (197.8)	436.11 (197.8)

# General Information

**Table 6. General data: 1000 ton family**

Bundle	A	A	A	A	B	B	B	B
Tube Outside Diameter (inch)	1.0	1.0	0.75	0.75	1.0	1.0	0.75	0.75
Evaporator Water pass	Two	Three	Two	Three	Two	Three	Two	Three
Overall Dimensions - Feet-Inch (mm)								
Length	17' - 5 13/32" (5320)							
Width	7' - 6 39/64" (2301)							
Height	8' - 4" (2540)							
Evaporator Inside Diameter	3' 7 3/4" (1111)							
Evaporator Water Connection size (NPS)	12" (305)	10" (250)	12" (305)	10" (250)	12" (305)	10" (250)	12" (305)	10" (250)
Condenser Inside Diameter	2' - 11 1/4" (895)							
Condenser Nominal Connector size (NPS)	14" (356)							
Weight - pounds (kg) 150 pound Waterboxes								
Compressor weight	9493 (4306)							
Evaporator weight	7537 (3419)	7537 (3419)	8190 (3715)	8190 (3715)	7787 (3532)	7787 (3532)	8474 (3844)	8474 (3844)
Condenser weight	6571 (2981)	6571 (2981)	7707 (3496)	7707 (3496)	6816 (3092)	6816 (3092)	8148 (3696)	8148 (3696)
Economizer weight	1461 (663)							

# General Information

**Table 6. General data: 1000 ton family (continued)**

Bundle	C	C	C	C	D	D	D	D
Tube Outside Diameter (inch)	1.0	1.0	0.75	0.75	1.0	1.0	0.75	0.75
Evaporator Water pass	Two	Three	Two	Three	Two	Three	Two	Three
<b>Overall Dimensions - Feet-Inch (mm)</b>								
Length	17' - 5 13/32" (5320)							
Width	7' - 6 39/64" (2301)							
Height	8' - 4" (2540)							
Evaporator Inside Diameter	3' 7 3/4" (1111)							
Evaporator Water Connection size (NPS)	12" (305)	10" (250)	12" (305)	10" (250)	12" (305)	10" (250)	12" (305)	10" (250)
Condenser Inside Diameter	2' - 11 1/4" (895)							
Condenser Nominal Connector size (NPS)	14" (356)							
<b>Weight - pounds (kg) 150 pound Waterboxes</b>								
Compressor weight	9493 (4306)							
Evaporator weight	7537 (3419)	7537 (3419)	8190 (3715)	8190 (3715)	7787 (3532)	7787 (3532)	8474 (3844)	8474 (3844)
Condenser weight	6571 (2981)	6571 (2981)	7707 (3496)	7707 (3496)	6816 (3092)	6816 (3092)	8148 (3696)	8148 (3696)
Economizer weight	1461 (663)							

# General Information

**Table 6. General data: 1000 ton family (continued)**

Bundle	A	A	A	A	B	B	B	B
Tube Outside Diameter (inch)	1.0	1.0	0.75	0.75	1.0	1.0	0.75	0.75
Evaporator Water pass	Two	Three	Two	Three	Two	Three	Two	Three
Starter panel - pound (kg)	542 (246)							
Control panel - pound (kg)	70 (318)							
I/C Piping and Supports - pound (kg)	1430 (649)	1430 (649)	1439 (653)	1439 (653)	1430 (649)	1430 (649)	1439 (653)	1439 (653)
Waterboxes pound (kg)	3222 (1461)	3274 (1485)	3222 (1461)	3274 (1485)	3222 (1461)	3274 (1485)	3222 (1461)	3274 (1485)
Miscellaneous Item - pound (kg)	520 (236)							
Total Shipping - pound (kg)	30933 (14031)	30985 (14055)	32731 (14846)	32783 (14870)	31428 (14256)	31480 (14279)	33456 (15175)	33508 (15199)
Total Water Volume - pound (kg)	3797 (1722)	3745 (1699)	3867 (1754)	3816 (1731)	4059 (1841)	4008 (1818)	4136 (1876)	4085 (1853)
Refrigerant and Oil - pound (kg)	1347 (611)	1347 (611)	1347 (611)	1347 (611)	1397 (634)	1397 (634)	1397 (634)	1397 (634)
Total Weight - pound (kg)	36077 (16364)	36077 (16364)	37945 (17212)	37946 (17212)	36884 (16730)	36885 (16731)	38989 (17685)	38990 (17686)

# General Information

**Table 6. General data: 1000 ton family (continued)**

Bundle	C	C	C	C	D	D	D	D
Tube Outside Diameter (inch)	1.0	1.0	0.75	0.75	1.0	1.0	0.75	0.75
Evaporator								
Water pass	Two	Three	Two	Three	Two	Three	Two	Three
Starter panel weight - pound (kg)	542 (246)							
Control panel weight - pound (kg)	70 (318)							
I/C Piping and Supports - pound (kg)	1430 (649)	1430 (649)	1439 (653)	1439 (653)	1430 (649)	1430 (649)	1439 (653)	1439 (653)
Waterboxes - pound (kg)	3222 (1461)	3274 (1485)	3222 (1461)	3274 (1485)	3222 (1461)	3274 (1485)	3222 (1461)	3274 (1485)
Miscellaneous Item - pound (kg)	520 (236)							
Total Shipping - pound (kg)	32101 (14561)	32153 (14584)	34189 (15508)	34241 (15531)	32639 (14805)	32691 (14828)	34656 (15720)	34708 (15743)
Total Water Volume - pound (kg)	4405 (1998)	4353 (1974)	4411 (2001)	4359 (1977)	4686 (2126)	4635 (2102)	4599 (2086)	4547 (2062)
Refrigerant and Oil - pound (kg)	1447 (656)	1447 (656)	1447 (656)	1447 (656)	1497 (679)	1497 (679)	1497 (679)	1497 (679)
Total Weight - pound (kg)	37953 (17215)	37953 (17215)	40047 (18165)	40047 (18165)	38822 (17609)	38823 (17610)	40752 (18484)	40752 (18485)

# General Information

**Table 6. General data: 1000 ton family (continued)**

Bundle	A	A	A	A	B	B	B	B
Tube Outside Diameter (inch)	1.0	1.0	0.75	0.75	1.0	1.0	0.75	0.75
<b>Evaporator Water</b>								
pass	Two	Three	Two	Three	Two	Three	Two	Three
Refrigerant Oil charge - pound (kg)	1225 (556)	1225 (556)	1225 (556)	1225 (556)	1275 (578)	1275 (578)	1275 (578)	1275 (578)
Oil charge - gallons (l)	15 (56.8)							
Minimum Evaporator Flow - GPM (l/s)	781 (2956)	521 (1972)	822 (3112)	548 (2074)	896 (3392)	598 (2264)	921 (3486)	614 (2324)
Maximum Evaporator Flow - GPM (l/s)	2864 (10841)	1909 (7226)	3013 (11405)	2009 (7605)	3287 (12443)	2191 (8294)	3377 (12783)	2251 (8521)
Minimum Condenser flow - GPM (l/s)	925 (3502)	925 (3502)	938 (3551)	938 (3551)	1020 (3861)	1020 (3861)	1056 (3997)	1056 (3997)
Maximum Condenser flow - GPM (l/s)	3391 (12836)	3391 (12836)	3441 (13026)	3441 (13026)	3741 (14161)	3741 (14161)	3874 (14665)	3874 (14665)
<b>150 pound waterboxes</b>								
Evaporator Water Storage - gallons (l)	216.5 (819.5)	210.3 (796.1)	222.5 (842.3)	216.4 (819.2)	233.7 (884.7)	227.6 (861.6)	237.3 (898.3)	231.2 (875.2)
Condenser Water Storage - gallons (l)	238.6 (903.2)	238.6 (903.2)	241 (912.3)	241 (912.3)	252.8 (957.0)	252.8 (957.0)	258.5 (978.5)	258.5 (978.5)
<b>Evaporator 2-pass Weight</b>								
Supply - pound (kg)	849.3 (385.2)							
Return - pound (kg)	758.2 (343.9)							
<b>Evaporator 3-pass Weight</b>								
Supply - pound (kg)	827.1 (375.2)							
Return - pound (kg)	831.8 (377.3)							
<b>Condenser 2-pass Weight</b>								
Supply - pound (kg)	854.2 (387.5)							
Return - pound (kg)	760.8 (345.1)							
<b>300 pound Waterboxes</b>								
Evaporator Water Storage - gallons (l)	217 (821.4)	210.7 (797.6)	223.1 (844.5)	216.7 (820.3)	234.3 (886.9)	228 (863.1)	237.9 (900.5)	231.6 (876.7)
Condenser Water Storage - gallons (l)	239.3 (905.8)	239.3 (905.8)	241.6 (914.6)	241.6 (914.6)	253.4 (959.2)	253.4 (959.2)	259.2 (981.2)	259.2 (981.2)
<b>Evaporator 2-pass Weight</b>								
Supply - pound (kg)	1041.7 (472.5)							
Return - pound (kg)	983.5 (446.1)							
<b>Evaporator 3-pass Weight</b>								
Supply - pound (kg)	1041.7 (472.5)							
Return - pound (kg)	1045.7 (474.3)							
<b>Condenser 2-pass Weight</b>								
Supply - pound (kg)	1004.8 (455.8)							
Return - pound (kg)	986.1 (447.3)	760.8 (447.3)						

**Note:** Immediately report any unit damage incurred during handling or installation at the job site to Trane sales office.

# General Information

**Table 6. General data: 1000 ton family (continued)**

Bundle	C	C	C	C	D	D	D	D
Tube Outside Diameter (inch)	1.0	1.0	0.75	0.75	1.0	1.0	0.75	0.75
Evaporator Water pass	Two	Three	Two	Three	Two	Three	Two	Three
Refrigerant Oil charge - pound (kg)	1325 (601)	1325 (601)	1325 (601)	1325 (601)	1375 (624)	1375 (624)	1375 (624)	1375 (624)
Oil charge - gallons (l)	15 (56.8)	15 (56.8)	15 (56.8)	15 (56.8)	15 (56.8)	15 (56.8)	15 (56.8)	15 (56.8)
Minimum Evaporator Flow - GPM (l/s)	1003 (3797)	669 (2532)	1021 (3865)	681 (2578)	1115 (4221)	744 (2816)	1136 (4300)	757 (2866)
Maximum Evaporator Flow - GPM (l/s)	3678 (13923)	2452 (9282)	3745 (14176)	2497 (9452)	4090 (15482)	2726 (10319)	4165 (15766)	2777 (10512)
Minimum Condenser flow - GPM (l/s)	1192 (4512)	1192 (4512)	1176 (4452)	1176 (4452)	1307 (4948)	1307 (4948)	1213 (4592)	1213 (4592)
Maximum Condenser flow - GPM (l/s)	4372 (16550)	4372 (16550)	4311 (16319)	4311 (16319)	4792 (18140)	4792 (18140)	4447 (16834)	4447 (16834)
<b>150 pound waterboxes</b>								
Evaporator Water Storage - gallons (l)	249.7 (945.2)	243.5 (921.7)	252.4 (955.4)	246.2 (932.0)	266.5 (1009)	260.4 (985.7)	269.5 (1020)	263.3 (996.7)
Condenser Water Storage - gallons (l)	278.3 (1054)	278.3 (1054)	276.3 (1046)	276.3 (1046)	295.2 (1118)	295.2 (1118)	281.8 (1067)	281.8 (1067)
Evaporator 2-pass Weight Supply - pound (kg)	849.3 (385.2)	849.3 (385.2)	849.3 (385.2)	849.3 (385.2)	849.3 (385.2)	849.3 (385.2)	849.3 (385.2)	849.3 (385.2)
Return - pound (kg)	758.2 (343.9)	758.2 (343.9)	758.2 (343.9)	758.2 (343.9)	758.2 (343.9)	758.2 (343.9)	758.2 (343.9)	758.2 (343.9)
Evaporator 3-pass Weight Supply - pound (kg)	827.1 (375.2)	827.1 (375.2)	827.1 (375.2)	827.1 (375.2)	827.1 (375.2)	827.1 (375.2)	827.1 (375.2)	827.1 (375.2)
Return - pound (kg)	831.8 (377.3)	831.8 (377.3)	831.8 (377.3)	831.8 (377.3)	831.8 (377.3)	831.8 (377.3)	831.8 (377.3)	831.8 (377.3)
Condenser 2-pass Weight Supply - pound (kg)	854.2 (387.5)	854.2 (387.5)	854.2 (387.5)	854.2 (387.5)	854.2 (387.5)	854.2 (387.5)	854.2 (387.5)	854.2 (387.5)
Return - pound (kg)	760.8 (345.1)	760.8 (345.1)	760.8 (345.1)	760.8 (345.1)	760.8 (345.1)	760.8 (345.1)	760.8 (345.1)	760.8 (345.1)
<b>300 pound Waterboxes</b>								
Evaporator Water Storage - gallons (l)	250.2 (947.1)	243.9 (923.3)	252.9 (957.3)	246.6 (933.5)	267 (1011)	260.7 (986.9)	270 (1022)	263.7 (998.2)
Condenser Water Storage - gallons (l)	278.9 (1056)	278.9 (1056)	276.9 (1048)	276.9 (1048)	295.9 (1120)	295.9 (1120)	282.4 (1069)	282.4 (1069)
Evaporator 2-pass Weight Supply - pound (kg)	1041.7 (472.5)	1041.7 (472.5)	1041.7 (472.5)	1041.7 (472.5)	1041.7 (472.5)	1041.7 (472.5)	1041.7 (472.5)	1041.7 (472.5)
Return - pound (kg)	983.5 (446.1)	983.5 (446.1)	983.5 (446.1)	983.5 (446.1)	983.5 (446.1)	983.5 (446.1)	983.5 (446.1)	983.5 (446.1)
Evaporator 3-pass Weight Supply - pound (kg)	1041.7 (472.5)	1041.7 (472.5)	1041.7 (472.5)	1041.7 (472.5)	1041.7 (472.5)	1041.7 (472.5)	1041.7 (472.5)	1041.7 (472.5)
Return - pound (kg)	1045.7 (474.3)	1045.7 (474.3)	1045.7 (474.3)	1045.7 (474.3)	1045.7 (474.3)	1045.7 (474.3)	1045.7 (474.3)	1045.7 (474.3)
Condenser 2-pass Weight Supply - pound (kg)	1004.8 (455.8)	1004.8 (455.8)	1004.8 (455.8)	1004.8 (455.8)	1004.8 (455.8)	1004.8 (455.8)	1004.8 (455.8)	1004.8 (455.8)
Return - pound (kg)	986.1 (447.3)	986.1 (447.3)	986.1 (447.3)	986.1 (447.3)	986.1 (447.3)	986.1 (447.3)	986.1 (447.3)	760.8 (447.3)

**Note:** Immediately report any unit damage incurred during handling or installation at the job site to Trane sales office.

# Installation: Mechanical

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## Storage

If the chiller is to be stored for at least one month prior to installation, observe the following precautions:

- Do not remove the protective coverings from the electrical panel.
- Store the chiller in a dry, vibration-free, secure area.
- At least every three months, attach a gauge to the service valve and manually check the pressure of dry nitrogen in the refrigerant circuit. If the pressure is below 5 psig (34 kPa) at 70°F (20°C), call a qualified service organization and the appropriate Trane sales office.

## Location Requirements

### Noise Considerations

- Locate the unit away from sound-sensitive areas.
- Install the isolation pads or isolation springs under the unit.
- Use rubber boot-type isolators for all water piping at the unit.
- Use flexible electrical conduit for final connection to the UPC.

**Note:** Consult an acoustical engineer for critical applications.

### Foundation

Provide rigid, non-warping mounting pads or a concrete foundation of sufficient strength and mass to support the chiller operating weight (including completed piping and full operating charges of refrigerant, oil and water).

After the chiller is in place, level the chiller within 1/4" (6 mm) over its length and width.

Trane is not responsible for equipment problems resulting from an improperly designed or constructed foundation.

### Vibration Eliminators

- Use rubber boot-type isolators for all water piping at the unit.
- Use flexible electrical conduit for final connection to the UPC.
- Isolate all pipe hangers and be sure they are not supported by main structural beams that could introduce vibration into occupied spaces.
- Make sure that the piping does not put additional stress on the unit.

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

# Installation: Mechanical

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## Clearances

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

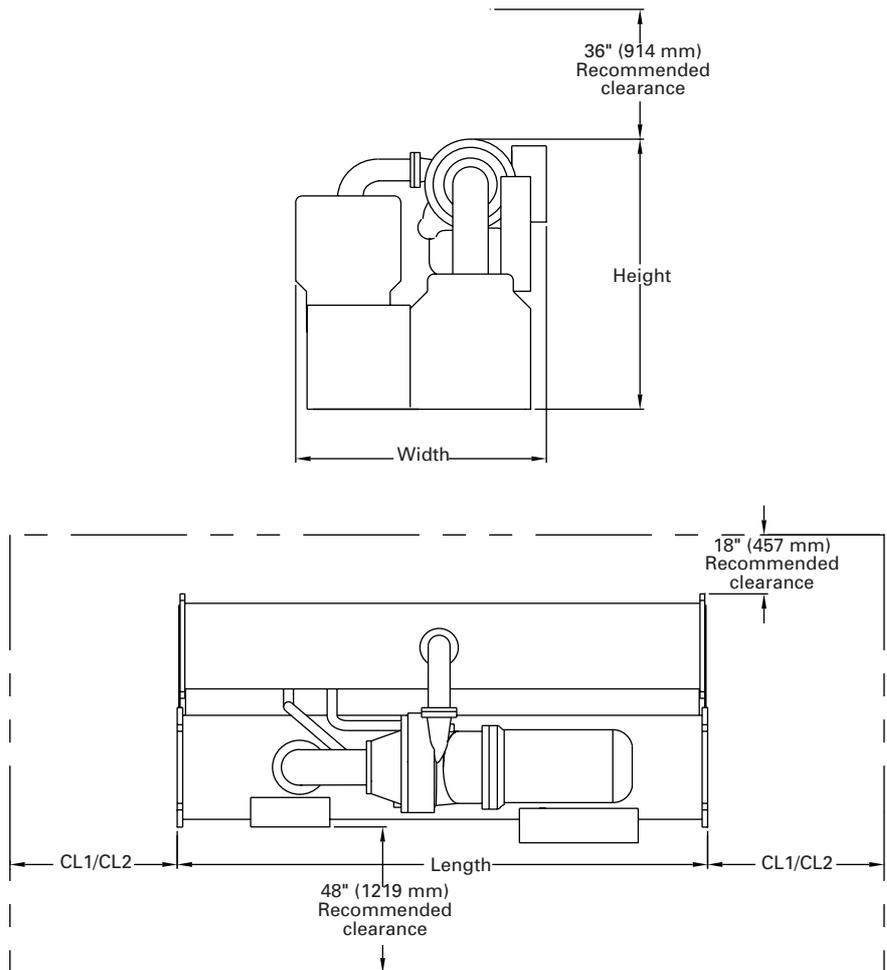
Allow adequate clearance for condenser and compressor servicing. A minimum of 36" (914 mm) is recommended for compressor service and to provide sufficient clearance for the opening of control panel doors. Refer to Figures 4 and 5, Tables 7 and 8 for minimum clearances required for condenser tube service. In all cases, local codes will take precedence over these recommendations.

**Notes:** Required vertical clearance above the unit is 36" (914 mm). There should be no piping or conduit located over the compressor motor.

If the room configuration requires a variance to the clearance dimensions, contact your Trane sales office representative.

# Installation: Mechanical

**Figure 4. Recommended operating and service clearances – Model CVGF with unit-mounted starters**



**Table 7. Dimensions for figure 4**

Compressor	Shell Size	Clearance Tube Pull Feet-Inch (mm)		Unit Dimensions With Unit Mounted Starters Dimensions Feet-Inch (m-meters)		
		CL1	CL2	Length	Height	Width
400-500	500	13' 11" (4.235)	3' 7" (1.092)	13' 5" (4.083)	6' 11" (1.790)	6' 6" (1.984)
560-700	700	13' 11" (4.235)	3' 7" (1.092)	13' 5" (4.083)	6' 11" (1.790)	6' 10" (2.083)
740-1000	1000	13' 11" (4.235)	3' 7" (1.092)	13' 5" (4.083)	8' 4" (2.540)	7' 6-3/4" (2.305)

**Notes:**

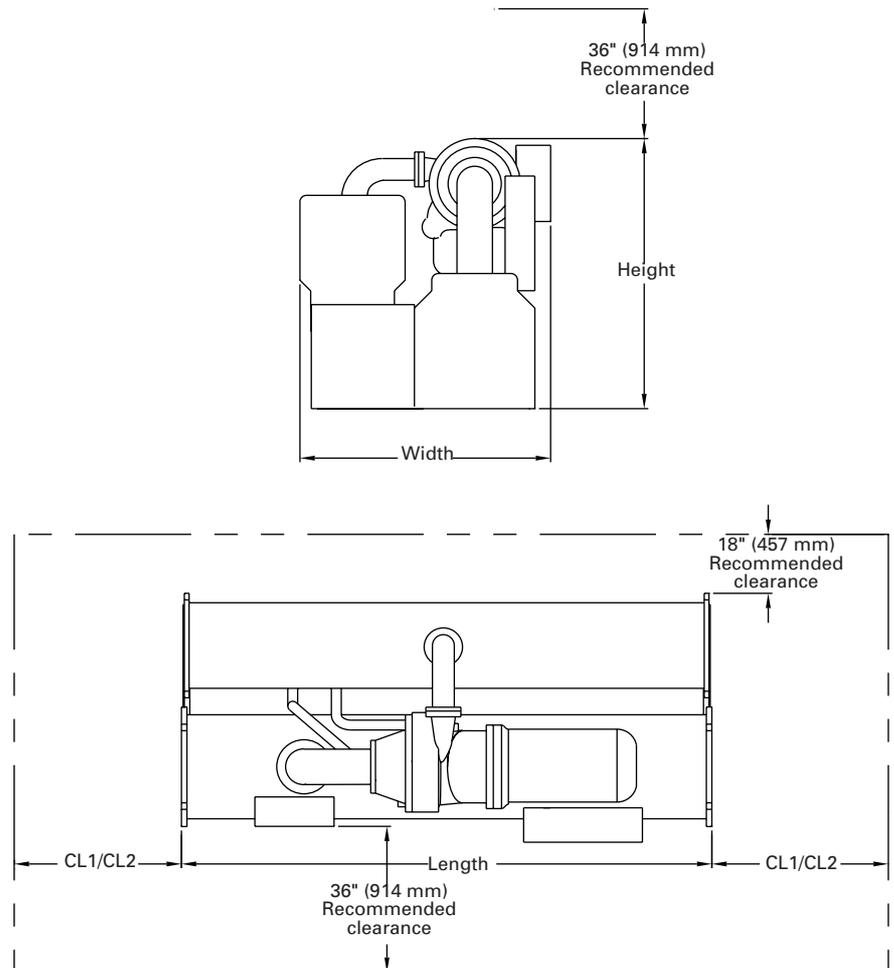
CL1 at either end of the machine and is required for tube pull clearance.

CL2 is always at the opposite end of the machine from CL1 and is required for service clearance.

Add 14-5/8" (37.1 cm) on each end for the water box.

# Installation: Mechanical

**Figure 5. Recommended operating and service clearances – Model CVGF without unit-mounted starters**



**Table 8. Dimensions for figure 5**

Compressor	Shell Size	Clearance Tube Pull Feet-Inch (mm)		Unit Dimensions Without Unit Mounted Starters Dimensions Feet-Inch (m-meters)		
		CL1	CL2	Length	Height	Width
400-500	500	13' 11" (4.235)	3' 7" (1.092)	13' 5" (4.083)	6' 11" (1.790)	6' 3" (1.913)
560-700	700	13' 11" (4.235)	3' 7" (1.092)	13' 5" (4.083)	6' 11" (1.790)	6' 7" (2.028)
740-1000	1000	13' 11" (4.235)	3' 7" (1.092)	13' 5" (4.083)	8' 4" (2.540)	7' 5" (2.261)

**Notes:**

CL1 at either end of the machine and is required for tube pull clearance.

CL2 is always at the opposite end of the machine from CL1 and is required for service clearance.

Add 14-5/8" (37.1 cm) on each end for the water box.

# Installation: Mechanical

## Water Pipe Connections

Table 9 applies to all CVGF chiller tonnage sizes 500, 700 and 1000.

Refer to Table 9 for water pipe connection sizing information and evaporator and condenser water pass information. All measurement are in either US or metric equivalents.

## Ventilation

The unit produces heat even though the compressor is cooled by the refrigerant. Make provisions to remove heat generated by unit operation from the equipment room. Ventilation must be adequate to maintain an ambient temperature lower than 122°F (50°C).

Vent the unit pressure relief valves in accordance with all local and national codes.

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

**Table 9. Model CVGF water connection pipe size (mm)**

Water Passes	Shell Size		
	500	700	1000
Nominal Pipe Size (inches) NPS			
<b>Evaporator</b>			
2-pass	8" (DN200)	10" (DN250)	12" (DN300)
3-pass	8" (DN200)	8" (DN200)	10" (DN250)
<b>Condenser</b>			
2-pass	10" (DN250)	12" (DN300)	14" (DN350)

## Water Drainage

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

## Moving and Rigging

The Model CVGF chiller should be moved by lifting at designated lift points only. Refer to the rigging diagram that ships with each unit for specific per unit weight data.

## ⚠ WARNING

### Heavy Objects!

**Do not use cables (chains or slings) except as shown. Each of the cables (chains or slings) used to lift the unit must be capable of supporting the entire weight of the unit. Lifting cables (chains or slings) may not be of the same length. Adjust as necessary for even unit lift. Other lifting arrangements may cause equipment or property-only damage. Failure to properly lift unit may result in death or serious injury. See details below:**

- Follow the procedures and diagrams in this manual and in the submittal.
- Always use lifting equipment with a capacity exceeding the unit lifting weight by an adequate safety factor. (+10%).

# Installation: Mechanical

## Chiller Isolation

To minimize sound and vibration transmission through the building structure, and to assure proper weight distribution over the mounting surface, install isolation pads or spring isolators under the chiller feet.

**Note:** Isolation pads are provided with each chiller unless spring isolators are specified on the sales order.

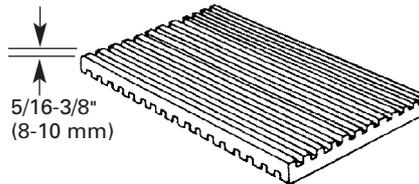
Specific isolator loading data is provided in the until submittal package. Also refer to Table 10. If necessary, contact your local Trane sales office for further information.

## Isolation Pads

When the unit is ready for final placement, position isolation pads end-to-end under the full length of the chiller leg. The pads measure 6" x 18" (152 x 457 mm). See Figure 6. No gaps should be present between pads.

Remember that the chiller must be level within 1/4" (6 mm) over its length and width after it is lowered onto the isolation pads. In addition, all piping connected to the chiller must be properly isolated and supported so that it does not place any stress on the unit.

**Figure 6. Isolation pad**



## Spring Isolators

Spring isolators should be considered whenever chiller installation is planned for an upper-story location. Spring isolator selection and placement information is presented in Figure 7 and Figure 8.

**Note:** Three types of spring isolators, shown in Tables 11-13 are used. Each type has its own maximum loading characteristics.

Spring isolators are typically shipped assembled and ready for installation. To install and adjust the isolators properly, follow the instructions given.

**Note:** Do not adjust the isolators until the chiller is piped and charged with refrigerant and water.

1. Position the spring isolators under the chiller as shown in Figure 7 and Figure 9. Make sure that each isolator is centered in relation to the tube sheet.
2. Set isolators on the sub-base; shim or grout them as necessary to provide a flat, level surface as the same elevation for all mountings. Be sure to support the full underside of the isolator base plate; no not straddle gaps or small shims.
3. If required, bolt the isolators to the floor through the slots provided, or cement the pads.
 

**Note:** fastening the isolators to the floor is not necessary unless specified.
4. If the chiller must be fastened to the isolators, insert cap screws through the chiller base and into the holes tapped in the upper housing of each isolator. Do not allow the screws to protrude below the underside of the isolator upper housing. An alternative method of fastening the chiller to the isolators is to cement the neoprene pads.
5. Set the chiller on the isolators; refer to the "Rigging" section for lifting instructions.

The weight of the chiller will force the upper housing of each isolator down, perhaps causing it to rest on the isolator's lower housing. Figure 9 illustrates spring isolator construction.

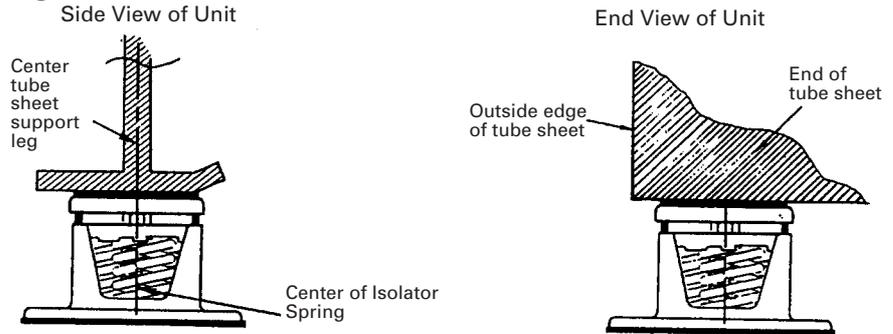
# Installation: Mechanical

6. Check the clearance on each isolator. If this dimension is less than 1/4" (6 mm) on any isolator, use a wrench to turn the adjusting bolt one complete revolution upward. Repeat this operation until a 1/4" (6 mm) clearance is obtained at all isolators.

7. After the minimum required clearance is obtained on each of the isolators, level the chiller by turning the adjusting bolt on each of the isolators on the low side of the unit. Be sure to work from one isolator to the next.

Remember that the chiller must be level to within 1/4" (6 mm) over its length and width and that clearance of each isolator must be 1/4" (6 mm).

**Figure 7. Chiller foot or isolator orientation**



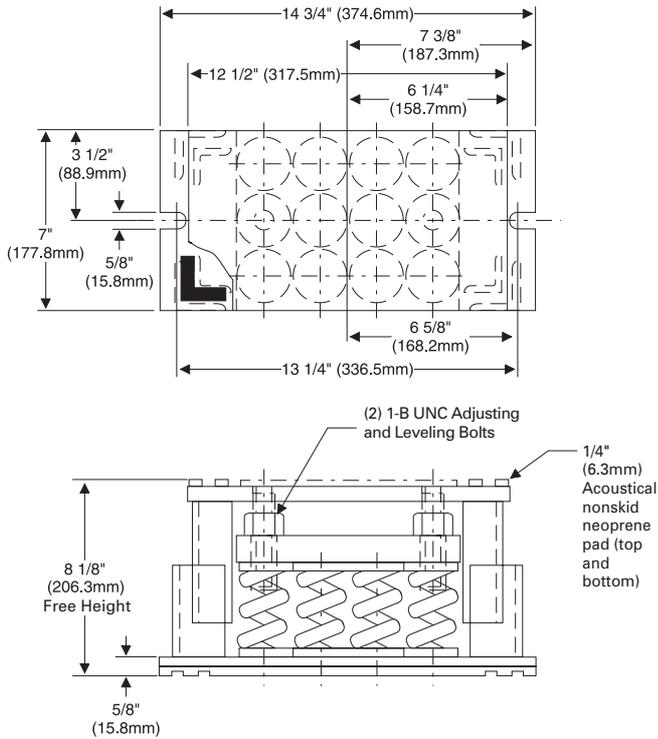
**Note:** The spring isolator must be centered in relation to the tube sheet. Do **not** align the isolator with the flat part of the chiller foot, because the tube sheet is often off-center.

**Note:** Place isolator near outside edge of tube sheet as shown.

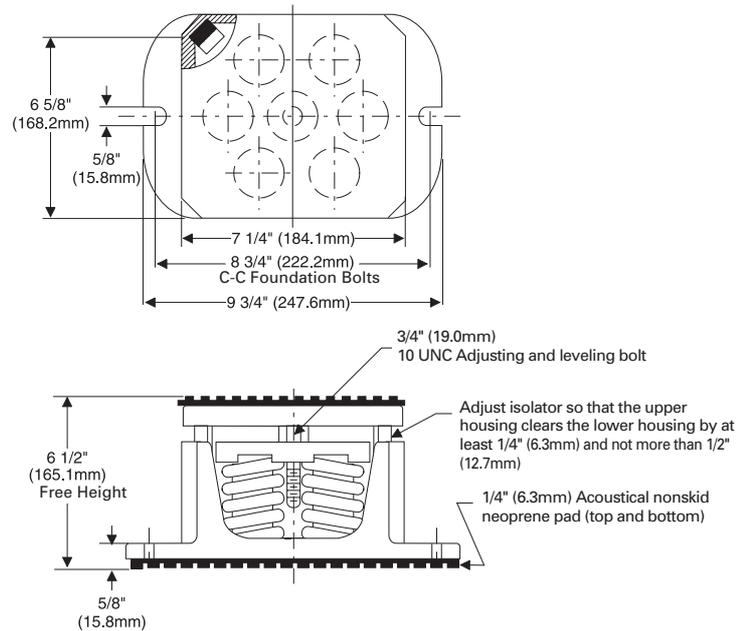
# Installation: Mechanical

**Figure 8. Typical spring isolator construction**

## CT-12 Spring Isolators



## CT-7 Spring Isolators



# Installation: Mechanical

**Table 10. Isolation loads - 500, 700 and 1000 ton families (reference figure 9)**

Location Point	500 Ton Family Maximum Load - pound (kg)	700 Ton Family Maximum Load - pound (kg)	1000 Ton Family Maximum Load - pound (kg)
A	5905 (2679)	8388 (3805)	10750 (4846)
B	7005 (3177)	9431 (4278)	12665 (5745)
C	6090 (2762)	8991 (4078)	11500 (5216)
D	7225 (3277)	10340 (4690)	13545 (6144)

**Table 11. Selected spring isolators – CVGF 500**

Isolator type and size	Trane Part #	Maximum Load lbm (kg)	Deflection inches (mm)	Spring Color Coding	Location Used
CT-12-27	X10350665-030	9000 (4082)	1.06 (27)	Orange	A & C
CT-12-28	X10350665-040	10800 (4898.8)	1.02 (26)	Green	B & D

**Note:** Each type CT-12 spring isolator has 12 springs.

**Table 12. Selected spring isolators – CVGF 700**

Isolator type and size	Trane Part #	Maximum Load lbm (kg)	Deflection inches (mm)	Spring Color Coding	Location Used
CT-7-31	X10350664-050	7700 (3492.7)	0.83 (21)	Gray	A, B, C, D

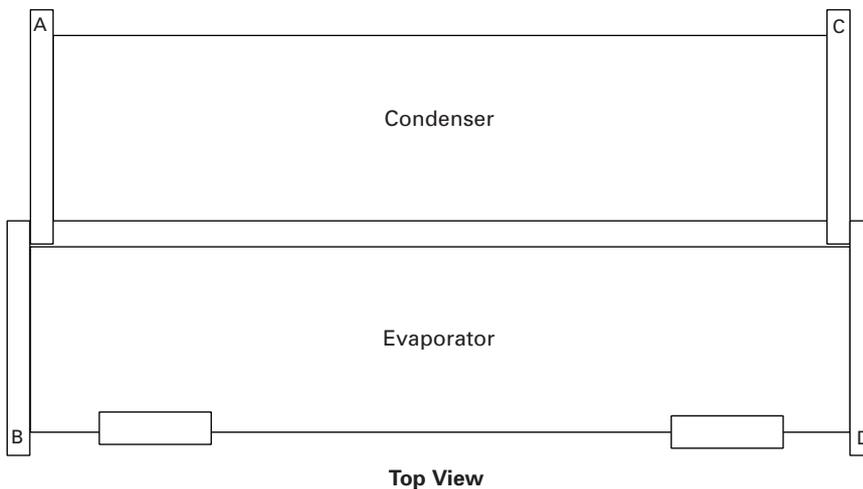
**Note:** Each type CT-7 spring isolator has 7 springs.

**Table 13. Selected spring isolators – CVGF 1000**

Isolator type and size	Trane Part #	Maximum Load lbm (kg)	Deflection inches (mm)	Spring Color Coding	Location Used
CT-12-28	X10350665-040	10000 (4535.9)	1.02 (26)	Green	A
CT-12-31	X10350665-050	13200 (5987.4)	0.83 (21)	Gray	B, C, D

**Note:** Each type CT-12 spring isolator has 12 springs.

**Figure 9. Load points - 500, 700 and 1000 ton families (reference table 10)**



# Installation: Mechanical

## CVGF Rigging

1. Dimensions are in millimeters (mm). Figure 10.

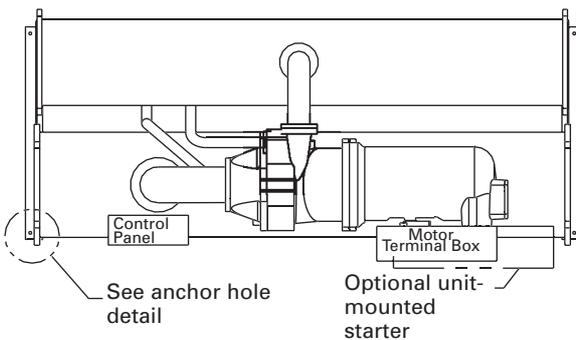
### ⚠ WARNING

### Heavy Objects!

Do not use cables (chains or slings) except as shown. Each of the cables (chains or slings) used to lift the unit must be capable of supporting the entire weight of the unit. Lifting cables (chains or slings) may not be of the same length. Adjust as necessary for even unit lift. Other lifting arrangements may cause equipment or property-only damage. Failure to properly lift unit may result in death or serious injury. See details below.

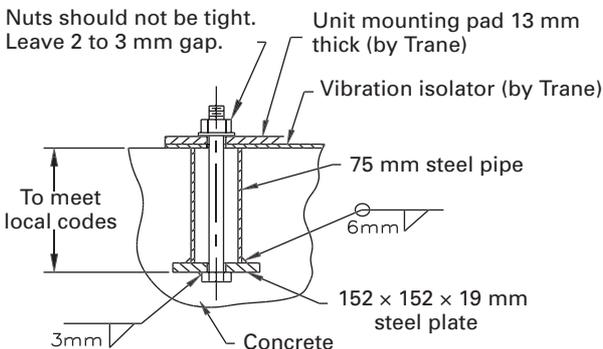
1. Use a 3600 mm lifting beam and adjust the chains (cables)

**Figure 10. Rigging diagram with anchor hole and bolt detail**



### Anchor Bolt Detail

Nuts should not be tight. Leave 2 to 3 mm gap.



Recommended procedure to allow for thermal expansion. (Unless otherwise specified, parts are furnished by the customer.)

for an even, level lift.

2. **900 mm recommended clearance above highest point of compressor.**

3. **Attach safety chains or cables as shown, and without tension. The safety chain is not used for lifting, but is there to prevent the unit from rolling.**

4. **More details weight information is available on request.**

2. Each chain or cable used to lift the unit must be capable of supporting the entire weight of the chiller.

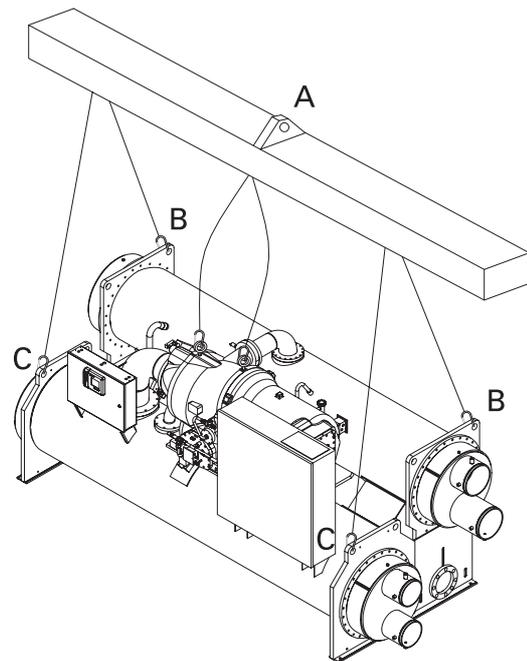
3. Use a 3600 mm lifting beam and adjust the chains or cables for an even, level lift.

4. 900 mm recommended clearance above highest point of compressor.

5. Attach safety chains or cables as shown in Figure 11, and without tension. The safety chain is not used for lifting, but is there to prevent the unit from rolling.

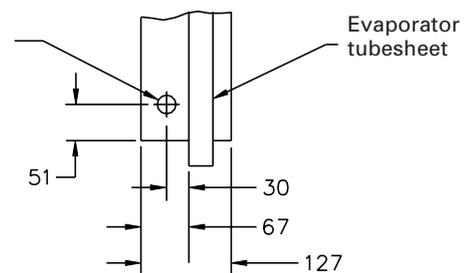
6. More detailed weight information is available upon request.

**Figure 11. Rigging diagram with safety chain placement**



### Anchor Hole Detail

4 x 22 mm diameter holes for anchoring the unit

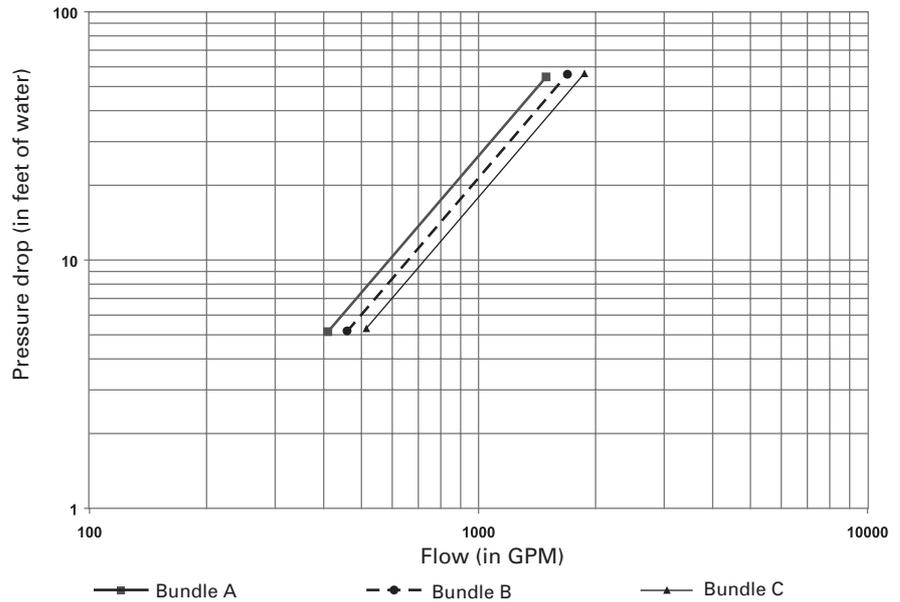


Dimensions are typical for each corner

# Installation: Mechanical

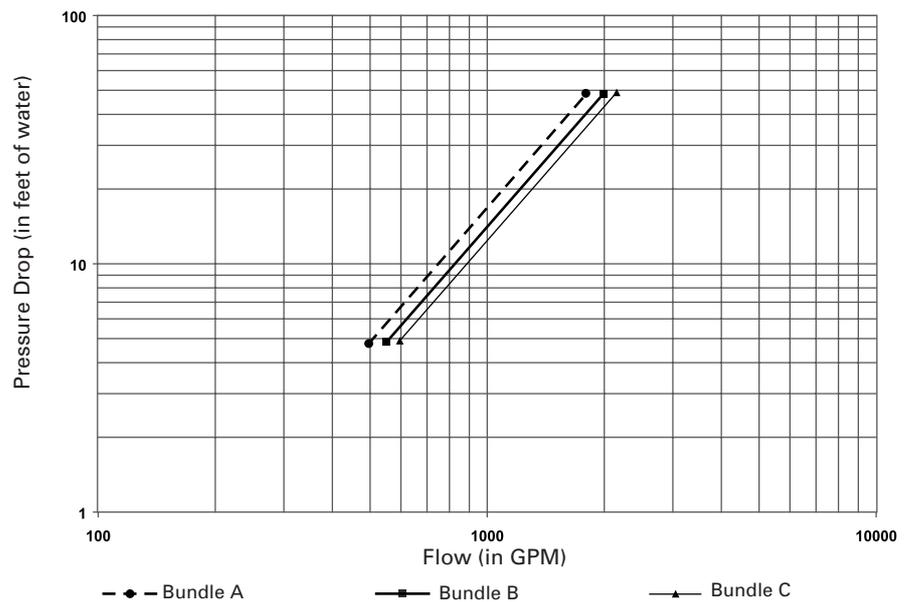
## Water Pressure Drop Data Graph 1.

Pressure drop for CVGF 500 Evaporators with 0.75 inch OD tubes and 2 pass waterboxes



## Graph 2.

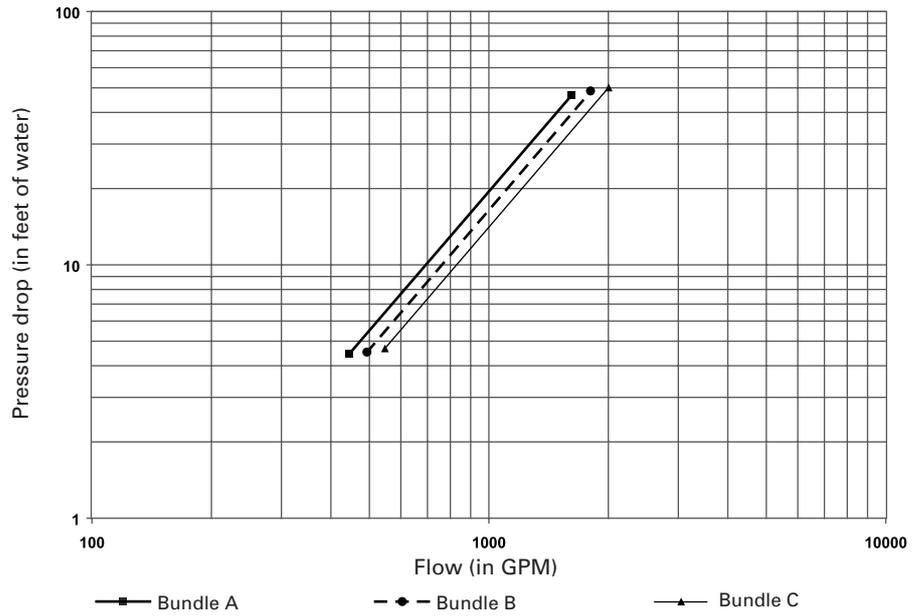
Pressure drop for CVGF 500 Condensers with 0.75 inch OD tubes and 2 pass waterboxes



# Installation: Mechanical

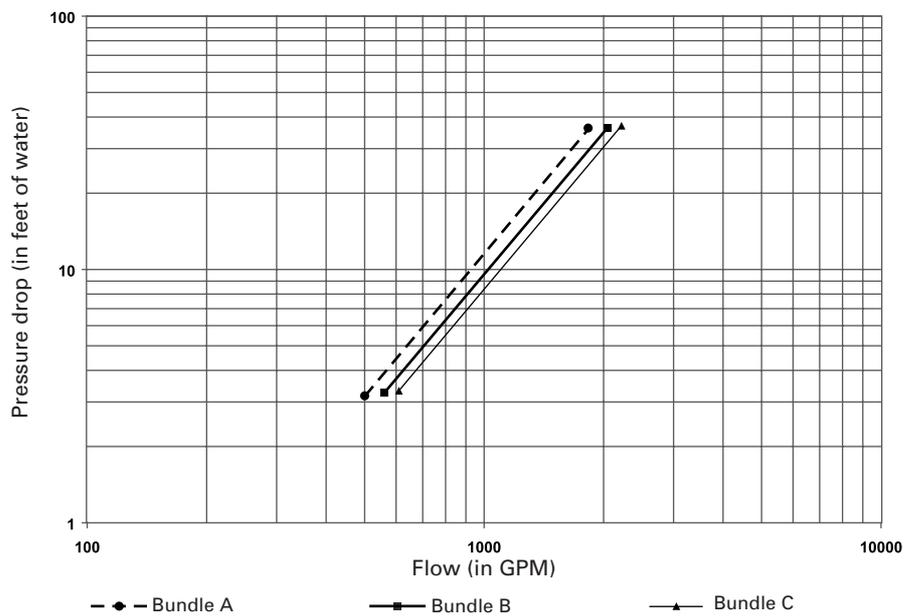
**Water Pressure Drop Data**  
Graph 3.

Pressure drop for CVGF 500 Evaporators with 1.0 inch OD tubes and 2 pass waterboxes



**Graph 4.**

Pressure drop for CVGF 500 Condensers with 1.0 inch OD tubes and 2 pass waterboxes

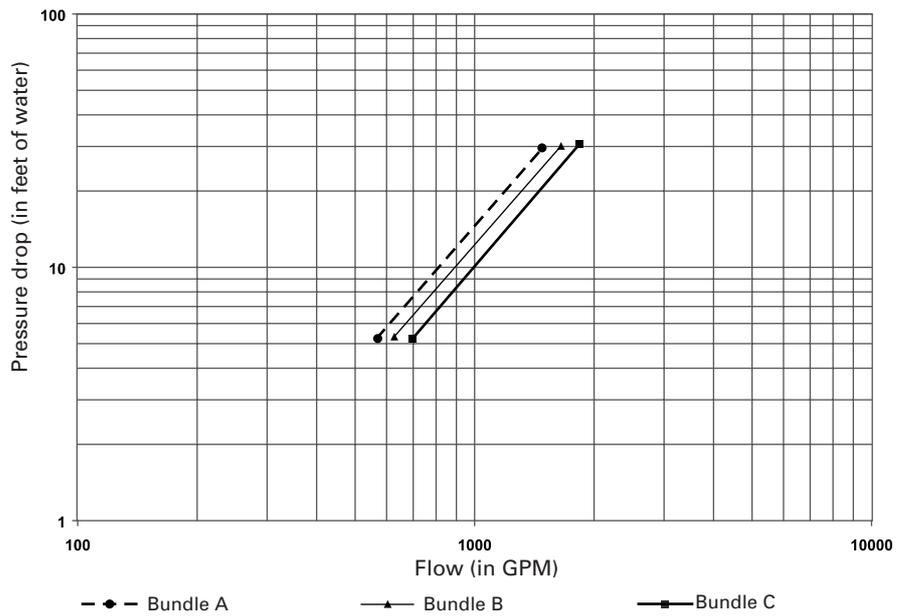


# Installation: Mechanical

## Water Pressure Drop Data

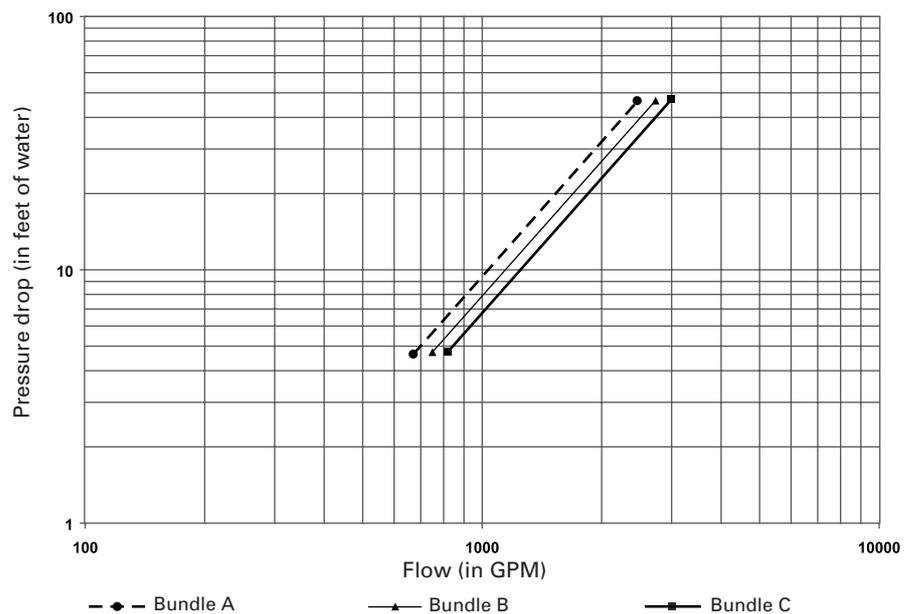
Graph 5.

Pressure drop for CVGF 700 Evaporators with 3/4 inch OD tubes and 2 pass waterboxes



Graph 6.

Pressure drop for CVGF 700 Condensers with 3/4 inch OD tubes and 2 pass waterboxes

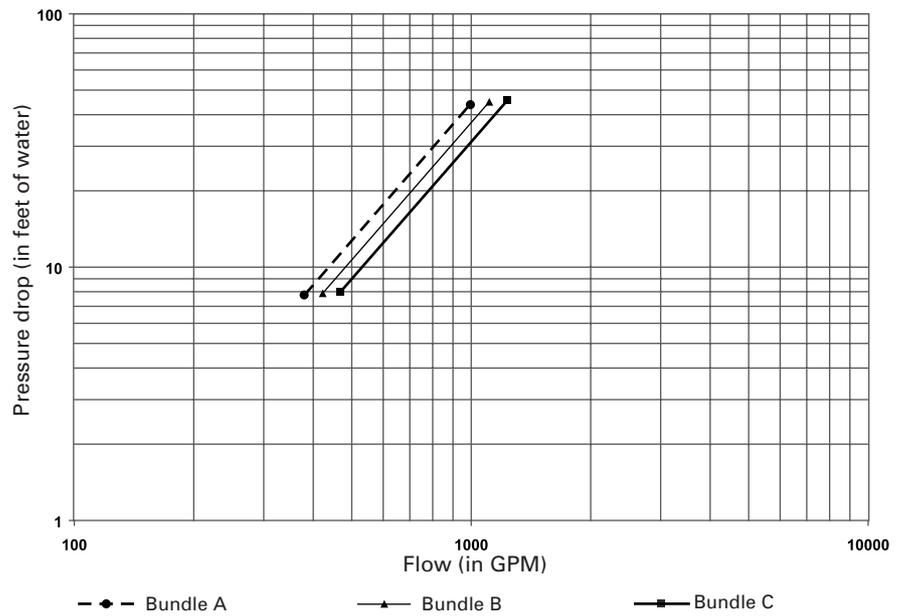


# Installation: Mechanical

## Water Pressure Drop Data

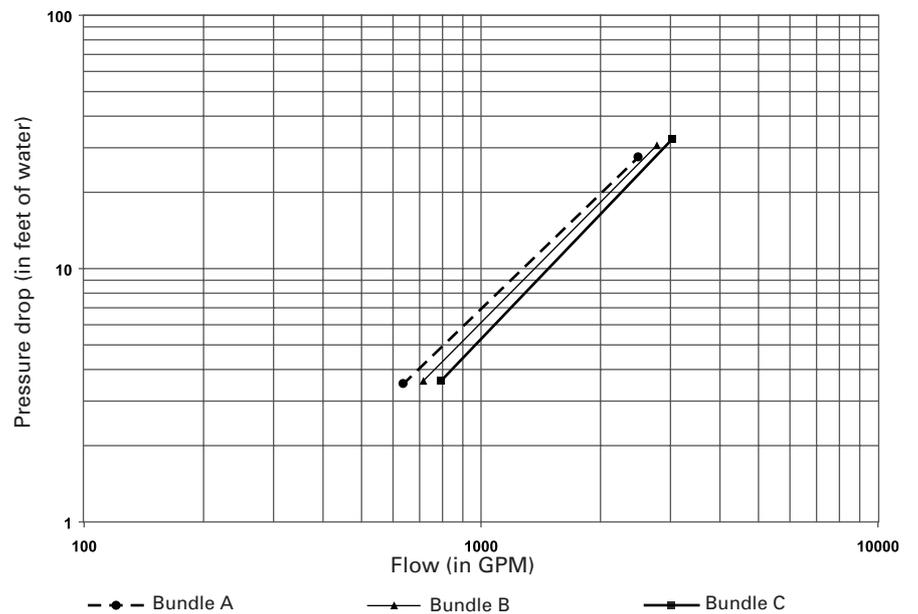
Graph 7.

Pressure drop for CVGF 700 Evaporators with 3/4 inch OD tubes and 3 pass waterboxes



Graph 8.

Pressure drop for CVGF 700 Evaporators with 1.0 inch OD tubes and 2 pass waterboxes

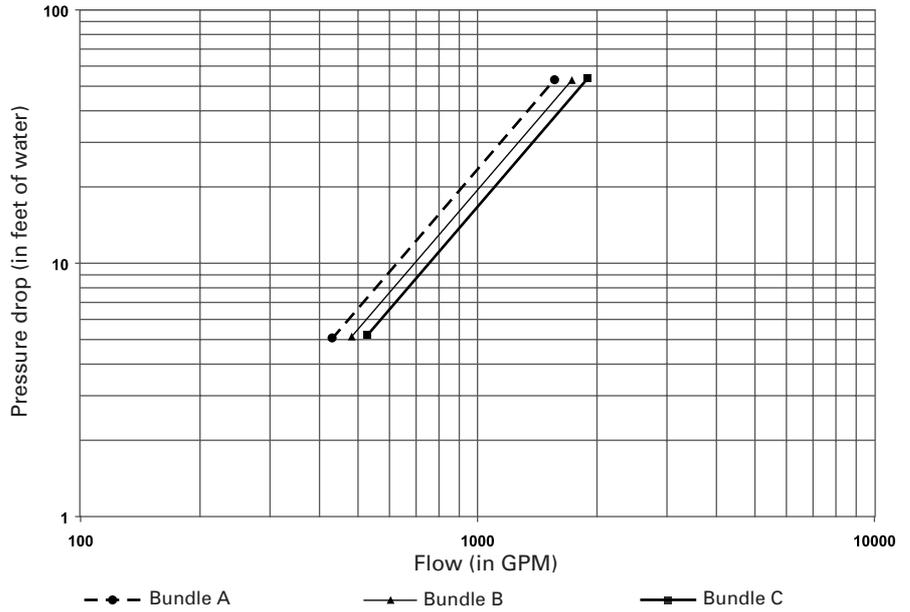


# Installation: Mechanical

## Water Pressure Drop Data

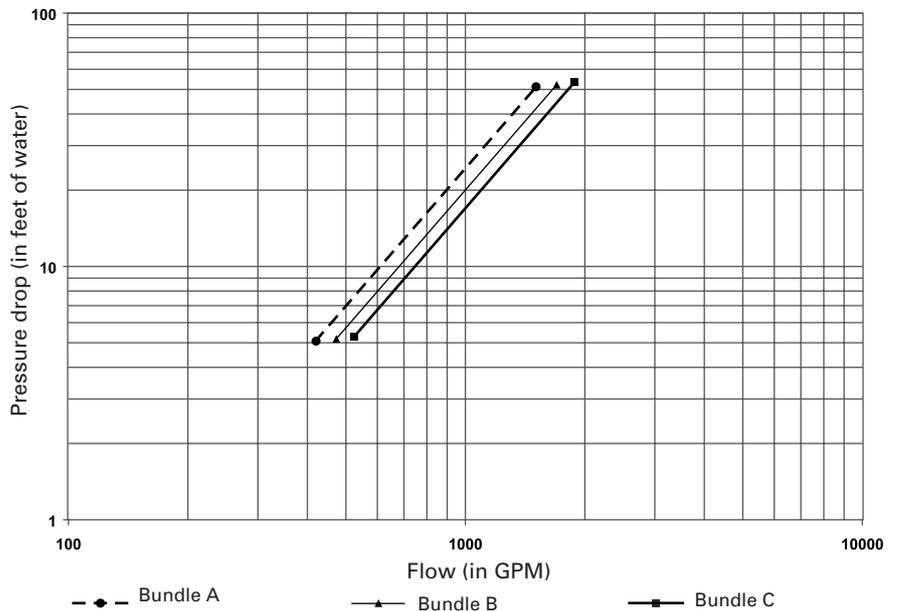
Graph 9.

Pressure drop for CVGF 700 Condensers with 1.0 inch OD tubes and 2 pass waterboxes



Graph 10.

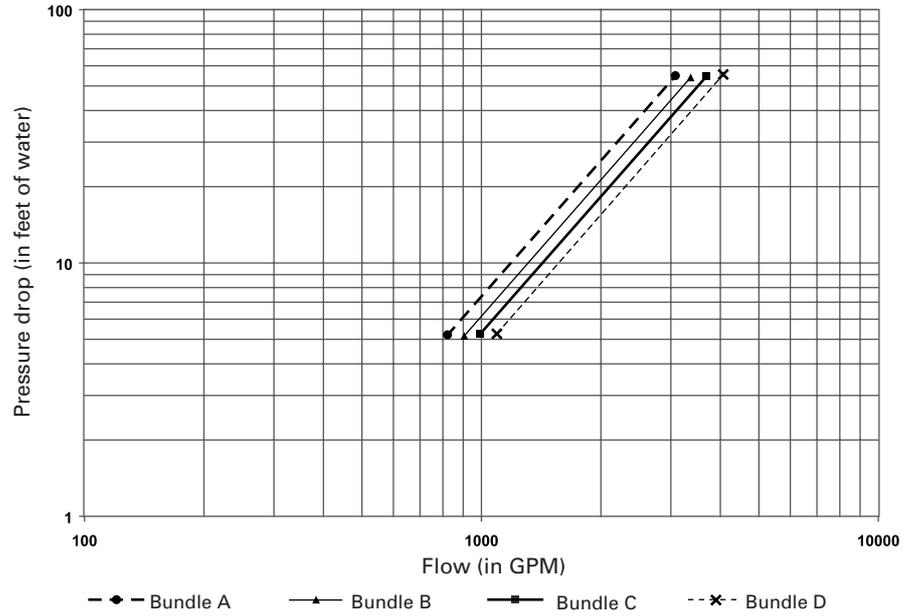
Pressure drop for CVGF 700 Evaporators with 1.0 inch OD tubes and 3 pass waterboxes



# Installation: Mechanical

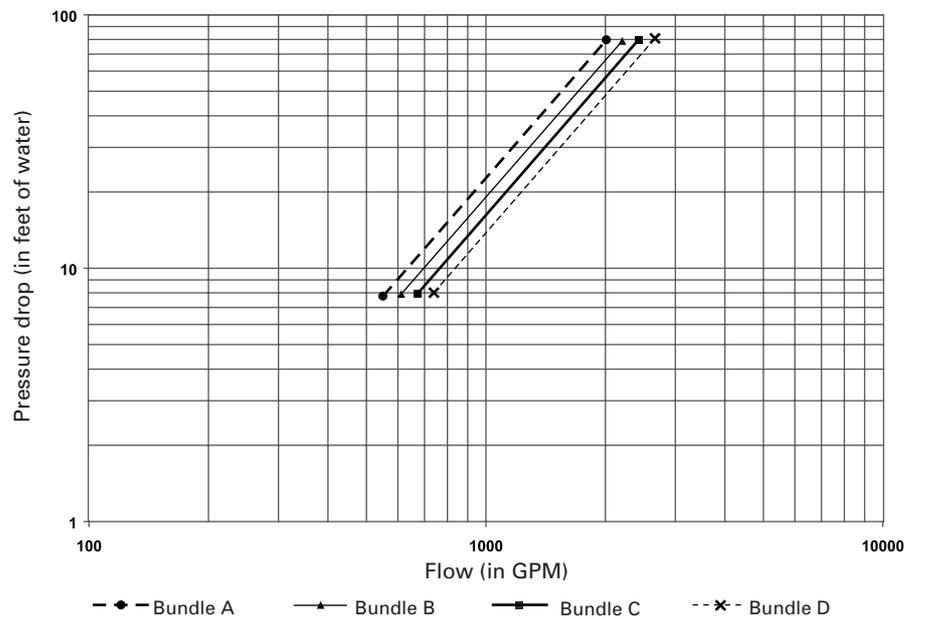
**Water Pressure Drop Data**  
Graph 11.

Pressure drop for CVGF 1000 Evaporators with 3/4 inch OD tubes and 2 pass waterboxes



**Graph 12.**

Pressure drop for CVGF 1000 Evaporators with 3/4 inch OD tubes and 3 pass waterboxes

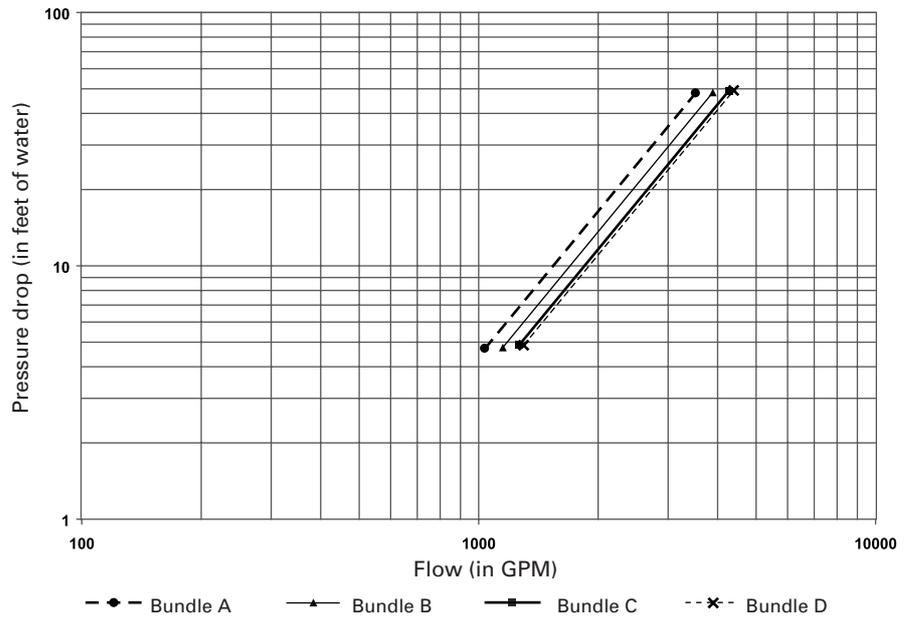


# Installation: Mechanical

## Water Pressure Drop Data

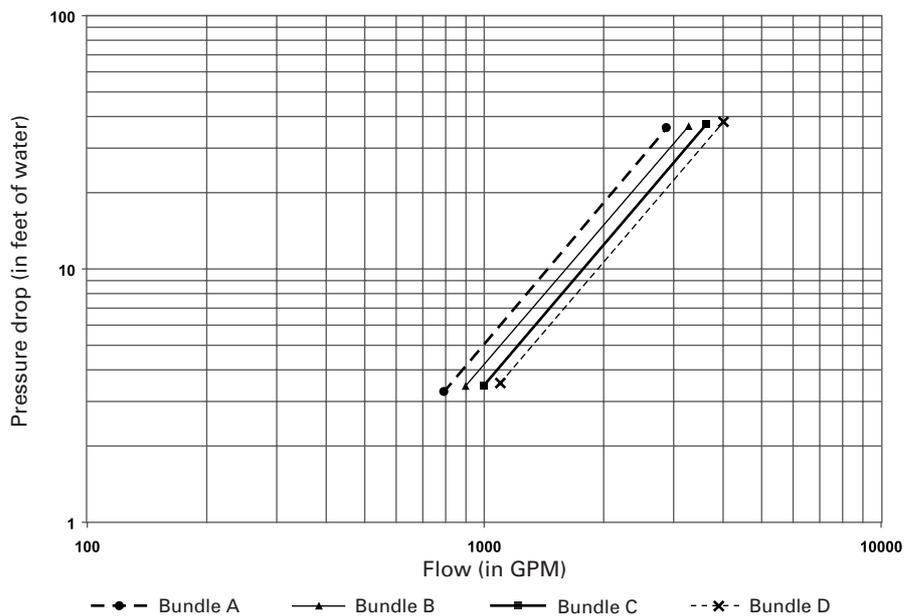
Graph 13.

Pressure drop for CVGF 1000 Condensers with 3/4 inch OD tubes and 2 pass waterboxes



Graph 14.

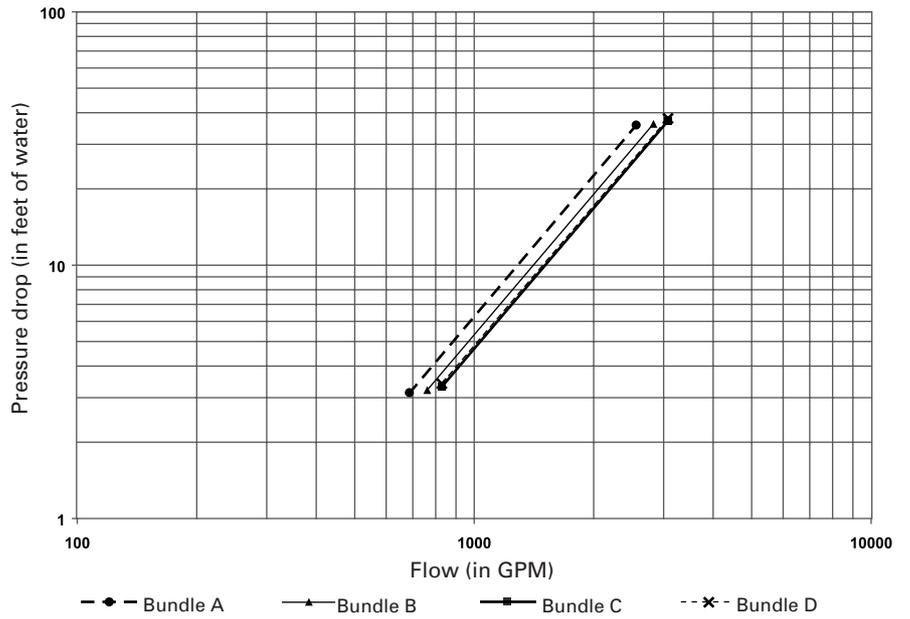
Pressure drop for CVGF 1000 Evaporators with 1.0 inch OD tubes and 2 pass waterboxes



# Installation: Mechanical

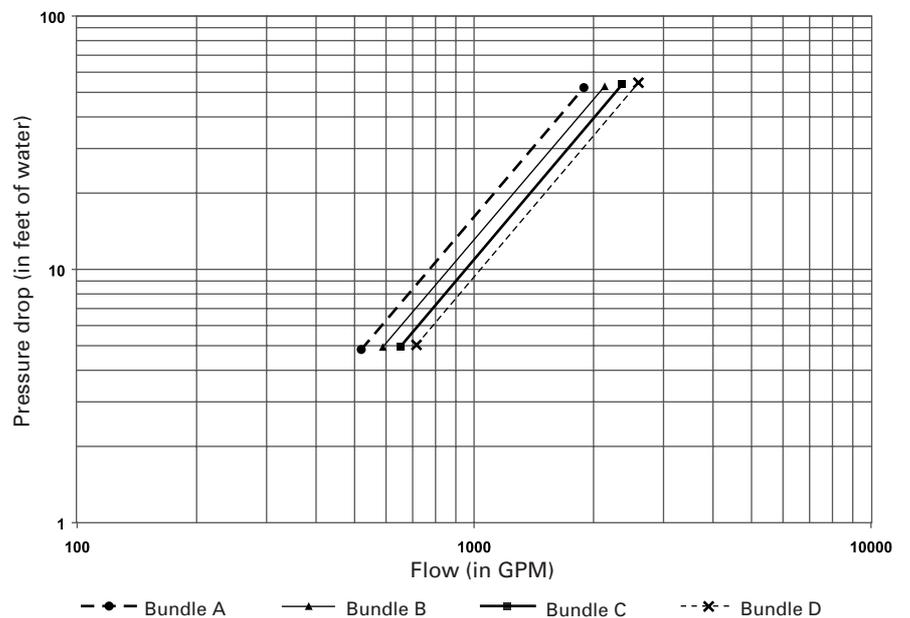
**Water Pressure Drop Data**  
Graph 15.

Pressure drop for CVGF 1000 Condensers with 1.0 inch OD tubes and 2 pass waterboxes



**Graph 16.**

Pressure drop for CVGF 1000 Evaporators with 1.0 inch OD tubes and 3 pass waterboxes



# Installation: Mechanical

---

## Connecting Groove Pipes

### CAUTION

#### Piping damage!

To prevent damage to water piping, do not overtighten the connections.

**Note:** Make sure that all piping is flushed and cleaned prior to starting the unit.

### CAUTION

#### Equipment damage!

To prevent equipment damage, bypass the unit if using an acidic flushing agent.

#### Vents and Drains

Install pipe plugs or ball valves, with National Pipe Thread (NPT) to water hose thread connections, in evaporator and condenser water box drain and vent connections before filling the water systems.

To drain water, remove the vent and drain plugs or open the ball valves. Install an NPT connectors in the drain connection, and connect a hose to it.

## Evaporator Piping Components

**Note:** Ensure that all piping components are between the shutoff valves, so that both the condenser and the evaporator can be isolated.

Piping components include all devices and controls used to provide proper water-system operation and unit operating safety. These components and their general locations are described below.

### Entering Chilled-Water Piping

- Air vents (to bleed air from system)
- Water pressure gauges manifolded with shutoff valves
- Pipe unions
- Vibration eliminators (rubber boots)
- Shutoff (isolation) valves
- Thermometers
- Cleanout tees
- Pipe strainer

## Leaving Chilled-Water Piping

- Air vents (to bleed air from system)
- Water pressure gauges manifolded with shutoff valves
- Pipe unions
- Vibration eliminators (rubber boots)
- Shutoff (isolation) valves
- Thermometers
- Cleanout tees
- Balancing valve
- Pressure relief valve
- Flow switch

### CAUTION

#### Equipment damage!

To prevent evaporator damage, do not exceed 150 psig (1035 kPa) evaporator water pressure for standard water boxes. The maximum pressure for high-pressure water boxes is 300 psig (2100 kPa). To prevent tube damage by erosion, install a strainer in the evaporator water inlet piping.

# Installation: Mechanical

---

## Condenser Piping Components

Piping components include all devices and controls used to provide proper water-system operation and unit operating safety. These components and their general locations are given below.

### Entering condenser-water piping

- Air vents (to bleed air from system)
- Water pressure gauges manifolded with shutoff valves
- Pipe unions
- Vibration eliminators (rubber boots)
- Shutoff (isolation) valves, one per pass
- Thermometers
- Cleanout tees
- Pipe strainer

### Leaving condenser-water piping

- Air vents (to bleed air from system)
- Water pressure gauges with manifolded shutoff valves
- Pipe unions
- Vibration eliminators (rubber boots)
- Shutoff (isolation) valves, one per pass
- Thermometers
- Cleanout tees
- Balancing valve
- Pressure relief valve
- Flow switch

## CAUTION

### Condenser damage!

**To prevent condenser damage, do not exceed 150 psig (1035 kPa) water pressure for standard water boxes. The maximum pressure for high-pressure water boxes is 300 psig (2100 kPa).**

**To prevent tube damage, install a strainer in the condenser water inlet piping.**

**To prevent tube corrosion, ensure that the initial water fill has a balanced pH.**

## Water Treatment

## CAUTION

### Water Treatment!

**Do not use untreated or improperly treated water. Use of untreated or improperly treated water may result in equipment damage.**

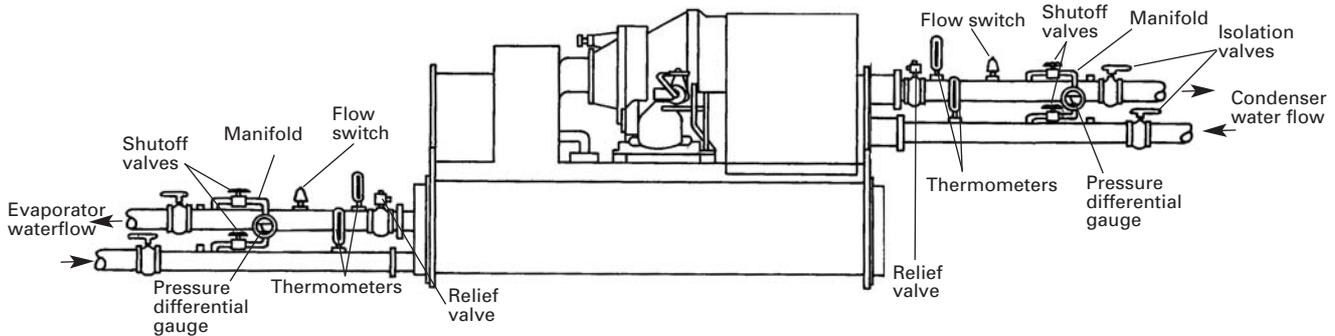
**Using untreated or improperly treated water in these units may result in inefficient operation and possible tube damage.**

**Consult a qualified water-treatment specialist to determine whether treatment is needed. The following disclamatory label is provided on each CVGF unit:**

*The use of improperly treated or untreated water in this equipment may result in scaling, erosion, corrosion, algae, or slime. The services of a qualified water-treatment specialist should be engaged to determine what treatment, if any, is advisable. The Trane Company warranty specifically excludes liability for corrosion, erosion, or deterioration of Trane equipment. Trane assumes no responsibility for the results of the use of untreated, improperly treated, saline, or brackish water.*

# Installation: Mechanical

**Figure 12. Typical thermometer, valving, and manifold pressure gauge set-up**



## Water Pressure Gauges and Thermometers

Install field-supplied thermometers and pressure gauges (with manifolds whenever practical) as shown in Figure 12. Locate pressure gauges or taps in a straight run of pipe; avoid placement near elbows, and so forth. Be sure to install the gauges at the same elevation on each shell if the shells have opposite-end water connections.

To read manifolded water pressure gauges, open one valve and close the other (depending upon the reading desired). This eliminates errors resulting from differently calibrated gauges installed at unmatched elevations.

## Water Pressure-Relief Valves

### CAUTION

#### Shell Damage!

**Install a pressure-relief valve in both the evaporator and condenser water systems. Failure to do so could result in shell damage.**

Install a water pressure-relief valve in one of the condenser, and one of the evaporator, water box drain connections, or on the shell side of any shutoff valve. Water vessels with close-coupled shutoff valves have a high potential for hydrostatic pressure buildup during a water temperature increase. Refer to applicable codes for pressure-relief valve installation guidelines.

## Flow-Sensing Devices

Use field provided flow switches or differential pressure switches with pump interlocks to sense system water flow. Flow switch locations are schematically shown in Figure 12.

To provide chiller protection, install and wire flow switches in series with the water pump interlocks, for both chilled-water and condenser-water circuits (refer to the Installation Electrical section). Specific connections and schematic wiring diagrams are shipped with the unit.

# Installation: Mechanical

---

Flow switches must stop or prevent compressor operation if either system water flow drops below the required minimum that is shown on the pressure drop curves. Follow the manufacturer's recommendations for selection and installation procedures. General guidelines for flow switch installation are outlined below.

- Mount the switch upright, with a minimum of 5 pipe diameters of straight, horizontal run on each side.
- Do not install close to elbows, orifices, or valves.

**Note:** The arrow on the switch must point in the direction of the water flow.

- To prevent switch fluttering, remove all air from the water system

**Note:** The CH530 provides a six-second time delay on the flow switch input before shutting down the unit on a loss-of-flow diagnostic. If machine shutdowns persist, contact your local Trane representative.

- Adjust the switch to open when water flow falls below nominal. Refer to the General Data tables for minimum flow recommendations for specific water-pass arrangements. Flow switch contacts are closed when there is proof of water flow.

# Installation: Mechanical

---

## Refrigerant Pressure-Relief Valve Venting

### ⚠ WARNING

#### Possible refrigerant asphyxiation!

Relief valve venting must be vented outdoors. Refrigerant is heavier than air and will displace available oxygen to breathe, causing asphyxiation or other health risks. Each chiller or Multiple chillers must have their own separate relief valves and vent piping. Consult local regulations for any special relief-line requirements. Failure to vent relief valves outdoors could result in death and serious injury.

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

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

All CVGF units use evaporator and condenser pressure-relief valves that must be vented to the outside of the building.

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

### CAUTION

**Do not exceed vent piping code specifications. Failure to heed specifications could result in capacity reduction, unit damage, and relief valve damage.**

After the relief valve has opened, it will reclose when pressure is reduced to a safe level.

**Note:** Relief valves tend to leak if they have opened and must be replaced.

## Thermal Insulation

All CVGF units are available with optional factory installed thermal insulation. If the unit is not factory insulated, install insulation over the areas with designated dotted lines in Figure 13. Refer to Table 14 for types and quantities of insulation required. All CVGF units come from the factory with oil sump insulation.

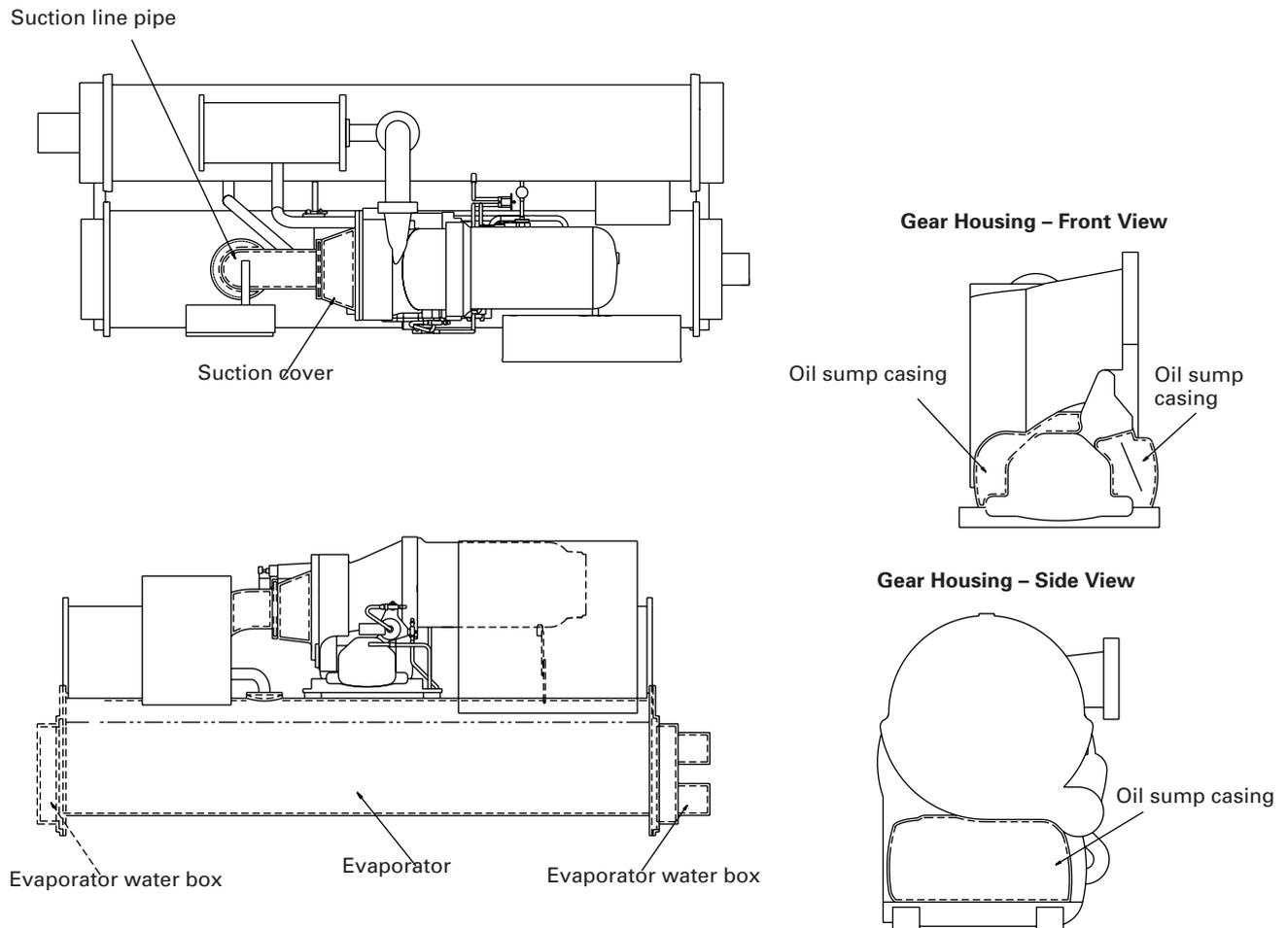
**Notes:** Refrigerant charging valves, water temperature sensors, and drain and vent connections, when insulated, must remain accessible for service.

Use only water-base latex paint on factory applied insulation. Failure to do so may result in insulation shrinkage.

**Note:** Units in environments with higher humidity may require additional insulation.

# Installation: Mechanical

**Figure 13. Typical CVGF insulation requirements**  
**Insulate where dotted lines are indicated.**



**Table 14. Recommended insulation types**

Location	Type	Square Feet (Square m)
Evaporator, waterboxes and tube sheets	3/4" wall (19 mm)	160 (15)
Compressor suction elbow and suction cover	3/4" wall (19 mm)	20 (2)
All components and piping on low side of system	3/4" wall (19 mm)	10 (1)

# Installation: Electrical

---

## General Requirements

### **⚠ WARNING!**

#### **Live Electrical Components!**

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

### **⚠ WARNING!**

#### **Rotating Components!**

During installation, testing, servicing and troubleshooting of this product it may be necessary to measure the speed of rotating components. Have a qualified or licensed service individual who has been properly trained in handling exposed rotating components, perform these tasks. Failure to follow all safety precautions when exposed to rotating components could result in death or serious injury.

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

All field-installed wiring must conform to National Electric Code (NEC) guidelines, as well as to any applicable state and local codes. Be sure to satisfy proper equipment grounding requirements per NEC.

All field-installed wiring must be checked for proper terminations, and for possible shorts or grounds.

Do not modify or cut enclosure to provide electrical access. Removable panels have been provided for this purpose. Modify these panels only; away from enclosure. Refer to installation information shipped with the starter or submittal drawings.

### **CAUTION**

**TO AVOID DAMAGE TO STARTER COMPONENTS, remove debris inside the starter panel. Failure to do so may cause an electrical short that seriously damages the starter components.**

# Installation: Electrical

## Power Supply Wiring

To assure that power supply wiring to the starter panel is properly installed and connected, review and follow the guidelines outlined below.

### 3-Phase Power Source

1. Verify that the starter nameplate ratings are compatible with the power supply characteristics and with the electrical data on the unit nameplate.
2. If the starter enclosure must be cut to provide electrical access, exercise care to prevent debris from falling inside the enclosure. If the starter cabinet has a removable panel, be sure to remove the panel from the unit before drilling holes.

## CAUTION

### Damage to Starter components!

To avoid damage remove debris inside the starter panel. Failure to do so may cause an electrical short that seriously damages the starter components.

3. Use copper conductors to connect the 3-phase power supply to the remote or unit-mounted starter panel.

## CAUTION

### Use Copper Conductors Only!

Unit terminals are not designed to accept other types of conductors. Failure to use copper conductors may result in equipment damage.

4. Size the power supply wiring in accordance with the Minimum Circuit Ampacity (MCA) shown on the unit nameplate.  
 $(MCA = (RLA \times 1.25) + \text{Control Power Load})$
5. Make sure that the incoming power wiring is properly phased; each power supply conduit run to the starter must carry the correct number of conductors to ensure equal phase representation. See Figure 14.

6. As you install the power supply conduit, make sure that this position does not interfere with the serviceability of any of the unit components, nor with structural members and equipment.

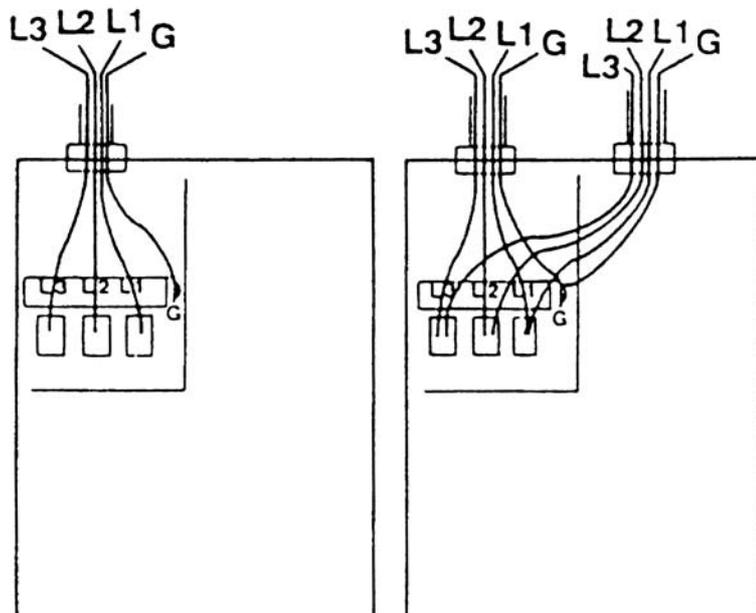
Also, assure that the conduit is long enough to simplify any servicing that may be necessary in the future (for example, starter removal).

**Note:** Use flexible conduit to enhance serviceability and minimize vibration transmission.

### Circuit Breakers and Fusible Disconnects

Size the circuit breaker or fuse disconnect in compliance with NEC or local guidelines.

Figure 14. Proper phasing for starter power supply wiring and conduit loading



# Installation: Electrical

## Optional PFCCs

Power factor correction capacitors (PFCCs) are designed to provide power factor correction for the compressor motor. They are available as an option.

**Note:** Remember that the PFCC nameplate voltage rating must be greater than or equal to the compressor voltage rating stamped on the unit nameplate. See Table 15 to determine what PFCC is appropriate for each compressor voltage application.

## CAUTION

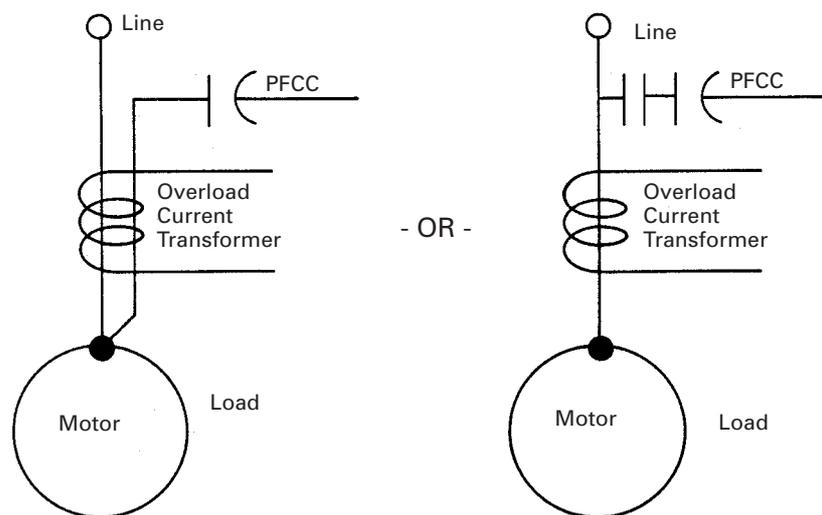
### Motor of safety overload damage!

PFCC must be wired into the starter correctly. Failure to do so may cause misapplication of these capacitors and result in a loss of motor overload protection and subsequently cause motor damage.

**Table 15. PFCC design voltage sizing per compressor voltage application**

PFCC Design Voltage	Compressor Motor Rating (See Unit Nameplate)
480V/60 Hz	380V/60 Hz
	440V/60 Hz
	460V/60 Hz
	480V/60 Hz
600V/60 Hz	575V/60 Hz
	600V/60 Hz
2400V/60 Hz	2300V/60 Hz
	2400V/60 Hz
PFCC Rating	Compressor Motor Rating (See Unit Nameplate)
480V/50 Hz	346V/50 Hz
	380V/50 Hz
	400V/50 Hz
	415V/50 Hz
4160V/60 Hz	3300V/60 Hz
	4160V/60 Hz
	6600V/60 Hz
4160V/50 Hz	3300V/50 Hz
	6600V/50 Hz

**Figure 15. PFCC leads routed through overload current transformer**



**Note:** See the attached wiring diagram for more detail.

# Installation: Electrical

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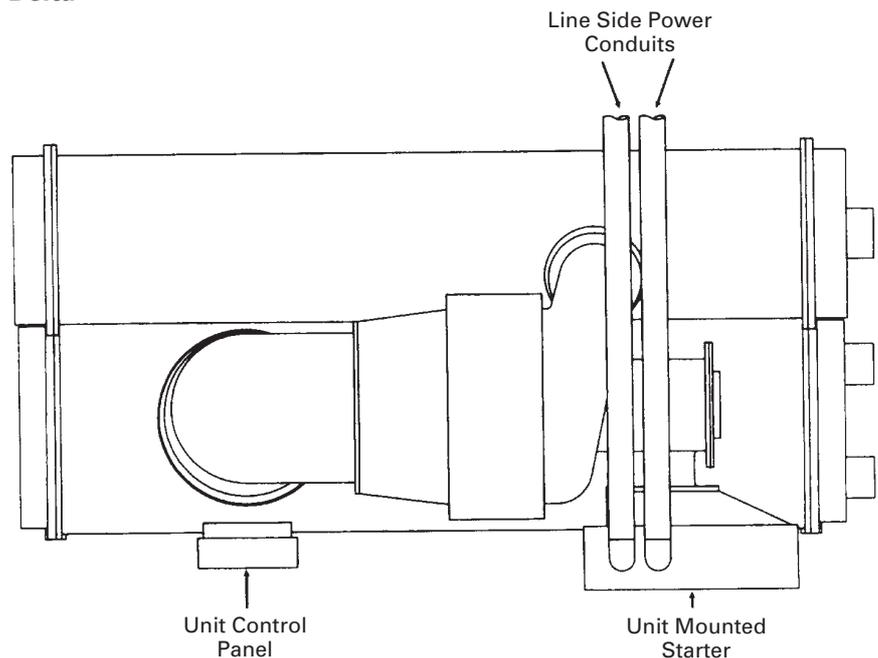
## Interconnecting Wiring

Typical equipment room conduit layouts with and without unit-mounted starters are shown in Figures 15 and 16, respectively.

## IMPORTANT

Keep in mind that the interconnecting wiring between the starter panel, compressor and UCP control panel is factory-installed with unit-mounted starters but must be field-installed when a remote-mounted starter is used.

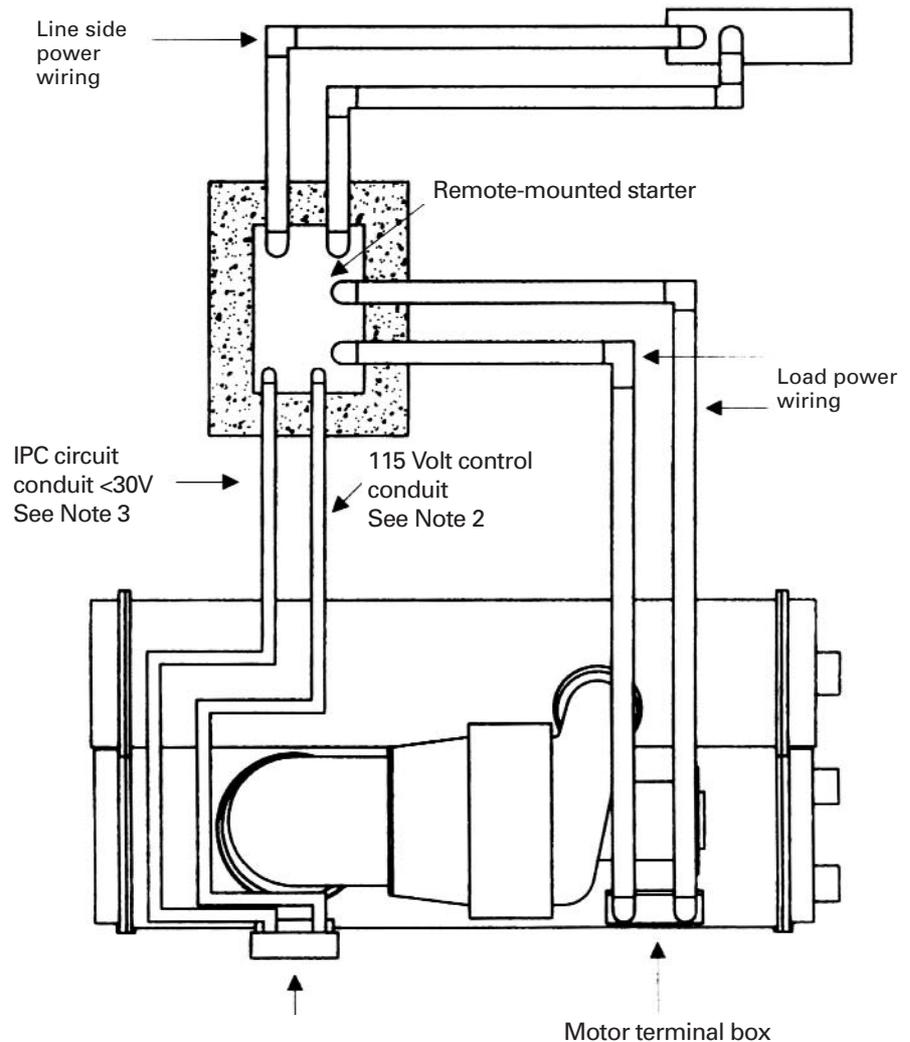
**Figure 16. Typical equipment room layout with unit-mounted, Wye-Delta**



**Note:** See Starter submittal drawing for location of incoming wiring to the starter.

# Installation: Electrical

**Figure 17. Typical equipment room layout with remote-mounted Wye-Delta starter**



**Notes:**

1. Refer to the unit field connection diagram for approximate UCP knockout locations.
2. 115-volt conduit must enter the higher than 30 Vdc Class I portion of the unit control panel.
3. IPC circuit conduit must enter the Low Voltage Class II portion of the UCP.
4. See starter submittal drawing for location of incoming wiring to the starter.

# Installation: Electrical

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## Starter to Motor (Remote-Mounted Starters Only)

### Ground Wire Terminal Lugs

Ground wire lugs are provided in the motor terminal box and in the starter panel.

### Terminal Clamps

Terminal clamps are supplied with the motor terminals to accommodate either bus bars or standard motor terminal wire lugs. Terminal clamps provide additional surface area to minimize the possibility of improper electrical connections.

### Wire Terminal Lugs

Wire terminal lugs must be field-supplied.

1. Use field-provided crimp-type wire terminal lugs properly sized for the application.

**Note:** Wire size ranges for the starter line and load-side lugs are listed on the starter submittal drawings supplied by the starter manufacturer or Trane. Carefully review the submitted wire lug sizes for compatibility with the conductor sizes specified by the electrical engineer or contractor.

2. A terminal clamp with a 3/8" bolt is provided on each motor terminal stud; use the factor-supplied Belleville washers on the wire lug connections.

Figure 18 illustrates the juncture between a motor terminal stud and terminal clamp.

3. Tighten each bolt to 24 foot-pounds.
4. Install but do not connect the power leads between the starter and compressor motor. (These connections will be completed under supervision of a qualified Trane service engineer after the prestart inspection).

## CAUTION

### Correct motor wire terminations!

**Ensure the power supply wiring and output motor wiring are connected to the proper terminals. Failure to do so will cause catastrophic failure of the starter and, or the motor.**

### Bus Bars

Install bus bars between the motor terminals when a low-voltage "across-the-line," "primary reactor/resistor," "auto transformer," customer-supplied solid-state starter, or customer-supplied AFD are field applied.

Be sure to bus motor terminal T1 to T6, T2 to T4, and T3 to T5.

**Note:** Bus bars are not needed in high-voltage applications since only 3 terminals are used in the motor and starter.

## Starter to UCP (Remote-Mounted Starters Only)

Electrical connections required between the remote-mounted starter and the unit control panel are shown in an example of a point-to-point starter-to-UCP connection diagram as shown at the end of the manual.

**Note:** Install control voltage conduit into control voltage section of chiller control panel and starter panel. Do not route with low voltage (30 volts) conduit wires.

When sizing and installing the electrical conductors for these circuits, follow the guidelines listed.

Unless otherwise specified use 14 ga. wire for 120 V control circuits.

# Installation: Electrical

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## CAUTION

### Damage to Starter components!

**To avoid damage remove debris inside the starter panel. Failure to do so may cause an electrical short that seriously damages the starter components.**

1. If the starter enclosure must be cut to provide electrical access, exercise care to prevent debris from falling inside the enclosure.
2. Use only shielded twisted pair for the interprocessor communication (IPC) circuit between the starter and the UCP on remote mounted starters. Recommended wire is Beldon Type 8760, 18 AWG for runs up to 1000 feet.

**Note:** The polarity of the IPC wire pair is critical for proper operation.

3. Separate low-voltage (less than 30V) wiring from the 115V wiring by running each in its own conduit.
4. As you route the IPC circuit out of the starter enclosure, make sure that it is at least 6" from all wires carrying a higher voltage.
5. For UCP IPC shielded twisted pair wiring, the shield should be grounded on one end only at UCP at 1X1-G. The other end should be unterminated and taped back on the cable sheath to prevent any contact between shield and ground.
6. Oil Pump Interlock - All starters must provide an interlock (N.O.) contact with the chiller oil pump connected to the UCP at Terminals 1A-J2-7 and 1A9-J2-9.

The purpose of this interlock is to power the oil pump on the chiller in the event that a starter failure, such as welded contacts, keeps the chiller motor running after the controller interrupts the run signal.

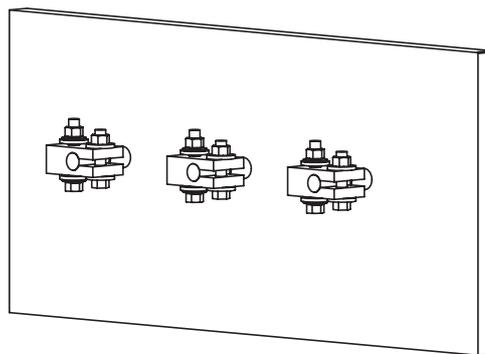
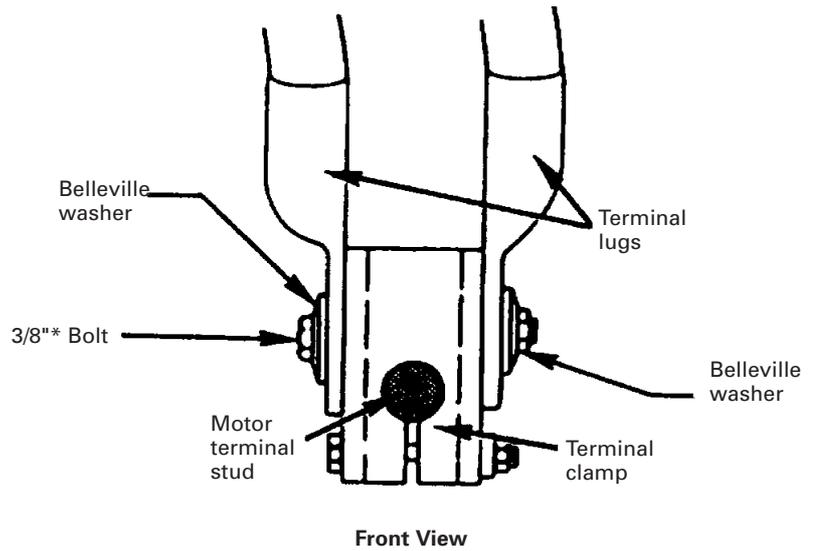
## CAUTION

### Electrical Noise!

**Maintain at least 6 inches between low-voltage (<30V) and high voltage circuits. Failure to do so could result in electrical noise that may distort the signals carried by the low-voltage wiring, including the IPC.**

# Installation: Electrical

*Figure 18. Terminal stud, clamp and lug assembly*



Mid Voltage  
RXL RATR RPIR CXL CATR CPIR

# Installation: Electrical

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## Optional Relay Circuits

### Optional Control and Output Circuits

Install various optional wiring as required by the owner's specifications.

### Optional Tracer Communication Interface

This control options allows the unit control panel to exchange information such as chiller status and operating set points with a Tracer system.

Figure 19 illustrates how such a communication control network might appear.

**Note:** The circuit must be run in separate conduit to prevent electrical noise interference.

Additional information about the Tracer Communication options is published in the installation manual and operator's guide that ships with the Tracer.

## Unit Start-Up

All phases of initial unit start-up must be conducted under the supervision of a qualified local service engineer. This includes pressure testing, evacuation, electrical checks, refrigerant charging, actual start-up and operator instruction.

Advance notification is required to assure that initial start-up is scheduled as close to the requested date as possible.

### Starter Module Configuration

The starter LLID configuration settings will be checked (and configured for Remote Starters) during start-up commissioning. To configure starter module, and perform other starter checks, it is recommended that the line voltage three phase power be turned off and secured (locked out), and then a separate source control power (115 Vac) be utilized to power up the control circuit. To do this, remove control coil circuit fuse, typically 2F4, and then connect separate source power cord to starter terminal block 2X1-1 (H), 2X1-2 (N), and Ground. Use the as-built starter schematic to assure correct fuse and terminals. Verify correct fuse is removed, control circuit connections are correct, then apply the 115 Vac separate source power to service the controls.

## Forms Information

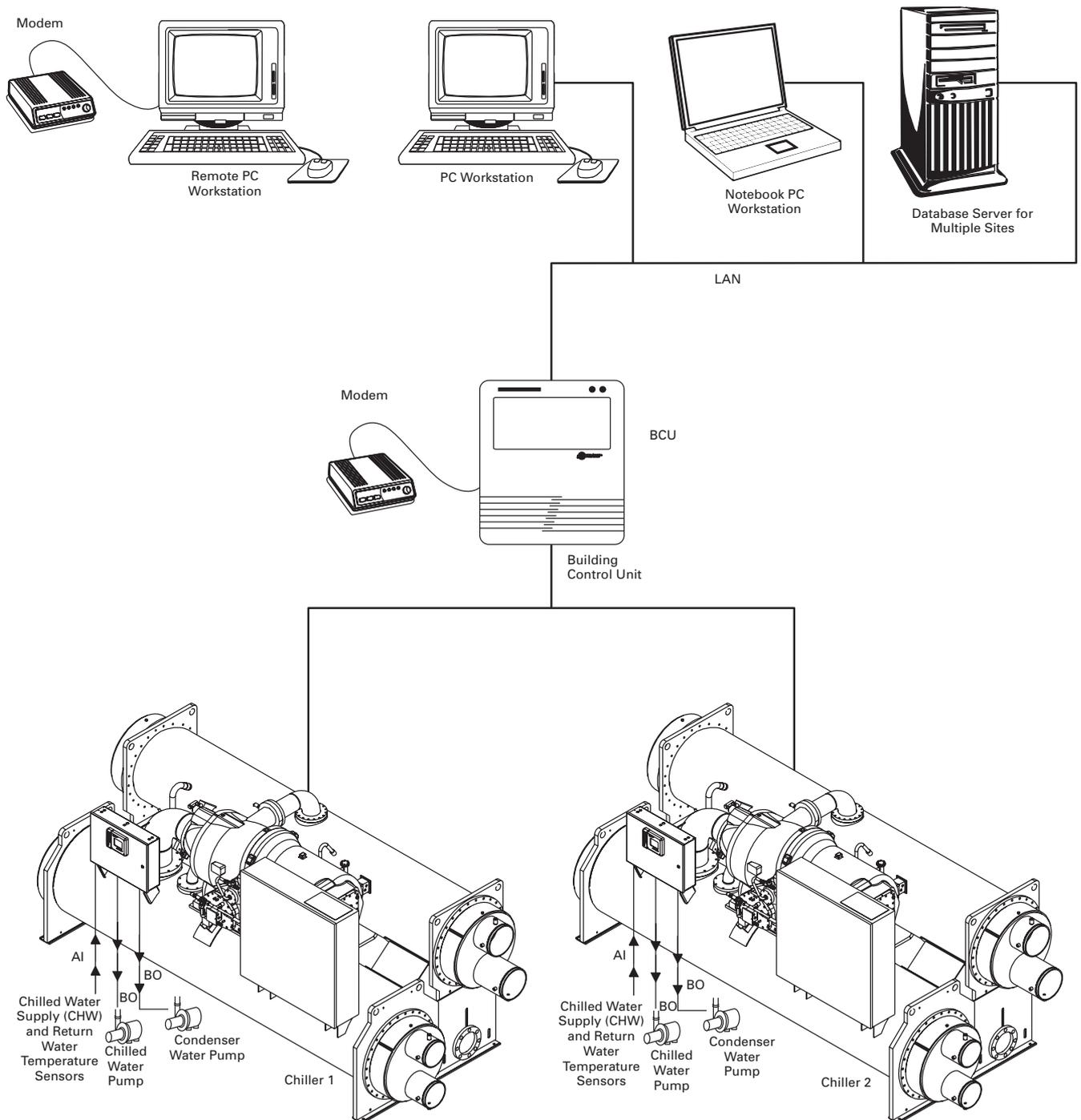
Samples of start-up and operating forms along with other helpful forms are found in the Operation Maintenance manual which can be obtained from the nearest Trane office.

It is recommended that the serviceman contact the local Trane office to obtain the most recent printing date of the form. The forms in the operation and maintenance manual are only current at the time of printing of the manual.

After obtaining the most recent form, complete all the information and forward it to your local Trane office.

# Installation: Electrical

Figure 19 – Illustrates communication control network to chiller units with CH530









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