



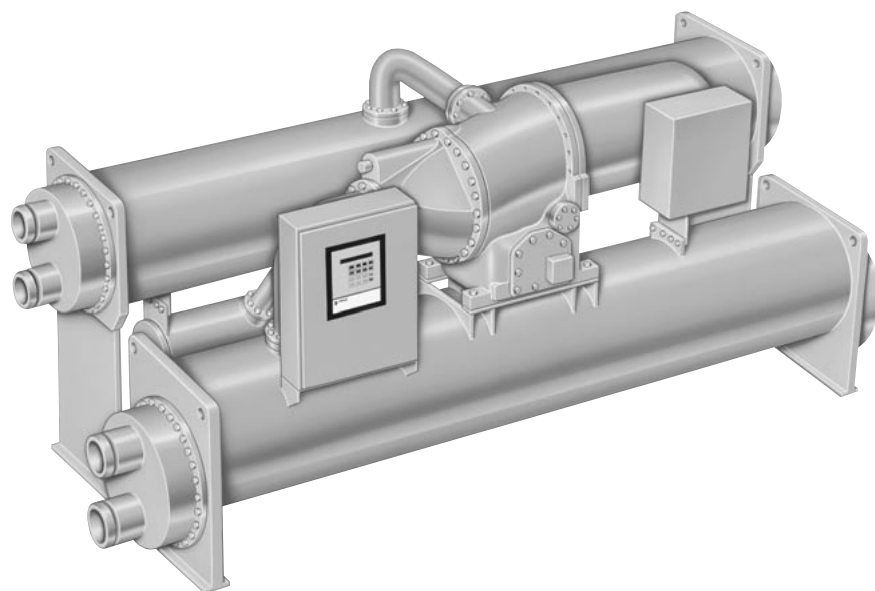
# Centrifugal Water Chillers

---

**Model CVGF**  
**Water-Cooled Hermetic Centrifugal**

**Refrigeration Capacities From**  
**400 to 1000 Tons (1400 kW-3510 kW)**

**50 and 60 Hz**





# Introduction

---

## Introducing Trane's New Model CVGF Centrifugal Water Chiller

### Introduction

The basic gear drive centrifugal water chiller design was introduced in 1976 and has been proven in thousands of installations. The Trane Company continues to deliver its reliability and energy fitness commitment on its newest line of gear drive centrifugal water chillers, the Model CVGF. The major advantages of the Model CVGF are:

- High reliability
- Low sound levels
- Compact size
- High efficiency at a competitive market price
- Designed to use environmentally responsible HFC-134a refrigerant.
- Expanded ampere rating on unit-mounted wye-delta starters

The Model CVGF chiller is ideal for office, hospital, school, hotel, retail store and industrial buildings. The gear drive line offers hundreds of individual evaporator-condenser-compressor combination selections, permitting precise tailoring of the machine capacity to system requirements. Machine selections can be computer optimized to provide low first cost, low operating cost or other criteria important for a particular selection. Centrifugal Water Chiller computer selection program provides selections in accordance with ARI standard 550/590. Trane Sales Engineers are available to assist in selecting the optimum machine to satisfy the particular project requirements.

Turn to the Model CVGF for energy efficiency provided by the two stage gear drive centrifugal water chillers with economizers. The Trane Model CVGF is your choice for energy fit operation year after year.

# Contents

---

<b>Introduction</b>	2
<b>Features and Benefits</b>	4
<b>General Data</b>	7
<b>Dimensional Data</b>	10
<b>Mechanical Specifications</b>	14



# Features and Benefits

## Standard CVGF Features

The following features are provided as standard with all Trane Model CVGF chillers:

- Hermetic two-stage centrifugal compressor-motor assembly with integral lubrication system and economizer cycle
- Evaporator and condenser assembly
- Prewired instrument and control panel
- Oil charge
- Integral oil heater
- Isolation pads
- Wiring and oil system interconnection to main control panel
- Advance motor protection
- Two-stage gear drive for high efficiency and high reliability
- Liquid cooled hermetic induction motor; the motor operates at lower temperatures for longer motor life

## Optional Features

- Unit and remote wye-delta mounted starters
- Solid-state starters – unit mounted only
- Marine waterboxes condenser only
- Factory-applied thermal insulation
- One-inch deflection spring isolators for vibration-sensitive installations
- Refrigerant available from a local distributor
- Building automation systems (BAS) interface
- Factory testing

## Applications

- Comfort cooling
- Industrial process cooling

## Patents Pending

- Polygon drive for refrigeration compressor impellers
- Centrifugal compressor sump demister
- Centrifugal impeller assembly
- Oil sump heater configuration
- Internal oil filter

## Orifice System

- Simplified orifice system with improved part load performance down to 20 percent part load

## Advanced Heat Transfer Surfaces

- Evaporator and condenser tubes use the latest heat transfer surfaces
- Less refrigerant needed due to advanced patented evaporator design

## Compact Size

- Designed with the retrofit and replacement market in mind
- The 400 to 500 NTON sizes can fit through standard double-width doors
- Small footprint of the CVGF chiller saves valuable equipment room space

## Simple Installation

- Simplified piping; the only water piping required is for the evaporator and condenser
- No oil cooler or purge system connections
- Simple power connection
- Unit mounted starter eliminates additional jobsite labor requirements

## Microprocessor Controls with UCP2™

- Microprocessor-based unit control panel (UCP2) monitors and controls chiller operation and associated sensors, actuators, relays and switches
- Control unit is entirely factory assembled and tested
- Proportional integral derivative (PID) control strategy for stable, efficient chilled water temperature control
- Extensive Adaptive Control™ designed to keep chiller on-line under adverse conditions
- Standard electrical demand limiting
- Chilled water reset for energy savings during part load operation
- Complete range of chiller safety controls
- Easy to use operator interface
- Panel displays all operating and safety messages with complete diagnostics information
- Clear and Complex Character Language displays easy to read; the standard clear language display panel supports eight languages including English, French, German, Spanish, Katakana, Italian, Portuguese and Dutch; the optional complex display panel is available in Chinese (simplified and complex), Japanese (combination: Kanji, Hiragana and Katakana), Thai and Korean languages
- Generic building automation system points available
- Over 120 diagnostics and operating points including chiller current draw, condenser pressure and evaporator pressure are standard displays

## System Interface

- The microprocessor based UCP2 easily interfaces with Tracer 100™ and Tracer Summit® building automation systems
- Single twisted pair of wire connections
- ICS solutions

# Features and Benefits

## Environmental Features and Benefits

### Improved Efficiency:

- High Efficiency: 0.59 kW/Ton at ARI conditions
- Motor cooling vented to economizer cycle, efficiency advantage
- HFC-134 optimized inlet guide vanes and impellers for improved cycle efficiency using computational fluid dynamics

### Reduced Emissions:

- Over 30 percent joint reduction in compressor/motor assembly compared to previous designs
- Patented integral heater imbedded into the compressor casting, no seals no leaks
- Beaded flat gasket technology instead of O-rings, lower susceptibility to developing leaks
- Minimal NPT pipe threads on chiller system, SAE O-ring boss fitting, lower leak potential
- Oil sump internal to compressor/motor assembly with internal pump/motor; eliminates vent and drain lines, leak prevention
- Patented internal oil filter prevents leaks and contamination from pipes; filter is isolated and easily replaced
- Advanced evaporator design minimizes the refrigerant charge; a reduced charge reduces the exposure to the environment in the event of a catastrophic charge loss

## Additional Features and Benefits

- Patented polygon attachment instead of a keyed shaft, self-balancing
- Easy to replace motor terminals
- Motor/stator assembly is easily removed; once removed the low speed assembly can be removed easily independent of the high-speed assembly
- Rolling element bearings
- Hydrodynamic bearings
- Advanced evaporator design: no eliminator necessary with an advanced suction baffle design
- All metric fasteners

## Complex Character Clear Language Display with Multi-Language Control Interface

Trane has multi-language support for all chillers controlled by the UCP2 control panel. The standard clear language display (CLD) supports eight languages including English, French, German, Spanish, Katakana, Italian, Portuguese and Dutch. The Complex Character CLD was added to support languages such as Traditional and Simplified Chinese, Japanese Kanji, Thai and Korean whose characters could not be formed on the standard display.

- Super-twist LCD display with backlighting for readability
- Access to all available chiller data (more than 200 items) including:
  - Setpoints
  - Field start-up items
  - Machine configuration items
  - Service test items
- Easily accessible reports, in logical groupings, including:
  - Chiller report
  - Refrigerant report
  - Compressor report
- Custom report capability for data arranged the way you want to see it
- Alarm and diagnostic capability including:
  - More than 100 different diagnostic messages
  - Log of the last 20 diagnostics
  - An indicator to let you know when an alarm is present
  - Expanded help messages for each alarm to let you know what action to take
  - Operator security
  - Internationally recognized symbols

## Application Flexibility

The UCP2 is available with the output in six languages and in either English or metric (SI) units.

## Remote Running and Alarm Contacts

The unit provides three single-pole/double-throw contact closures to indicate whether:

- A failure has occurred
- The compressor is running
- The compressor is running at maximum capacity; this information may be used to authorize the start of an additional chiller



**Adaptive Control: Trouble-free installation, start-up and operation.**

## Features and Benefits

---

### Chiller Plant Control

For chilled water plants, Trane has developed the Tracer Summit®. It can control the operation of the complete installation: chillers, pumps, cooling towers, isolating valves, etc. It is a programmable module, configured according to the requirements of the end user. Trane can undertake full responsibility for an optimized automation and energy management for the entire chiller plant.

The main functions are:

- Chiller sequencing: equalizes the number of running hours of the chillers; different control strategies are available depending on the configuration of the installation
- Control of the auxiliaries: includes input/output modules to control the operation of the various auxiliary equipments (water pumps, valves, cooling towers, etc.)
- Time of day scheduling: allows the end user to define the occupancy period, i.e. time of the day, holiday periods and exception schedules
- Optimization of the start/stop time of the installation: based on the programmed schedule of occupancy and on the historical record of the behavior of the temperatures, calculates the optimal time of start and stop of the installation to get the best compromise between energy savings and comfort of the occupants
- Soft loading: the soft loading function minimizes the number of chillers that are operated to satisfy the building morning pull down, thus preventing an overshoot of the actual capacity required; unnecessary starts are avoided and the peak current demand is lowered

Several communication capabilities are provided:

- Local, through a PC workstation keyboard; the Tracer Summit® can be programmed to send messages to the workstation in the following cases
  - Analog parameter exceeding a programmed value
  - Maintenance warning
  - Component failure alarm
  - Critical alarm messages; in this latter case, the message is displayed until the operator acknowledges the receipt of the information; from the remote station it is also possible to access and modify the chiller plant's control parameters

- Remote communication through a modem; as an option, a modem can be connected to communicate the plant operation parameters through voice grade phone lines

The remote station is a PC workstation, a modem and software to display the remote plant parameters.



# General Data

**Table GD-1 – Model CVGF Description**

Model	CVGF			
Nominal Cooling Capacity	NTON	400	500	650
Heat Exchanger Size				
Evaporator	EVSZ	500	500	700
Condenser	CDSZ	500	500	700
Heat Exchanger Bundles				
Evaporator	EVBS	Small Medium Large	Small Medium Large	Small Medium Large
Condenser	CDBS	Small Medium Large	Small Medium Large	Small Medium Large
Heat Exchanger Tube				
Evaporator	EVTM	IE25 - 0.025" W 1.00" Internally Enhanced (IE25 - 0.635 mm W 25.4 mm Internally Enhanced) TE25 - 0.025" W 0.75" Internally Enhanced (TE25 - 0.635 mm W 19 mm Internally Enhanced)		
Condenser	CDTM	IE28 - 0.028" W 1.00" Internally Enhanced (IE28 - 0.711 mm W 25.4 mm Internally Enhanced) TE28 - 0.028" W 0.75" Internally Enhanced (TE28 - 0.711 mm W 19 mm Internally Enhanced)		
Evap/Cond Working Pressure				
psi		150	150	150
bar		10.5	10.5	10.5
Evap/Cond Water Connection		Victaulic Connection Flanged Adaptor (English Unit) Flanged Adaptor (SI Unit)		
Agency Approvals (Chiller)		UL-CUL Listed/ASME CE Approval/PED (European Code)		
Motor Volt/Hz		380/400/415 Volts – 50 Hz 380/460/575 Volts – 60 Hz		
Starter				
Unit Mounted		Wye-Delta Solid-State Inside the Delta		
Remote Mounted		Wye-Delta		
Operating Weight				
lb		21,460	22,564	26,566
kg		9,735	10,235	12,051



# General Data

# 50 and 60 Hz English Units

**Table GD-2 – Evaporator and Condenser Flow rates  
(Minimum and Maximum, gallons per minute)**

<b>High Efficiency Shells - 0.75 inch (19 mm) Int. Enhanced Cu Tube:</b>									
<b>Condenser:</b>									
Nominal Shell	500	500	500	700	700	700	1000	1000	1000
Bundle size	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Number of Passes	2	2	2	2	2	2	2	2	2
Min Flow (GPM)	487	542	586	668	744	816	N/A	N/A	N/A
Max Flow (GPM)	1786	1987	2148	2450	2727	2993	N/A	N/A	N/A
<b>Evaporator:</b>									
Nominal Shell	500	500	500	700	700	700	1000	1000	1000
Bundle size	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Number of Passes	2	2	2	2	2	2	2	2	2
Min Flow (GPM)	407	458	511	566	628	698	N/A	N/A	N/A
Max Flow (GPM)	1493	1680	1873	2077	2304	2559	N/A	N/A	N/A
<b>Evaporator:</b>									
Nominal Shell	500	500	500	700	700	700	1000	1000	1000
Bundle size	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Number of Passes	3	3	3	3	3	3	3	3	3
Min Flow (GPM)	271	305	340	378	419	465	N/A	N/A	N/A
Max Flow (GPM)	995	1120	1248	1385	1536	1706	N/A	N/A	N/A
<b>Standard Efficiency Shells - 1.00 inch (25.4 mm) Int. Enhanced Cu Tube:</b>									
<b>Condenser:</b>									
Nominal Shell	500	500	500	700	700	700	1000	1000	1000
Bundle size	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Number of Passes	2	2	2	2	2	2	2	2	2
Min Flow (GPM)	499	557	606	682	764	838	N/A	N/A	N/A
Max Flow (GPM)	1831	2041	2221	2501	2801	3071	N/A	N/A	N/A
<b>Evaporator:</b>									
Nominal Shell	500	500	500	700	700	700	1000	1000	1000
Bundle size	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Number of Passes	2	2	2	2	2	2	2	2	2
Min Flow (GPM)	447	496	550	625	706	784	N/A	N/A	N/A
Max Flow (GPM)	1638	1818	2018	2293	2589	2874	N/A	N/A	N/A
<b>Evaporator:</b>									
Nominal Shell	500	500	500	700	700	700	1000	1000	1000
Bundle size	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Number of Passes	3	3	3	3	3	3	3	3	3
Min Flow (GPM)	298	330	367	417	471	523	N/A	N/A	N/A
Max Flow (GPM)	1092	1212	1346	1529	1726	1916	N/A	N/A	N/A



# General Data

# 50 and 60 Hz SI Units

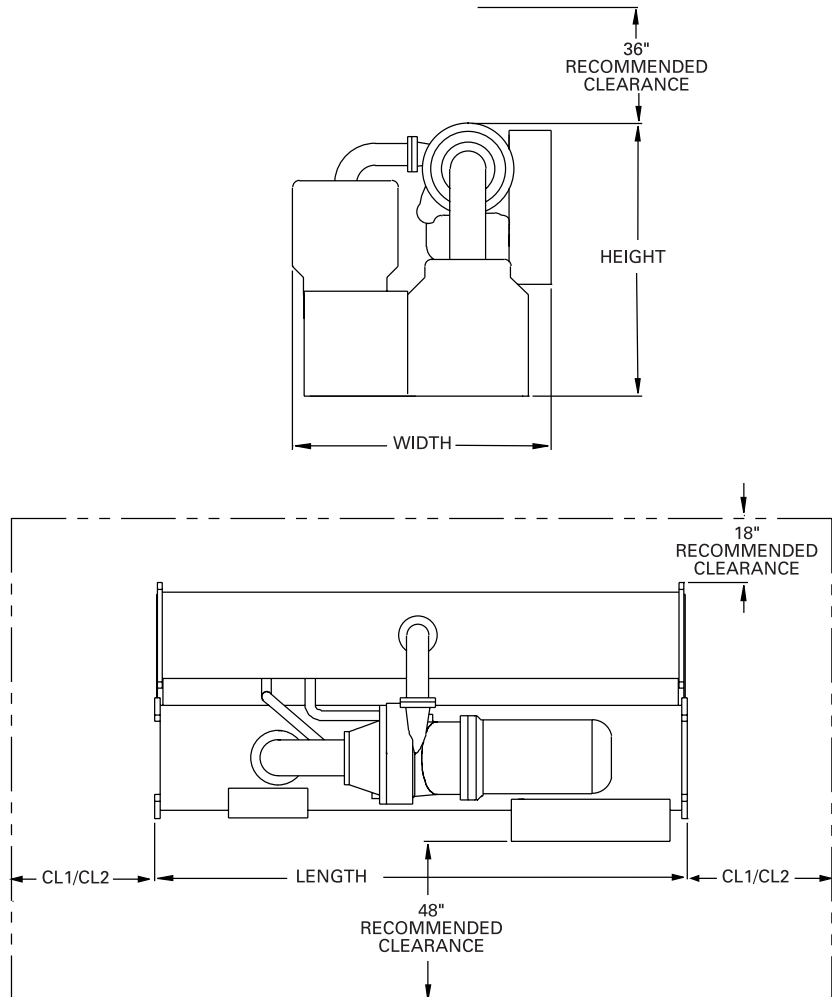
**Table GD-3 –Evaporator and Condenser Flow rates  
(Minimum and Maximum, liters per second)**

<b>High Efficiency Shells - 0.75 inch (19 mm) Int. Enhanced Cu Tube:</b>									
<b>Condenser:</b>									
Nominal Shell	500	500	500	700	700	700	1000	1000	1000
Bundle size	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Number of Passes	2	2	2	2	2	2	2	2	2
Min Flow (lps)	31	34	37	42	47	52	N/A	N/A	N/A
Max Flow (lps)	113	125	136	155	172	189	N/A	N/A	N/A
<b>Evaporator:</b>									
Nominal Shell	500	500	500	700	700	700	1000	1000	1000
Bundle size	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Number of Passes	2	2	2	2	2	2	2	2	2
Min Flow (lps)	26	29	32	36	40	44	N/A	N/A	N/A
Max Flow (lps)	94	106	118	131	145	161	N/A	N/A	N/A
<b>Evaporator:</b>									
Nominal Shell	500	500	500	700	700	700	1000	1000	1000
Bundle size	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Number of Passes	3	3	3	3	3	3	3	3	3
Min Flow (lps)	17	19	21	24	26	29	N/A	N/A	N/A
Max Flow (lps)	63	71	79	87	97	108	N/A	N/A	N/A
<b>Standard Efficiency Shells - 1.00 inch (25.4 mm) Int. Enhanced Cu Tube:</b>									
<b>Condenser:</b>									
Nominal Shell	500	500	500	700	700	700	1000	1000	1000
Bundle size	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Number of Passes	2	2	2	2	2	2	2	2	2
Min Flow (lps)	31	35	38	43	48	53	N/A	N/A	N/A
Max Flow (lps)	115	129	140	158	177	194	N/A	N/A	N/A
<b>Evaporator:</b>									
Nominal Shell	500	500	500	700	700	700	1000	1000	1000
Bundle size	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Number of Passes	2	2	2	2	2	2	2	2	2
Min Flow (lps)	28	31	35	39	45	49	N/A	N/A	N/A
Max Flow (lps)	103	115	127	145	163	181	N/A	N/A	N/A
<b>Evaporator:</b>									
Nominal Shell	500	500	500	700	700	700	1000	1000	1000
Bundle size	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Number of Passes	3	3	3	3	3	3	3	3	3
Min Flow (lps)	19	21	23	26	30	33	N/A	N/A	N/A
Max Flow (lps)	69	76	85	96	109	121	N/A	N/A	N/A

# Dimensional Data

# 50 and 60 Hz English Units

Figure DD-1 – Model CVGF Cooling Only With Unit Mounted Starter



**Dimensions – English Units**

Comp.	Shell Size	Clearance		Unit Dimensions		
		CL1	CL2	Length	Height	Width
400-500	500	13' 10 <sup>3</sup> / <sub>4</sub> "	3' 7"	13' 4 <sup>3</sup> / <sub>4</sub> "	6' 10 <sup>1</sup> / <sub>2</sub> "	6' 6 <sup>1</sup> / <sub>8</sub> "
560-700	700	13' 10 <sup>3</sup> / <sub>4</sub> "	3' 7"	13' 4 <sup>3</sup> / <sub>4</sub> "	6' 10 <sup>1</sup> / <sub>2</sub> "	6' 10"
740-1000	1000	N/A	N/A	N/A	N/A	N/A

CL1 at either end of machine and is required for tube pull clearance.  
 CL2 is always at the opposite end of machine from CL1 and is for water box plus clearance.  
 Add 14<sup>5</sup>/<sub>8</sub>" on each end for the water box.

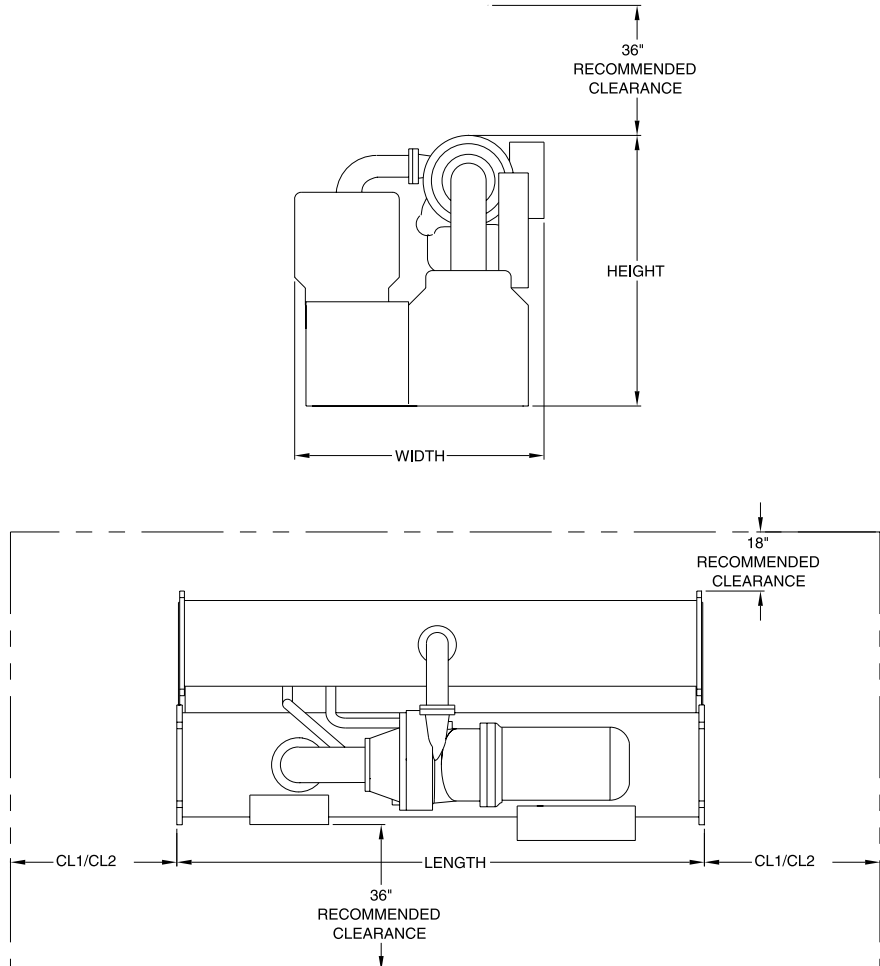
**Model CVGF Water Connection Pipe Size**

Water Passes	Shell Size		
	500	700	1000
	Nominal Pipe Size (Inches) NPS		
<b>Evaporator</b>			
2 Pass	8"	10"	12"
3 Pass	8"	8"	10"
<b>Condenser</b>			
2 Pass	10"	12"	14"

# Dimensional Data

# 50 and 60 Hz English Units

**Figure DD-2 – Model CVGF Cooling Only Without Unit Mounted Starter (For Remote Mounted Starter)**



**Dimensions – English Units**

Comp.	Shell Size	Clearance		Unit Dimensions		
		Tube Pull		Without Unit Mounted Starters		
		CL1	CL2	Length	Height	Width
400-500	500	13' 10 <sup>3</sup> / <sub>4</sub> "	3' 7"	13' 4 <sup>3</sup> / <sub>4</sub> "	6' 10 <sup>1</sup> / <sub>2</sub> "	6' 3 <sup>15</sup> / <sub>16</sub> "
560-700	700	13' 10 <sup>3</sup> / <sub>4</sub> "	3' 7"	13' 4 <sup>3</sup> / <sub>4</sub> "	6' 10 <sup>1</sup> / <sub>2</sub> "	6' 7 <sup>21</sup> / <sub>32</sub> "
740-1000	1000	N/A	N/A	N/A	N/A	N/A

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

CL2 is always at the opposite end of machine from CL1 and is for water box plus clearance.

Add 14<sup>5</sup>/<sub>8</sub>" on each end for the water box.

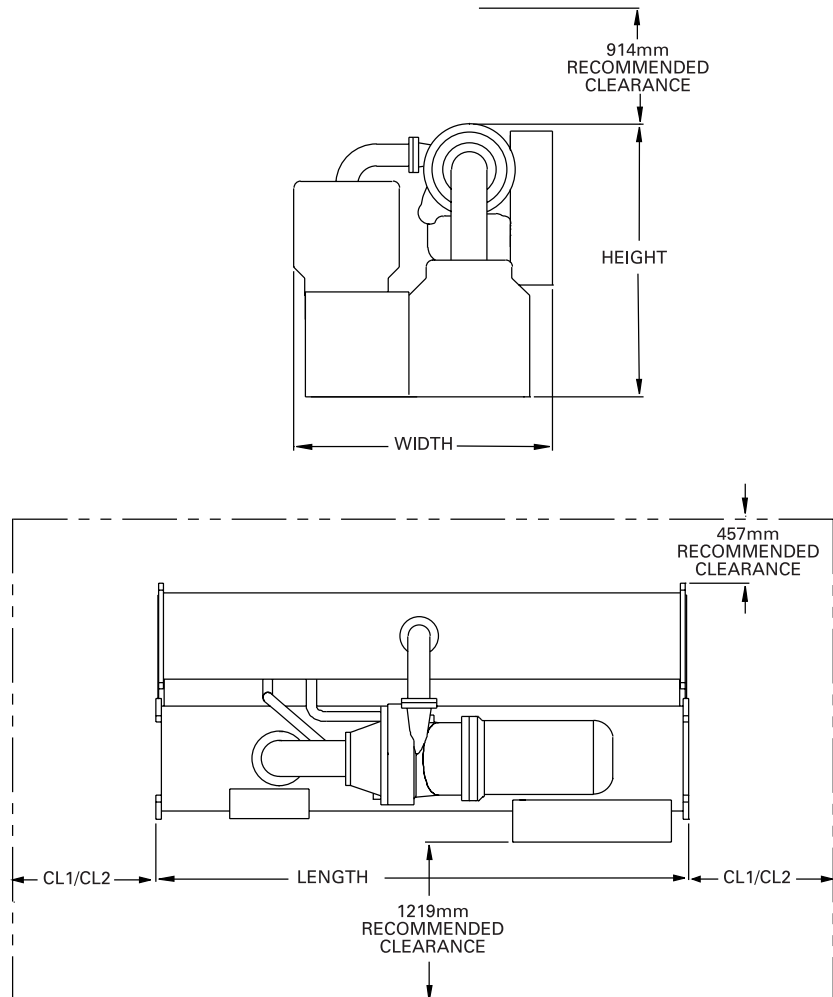
**Model CVGF Water Connection Pipe Size**

Water Passes	Shell Size		
	500	700	1000
	Nominal Pipe Size (Inches) NPS		
<b>Evaporator</b>			
2 Pass	8"	10"	12"
3 Pass	8"	8"	10"
<b>Condenser</b>			
2 Pass	10"	12"	14"

# Dimensional Data

# 50 and 60 Hz SI Units

Figure DD-3 – Model CVGF Cooling Only With Unit Mounted Starter



**Dimensions – Metric Units**

Comp.	Shell Size	Clearance Tube Pull		Unit Dimensions With Unit Mounted Starters		
		CL1	CL2	Length	Height	Width
400-500	500	4236 mm	1093 mm	4083 mm	2094 mm	1984 mm
560-700	700	4236 mm	1093 mm	4083 mm	2094 mm	2083 mm
740-1000	1000	N/A	N/A	N/A	N/A	N/A

CL1 at either end of machine and is required for tube pull clearance.  
 CL2 is always at the opposite end of machine from CL1 and is for water box plus clearance.  
 Add 372 mm on each end for the water box.

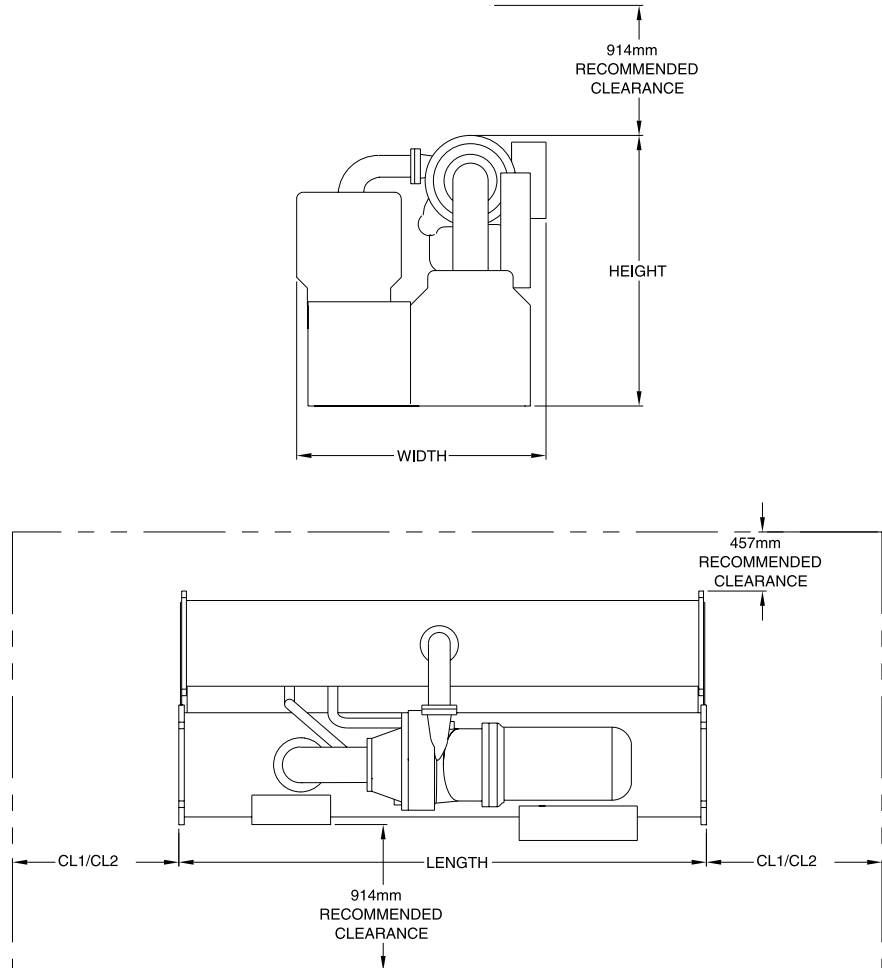
**Model CVGF Water Connection Pipe Size**

Water Passes	Shell Size		
	500	700	1000
	Metric Pipe Size (mm) DN		
<b>Evaporator</b>			
2 Pass	DN 200	DN 250	DN 300
3 Pass	DN 200	DN 200	DN 250
<b>Condenser</b>			
2 Pass	DN 250	DN 300	DN 350

# Dimensional Data

# 50 and 60 Hz SI Units

**Figure DD-4 – Model CVGF Cooling Only Without Unit Mounted Starter (For Remote Mounted Starter)**



### Dimensions – Metric Units

Comp.	Shell Size	Clearance Tube Pull		Unit Dimensions Without Unit Mounted Starters		
		CL1	CL2	Length	Height	Width
400-500	500	4236 mm	1093 mm	4083 mm	2094 mm	1929 mm
560-700	700	4236 mm	1093 mm	4083 mm	2094 mm	2028 mm
740-1000	1000	N/A	N/A	N/A	N/A	N/A

CL1 at either end of machine and is required for tube pull clearance.  
 CL2 is always at the opposite end of machine from CL1 and is for water box plus clearance.  
 Add 372 mm on each end for the water box.

### Model CVGF Water Connection Pipe Size

Water Passes	Shell Size		
	500	700	1000
	Metric Pipe Size (mm) DN		
<b>Evaporator</b>			
2 Pass	DN 200	DN 250	DN 300
3 Pass	DN 200	DN 200	DN 250
<b>Condenser</b>			
2 Pass	DN 250	DN 300	DN 350



# Mechanical Specifications

The Trane CVGF packaged centrifugal water chillers using HFC-134a refrigerant consist of a hermetic two stage, gear-drive centrifugal compressor, evaporator, condenser, interstage economizer, unit-mounted microprocessor based control panel and compressor motor starter. The chiller is completely factory assembled and run tested before shipment.

## Compressor

Two-stage centrifugal compressor with high-strength aluminum alloy fully shrouded impellers. The impellers are tested at 25 percent over design operating speed. The rotating assembly is dynamically balanced for vibration of less than 5.1 mm/s (0.2 ips peak velocities) at nominal operating speeds. The control system affords 100 - 20 percent capacity modulation by electrically actuated guide vanes upstream of each impeller.

## Drive Train

The drive train consists of helical bull and pinion gears. Gear tooth surfaces are case hardened and precision ground. The one-piece impeller shaft is supported by hydrodynamic thrust and radial bearings.

## Motor

The motor is a hermetic, liquid refrigerant cooled, two-pole, low-slip squirrel cage induction motor. A radial hydrodynamic bearing and duplex angular contact ball bearings support the rotor assembly. Winding-embedded sensors provide positive thermal protection.

## Lubrication System

The lubrication system consists of an internal oil sump with heaters, positive displacement oil pump, brazed plate condenser-cooled oil cooler, and oil distillation/return line.

## Economizer/Orifice

The economizer consists of a carbon steel shell with internal components designed to prevent liquid carryover to the compressor. Liquid refrigerant is admitted through a single calibrated orifice (no moving parts) which maintains a pressure differential between condenser and economizer.

## Evaporator

The evaporator is designed, tested and stamped in accordance with ASME Boiler and Pressure Vessel Code or PED (European Code) for refrigerant side working pressure of 15.2 bars (220 psig). It consists of a carbon steel shell with steel tube sheets welded to each end. Intermediate tube support sheets positioned along the shell axis prevent relative tube motion. Individually replaceable externally finned and internally grooved 19 mm (¾ in.) and 25.4 mm (1.0 in.) nominal diameter seamless copper tubes are mechanically expanded into tube sheets.

Two or three pass water boxes rated at 10.5 bar (150 psi) is standard. Grooved pipe stubs for Victaulic couplings are standard; flanged connections are optionally available. The waterside is hydrostatically tested at 1.5 times maximum working pressure.

Liquid refrigerant is admitted to the evaporator through a single calibrated orifice (no moving parts) which maintains a pressure differential between the economizer and the evaporator.

## Condenser

The condenser is designed, tested and stamped in accordance with the ASME Boiler and Pressure Vessel Code or PED (European Code) for a refrigerant side working pressure of 15.2 bars (220 psig). It consists of a carbon steel shell with steel tube sheets welded to each end. Individually replaceable, externally finned and internally grooved 19 mm (¾ in.) and 25.4 mm (1.0 in.) nominal diameter seamless copper tubes are mechanically expanded into the tube sheets.

Welded steel two pass water boxes are bolted to the tube sheets. Water connections are steel pipe stubs grooved for Victaulic couplings; flanged connections are optionally available. Maximum waterside working pressure of 10.5 bars (150 psi) is standard. The waterside is hydrostatically tested at 1.5 times maximum working pressure.

# Mechanical Specifications

---

## Unit Control Panel

The unit mounted microprocessor based control panel is factory installed and tested on the CVGF unit. All controls necessary for the safe and reliable operation of the chiller are provided including oil management and interface to the starter. A control power transformer included in the starter panel powers the control system. The microcomputer control system processes the leaving evaporator fluid temperature sensor signal to satisfy the system requirements across the entire load range.

The microprocessor controller is compatible with reduced voltage or full voltage electromechanical starters and may be factory unit-mounted or field remote mounted. A solid-state starter is available only as unit mounted (not available for Europe).

The controller will load and unload the chiller via control of the stepper-motor/ actuator which drives the inlet guide vanes open and closed. The load range can be limited either by a control limit function such as motor current, low evaporator temperature or high condenser pressure limit or by an inlet guide vane limit (whichever comes first). It will also control the evaporator and condenser pumps to insure proper chiller operation.

Over 100 diagnostic checks are made on a continuous basis. When a fault is detected, the display indicates the fault, the type of reset required, the time and date the diagnostic occurred, the mode in which the machine was operating at the time of the diagnostic, and a help message. A diagnostic history will display the last 20 diagnostics with the time and date of their occurrence.

The display also provides over 20 reports that are organized into four groupings: Custom Report, Chiller Report, Refrigerant Report, and Compressor Report. Each report contains data that is accessed by scrolling through the menu items. Each grouping will have a heading that describes the type of data in that grouping.

All necessary settings and setpoints are programmed into the microprocessor controller via the keypad of the operator interface. The controller is capable of receiving signals from a variety of control sources and of being programmed at the keypad as to which control source has priority. These control sources are not mutually exclusive, any combination of control sources can coexist simultaneously. The control panel will then set the active setpoints according to the priority signal.

## Compressor Motor Starter

Unit-mounted starters can either be a star-delta or solid-state in a NEMA 1 enclosure wired to compressor motor up to 1024 RLA (star-delta) and 1039 RLA (solid-state). Unit mounted starters for Europe will be star-delta only in a IP54 enclosure wired to the compressor motor up to 1024 RLA. A steel panel door with optional mechanical interlock disconnects the system when the door is opened. The panel also contains three-phase current transformer for overload protection, and an oil pump starter with overloads. The starter is factory mounted and wired to the compressor motor and the control panel. The CVGF chiller/starter assembly is factory tested.

Optional remote mounted electromechanical starters are available.

## Run Test

Prior to shipment, all chillers receive post-assembly pressure and leak tests followed by a run test to verify performance and to calibrate operating and safety controls.

## Isolation Pads

Molded neoprene isolation pads are supplied with each chiller for placement under all support points. Spring isolators are optionally available.

## Refrigerant and Oil Charge

A full charge of refrigerant and oil is supplied with each unit. The oil ships in the unit's sump and the refrigerant ships directly to the jobsite from refrigerant suppliers.

## Painting

All painted CVGF surfaces are coated with two coats of air-dry beige primer-finisher prior to shipment.

## Insulation

The chiller can be ordered with or without factory applied insulation. Factory supplied insulation is applied to all low temperature surfaces including the evaporator, water boxes and suction elbow. Insulation material is 19 mm ( $\frac{3}{4}$  in.) Armaflex II or equal (thermal conductivity = 0.04 W/m·°C; 0.3 Btu·in/h·ft<sup>2</sup>·°F). The oil cooling lines are insulated with 9.5 mm ( $\frac{3}{8}$  in.) and 13 mm ( $\frac{1}{2}$  in.) insulation respectively.

## Rigging

Evaporator and condenser tube sheets provide rigging support points. A rigging diagram is affixed to the chiller.

## Quality

The La Crosse chiller manufacturing facility is ISO 9001.



ISO 9001  
Quality System  
Certified



La Crosse  
Business Unit



**TRANE®**

**The Trane Company**  
**An American Standard Company**  
**[www.trane.com](http://www.trane.com)**

For more information contact  
your local dealer (distributor) or  
e-mail us at [tycust@unitary.trane.com](mailto:tycust@unitary.trane.com)

---

Literature Order Number	CTV-PRC001-EN
File Number	PLRF-CTV-000-PRC001-700
Supersedes	CTV-PRC001-EN 1/00
Stocking Location	La Crosse-Inland

---

Since The Trane Company has a policy of continuous product improvement, it reserves the right to change design and specifications without notice.