TRANE®

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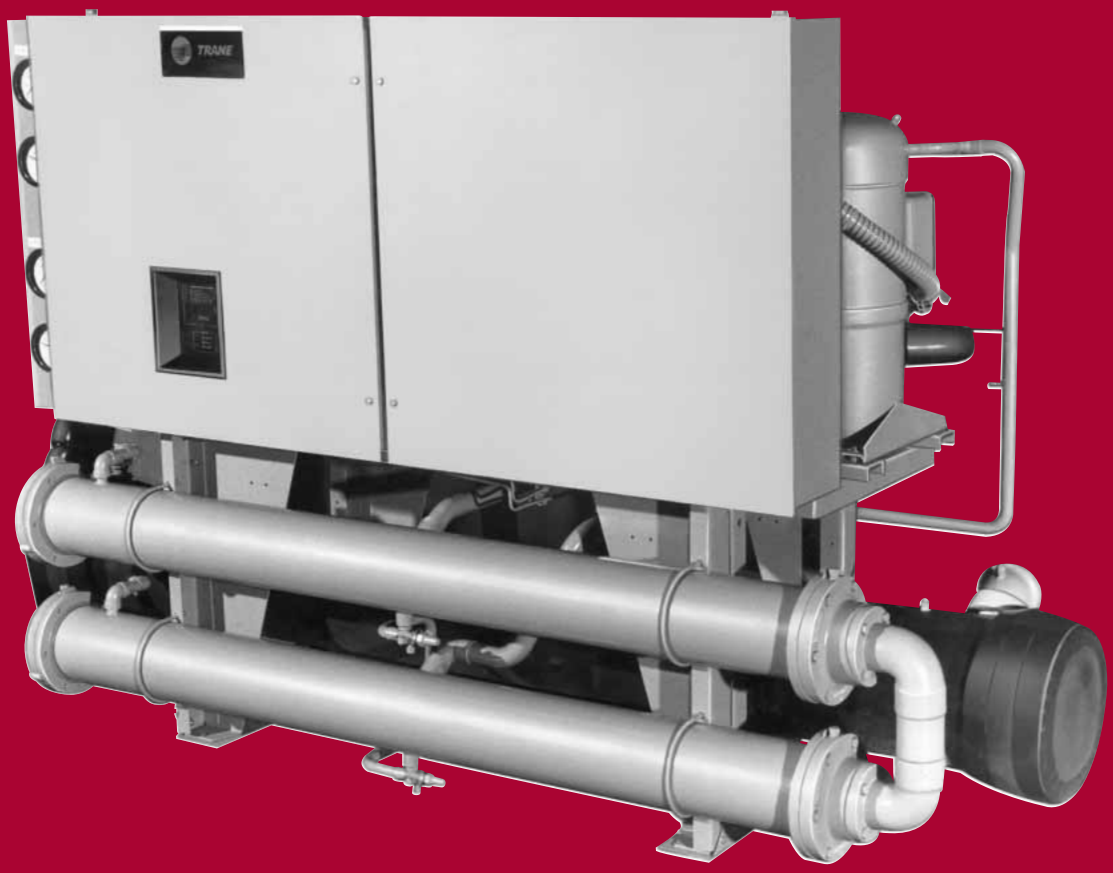
SLC-DS-1

Cold Generator® Scroll Liquid Chillers

20 to 60 Tons Water-Cooled and Condenserless

Built For the Industrial and Commercial Markets



Features and Benefits

The Trane 20-60 Ton Cold Generator® Liquid Chiller

More Than Just Another "Improved" Reciprocating Chiller
— More Advanced Design
— Better Reliability
— Improved Efficiency
— Smarter Microprocessor Control
— Better Availability
— Easier To Install and Operate

Design
The Trane scroll compressor is the most advanced compressor in the industry.

Reliability
64 percent fewer compressor parts, compared to reciprocating compressors, mean long and reliable life.

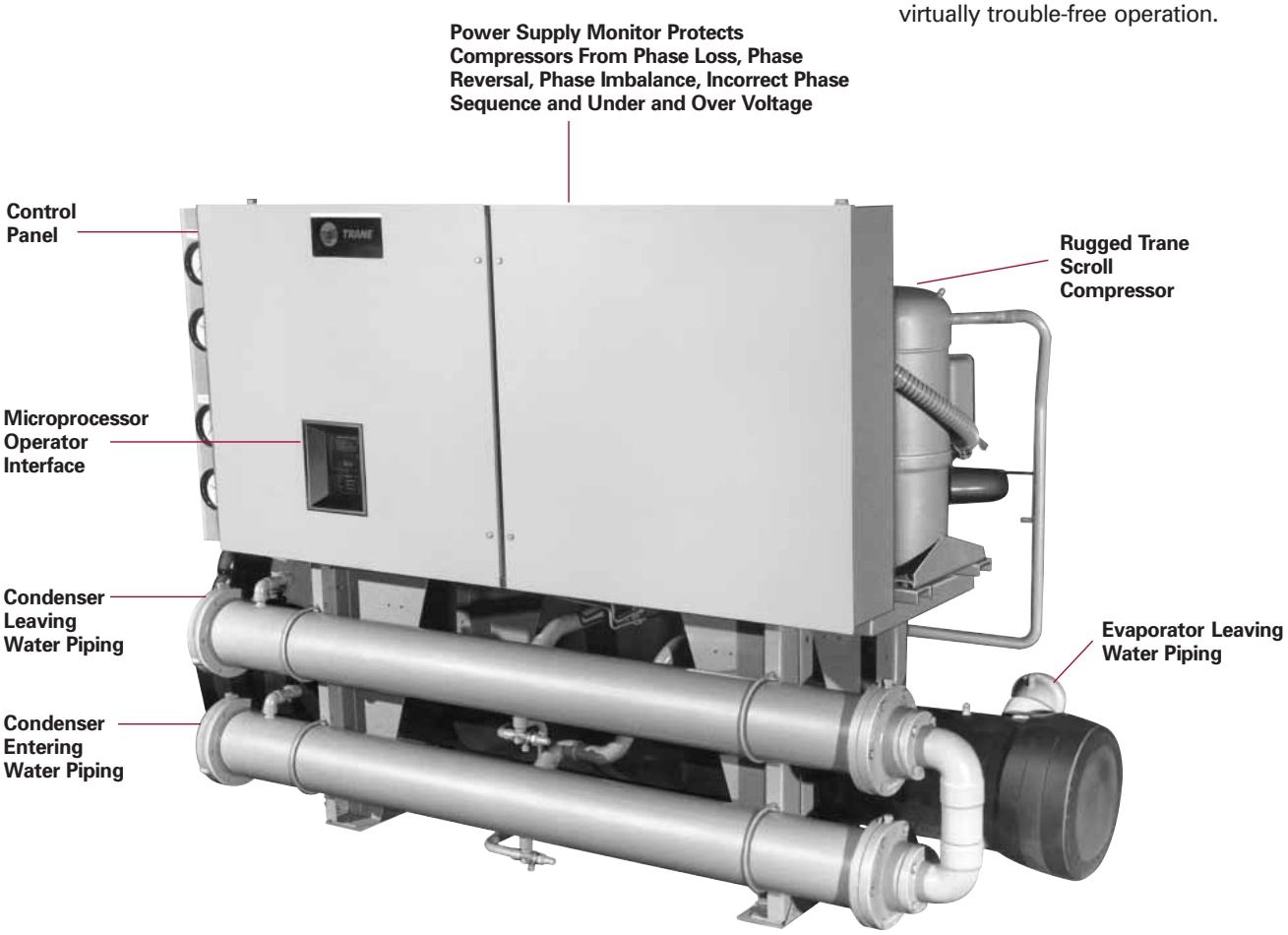
Efficiency
Part load efficiencies are simply unmatched by reciprocating chillers.

Control
Most advanced and complete safety and control algorithms available.

Availability
Industry's fastest ship cycles on both stock and built-to-order specials.

Installation
Small unit size, factory wiring, easy lifting provisions, and start-up control logic mean quick and easy setup. Chillers fit through standard single-width door.

Operation
Smart safety features and over 40 diagnostic displays mean easy and virtually trouble-free operation.



Contents

Standard Features

Microprocessor Control
Microprocessor control means the Cold Generator® chiller maintains chilled water temperature more accurately, resulting in less temperature drift in the building. The microprocessor control also incorporates optimal chiller start-up logic (low and high ambient), load limiting, compressor anti-recycle timing, auto lead/lag function, compressor protection, and many other safety features. The "smart" safety features provide complete fault protection without nuisance tripping.

BENEFIT: consistent, reliable operation, longer life.

Leaving Chilled Water Temperature Control
The microprocessor actually monitors temperature and the rate of change over time, effectively controlling compressor loading for efficient chiller operation.

BENEFIT: accurate and efficient building comfort, less energy wasted.

Diagnostics and Display
The microprocessor's operator interface is a menu-driven digital display. The display provides temperatures, pressures, setpoints and diagnostics readouts. Flashing display notifies operator of fault condition and diagnostics are saved until manually reset.

BENEFIT: easy troubleshooting and control

Compressor Protection
All compressors are individually protected against starting and running overload, under and over voltages, phase loss, phase reversal, high winding temperature and rapid recycling.

BENEFIT: long unit life and added reliability.

External Control
Several external contacts are provided for custom control requirements including time of day scheduling and kW demand limiting.

BENEFIT: more standard control and more flexible owner upgrades.

Other Standard Features
- Control power transformer
- Auto lead/lag (on or off)
- Solid-state motor protection
- Insulation (Armaflex II or equal)
- Evaporator and condenser water pump interlocks
- Filter-dryer
- Built-in loss of chilled water flow sensors
- Chillers fit through standard single width door.

Options
- Trane Integrated Comfort™ systems communication
- Generic building automation systems (BAS) interface
- Chilled water reset (ambient, zone, return)
- Ice making
- Hot gas bypass
- Remote display/control panel
- Remote running indication and alarm contact
- Unit-mounted disconnect
- Gauges
- Sound Attenuation
- Neoprene Isolators
- Compressor cycle counter/hour meter
- Water regulating valves
- Condenser water temperature sensors

The standard ARI rating condition (54/44 F and 95 F) and IPLV are ARI certified. All other ratings, including the following, are outside the scope of the certification program and are excluded:
- Glycol.
- 50 Hz.
- Condenserless models CCAD.

Water Chiller Systems Business Unit

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Features and Benefits

Leading in Efficiency and Reliability With State-Of-The-Art Scroll Compressor Technology

Reliability
The Trane Cold Generator® water chiller with many new improvements, now brings an exciting new compressor to the commercial market — the Trane scroll compressor. Trane has designed the scroll compressor to be a leader in reliability. HERE'S HOW:

- Simple design with 64 percent fewer parts than equal capacity reciprocating compressor.
- Scroll compliance allows liquid and dirt to pass through without damaging compressor (liquid slugging resistant).
- Advanced microelectronics protect both compressor and motor from typical electrical fault conditions.
- Scroll compressors have less than a third the torque variations of a reciprocating compressor.
- Years of laboratory testing have optimized compressor and chiller systems reliability.
- Water-cooled Cold Generators are factory tested.

Efficiency
The energy efficiency of the Cold Generator liquid chiller results in energy costs lower than any other comparable chiller. Full load efficiencies are typical of reciprocating chillers, but part load efficiencies are simply unmatched by any other manufacturer.

Superior efficiencies are obtained by combining many of the traditional Cold Generator chiller energy efficient features with the Trane scroll compressor technology. HERE'S HOW:

- Scroll compressor's positive displacement design
- Dual refrigerant circuits (40-60 ton units)
- Multiple compressors
- Optimum system design
- Reduced friction
- No valves
- Advanced heat transfer surfaces

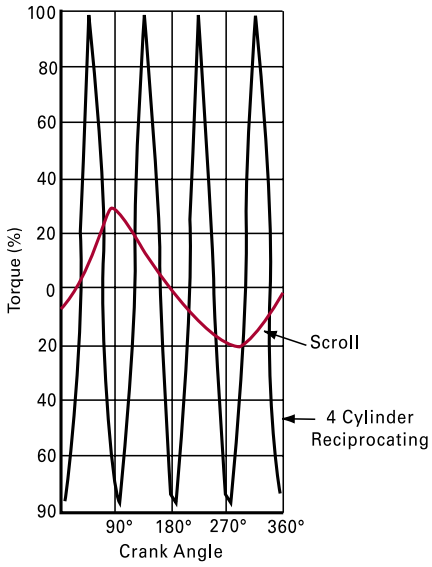
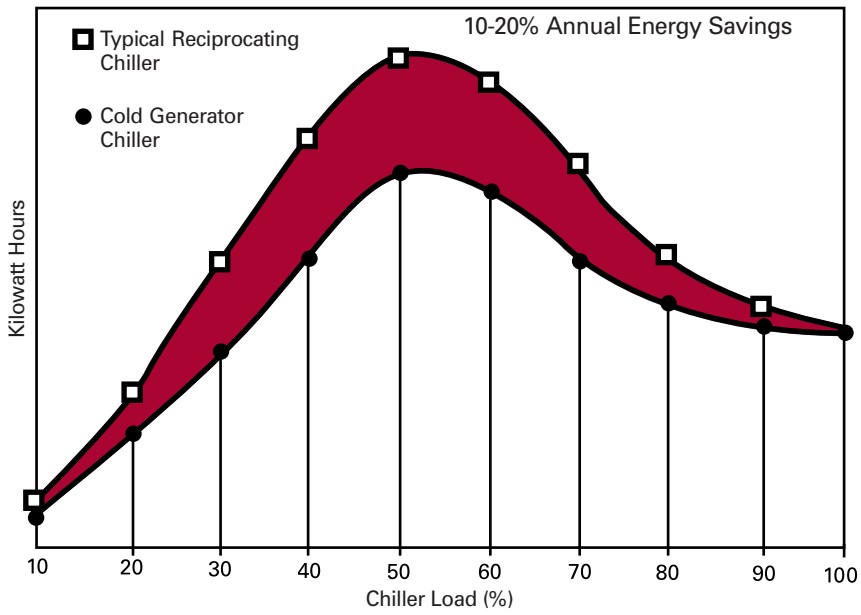


Chart illustrates low torque variation of the Trane scroll compressor vs reciprocating compressor.

Cold Generator Energy Usage Savings



Graph illustrates Trane Cold Generator chiller's superior annual energy costs vs typical reciprocating chillers.

Features and Benefits

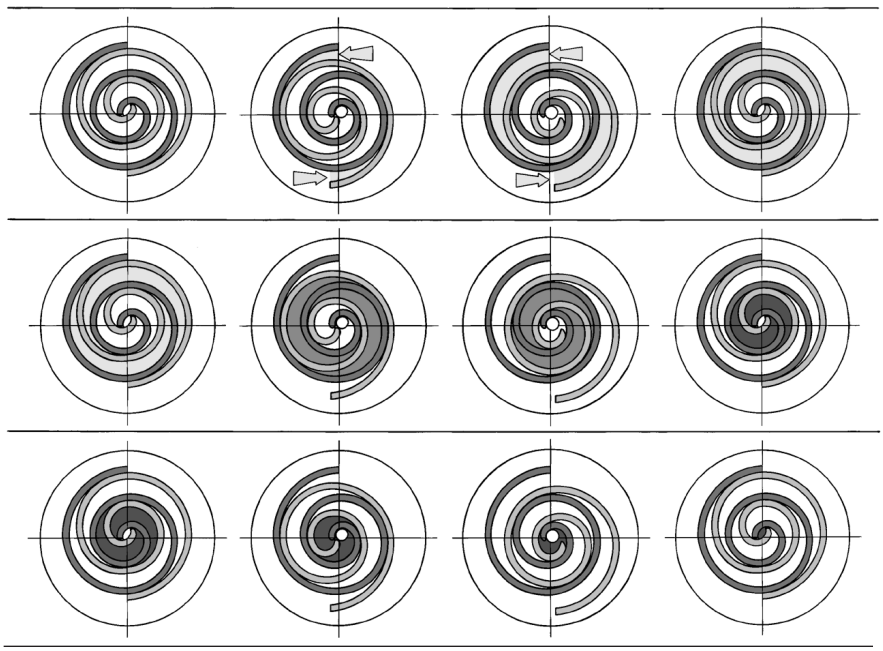
Trane Scroll Compressor
— Maximum Efficiency with Enhanced Reliability

General
The scroll compressor has two scrolls. The top scroll is fixed and the bottom scroll orbits. Each scroll has walls in a spiral shape that intermesh.

Inlet-First Orbit
As the bottom scroll orbits, two refrigerant gas pockets are formed and enclosed.

Compression-Second Orbit
The refrigerant gas is compressed as the volume is reduced closer to the center of the scroll.

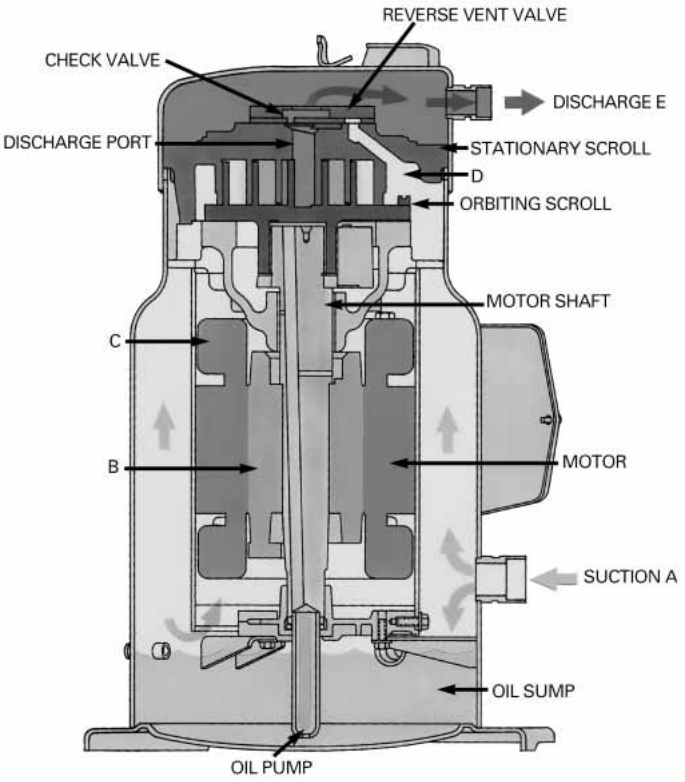
Discharge-Third Orbit
The gas is compressed further and discharged through a small port in the center of the fixed scroll.



Scroll Principal Components
This is a cutaway view of a hermetic, scroll compressor, showing the relative positions of the principal components. Shown is a Trane 10-ton, 3600 rpm, scroll compressor as an example.

The principle of operation of this example compressor is as follows: The suction gas is drawn into the compressor at A. The gas then passes through the gap between the rotor and stator, B, cooling the motor, before it enters the compressor housing, C. Here, the velocity of the gas is reduced, causing a separation of the entrained oil from the gas stream. The gas then enters the intake chamber, D, that encircles the scrolls.

Finally, the suction gas is drawn into the scroll assembly where it is compressed and discharged into the dome of the compressor. The dome of this example compressor acts as a hot gas muffler which dampens the pulsations before the gas enters the discharge line, E.



Features and Benefits

Trane Value Means Fast Availability, Easy Installation and Quality Service

Packed Stock For Fast Delivery
When your project is a fast-track job, Trane can help. A wide range of chillers are stocked and can be shipped soon after receipt of your order.

Build To Order
Need a special chiller fast? Think Trane Cold Generator® chillers. New manufacturing technology and inventory control means the fastest delivery schedule in the industry. Wide array of standard options provides the right chiller for the job fast.

Installation
- Only one power connection hook-up — for fast and inexpensive installation.
- Integrated Comfort™ system means only single pair connections are required for control interfaces and therefore, lower total installation costs.
- Factory refrigerant and oil charged units help speed installation.
- All units easily fit through a standard single width door.
- Built-in chilled water flow sensors mean no field-installed flow switches are required.
- Microprocessor displays both entering and leaving chilled water temperatures. No chilled water thermometers are required.

Easy Serviceability
Trane 20 through 60 ton Cold Generator chillers are designed with service personnel in mind. All major components are replaceable without complete unit disassembly. Plus, the microprocessor control panel provides diagnostic capability to aid service personnel in analyzing problems. Therefore, if a problem does occur, the chiller can be up and running in a shorter period of time.

Quick and Complete Submittals
The Trane commitment to value-added products doesn't stop at just the products, we are committed to total customer satisfaction. Part of this commitment is to provide quick, complete, readable and accurate drawings.

Single-Source Responsibility
A wide range of products designed for complete compatibility are available with the Cold Generator chillers. Your entire building comfort system can be completed using components from Trane.

The Added Value of Applications Expertise
With the Cold Generator chiller you get applications expertise and know-how from a Trane sales engineer. Trane has more than 500 sales engineers across the country — each one a graduate engineer with an average of 13 years experience working with leading design and construction firms in the industry. Trane sales engineers have creative ideas and solutions to difficult building comfort system design problems. You can take full advantage of their knowledge in designing a quality, dependable comfort system.

There's more. Your Trane sales engineer is backed by the Trane world headquarters staff of applications experts, regarded as the best in the industry. The C.D.S. Network provides Trane sales engineers — and many independent design and consulting firms — direct access to the Trane mainframe computer and to many comfort system application, selection and design programs.

You get a quality chiller, properly selected and applied in a properly designed system. That means a comfort system that works, the first time!

Features and Benefits

The Trane Difference — The Integrated Comfort™ System

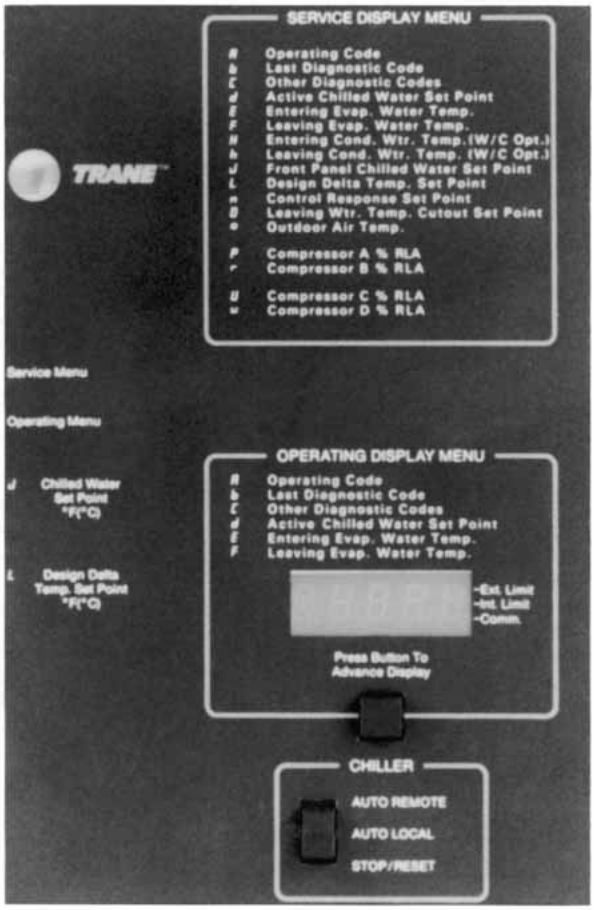
No Other Microprocessor Does More So You Can Do Less

The new microprocessor control system enhances the Trane Cold Generator® chiller by providing the very latest technology to control chiller operation and associated sensors, actuators, relays and switches.

- Operator interface is improved and easy to use. Panel displays all operating and safety codes with complete diagnostic information. Over 40 diagnostics are included.
- Smart safety features shut down cooling only if absolutely necessary, preventing nuisance safety trip outs.
- Microprocessor easily interfaces with Trane Tracer® building management computer for Integrated Comfort system benefits; all with a single twisted pair wire!

Twisted Pair Communications

Connects To:
Trane Integrated Comfort Systems (No System Control Panel (SCP) is necessary)



Trane Integrated Comfort System The Future Is Now!

Simple

- Factory packaging for smooth start-up.
- Easy to install with only a single twisted wire pair to the central Tracer building management system.
- Constant, comprehensive monitoring tracks equipment operation and takes control to keep tenants comfortable.
- Optional override buttons on each floor allow tenants to have control after hours. After-hours use is automatically logged to allow tenant billing.
- Review building performance at a glance with automatically generated reports and logs.
- Enhanced service and building management capability through remote diagnostics and control.
- Trane Building Management Network allows control from across town or across the country.

A Dependable System From A Single, Reliable Source

- System design, equipment supply and service support all available from Trane.
- Factory testing of all Trane equipment ensures the system works.

At A Lower Cost

- Factory packaged controls and sensors reduce jobsite labor costs while assuring proper installation.
- Single twisted pair wire communication technology dramatically simplifies installation and reduces jobsite installation costs.
- Because the unit has been factory tested, there are no system problems; allowing smoother start-up, reducing follow-up costs.
- Building block approach allows you to change your system without redundancy and wasted cost.

No Bad Jobs

There is another benefit from single-source responsibility and the Trane Integrated Comfort systems. With Trane ICS, you get a single-source supplier of the system — from the chillers to the air handlers to the controls. Trane is the only HVAC manufacturer which can provide the entire system.

For more information on how Trane Cold Generator chillers and an Integrated Comfort system can benefit your next HVAC project, contact your nearest Trane sales office.

Model Number Description

Typical Product Coding Block

MODL CGWD	DSEQ A	NTON 60	VOLT 460A	EVTL STD
CDTE STD	AGLT UL	CNIF MICR	CWRE RWTR	PNCO TB
HGBP WITH	SPKG DOMC	OPTI UNGA		

The operation, components and options for any 20-60 ton Cold Generator® unit can be identified by referring to the alphanumeric product identification coding block located on the service nameplate for the unit. The coding block precisely identifies all characteristics of a unit. An example of a typical product code block is shown:

Product Code Explanation

MODL
Unit Model
CGWD = Cold Generator Water-Cooled, "D" Development sequence
CCAD = Compressor/Chiller Air-Cooled, "D" Development sequence

DSEQ
Design Sequence
A = 1st Design Change
B = 2nd Design Change, Etc.

NTON
Unit Nominal Tonnage
20= 20 Tons
25= 25 Tons
30= 30 Tons
40= 40 Tons
50= 50 Tons
60= 60 Tons

VOLT
Unit Voltage
DULA = 200-240/60/3
460A = 460/60/3
575A = 575/60/3
380A = 380/60/3

EVTL
Evaporator Leaving Water Temperature
ICE = Ice Machine (20-60 F Fluid Temperature)
STD = Standard (40-60 F Fluid Temperature)
LOWA = Low Option A (25-39 F Fluid Temperature)
LOWB = Low Option B (15-24 F Fluid Temperature)

CDTE
Condenser Entering Water Temperature
STD = Standard (60-90 F Water Temperature)
HIGH = High (90-123 F Water Temperature)

AGLT
Agency Listing
UL = C/UL Listed

CNIF
Control Interface
MICR = Standard Microprocessor
BDI = Bi-Directional Interface (ICS)
MTWI= Multiple Wire Interface (Generic BAS)

CWRE
Chilled Water Reset
RWTR = Return Water
CWR OAIR = Outside Air
CWR (Ambient) ZONE = Zone CWR

PNCO
Panel Connection
TB = Terminal Block
DISC = Disconnect Switch

HGBP
Hot Gas Bypass
WITH = With Hot Gas Bypass

SPKG
Shipping Package
DOMC = Standard Domestic
FULL = Full Sheath Export
CONT = Containerized

OPTI
Options
CCHR = Cycle Counter and Hour Meter
CDCR = Contacts For Remote Alarm Indication
UNGA = Unit Gauges
USAT = Unit Sound Attenuator

General Data

Table GD-1 — General Data Model CGWD Chillers

Unit		20 Ton	25 Ton	30 Ton	40 Ton	50 Ton	60 Ton
Compressor: Number-Size		2-10	1-10 1-15	2-15	4-10	2-10	4-15
Steps of Unloading (%)		100,50	100,60	100,50	100,75 50,25	100,80 60,30	100,75 50,25
Evaporator: Water Volume	(Gal)	12	11	16	13	21	19
	(L)	45	42	61	49	80	72
Min. Flow	(Gpm)	24	30	36	48	60	72
	(L/s)	1.5	1.9	2.3	3.0	3.8	4.5
Max. Flow	(Gpm)	72	90	108	144	180	216
	(L/s)	4.5	5.7	6.8	9.1	11.4	13.6
Condenser: Water Volume	(Gal)	2	3	3	5	5	6
	(L)	8	11	11	19	19	23
Min. Flow	(Gpm)	27	31	39	54	63	78
	(L/s)	1.7	2.0	2.5	3.4	4.0	4.9
Max. Flow	(Gpm)	80	93	115	159	186	230
	(L/s)	5.0	5.9	7.3	10.0	11.7	14.5
General: Refr. Type		R-22	R-22	R-22	R-22	R-22	R-22
Refr. Charge	(Lb)	47	47	48	91	93	93
	(KG)	21	21	22	41	42	42
Oil Charge	(Pints)	16	22	28	32	44	56
	(L)	7.6	10.4	13.2	15.1	20.8	26.5

Table GD-2 — General Data Model CCAD Compressor-Chiller

Unit		20 Ton	25 Ton	30 Ton	40 Ton	50 Ton	60 Ton
Compressor: Number-Size		2-10 1-15	1-10	2-15	4-10 2-15	2-10	4-15
Steps of Unloading (%)		100,50	100,60	100,50	100,75 50,25	100,80 60,30	100,75 50,25
Evaporator:							
Water Volume	(Gal)	12	11	16	13	21	19
	(L)	45	42	61	49	80	72
Min. Flow	(Gpm)	24	30	36	48	60	72
	(L/s)	1.5	1.9	2.3	3.0	3.8	4.5
Max. Flow	(Gpm)	72	90	108	144	180	216
	(L/s)	4.5	5.7	6.8	9.1	11.4	13.6
General: Refr. Type		R-22	R-22	R-22	R-22	R-22	R-22
Refr. Charge	(Lb)	6	8	12	12	16	24
	(Kg)	2.7	3.6	5.4	5.4	7.2	10.9
Oil Charge	(Pts-Total)	16	22	28	32	44	56
	(L)	7.6	10.4	13.2	15.1	20.8	26.5

Application Considerations

Unit Location
Units should be installed indoors where exposure to rain or water splash is minimal. A level foundation or flooring must be provided which will support at least 150 percent of the operating weight of the unit. The chiller foundation must be rigid to reduce vibration transmission to a minimum. Use of vibration isolators is recommended for applications with sensitive vibration and noise criteria.

Allow service clearance for compressor removal as well as evaporator and condenser tube removal.

Condenser Water Limitations
Water-cooled Cold Generator chillers start and operate satisfactorily over a range of load conditions with uncontrolled entering water temperature.

Reducing the condenser water temperature is an effective method of lowering the power input required. However, by reducing the condenser water temperature beyond certain limits, the effect causes a reduction in the pressure drop across the thermal expansion valve to a point when system instability may occur.

In general, continuous machine operation with entering condenser water temperature below 60 F is not recommended. When the condenser water temperature is expected to drop below 60 F, it is recommended that some form of condenser water temperature control be used to ensure optimal machine performance.

Water Treatment
Use of untreated or improperly treated water in chillers may result in scaling, erosion, corrosion, algae or slime. It is recommended that the services of a qualified water treatment specialist be engaged to determine what treatment, if any, is advisable. The Trane Company assumes no responsibility for the results of untreated, or improperly treated water.

Water Pumps
Avoid specifying or using 3600 rpm condenser water and chilled water pumps. Such pumps may operate with objectional noise and vibration. In addition, a low frequency beat may occur due to the slight difference in operating rpm between water pumps and scroll compressor motors. Where noise and vibration-free operation is important, The Trane Company encourages the use of 1750 rpm pumps.

Remote Condenser
Remote condensers should be located as close as possible to the chiller to ensure minimum pressure drops of discharge refrigerant. If non-Trane condensers are provided, a subcooling circuit must be provided in order to achieve cataloged performances (16 F subcooling).

Selection Procedures

The chiller capacity tables on the following pages cover the most frequently encountered leaving water temperatures. For temperature drops other than 10 F, refer to Table SP-1, Performance Adjustment Factors, shown below.

Additional chiller selections and performance information can be obtained through your local Trane sales office. For low temperature selections of water-cooled Cold Generator® chillers which cannot be obtained directly out of the catalog, refer to Engineering Bulletin CG-EB-80.

To select a Trane water-cooled Cold Generator® chiller, the following information is required:

1
Design load in tons of refrigeration

2
Design chilled water temperature drop

3
Design leaving chilled water temperature

4
Entering condenser water temperature

Evaporator flow rate (gpm) can be determined by using the following formula:

$$\text{gpm} = \frac{\text{Tons x 24}}{\text{Chilled Water } \Delta T \text{ (Degrees F)}}$$

Condenser flow rate (gpm) can be determined by using the following formula:

$$\text{gpm} = \frac{24 \text{ x (tons + (0.285 x compressor kW)}}{\text{Condenser Water } \Delta T \text{ (Degrees F)}}$$

Table SP-1 — Performance Adjustment Factors

Fouling Factor	Water Delta T	Capacity	Evap Gpm	kW	Cond Gpm
	8	.997	1.246	1.000	.997
0.00010	10	1.000	1.000	1.000	1.000
	12	1.004	.836	1.000	1.003
	14	1.008	.719	1.000	1.006

Note:
This selection procedure is for water only as the solution.

Cold Generator Liquid Chiller — (CGWD) — Selection Example:
Given:
System Load = 40 tons
Leaving Chilled Water Temperature (LCWT) = 44 F
Entering Condenser Water Temperature (EWT) = 85 F
Leaving Condenser Water Temperature (LWT) = 95 F
Chilled Water Temperature Drop = 10 F

1
From Table PD-2 (Performance Data), a CGWD 40 at the given conditions will produce 41.7 tons with a compressor power input of 33.2 kW and a unit EER of 15.0.

2
To determine the evaporator and condenser water pressure drops, the flow rates (gpm) must be determined. Using the formula above, this unit would require an evaporator flow rate of 101 gpm and a condenser flow rate of 123 gpm. (Compressor kW is found in the same table as the capacity.) The Evaporator Pressure Drop Curve, Figure PD-1, indicates that 101 gpm through a 40 ton evaporator results in a pressure drop of 14.0 ft. of water. The Condenser Pressure Drop curve, Chart PD-2, indicates 123 gpm through a 40 ton condenser results in a pressure drop of 17.5 ft. of water.

3
The final unit selection is:
— Qty (1) CGWD 40
— Cooling Capacity = 41.7 tons
— Entering/Leaving Chilled Water Temperatures = 54/44 F
— Chilled water flow rate = 101 gpm
— Evaporator water pressure drop = 14.0 feet
— Cooling water flow = 123 gpm
— Condenser water pressure drop = 17.5 feet
— Compressor power input = 33.2 kW
— Unit EER = 15.0

Compressor Chiller – (CCAD) – Selection Example:
Select the unit for the following conditions:

A compressor chiller is required to produce 45 tons when matched with an air-cooled condenser. The leaving chilled water temperature is 44 F. The evaporator temperature differential is 10 F. The ambient temperature is 95 F.

1
Select the nominal unit size. The performance data is tabulated by leaving chilled water temperature. For example, the standard unit capacities at 44 F leaving chilled water temperature are found on page 18. The system that best meets the tonnage requirement is a CCAD 50 matched with a CAUC C50. The unit capacity is 47.1 tons with a kW input of 56.3. The compressor chiller EER is 10.0.

2
Calculate the required chilled water flow rate.

3

$$\text{gpm} = \frac{\text{Tons x 24}}{\text{Chilled Water } \Delta T \text{ (Degrees F)}}$$

From this example,

$$\text{gpm} = \frac{47.1 \text{ x } 24}{10} = 113$$

4
Determine the evaporator water pressure drop. The evaporator water pressure drop is located on page 19. Entering the evaporator chart at 113 gpm, the pressure drop for a CCAD 50 evaporator is 7.9 feet.

5
Unit Selection
The above procedure shows the proper selection for this example is a CCAD 50 with a CAUB C50 condenser operating as follows:

— Capacity = 47.1
— Entering/leaving chilled water temperature = 54/44
— Chilled water flow rate = 113 gpm
— Evaporator water pressure drop = 7.9 feet
— Compressor power input = 56.3
— Unit EER = 10.0

Performance Adjustment Factors

Figure PAF-1 — Ethylene Glycol Performance Adjustment Factors and Solution Freezing Points

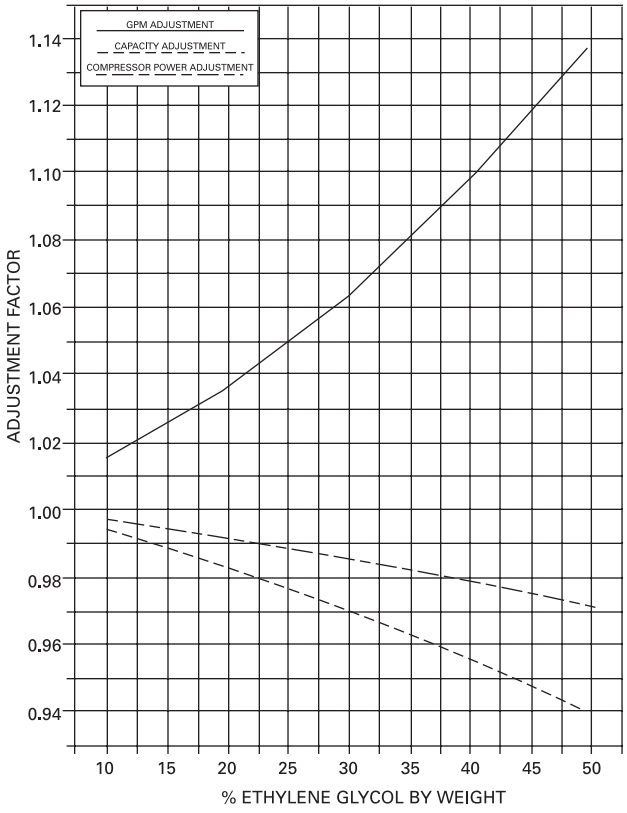


Figure PAF-2 — Propylene Glycol Performance Adjustment Factors and Solution Freezing Points

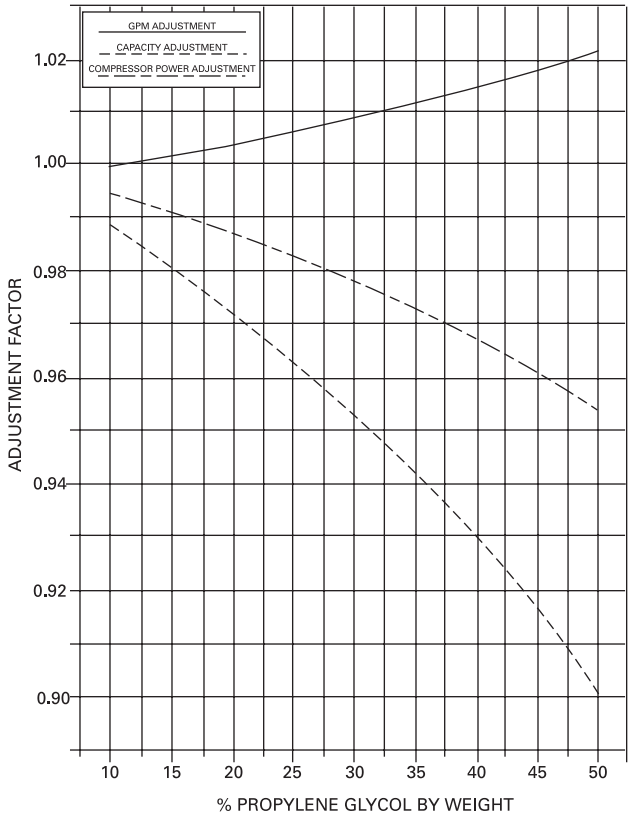


Figure PAF-3 — Ethylene Glycol and Propylene Glycol Performance Adjustment Factors and Solution Freezing Points

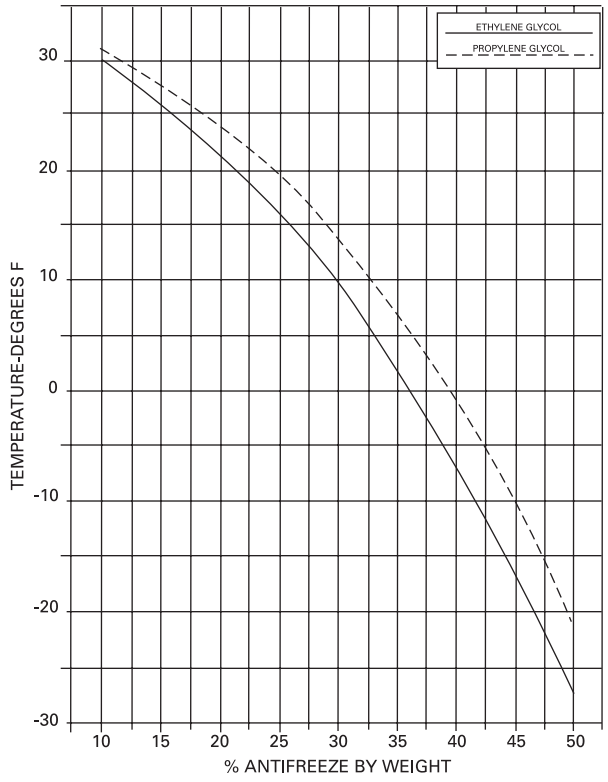


Table PAF-1 — Pressure Drop Correction Factor

Lvg Water Temp.	Percent Of Ethylene Glycol					
	0	10	20	30	40	50
0	NA	NA	NA	NA	1.50	1.60
10	NA	NA	NA	1.38	1.46	1.55
20	NA	NA	1.26	1.34	1.42	1.51
30	NA	1.15	1.22	1.30	1.38	1.47
40	1.00	1.12	1.19	1.26	1.34	1.42
50	1.00	1.09	1.16	1.23	1.31	1.39
60	1.00	1.05	1.09	1.12	1.16	1.21

Table PAF-2 — Pressure Drop Correction Factor

Lvg Water Temp.	Percent Of Propylene Glycol					
	0	10	20	30	40	50
0	NA	NA	NA	NA	1.63	1.90
10	NA	NA	NA	1.42	1.55	1.74
20	NA	NA	1.24	1.34	1.46	1.62
30	NA	1.11	1.19	1.28	1.39	1.53
40	1.00	1.07	1.15	1.23	1.33	1.45
50	1.00	1.04	1.11	1.19	1.28	1.39
60	1.00	1.00	1.03	1.08	1.13	1.20

Table PD-1 – CGWD Performance Data, 42 F Leaving Chilled Water

	Entering Condenser Water Temperature														
Unit	75			80			85			90			95		
Size	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
20	21.1	14.7	17.0	20.6	15.5	15.8	20.2	16.4	14.6	19.7	17.3	13.5	19.2	18.2	12.5
25	25.5	19.7	15.4	24.9	20.7	14.3	24.4	21.8	13.3	23.9	23.0	12.3	23.2	24.2	11.4
30	30.0	23.4	15.3	29.4	24.5	14.3	28.9	25.7	13.4	28.3	27.0	12.5	27.7	28.4	11.6
40	42.1	29.5	17.0	41.2	31.2	15.7	40.3	33.0	14.6	39.4	34.9	13.5	38.5	36.8	12.5
50	49.5	38.4	15.4	48.5	40.5	14.3	47.5	42.5	13.3	46.5	44.9	12.4	45.4	47.2	11.5
60	60.3	47.3	15.2	59.1	49.7	14.2	58.0	52.0	13.3	56.8	54.8	12.4	55.6	57.5	11.6

Table PD-2 – CGWD Performance Data, 44 F Leaving Chilled Water

	Entering Condenser Water Temperature														
Unit	75			80			85			90			95		
Size	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
20	21.7	14.7	17.5	21.3	15.5	16.3	20.8	16.5	15.0	20.3	17.4	13.9	19.8	18.3	12.9
25	26.3	19.7	15.9	25.8	20.8	14.7	25.2	21.9	13.7	24.7	23.0	12.8	24.1	24.2	11.8
30	31.0	23.5	15.7	30.4	24.7	14.7	29.8	25.7	13.8	29.2	27.2	12.8	28.6	28.5	12.0
40	43.5	29.6	17.4	42.6	31.4	16.2	41.7	33.2	15.0	40.7	35.0	13.9	39.7	36.9	12.8
50	51.1	38.5	15.9	50.1	40.6	14.7	49.1	42.8	13.7	48.0	45.0	12.7	46.9	47.3	11.8
60	62.3	47.5	15.7	61.1	49.9	14.6	60.0	52.4	13.7	58.7	55.0	12.8	57.4	57.7	11.9

Table PD-3 – CGWD Performance Data, 45 F Leaving Chilled Water

	Entering Condenser Water Temperature														
Unit	75			80			85			90			95		
Size	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
20	22.1	14.7	17.8	21.6	15.6	16.4	21.2	16.4	15.4	20.7	17.3	14.2	20.2	18.3	13.1
25	26.8	19.8	16.1	26.2	20.8	15.0	25.7	21.9	13.9	25.1	23.1	12.9	24.5	24.3	12.0
30	31.6	23.5	16.0	31.0	24.7	15.0	30.4	25.8	14.0	29.7	27.2	13.0	29.1	28.6	12.1
40	44.3	29.6	17.8	43.3	31.4	16.4	42.3	33.1	15.3	41.4	35.0	14.1	40.4	36.9	13.1
50	52.2	38.6	16.1	51.0	40.6	15.0	50.0	42.6	14.0	48.9	45.0	13.0	47.8	47.4	12.0
60	63.5	47.7	15.9	62.3	50.0	14.9	61.0	52.3	13.9	59.7	55.1	13.0	58.5	57.9	12.1

Table PD-4 – CGWD Performance Data, 46 F Leaving Chilled Water

	Entering Condenser Water Temperature														
Unit	75			80			85			90			95		
Size	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
20	22.4	14.7	18.1	22.0	15.6	16.8	21.5	16.4	15.6	21.0	17.4	14.3	20.5	18.3	13.3
25	27.2	19.8	16.3	26.6	20.8	15.2	26.1	21.9	14.2	25.5	23.1	13.1	24.9	24.3	12.2
30	32.1	23.6	16.2	31.4	24.7	15.1	30.8	25.9	14.2	30.2	27.3	13.2	29.6	28.7	12.3
40	44.9	29.7	18.0	44.0	31.5	16.6	43.1	33.2	15.5	42.0	35.1	14.3	41.0	37.0	13.2
50	53.0	38.7	16.3	51.8	40.7	15.2	50.8	42.7	14.2	49.6	45.1	13.1	48.5	47.5	12.2
60	64.4	47.8	16.1	63.2	50.1	15.1	62.1	52.5	14.1	60.7	55.2	13.2	59.4	58.0	12.2

Table PD-5 – CGWD Performance Data, 48 F Leaving Chilled Water

	Entering Condenser Water Temperature														
Unit	75			80			85			90			95		
Size	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
20	23.1	14.8	18.5	22.6	15.6	17.2	22.1	16.5	15.9	21.6	17.4	14.8	21.2	18.4	13.7
25	28.0	19.8	16.8	27.5	20.9	15.6	26.9	21.9	14.6	26.3	23.2	13.5	25.7	24.4	12.5
30	33.2	23.7	16.6	32.4	24.8	15.6	31.8	26.0	14.6	31.2	27.4	13.6	30.5	28.8	12.6
40	46.3	29.7	18.5	45.3	31.5	17.1	44.4	33.2	15.9	43.4	35.1	14.7	42.3	37.0	13.7
50	54.6	38.8	16.8	53.6	40.8	15.7	52.5	42.8	14.6	51.2	45.2	13.5	50.1	47.6	12.6
60	66.5	48.1	16.5	65.2	50.4	15.5	64.0	52.7	14.5	62.7	55.5	13.5	61.3	58.3	12.6

Table PD-6 – CGWD Performance Data, 50 F Leaving Chilled Water

	Entering Condenser Water Temperature														
Unit	75			80			85			90			95		
Size	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
20	23.9	14.8	19.1	23.3	15.7	17.6	22.8	16.5	16.4	22.3	17.5	15.2	21.8	18.4	14.1
25	28.9	19.9	17.3	28.3	21.0	16.0	27.7	22.0	15.0	27.1	23.3	13.8	26.5	24.5	12.9
30	34.2	23.8	17.1	33.6	25.0	16.0	32.8	26.1	15.0	32.2	27.5	14.0	31.5	28.9	13.0
40	47.6	29.8	19.0	46.7	31.6	17.6	45.7	33.3	16.4	44.7	35.2	15.1	43.7	37.1	14.0
50	56.3	38.9	17.3	55.2	40.9	16.1	54.1	42.9	15.1	52.9	45.3	13.9	51.6	47.7	12.9
60	68.5	48.3	16.9	67.3	50.6	15.9	66.0	52.9	14.9	64.7	55.7	13.9	63.3	58.5	12.9

Notes:
1. Rated in accordance with ARI Standard 550/590-98 with fouling factors of 0.00010 in the evaporator and 0.00025 in the condenser.
2. Consult Trane representative for performance at temperatures outside of the ranges shown.
3. kW input is for compressors only.
4. EER = Energy Efficiency Ratio (Btu/watt-hour). Power inputs include compressors and control power.
5. Ratings are based on an evaporator temperature drop of 10 F.
6. Interpolation between points is permissible. Extrapolation is not permitted.

Table PD-7 – CGWD Performance Data, 6 C Leaving Chilled Water

Unit Size	Entering Condenser Water Temperature								
	25			30			35		
	kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP
20	74.5	15.0	4.9	71.5	16.6	4.3	68.4	18.3	3.7
25	89.9	20.1	4.4	86.5	22.1	3.9	82.9	24.2	3.4
30	106.1	23.9	4.4	102.5	26.0	3.9	98.6	28.5	3.4
40	148.8	30.3	4.9	143.1	33.4	4.3	137.1	36.8	3.7
50	175.0	39.2	4.4	168.5	43.1	3.9	161.7	47.2	3.4
60	213.2	48.3	4.4	205.9	52.7	3.9	198.0	57.6	3.4

Table PD-8 – CGWD Performance Data, 8 C Leaving Chilled Water

Unit Size	Entering Condenser Water Temperature								
	25			30			35		
	kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP
20	78.8	15.1	5.2	75.8	16.6	4.5	72.6	18.3	3.9
25	95.3	20.2	4.7	91.8	22.2	4.1	88.0	24.4	3.6
30	112.7	24.1	4.6	108.7	26.2	4.1	104.8	28.8	3.6
40	157.5	30.4	5.1	151.6	33.5	4.5	145.2	37.0	3.9
50	185.8	39.5	4.7	179.0	43.2	4.1	171.7	47.5	3.6
60	226.1	48.8	4.6	218.6	53.1	4.1	210.3	58.1	3.6

Table PD-9 – CGWD Performance Data, 10 C Leaving Chilled Water

Unit Size	Entering Condenser Water Temperature								
	25			30			35		
	kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP
20	83.2	15.2	5.4	80.0	16.7	4.7	76.8	18.4	4.1
25	100.8	20.4	4.9	96.9	22.3	4.3	93.1	24.5	3.8
30	119.3	24.3	4.9	115.1	26.4	4.3	110.9	28.9	3.8
40	166.1	30.5	5.4	159.9	33.6	4.7	153.5	37.1	4.1
50	196.4	39.7	4.9	189.3	43.3	4.3	181.6	47.7	3.8
60	239.2	49.2	4.8	231.1	53.4	4.3	222.5	58.5	3.8

Notes:
1. Rated in accordance with ARI Standard 550/590-98 with fouling factors of 0.0000176 in the evaporator and 0.000044 in the condenser.
2. Consult Trane representative for performance at temperatures outside of the ranges shown.
3. kWi input is for compressors only.
4. COP = Coefficient of Performance (kWo/total kW). Total kW include compressors and control power.
5. Ratings are based on an evaporator temperature drop of 5.6 C.
6. Interpolation between points is permissible. Extrapolation is not permitted.

Table PD-10 – CGWD 20-60 Ton Part Load Performance

	CGWD 20 Unit Compressor Capacity				
	100%	75%	50%	25%	IPLV
Tons	20.8	15.6	10.4	5.2	
kW	16.4	9.3	5.3	2.7	21.2
EER	15.0	19.7	22.6	21.4	

	CGWD 25 Unit Compressor Capacity				
	100%	75%	50%	25%	IPLV
Tons	25.2	18.9	12.6	6.3	
kW	21.9	12.8	8.0	4.1	17.9
EER	13.7	17.5	18.4	17.6	

	CGWD 30 Unit Compressor Capacity				
	100%	75%	50%	25%	IPLV
Tons	29.8	22.4	14.9	7.5	
kW	25.7	15.6	9.2	4.7	18.0
EER	13.8	17.0	19.1	18.1	

	CGWD 40 Unit Compressor Capacity				
	100%	75%	50%	25%	IPLV
Tons	41.7	31.3	20.9	10.4	
kW	33.2	18.9	10.7	5.5	21.3
EER	15.0	19.6	22.9	22.1	

	CGWD 50 Unit Compressor Capacity				
	100%	75%	50%	25%	IPLV
Tons	49.1	36.8	24.6	12.3	
kW	42.8	24.9	15.3	7.8	18.3
EER	13.7	17.6	19.0	18.3	

	CGWD 60 Unit Compressor Capacity				
	100%	75%	50%	25%	IPLV
Tons	60.0	45.0	30.0	15.0	
kW	52.4	31.6	18.4	9.3	18.3
EER	13.7	17.0	19.4	18.9	

Notes:
1. IPLV values are rated in accordance with ARI Standard 550/590-98.
2. EER and IPLV values include compressor and control kW.
3. kW input is for compressors only.

Table PD-11 – CCAD Performance Data, 42 F Leaving Chilled Water

Unit	Condenser	Entering Condenser Air Temperature											
		85			95			105			115		
Size	Size	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
20	CAUC-C20	19.6	19.5	11.9	18.6	21.7	10.2	17.5	24.0	8.7	16.3	26.7	7.3
20	CAUC-C25	19.9	18.6	12.7	18.9	20.7	10.9	17.8	23.1	9.2	16.7	25.6	7.8
25	CAUC-C25	24.3	25.0	11.6	23.0	27.7	9.9	21.7	30.7	8.4	20.2	34.1	7.1
25	CAUC-C30	24.8	23.5	12.6	23.6	26.1	10.8	22.2	29.0	9.2	20.8	32.2	7.7
30	CAUC-C30	29.1	29.2	11.9	27.6	32.3	10.2	26.0	35.8	8.7	24.3	39.7	7.3
30	CAUC-C40	29.5	27.1	13.0	28.1	30.0	11.2	26.6	33.3	9.5	25.0	37.0	8.1
40	CAUC-C40	39.1	38.9	12.0	37.1	43.1	10.3	34.8	47.9	8.7	32.5	53.3	7.3
40	CAUC-C50	39.5	37.5	12.6	37.5	41.7	10.7	35.4	46.3	9.1	33.1	51.5	7.7
50	CAUC-C50	48.1	50.3	11.4	45.5	55.7	9.8	42.9	62.0	8.3	40.1	68.6	7.0
50	CAUC-C60	48.9	47.1	12.4	46.5	52.3	10.6	44.0	58.4	9.0	41.3	64.8	7.6
60	CAUC-C60	57.5	58.5	11.7	54.5	65.0	10.0	51.4	72.0	8.5	48.1	80.0	7.2
60	CAUC-C80	58.1	53.7	12.9	55.3	59.8	11.1	52.4	66.6	9.4	49.1	74.0	7.9

Table PD-12 – CCAD Performance Data, 44 F Leaving Chilled Water

Unit	Condenser	Entering Condenser Air Temperature											
		85			95			105			115		
Size	Size	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
20	CAUC-C20	20.2	19.7	12.2	19.2	21.9	10.5	18.0	24.3	8.8	16.8	26.9	7.4
20	CAUC-C25	20.6	18.8	13.0	19.5	20.9	11.1	18.4	23.3	9.4	17.3	25.8	8.0
25	CAUC-C25	25.1	25.2	11.9	23.8	28.0	10.2	22.4	31.0	8.6	20.9	34.4	7.3
25	CAUC-C30	25.6	23.8	12.8	24.4	26.4	11.0	23.0	29.3	9.4	21.5	32.5	7.9
30	CAUC-C30	30.0	29.5	12.1	28.5	32.7	10.4	26.9	36.2	8.9	25.1	40.1	7.5
30	CAUC-C40	30.5	27.3	13.4	29.1	30.3	11.5	27.5	33.6	9.8	25.9	37.3	8.3
40	CAUC-C40	40.3	39.3	12.2	38.2	43.5	10.5	35.9	48.3	8.9	33.6	53.7	7.5
40	CAUC-C50	40.8	37.9	12.8	38.7	42.1	11.0	36.5	46.7	9.3	34.2	51.9	7.9
50	CAUC-C50	49.6	50.7	11.7	47.1	56.3	10.0	44.3	62.4	8.5	41.4	69.2	7.2
50	CAUC-C60	50.6	47.5	12.7	48.0	52.7	10.9	45.4	58.8	9.2	42.7	65.4	7.8
60	CAUC-C60	59.3	58.6	12.1	56.2	65.6	10.3	53.1	72.8	8.7	49.7	80.8	7.4
60	CAUC-C80	60.0	54.1	13.2	57.1	60.2	11.4	54.1	67.0	9.7	50.9	74.6	8.2

Table PD-13 – CCAD Performance Data, 45 F Leaving Chilled Water

Unit	Condenser	Entering Condenser Air Temperature											
		85			95			105			115		
Size	Size	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
20	CAUC-C20	20.5	19.8	12.3	19.5	22.0	10.6	18.3	24.4	8.9	17.1	27.0	7.5
20	CAUC-C25	20.9	18.9	13.1	19.8	21.0	11.3	18.7	23.4	9.5	17.5	25.9	8.1
25	CAUC-C25	25.5	25.4	12.0	24.2	28.1	10.3	22.8	31.2	8.7	21.3	34.5	7.4
25	CAUC-C30	26.1	23.9	13.0	24.8	26.5	11.2	23.4	29.4	9.5	21.9	32.6	8.0
30	CAUC-C30	30.5	29.6	12.3	29.0	32.8	10.6	27.3	36.4	9.0	25.5	40.3	7.6
30	CAUC-C40	31.0	27.4	13.5	29.5	30.4	11.6	28.0	33.8	9.9	26.3	37.5	8.4
40	CAUC-C40	40.9	39.5	12.3	38.8	43.7	10.6	36.6	48.5	9.0	34.1	53.9	7.6
40	CAUC-C50	41.4	38.1	12.9	39.3	42.1	11.1	37.1	46.9	9.4	34.8	52.1	8.0
50	CAUC-C50	50.4	50.9	11.8	47.8	56.5	10.1	45.0	62.8	8.6	42.1	69.6	7.2
50	CAUC-C60	51.4	47.7	12.9	48.8	53.1	11.0	46.2	59.0	9.4	43.4	65.6	7.9
60	CAUC-C60	60.2	59.3	12.1	57.2	65.8	10.4	53.9	73.0	8.8	50.6	81.0	7.5
60	CAUC-C80	61.0	54.3	13.4	58.0	60.6	11.5	55.0	67.4	9.8	51.7	74.8	8.3

Notes:
1. Ratings based on sea level altitude and evaporator fouling factor of 0.00010.
2. Consult Trane representative for performance at temperatures outside of the ranges shown.
3. kW input is for compressors only.
4. EER = Energy Efficiency Ratio (Btu/watt-hour). Power inputs include compressors and control power.
5. Ratings are based on an evaporator temperature drop of 10 F.
6. Interpolation between points is permissible. Extrapolation is not permitted.
7. Rated in accordance with ARI Standard 550/590-98.

Table PD-14 – CCAD Performance Data, 46 F Leaving Chilled Water

Unit	Condenser	Entering Condenser Air Temperature											
		85			95			105			115		
Size	Size	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
20	CAUC-C20	20.9	19.9	12.5	19.8	22.1	10.7	18.6	24.5	9.1	17.4	27.2	7.6
20	CAUC-C25	21.2	18.9	13.3	20.2	21.1	11.4	19.0	23.5	9.7	17.8	26.0	8.2
25	CAUC-C25	26.0	25.5	12.2	24.5	28.3	10.4	23.1	31.3	8.8	21.6	34.7	7.4
25	CAUC-C30	26.5	24.0	13.2	25.2	26.6	11.3	23.8	29.6	9.6	22.2	32.7	8.1
30	CAUC-C30	31.0	29.8	12.4	29.4	33.0	10.6	27.8	36.5	9.1	26.0	40.5	7.7
30	CAUC-C40	31.5	27.5	13.7	30.0	30.5	11.8	28.5	33.9	10.1	26.8	37.6	8.5
40	CAUC-C40	41.5	38.7	12.8	39.4	43.9	10.7	37.2	48.9	9.1	34.7	54.1	7.7
40	CAUC-C50	42.1	38.1	13.2	39.9	42.3	11.3	37.7	47.1	9.6	35.4	52.3	8.1
50	CAUC-C50	51.1	51.3	11.9	48.5	56.7	10.2	45.7	63.0	8.7	42.7	70.0	7.3
50	CAUC-C60	52.2	47.9	13.0	49.6	53.3	11.1	46.9	59.2	9.5	44.1	65.8	8.0
60	CAUC-C60	61.1	59.5	12.3	58.1	66.2	10.5	54.8	73.4	8.9	51.4	81.4	7.6
60	CAUC-C80	61.9	54.5	13.6	59.0	60.8	11.6	55.8	67.6	9.9	52.6	75.2	8.4

Table PD-15 – CCAD Performance Data, 48 F Leaving Chilled Water

Unit	Condenser	Entering Condenser Air Temperature											
		85			95			105			115		
Size	Size	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
20	CAUC-C20	21.5	20.2	12.7	20.4	22.3	10.9	19.2	24.7	9.3	17.9	27.4	7.8
20	CAUC-C25	21.9	19.1	13.6	20.8	21.3	11.7	19.6	23.7	9.9	18.4	26.3	8.4
25	CAUC-C25	26.8	25.8	12.4	25.3	28.5	10.6	23.9	31.6	9.0	22.3	35.0	7.6
25	CAUC-C30	27.3	24.2	13.5	26.0	26.8	11.6	24.6	29.7	9.9	23.1	33.0	8.3
30	CAUC-C30	31.9	30.1	12.7	30.4	33.3	10.9	28.7	36.9	9.3	26.9	40.8	7.9
30	CAUC-C40	32.6	27.8	14.0	31.0	30.8	12.0	29.4	34.2	10.3	27.7	37.9	8.7
40	CAUC-C40	42.8	40.1	12.7	40.6	44.5	10.9	38.3	49.3	9.3	35.8	54.7	7.8
40	CAUC-C50	43.3	38.5	13.4	41.2	42.7	11.5	38.9	47.5	9.8	36.5	52.7	8.3
50	CAUC-C50	52.7	51.7	12.2	50.0	57.3	10.4	47.2	63.6	8.9	44.1	70.4	7.5
50	CAUC-C60	53.8	48.3	13.3	51.2	53.7	11.4	48.4	59.8	9.7	45.5	66.4	8.2
60	CAUC-C60	63.0	60.4	12.5	59.9	66.8	10.7	56.5	74.2	9.1	53.0	82.2	7.7
60	CAUC-C80	63.8	54.9	13.9	60.9	62.0	11.7	57.6	68.0	10.1	54.3	75.6	8.6

Table PD-16 – CCAD Performance Data, 50 F Leaving Chilled Water

Unit	Condenser	Entering Condenser Air Temperature											
		85			95			105			115		
Size	Size	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
20	CAUC-C20	22.1	20.4	12.9	21.0	22.6	11.1	19.8	25.0	9.5	18.5	27.7	8.0
20	CAUC-C25	22.5	19.4	13.9	21.4	21.5	11.9	20.3	23.9	10.2	19.0	26.5	8.6
25	CAUC-C25	27.6	26.0	12.7	26.2	28.8	10.8	24.6	31.9	9.2	23.1	35.3	7.8
25	CAUC-C30	28.2	24.4	13.8	26.8	27.0	11.9	25.4	30.0	10.1	23.8	33.2	8.6
30	CAUC-C30	32.9	30.4	12.9	31.3	33.7	11.1	29.6	37.3	9.5	27.8	41.2	8.1
30	CAUC-C40	33.6	28.0	14.3	32.1	31.0	12.4	30.3	34.4	10.5	28.6	38.2	9.0
40	CAUC-C40	44.0	40.5	13.0	41.8	44.9	11.1	39.5	49.7	9.5	37.0	55.1	8.0
40	CAUC-C50	44.6	38.9	13.7	42.5	43.1	11.8	40.1	47.9	10.0	37.6	53.1	8.5
50	CAUC-C50	54.2	52.3	12.4	51.5	57.9	10.6	48.6	64.2	9.1	45.5	71.2	7.7
50	CAUC-C60	55.4	48.7	13.6	52.8	54.1	11.6	50.0	60.2	9.9	46.9	66.8	8.4
60	CAUC-C60	64.9	61.0	12.7	61.7	67.6	10.9	58.4	74.8	9.3	54.7	83.0	7.9
60	CAUC-C80	65.8	55.5	14.2	62.8	61.6	12.2	59.5	68.6	10.4	56.0	76.2	8.8

1. Ratings based on sea level altitude and evaporator fouling factor of 0.00010.
2. Consult Trane representative for performance at temperatures outside of the ranges shown.
3. kW input is for compressors only.
4. EER = Energy Efficiency Ratio (Btu/watt-hour). Power inputs include compressors and control power.
5. Ratings are based on an evaporator temperature drop of 10 F.
6. Interpolation between points is permissible. Extrapolation is not permitted.
7. Rated in accordance with ARI Standard 550/590-98.

Table PD-17 – CCAD Performance Data, 6 C Leaving Chilled Water

Unit	Condenser	Entering Condenser Air Temperature											
		30			35			40			45		
Size	Size	kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP
20	CAUC-C20	69.4	19.8	3.5	66.2	21.7	3.0	62.5	23.8	2.6	58.7	26.2	2.2
20	CAUC-C25	70.7	18.9	3.7	67.3	20.7	3.2	63.8	22.9	2.8	60.3	25.1	2.4
25	CAUC-C25	86.2	25.3	3.4	82.1	27.8	2.9	77.8	30.5	2.5	73.1	33.5	2.2
25	CAUC-C30	87.8	23.8	3.7	84.0	26.2	3.2	79.7	28.8	2.8	75.2	31.7	2.4
30	CAUC-C30	103.0	29.6	3.5	98.2	32.4	3.0	93.1	35.6	2.6	87.9	39.1	2.2
30	CAUC-C40	104.7	27.4	3.8	100.3	30.1	3.3	95.3	33.1	2.9	90.2	36.4	2.5
40	CAUC-C40	138.4	39.5	3.5	131.9	43.3	3.0	124.8	47.6	2.6	117.5	52.4	2.2
40	CAUC-C50	140.0	38.1	3.7	133.6	41.9	3.2	126.8	46.0	2.7	119.5	50.7	2.3
50	CAUC-C50	170.2	51.0	3.3	162.3	56.0	2.9	153.8	61.5	2.5	144.8	67.5	2.1
50	CAUC-C60	173.5	47.8	3.6	165.7	52.5	3.1	157.6	57.9	2.7	149.0	63.7	2.3
60	CAUC-C60	203.5	59.2	3.4	194.1	65.2	3.0	184.2	71.6	2.6	173.6	78.7	2.2
60	CAUC-C80	206.0	54.5	3.8	197.0	59.9	3.3	187.6	66.1	2.8	177.5	72.7	2.4

Table PD-18 — CCAD Performance Data, 8 C Leaving Chilled Water

Unit	Condenser	Entering Condenser Air Temperature											
		30			35			40			45		
Size	Size	kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP
20	CAUC-C20	73.5	20.2	3.6	70.0	22.1	3.1	66.2	24.3	2.7	62.3	26.7	2.3
20	CAUC-C25	74.8	19.2	3.9	71.5	21.1	3.4	67.7	23.3	2.9	63.9	25.5	2.5
25	CAUC-C25	91.3	25.8	3.5	86.8	28.3	3.1	82.4	31.0	2.6	77.6	34.1	2.3
25	CAUC-C30	93.3	24.3	3.8	89.1	26.6	3.3	84.6	29.3	2.9	79.9	32.1	2.5
30	CAUC-C30	109.1	30.2	3.6	104.0	33.0	3.1	98.9	36.2	2.7	93.2	39.8	2.3
30	CAUC-C40	111.1	27.8	4.0	106.3	30.5	3.5	101.4	33.6	3.0	96.1	36.9	2.6
40	CAUC-C40	146.1	39.5	3.7	139.3	44.0	3.1	132.2	48.5	2.7	124.6	53.2	2.3
40	CAUC-C50	148.0	38.6	3.8	141.3	42.4	3.3	134.3	46.7	2.9	126.9	51.4	2.5
50	CAUC-C50	179.9	52.0	3.4	171.5	56.9	3.0	162.8	62.5	2.6	153.3	68.7	2.2
50	CAUC-C60	183.7	48.5	3.8	175.6	53.4	3.3	167.0	58.7	2.8	158.0	64.6	2.4
60	CAUC-C60	215.1	60.4	3.5	205.4	66.3	3.1	195.1	72.8	2.7	184.3	80.0	2.3
60	CAUC-C80	217.9	55.3	3.9	208.6	61.0	3.4	198.6	67.0	3.0	188.4	73.8	2.5

Table PD-19 – CCAD Performance Data, 10 C Leaving Chilled Water

Unit	Condenser	Entering Condenser Air Temperature											
		30			35			40			45		
Size	Size	kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP
20	CAUC-C20	77.4	20.6	3.7	73.8	22.6	3.3	70.0	24.7	2.8	65.9	27.1	2.4
20	CAUC-C25	78.9	19.6	4.0	75.4	21.5	3.5	71.9	23.6	3.0	67.8	25.9	2.6
25	CAUC-C25	96.4	26.2	3.7	92.0	28.8	3.2	87.2	31.6	2.7	82.4	34.6	2.4
25	CAUC-C30	98.7	24.6	4.0	94.2	27.0	3.5	89.7	29.7	3.0	84.7	32.5	2.6
30	CAUC-C30	115.2	30.7	3.7	110.1	33.7	3.3	104.6	36.9	2.8	98.9	40.4	2.4
30	CAUC-C40	117.5	28.3	4.1	112.7	31.0	3.6	107.3	34.0	3.1	101.8	37.4	2.7
40	CAUC-C40	154.0	40.9	3.7	147.0	44.9	3.3	139.6	49.2	2.8	131.7	54.1	2.4
40	CAUC-C50	156.0	39.3	3.9	149.3	43.1	3.4	142.0	47.4	3.0	134.0	52.1	2.6
50	CAUC-C50	189.7	52.9	3.6	181.1	57.9	3.1	171.8	63.5	2.7	162.3	69.8	2.3
50	CAUC-C60	193.9	49.3	3.9	185.6	54.1	3.4	176.6	59.6	3.0	167.1	65.4	2.5
60	CAUC-C60	227.2	61.6	3.7	216.9	67.6	3.2	206.4	74.1	2.8	195.0	81.4	2.4
60	CAUC-C80	230.4	56.1	4.1	220.8	61.6	3.6	210.2	67.9	3.1	199.4	74.7	2.7

Notes:
1. Ratings based on sea level altitude and evaporator fouling factor of 0.0000176.
2. Consult Trane representative for performance at temperatures outside of the ranges shown.
3. kWi input is for compressors only.
4. COP = Coefficient of Performance (kWo/total kW). Total kW include compressors and control power.
5. Ratings are based on an evaporator temperature drop of 5.6 C.
6. Interpolation between points is permissible. Extrapolation is not permitted.
7. Rated in accordance with ARI Standard 550/590-98.

Chart PD-1 — Evaporator Pressure Drops

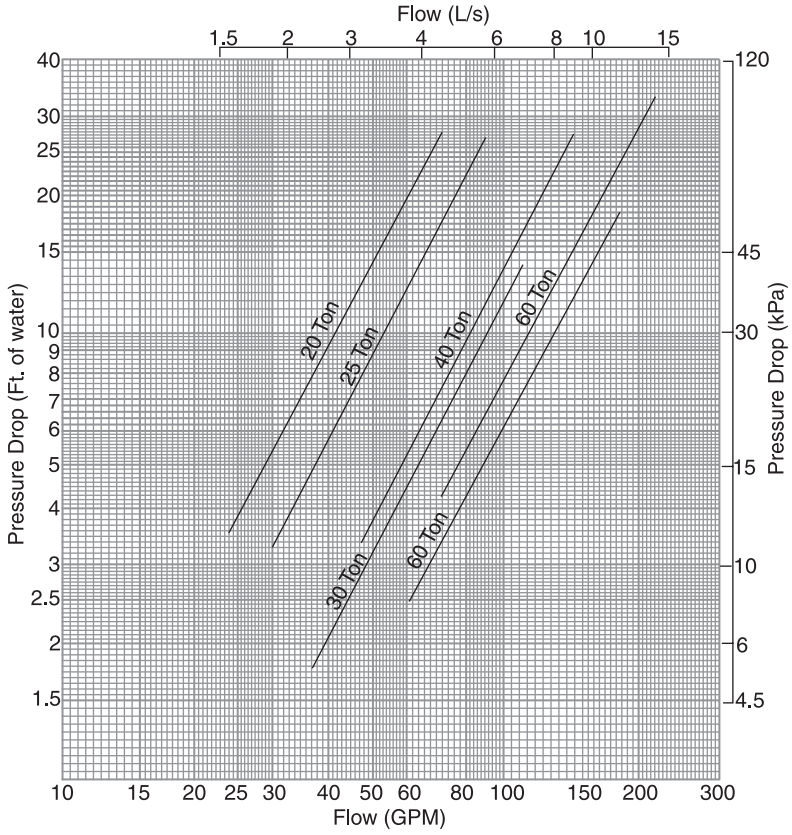


Chart PD-2 — Condenser Pressure Drops

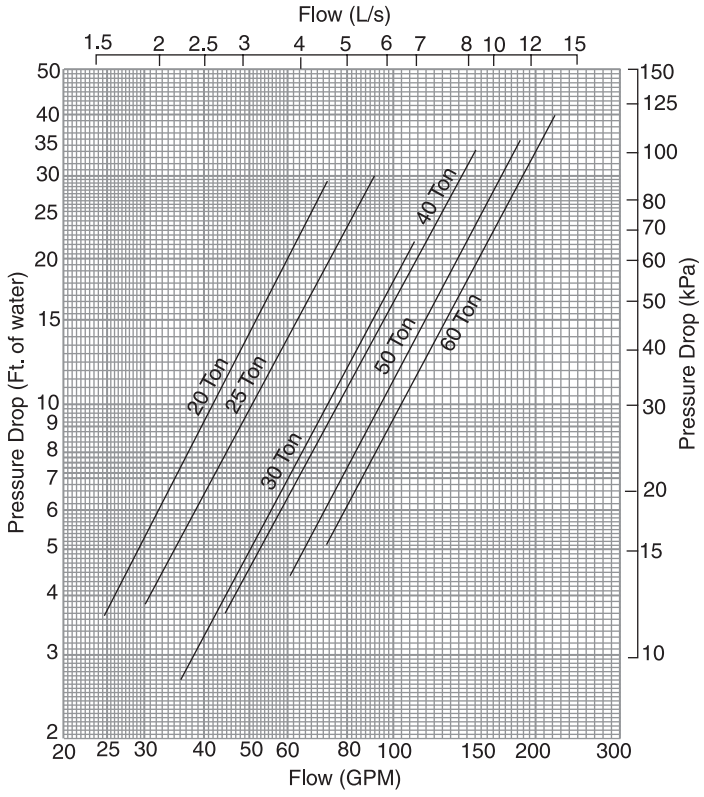


Table E-1 — Electrical Data Model CGWD Units (See Note 1)

	Wiring Data — 60 Cycle, 3-Phase					Motor Electrical Data		
	Unit Wiring Data					Compressor		Controls
Unit Size	Rated Voltage	Minimum Circuit Ampacity	Max Fuse Size	Recommended Dual Element Fuse Size	Qty	RLA Each	LRA Each	kW
20	200/230	77	110	90	2-10	34	251	.16
	380	39	50	45		17	142	.16
	460	32	45	35		14	117	.16
	575	29	35	30		13	94	.16
25	200/230	99	150	125	1-15	52/34	376/251	.16
	380	51	70	60		27/17	215/142	.16
	460	43	60	50	1-10	23/14	178/117	.16
	575	36	50	40		18/13	143/94	.16
30	200/230	117	150	150	2-15	52	376	.16
	380	61	80	70		27	215	.16
	460	52	70	60		23	178	.16
	575	41	50	45		18	143	.16
40	200/230	145	175	175	4-10	34	251	.24
	380	73	80	80		17	142	.24
	460	60	70	70		14	117	.24
	575	55	60	60		13	94	.24
50	200/230	185	225	200	2-15	52/34	376/251	.24
	380	95	110	100		27/17	215/142	.24
	460	80	100	90	2-10	23/14	178/117	.24
	575	67	80	70		18/13	143/94	.24
60	200/230	221	250	250	4-15	52	376	.24
	380	115	125	125		27	215	.24
	460	98	110	110		23	178	.24
	575	77	90	90		18	143	.24

Notes:

1. If unit is ordered with CDTE (Condenser entering water temp) = HIGH (90-123 F), use CCAD electrical information on following page.
2. Minimum circuit ampacity is 125% of the largest compressor RLA, plus 100% of the remaining compressor(s) RLA, per NEC 440-32 and NEC 440-33.
3. Maximum fuse size is 225% of the largest compressor RLA, plus 100% of the remaining compressor(s) RLA, per NEC 440-33.
4. Recommended dual element fuse size is 150% of the largest compressor RLA, plus 100% of remaining compressor(s) RLA, per NEC 440-33.
5. Use copper conductors only.
6. VOLTAGE UTILIZATION RANGE:

Rated Voltage	Utilization Range
200-230/60	180-253
380/60	342-418
460/60	414-506
575/60	517-633

7. Local codes may take precedence.

Table E-2 — Electrical Data Model CCAD Units

	Wiring Data — 60 Cycle, 3-Phase					Motor Electrical Data		
	Unit Wiring Data					Compressor		Controls
Unit Size	Rated Voltage	Minimum Circuit Ampacity	Max Fuse Size	Recommended Dual Element Fuse Size	Qty	RLA Each	LRA Each	kW
20	200/230	88	125	100	2-10	39	251	.16
	380	52	60	50		20	142	.16
	460	39	50	45		17	117	.16
	575	32	45	35		14	94	.16
25	200/230	112	150	150	1-15 1-10	58/39	376/251	.16
	380	59	80	70		31/20	215/142	.16
	460	50	70	60		26/17	178/117	.16
	575	41	60	50		21/14	143/94	.16
30	200/230	131	175	150	2-15	58	376	.16
	380	70	100	90		31	215	.16
	460	59	80	70		26	178	.16
	575	48	60	60		21	143	.16
40	200/230	166	200	200	4-10	39	251	.24
	380	85	100	90		20	142	.24
	460	73	80	80		17	117	.24
	575	60	70	70		14	94	.24
50	200/230	209	250	225	2-15 2-10	58/39	376/251	.24
	380	110	125	125		31/20	215/142	.24
	460	93	110	100		26/17	178/117	.24
	575	76	90	90		21/14	143/94	.24
60	200/230	247	300	275	4-15	58	376	.24
	380	132	150	150		31	215	.24
	460	111	125	125		26	178	.24
	575	90	110	100		21	143	.24

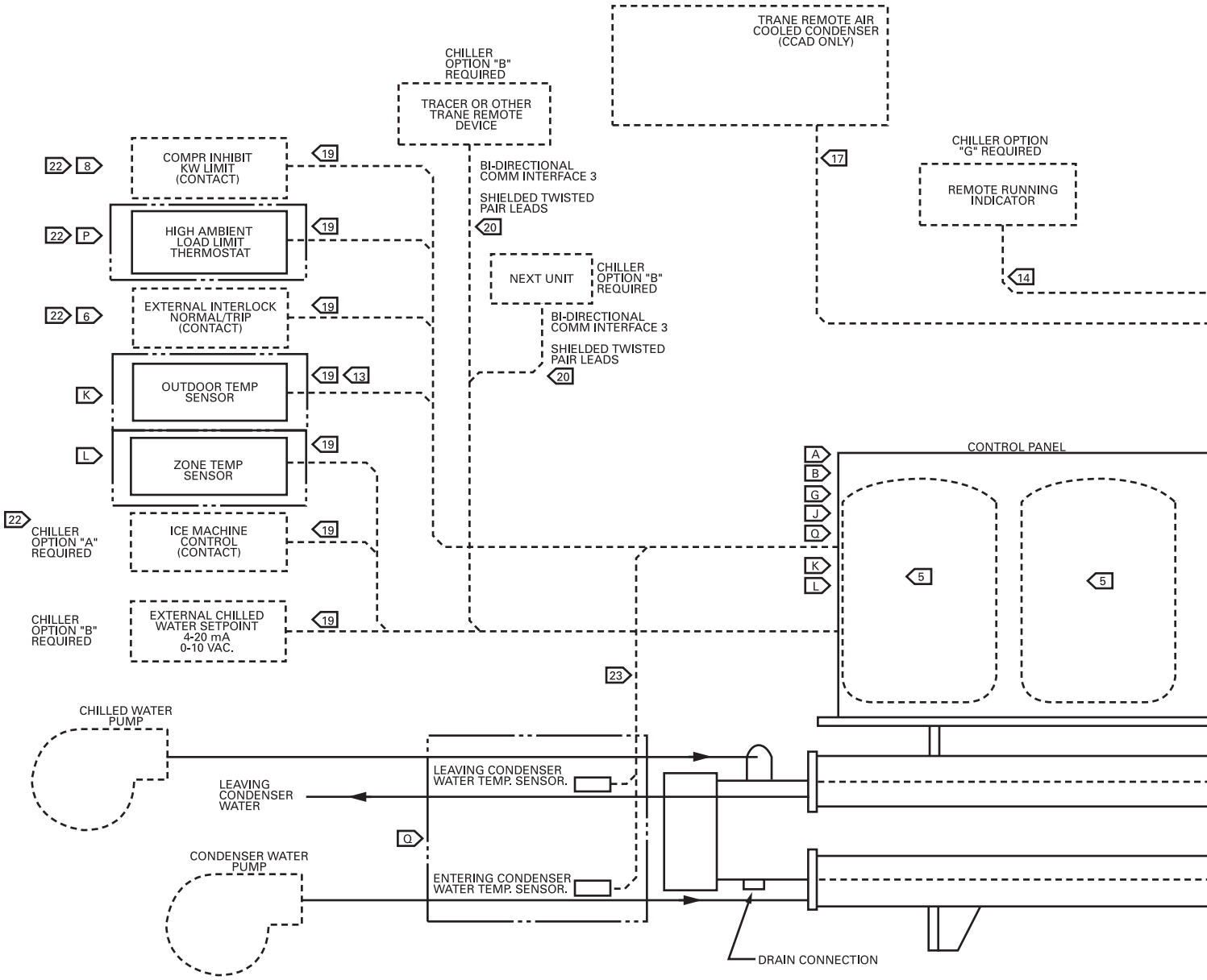
Notes:

1. Minimum circuit ampacity is 125% of the largest compressor RLA, plus 100% of the remaining compressor(s) RLA, per NEC 440-32 and NEC 440-33.
2. Maximum fuse size is 225% of the largest compressor RLA, plus 100% of the remaining compressor(s) RLA, per NEC 440-33.
3. Recommended dual element fuse size is 150% of the largest compressor RLA, plus 100% of remaining compressor(s) RLA, per NEC 440-33.
4. Use copper conductors only.
5. VOLTAGE UTILIZATION RANGE:

Rated Voltage	Utilization Range
200-230/60	180-253
380/60	342-418
460/60	414-506
575/60	517-633

6. Local codes may take precedence.

Jobsite Connections



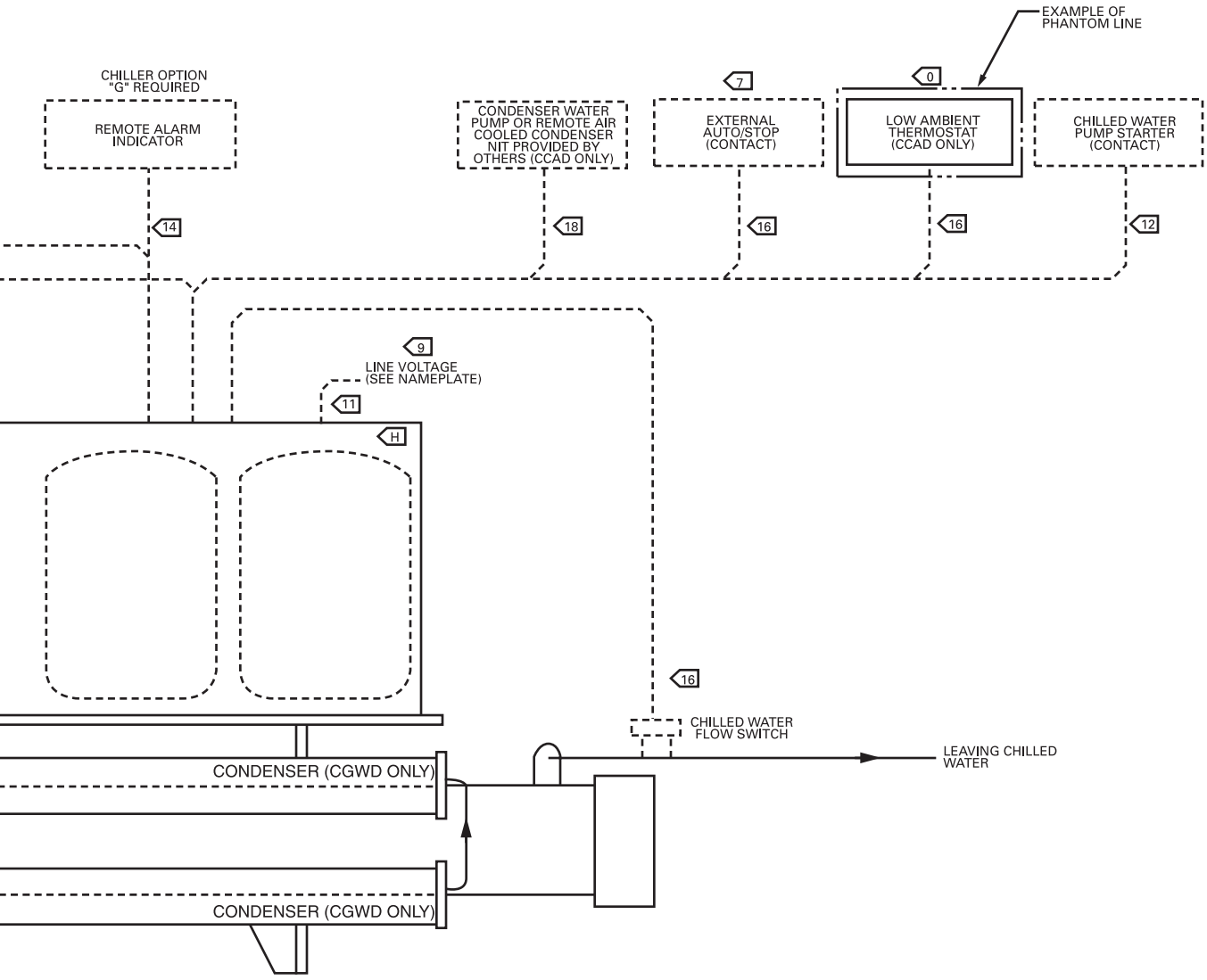
NOTES:

1. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS. PHANTOM LINES INDICATE ALTERNATE CIRCUITRY OR AVAILABLE SALES OPTION. CHECK SALES ORDER TO DETERMINE IF WIRING IS REQUIRED FOR SPECIFIC OPTIONS.
2. ALL THREE PHASE MOTORS SUPPLIED WITH THE UNIT ARE PROTECTED UNDER PRIMARY SINGLE PHASE FAILURE CONDITIONS.
3. CAUTION - DO NOT ENERGIZE UNIT UNTIL CHECK OUT AND START-UP PROCEDURES HAVE BEEN COMPLETED.
4. THE FOLLOWING CAPABILITIES ARE OPTIONAL - THEY ARE IMPLEMENTED AND WIRED AS REQUIRED FOR A SPECIFIC SYSTEM APPLICATION.

A ICE-MACHINE CONTROL
B COMMUNICATIONS INTERFACE
G REMOTE RUNNING INDICATION AND ALARM CONTACTS
H UNIT DISCONNECT, NON-FUSED
J CHILLED WATER RESET - RETURN WATER
K CHILLED WATER RESET - OUTDOOR AIR TEMP. SENSOR OPTIONAL ON CGWD AND STANDARD ON CCAD.
L CHILLED WATER RESET - ZONE AIR
O LOW AMBIENT THERMOSTAT
P HIGH AMBIENT LOAD LIMIT THERMOSTAT
Q ENTERING AND LEAVING CONDENSER WATER TEMP. SENSOR. MATCHED PAIR OF THERMESTORS. SENSOR KIT SHIPPED WITH UNIT AND FACTORY INSTALLED.

5. NOT USED ON 20-30 TON UNITS.
6. AUXILIARY CONTROLS FOR A CUSTOMER SPECIFIED OR INSTALLED LATCHING TRIPOUT. THE CHILLER WILL RUN NORMALLY WHEN THE CONTACT IS CLOSED AND TRIP THE CHILLER OFF ON MANUALLY RESETTABLE DIAGNOSTIC WHEN THE CONTACT OPENS. MANUAL RESET IS ACCOMPLISHED AT THE CHILLER SWITCH ON THE FRONT OF THE UNIT CONTROL MODULE (UCM).
7. AUXILIARY CONTROLS FOR A CUSTOMER SPECIFIED OR INSTALLED REMOTE AUTO/STOP FUNCTION. THE CHILLER WILL RUN NORMALLY WHEN THE CONTACT IS CLOSED AND STOP THE CHILLER WHEN THE CONTACT IS OPEN. RE-CLOSURE OF THE CONTACT WILL PERMIT THE CHILLER TO AUTOMATICALLY RETURN TO NORMAL OPERATION.
8. AUXILIARY CONTROLS FOR A CUSTOMER SPECIFIED OR INSTALLED DEMAND LIMIT FUNCTION. THE CHILLER WILL RUN NORMALLY WHEN THE CONTACT IS CLOSED AND LIMIT CHILLER OPERATION TO ONE COMPRESSOR PER CIRCUIT WHEN THE CONTACT OPENS. . RE-CLOSURE OF THE CONTACT WILL PERMIT THE CHILLER TO AUTOMATICALLY RETURN TO NORMAL OPERATION.

Jobsite Connections



WIRING :

10. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC), STATE, AND LOCAL REQUIREMENTS. OUTSIDE THE UNITED STATES, OTHER COUNTRIES APPLICABLE NATIONAL AND/OR LOCAL REQUIREMENTS SHALL APPLY.

REQUIRED WIRING:

11. COPPER WIRE ONLY - SIZED PER N.E.C. - BASED ON NAMEPLATE RLA. SEE CUSTOMER WIRE SELECTION TABLE.
12. 2 WIRES, 115 VAC CIRCUIT. MINIMUM CONTACT RATING AT 115 VAC - 6.9 VA INRUSH. 1.3 VA SEALED.
13. CCAD UNITS WITH AIR COOLED CONDENSER ONLY. 2 WIRES, 30 VOLT OR LESS CIRCUIT. DO NOT RUN IN CONDUIT WITH HIGHER VOLTAGE CIRCUITS. SEE CUSTOMER WIRE SELECTION TABLE.

OPTIONAL WIRING:

14. 3 WIRES. 115 VAC CIRCUIT. SEPARATE 115 VAC POWER SUPPLY IS REQUIRED. LOAD NOT TO EXCEED 115 VA SEALED, 1150 VA INRUSH.
16. 2 WIRES. 115 VAC CIRCUIT. MINIMUM CONTACT RATING AT 115 VAC - 6.9 VA INRUSH, 1.3 VA SEALED.
17. 3 WIRES ON 20-30 TON UNITS. 6 WIRES ON 40-60 TON UNITS. 115 VAC CIRCUIT. SEPARATE 115 VAC POWER SUPPLY REQUIRED. LOAD NOT TO EXCEED 115 VA SEALED, 1150 VA INRUSH.
18. 2 WIRES. 115 VAC CIRCUIT. SEPARATE 115 VAC POWER SUPPLY IS REQUIRED. LOAD NOT TO EXCEED 1150 VA INRUSH, 115 VA SEALED.
19. 2 WIRES. 30 VOLT OR LESS CIRCUIT. DO NOT RUN IN CONDUIT WITH HIGHER VOLTAGE CIRCUITS. SEE CUSTOMER WIRE SELECTION TABLE.
20. SHIELDED TWISTED PAIR, 30V OR LESS CIRCUIT. MAXIMUM LENGTH 5000 FT. DO NOT RUN IN CONDUIT WITH HIGHER VOLTAGE WIRE. SEE CUSTOMER WIRE SELECTION TABLE.
22. CUSTOMER SUPPLIED CONTACTS MUST BE COMPATIBLE WITH DRY CIRCUIT 12 VDC, 45 mA RESISTIVE LOAD. SILVER OR GOLD PLATED CONTACTS ARE RECOMMENDED.
23. SENSOR LEADS TO REACH CONTROL PANEL. 30 VOLT OR LESS CIRCUIT. DO NOT RUN IN CONDUIT WITH HIGHER VOLTAGE CIRCUITS.

Controls

A microcomputer-based controller controls the CGWD and CCAD Cold Generator® chiller. The microcomputer controller provides better control than past controls with several new, important benefits.

Customized Control
The microcomputer-based controller allows Trane to customize controls around the chiller application and the specific components used in the Cold Generator® chiller. For instance, the compressor protection system is specifically designed for the Trane scroll compressor. The leaving chilled water temperature control algorithm maintains accurate temperature control, minimizes the drift from set point and provides better building comfort. The microcomputer control incorporates improved chiller start-up, load limiting, compressor anti-recycle timing and lead/lag functions into standard chiller operation.

Simple Interface with Other Control Systems
Microcomputer controls afford simple interface with other control systems, such as time clocks, building automation systems and ice storage systems. Wiring to the unit can be as simple as two wires! You can have the flexibility to meet job requirements without learning a complicated control system.

Safety Controls
A centralized microcomputer offers a higher level of machine protection. Since the safety controls are smarter, compressor operation can be limited to avoid compressor or evaporator failures, minimizing nuisance shutdown. For instance, if the head pressure on a unit is approaching the trip point, the controller will turn off a compressor and display an alarm to indicate a head pressure problem. This keeps cooling capacity available until the problem can be solved. Whenever possible, the chiller is allowed to perform its function: make chilled water. In addition, microcomputer controls allow for more types of protection as standard, such as over and under voltage! Overall, the safety controls help keep the building running and out of trouble.

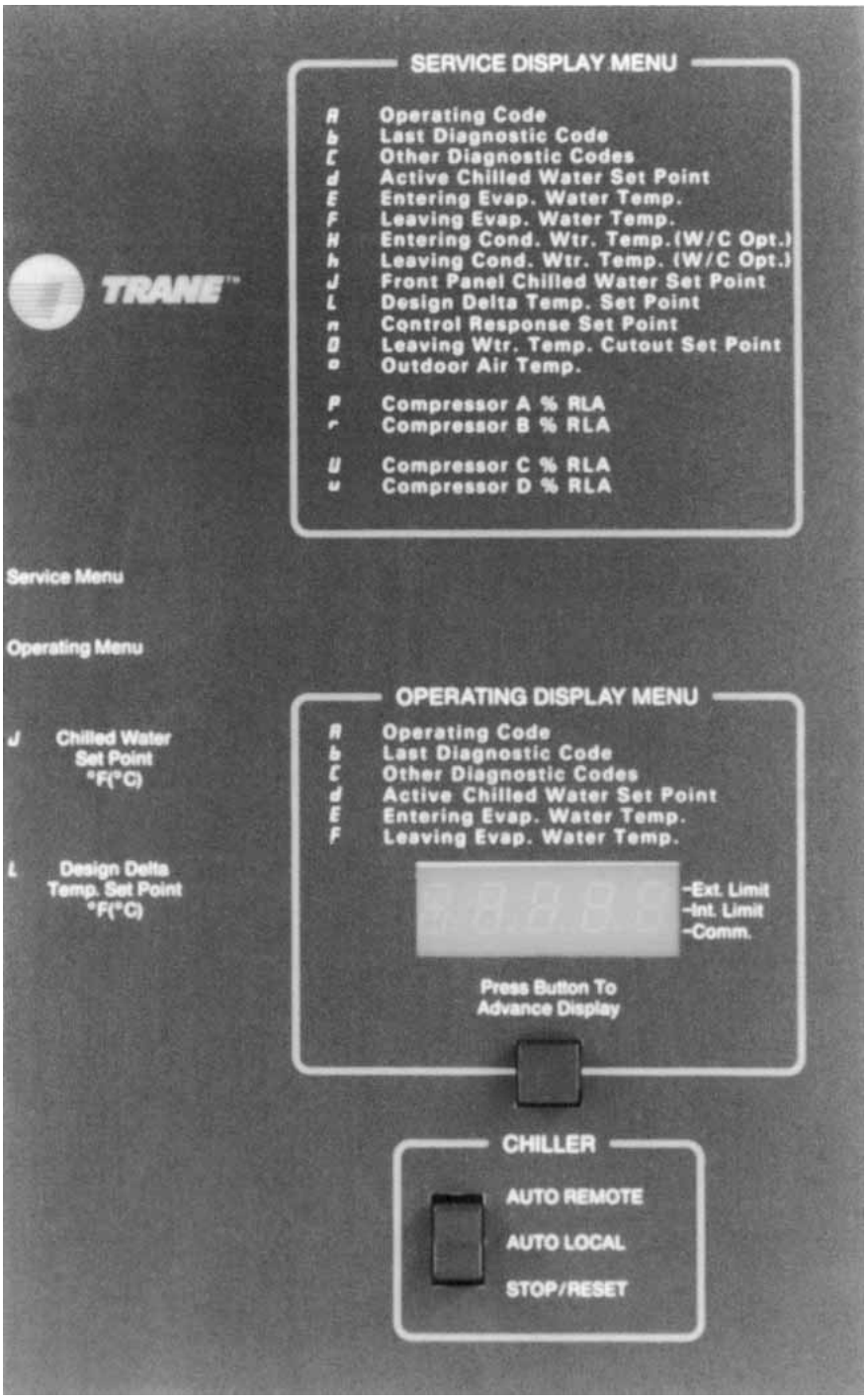
Monitoring and Diagnostics
The microcomputer provides all control functions and can easily indicate such parameters as leaving chilled water temperature and capacity stage. If a failure does occur, one of over 40 individual diagnostic codes will be used to indicate the problem, giving more specific information about the failure. The repair of the unit can occur in a shorter period of time. All of the monitoring and diagnostic information is displayed directly on a microcomputer display.

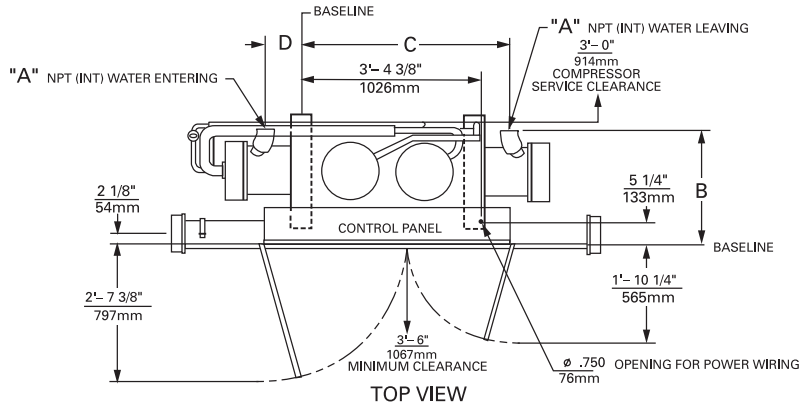
Interface with the Trane Integrated Comfort™ System (ICS)
When the Cold Generator chiller is used in conjunction with a Trane Tracer® system, the unit can be monitored and controlled from a remote location. The Cold Generator chiller can be controlled to fit into the overall building control strategy by using auto/stop, compressor inhibit and chilled water reset functions.

All of the monitoring information indicated on the microcomputer can be read off the Tracer system display. In addition, all the powerful diagnostic information can be read back at the Tracer system.

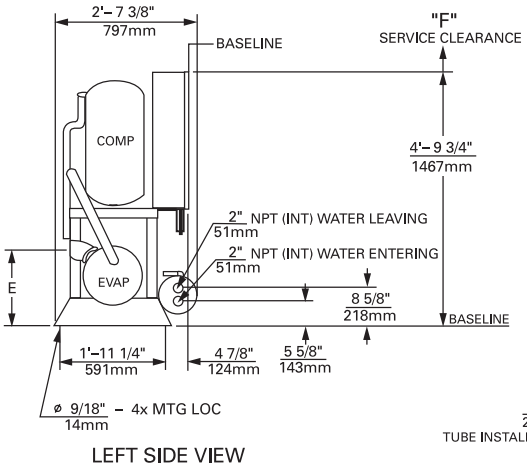
Best of all, this powerful capability comes over a single twisted pair of wires!

Controls

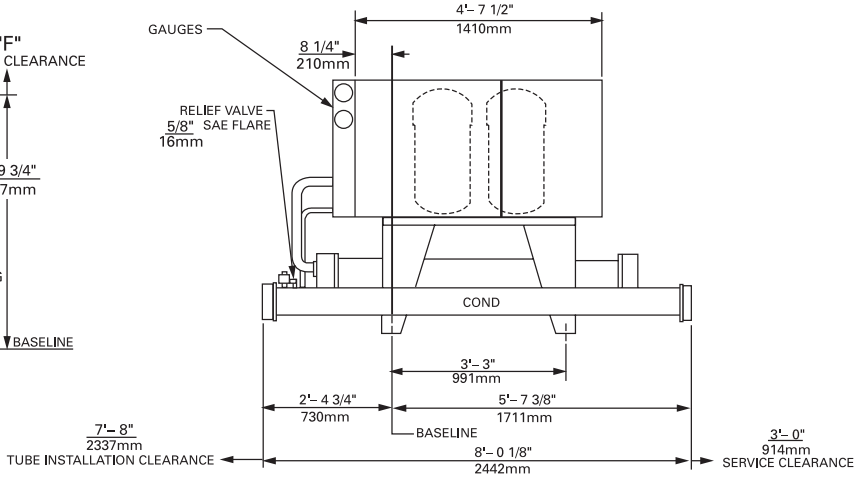

SERVICE DISPLAY MENU
A Operating Code
b Last Diagnostic Code
C Other Diagnostic Codes
d Active Chilled Water Set Point
E Entering Evap. Water Temp.
F Leaving Evap. Water Temp.
H Entering Cond. Wtr. Temp.(W/C Opt.)
h Leaving Cond. Wtr. Temp. (W/C Opt.)
J Front Panel Chilled Water Set Point
L Design Delta Temp. Set Point
n Control Response Set Point
O Leaving Wtr. Temp. Cutout Set Point
o Outdoor Air Temp.
P Compressor A % RLA
r Compressor B % RLA
U Compressor C % RLA
u Compressor D % RLA
TRANE
Service Menu
Operating Menu
J Chilled Water Set Point °F(°C)
L Design Delta Temp. Set Point °F(°C)
OPERATING DISPLAY MENU
A Operating Code
b Last Diagnostic Code
C Other Diagnostic Codes
d Active Chilled Water Set Point
E Entering Evap. Water Temp.
F Leaving Evap. Water Temp.
-Ext. Limit
-Int. Limit
-Comm.
Press Button To Advance Display
CHILLER
AUTO REMOTE
AUTO LOCAL
STOP/RESET



TOP VIEW



LEFT SIDE VIEW



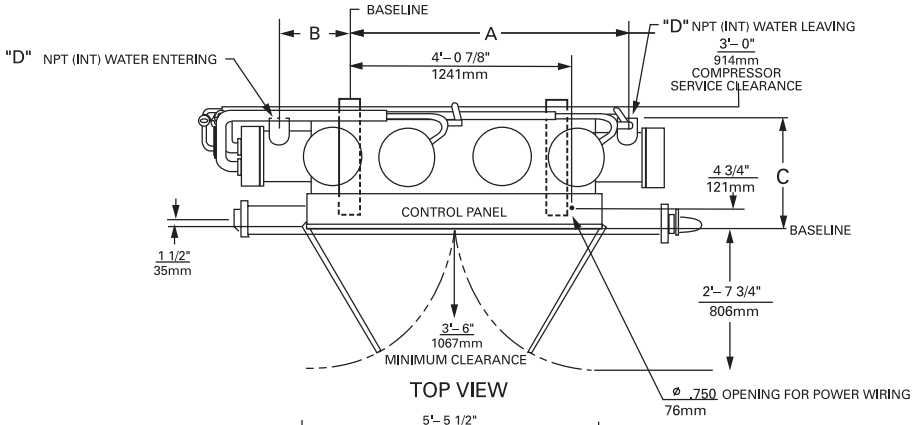
FRONT VIEW

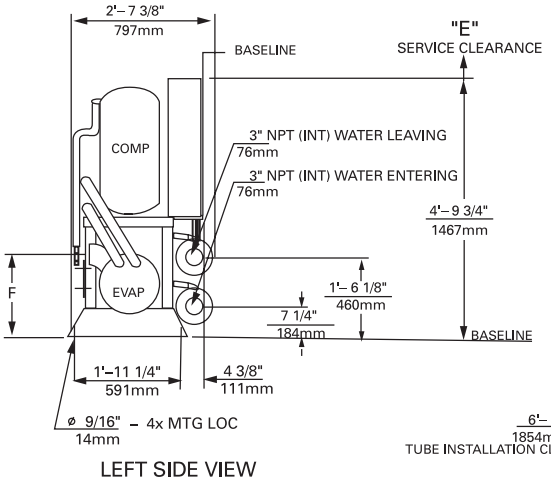
	ENGLISH DIMENSIONS					
UNIT SIZE	A	B	C	D	E	F
20 TON	2″	2′-0″	3′-11 1/2″	8 1/2″	1′-3 3/8″	3′-5″
25 TON	2″	1′-11 3/4″	3′-11 1/2″	8 1/2″	1′-3 3/8″	3′-10″
30 TON	2 1/2″	2′-1 7/8″	3′-10 3/4″	7 3/4″	1′-5 3/8″	3′-10″

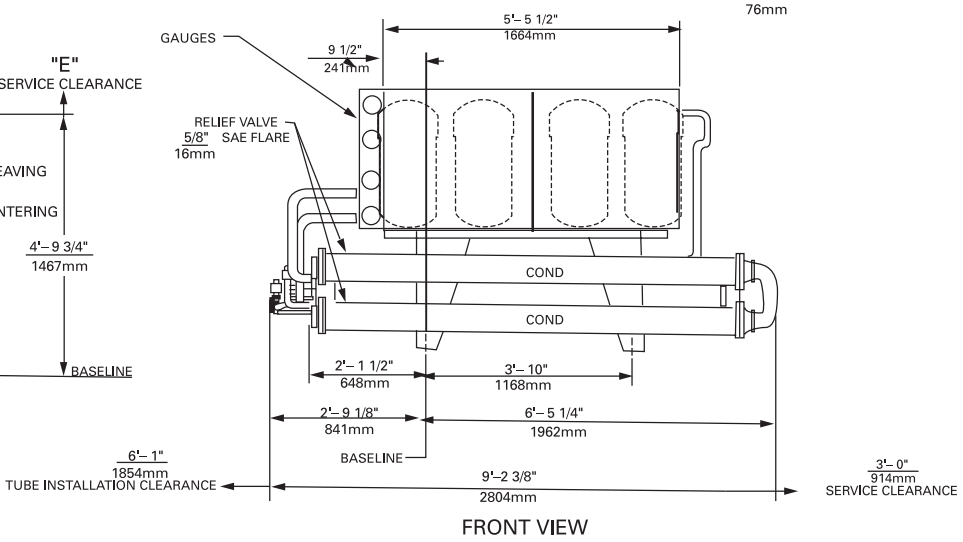
	METRIC DIMENSIONS (mm)					
UNIT SIZE	A	B	C	D	E	F
20 TON	51	610	1207	216	391	1041
25 TON	51	603	1207	216	391	1041
30 TON	64	657	1187	197	441	1168

NOTES:
1. DIMENSIONAL TOLERANCE ± 1/8″ (3mm).

Dimensional Data





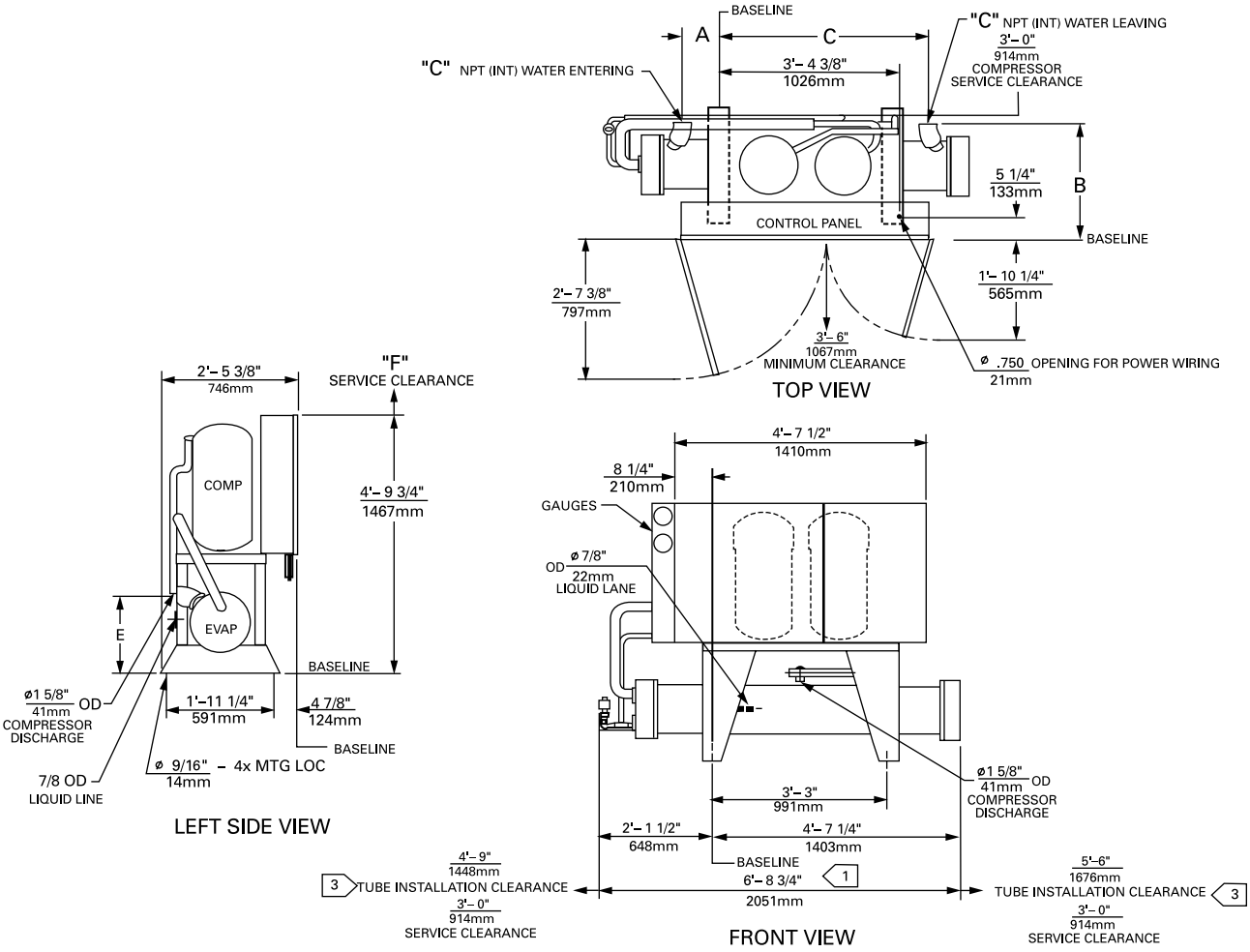


	ENGLISH DIMENSIONS					
UNIT SIZE	A	B	C	D	E	F
40 TON	5′-1 3/4″	1′-3 3/4″	1′-11 1/4″	2 1/2″	3′-5″	1′-4 1/4″
50 TON	5′-1 1/2″	1′-3 1/2″	2′-1 1/8″	3″	3′-10″	1′-6 1/8″
60 TON	5′-1 1/2″	1′-3 1/2″	2′-0 7/8″	3″	3′-10″	1′-6 1/8″

	METRIC DIMENSIONS (mm)					
UNIT SIZE	A	B	C	D	E	F
40 TON	1568	400	591	64	1041	413
50 TON	1562	394	638	76	1168	480
60 TON	1562	394	632	76	1168	460

NOTES:
1. DIMENSIONAL TOLERANCE ± 1/8″ (3mm).

Dimensional Data

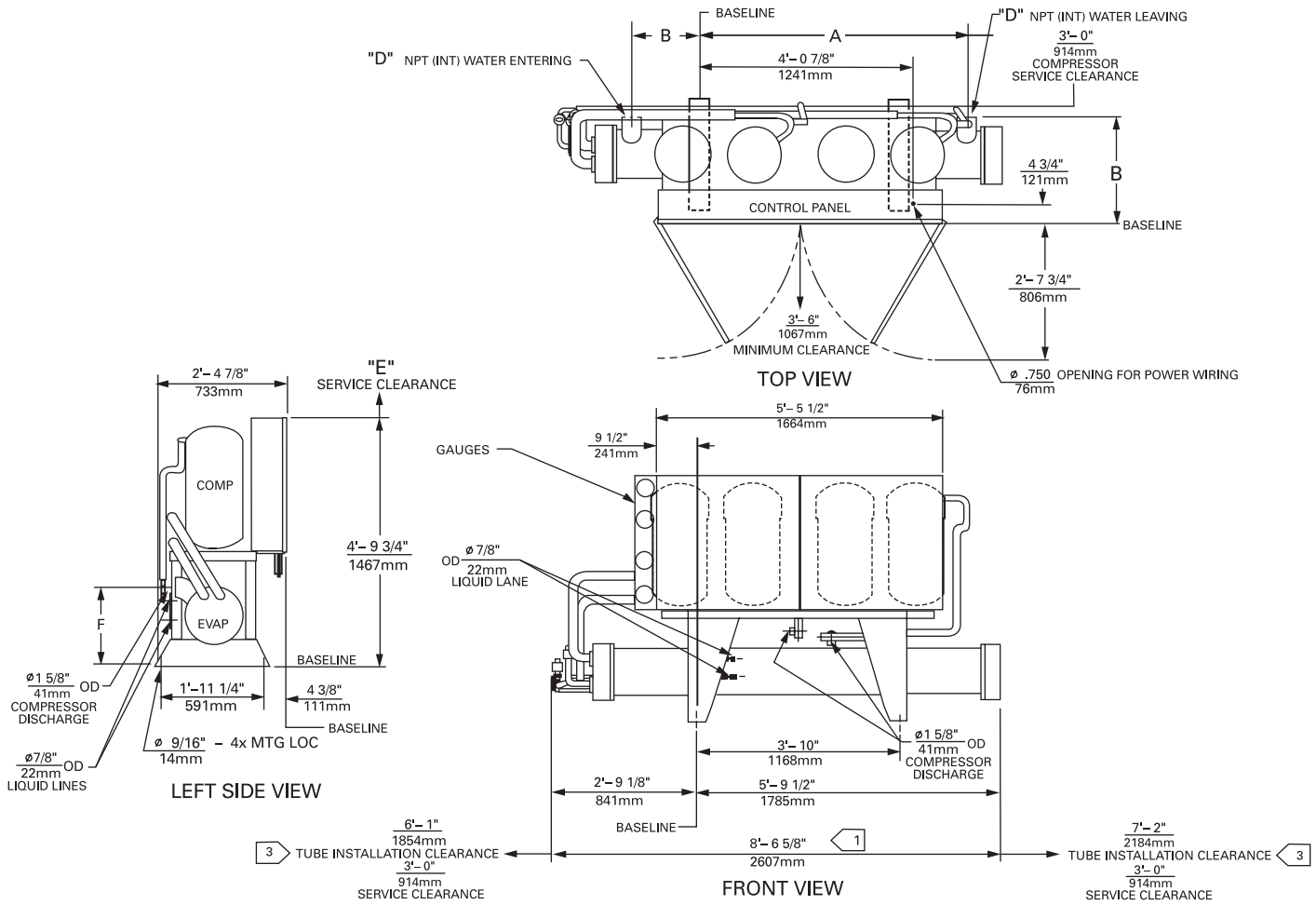


	ENGLISH DIMENSIONS					
UNIT SIZE	A	B	C	D	E	F
20 TON	8 1/2″	3′-11 1/2″	2″	2′-0″	1′-3 1/2″	3′-3″
25 TON	8 1/2″	3′-11 1/2″	2″	1′-11 3/4″	1′-3 1/2″	3′-10″
30 TON	7 3/4″	3′-10 3/4″	2 1/2″	2′-1 7/8″	1′-5 3/8″	3′-10″

	METRIC DIMENSIONS (mm)					
UNIT SIZE	A	B	C	D	E	F
20 TON	216	1207	51	610	394	1041
25 TON	216	1207	51	603	394	1041
30 TON	197	1187	64	657	441	1168

NOTES:
1. ADD 3/4″ (19mm) FOR UNITS WITH INSULATION.
2. DIMENSIONAL TOLERANCE ± 1/8″ (3mm).
3. TUBE INSTALLATION AT EITHER END OF EVAPORATOR.

Dimensional Data



	ENGLISH DIMENSIONS					
UNIT SIZE	A	B	C	D	E	F
40 TON	5′-1 3/4″	1′-3 3/4″	1′-11 1/4″	2 1/2″	3′-5″	1′-4 1/4″
50 TON	5′-1 1/2″	1′-3 1/2″	2′-1 1/8″	3″	3′-10″	1′-6 1/8″
60 TON	5′-1 1/2″	1′-3 1/2″	2′-0 7/8″	3″	3′-10″	1′-6 1/8″

	METRIC DIMENSIONS (mm)					
UNIT SIZE	A	B	C	D	E	F
40 TON	1568	400	591	64	1041	413
50 TON	1562	394	638	76	1168	480
60 TON	1562	394	632	76	1168	460

NOTES:
1. ADD 3/4″ (19mm) FOR UNITS WITH INSULATION.
2. DIMENSIONAL TOLERANCE ± 1/8″ (3mm).
3. TUBE INSTALLATION AT EITHER END OF EVAPORATOR.

Weights

Table W-1 — Weights CGWD Chillers

Unit		20	25	30	40	50	60
Operating Wt.	(lb.)	1189	1268	1544	1965	2301	2527
	(kg)	540	576	701	892	1045	1148
Shipping Wt.	(lb.)	1655	1852	2086	2217	2625	2995
	(kg)	751	841	947	1007	1192	1360

Table W-2 — Weights, CCAD Compressor-Chiller

Unit		20	25	30	40	50	60
Operating Wt.	(lb.)	1004	1079	1274	1509	1808	1982
	(kg)	456	490	579	685	821	900
Shipping Wt.	(lb.)	1430	1605	1836	1792	2166	2494
	(kg)	649	729	834	814	984	1133

Options

Options

Hot Gas Bypass: Hot gas bypass option allows unit operation below the minimum step of unit unloading. The regulator valve, along with all associated refrigerant piping and electrical wiring, are factory installed and tested on one refrigeration circuit. Unit does not start in hot gas bypass mode. If the unit operates in bypass mode for 30 minutes without a call for cooling, it will pump down and shut off. Unit starts immediately upon a further call for cooling.

Chilled Water Reset: Front panel settable control, microprocessor based control strategy, and field-installed sensor for temperature based (ambient or zone) reset are included in this option. Return water reset sensor is standard, but panel controller and control strategy must be ordered as an option.

Communications Interface: Bi-directional (Trane ICS) and generic BAS (external chilled water setpoint) communication interfaces are available for external control applications.

Remote Display Panel: The remote panel has the same digital display that is on the unit control panel as well as an auto/stop switch. Another auto/stop switch can be wired from pump contactor or time clock (scheduling). Remote display is mutually exclusive with Trane ICS and generic BAS.

Remote Running Indication and Alarm Contacts: Two separate single pole/double throw contacts are provided to indicate when the compressors are running and if a unit failure has occurred. A failure will be indicated if the unit has a manual reset fault. A failure is not indicated on an automatic reset fault.

Ice Making Controls: In ice-making mode, the unit will operate fully loaded in response to jobsite supplied contact closure. Ice making will terminate when the return fluid temperature falls below an adjustable setpoint (minimum 20 F). When not in ice making mode, unit will provide modulating capacity control based on leaving chilled fluid temperature (20-55 F).

Cycle Counter and Hour Meter: One cycle counter and hour meter per compressor.

Unit Mounted Disconnect Switch: Non-fused molded case disconnect switch factory installed in control panel for disconnecting main three-phase power.

Isolators: Neoprene-in-shear isolators for field installation under unit frame.

Gauges: Factory-installed gauges monitor suction and discharge pressure. One set of gauges per refrigeration circuit.

Sound Attenuation: Factory-installed acoustical attenuation for applications where extremely low sound level is required.

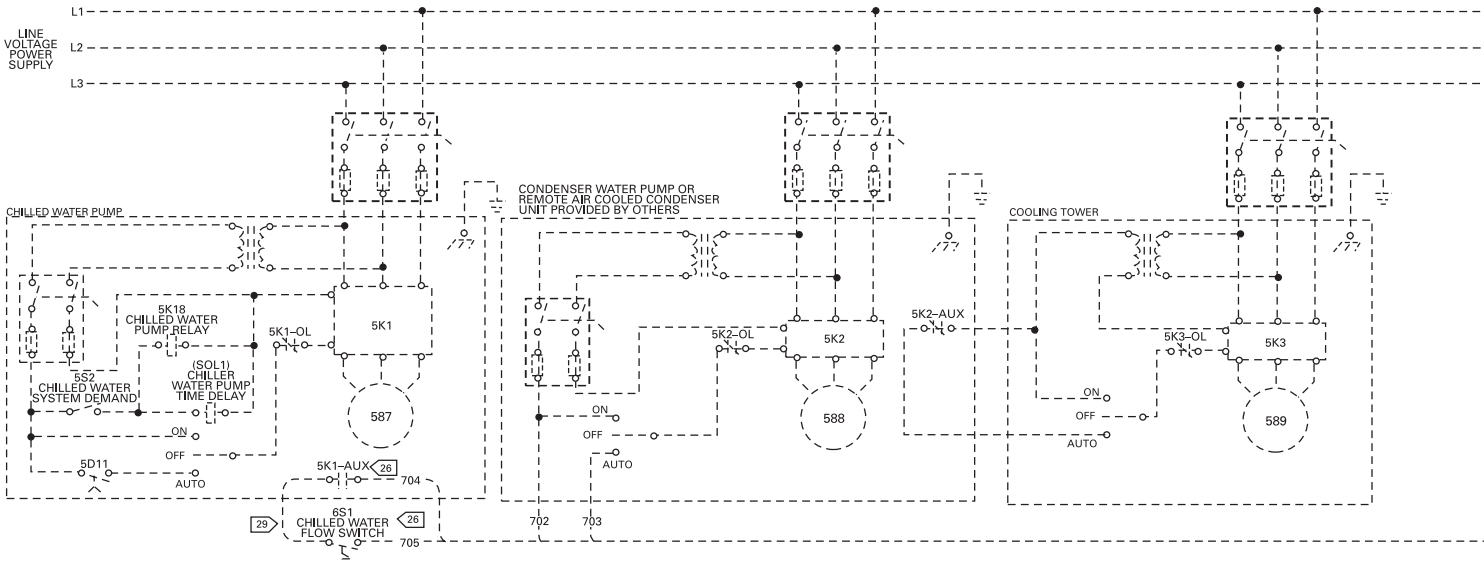
Water Regulating Valves: Field-installed valves provide means for control of head pressure.

Low Ambient Thermostat: Field-installed outdoor thermostat with an adjustable setpoint provides means for low ambient lockout.

Condenser Water Temperature Sensor: Field-installed matched pair temperature sensors provide for microprocessor display.

Typical Wiring Diagrams

Typical Field Wiring, Model CGWD, CCAD Chillers



NOTES:

1. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS. PHANTOM LINES INDICATE ALTERNATE CIRCUITRY OR AVAILABLE SALES OPTION. CHECK SALES ORDER TO DETERMINE IF WIRING IS REQUIRED FOR SPECIFIC OPTIONS.
2. ALL THREE PHASE MOTORS SUPPLIED WITH THE UNIT ARE PROTECTED UNDER PRIMARY SINGLE PHASE FAILURE CONDITIONS.
4. CAUTION - DO NOT ENERGIZE UNIT UNTIL CHECK OUT AND START-UP PROCEDURES HAVE BEEN COMPLETED.
5. USED ON 40, 50 AND 60 TON UNITS ONLY.
6. SEE INSET "A" FOR PROGRAMMING RESISTOR CONNECTIONS . TO PROGRAM AN EXTERNAL CHILLED WATER SETPOINT WHEN A 4-20 mA/0-10VDC SIGNAL IS NOT USED. SEE THE OPERATORS MANUAL FOR PROGRAMMING RESISTOR CONNECTIONS FOR USE ON NORMAL COOLING OR ICE MAKING APPLICATIONS.
7. SEE INSET "C" FOR CONTACTS (IN PLACE OF ZONE TEMP. SENSOR) FOR OPTIONAL ICE MACHINE CONTROL.
8. THE FOLLOWING CAPABILITIES ARE OPTIONAL - THEY ARE IMPLEMENTED AND WIRED AS REQUIRED FOR A SPECIFIC SYSTEM APPLICATION.

<A> ICE-MACHINE CONTROL (CANNOT BE USED WITH OPT. L)
<B> COMMUNICATIONS INTERFACE
<G> REMOTE RUNNING INDICATION AND ALARM CONTACTS
<H> UNIT DISCONNECT, NON-FUSED
<J> CHILLED WATER RESET - RETURN WATER
<K> CHILLED WATER RESET - OUTDOOR AIR TEMP. SENSOR OPTIONAL ON CGWD AND STANDARD ON CCAD.
<L> CHILLED WATER RESET - ZONE AIR (CANNOT BE USED WITH OPT. A)
<O> LOW AMBIENT THERMOSTAT
<P> HIGH AMBIENT LOAD LIMIT THERMOSTAT
<Q> ENTERING AND LEAVING CONDENSER WATER TEMP. SENSOR. MATCHED PAIR OF THERMESTORS FOR 4RT1 AND 4RT2.

WIRING AND CONTACT REQUIREMENTS:

21. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC), STATE, AND LOCAL REQUIREMENTS. OUTSIDE THE UNITED STATES, OTHER COUNTRIES APPLICABLE NATIONAL AND/OR LOCAL REQUIREMENTS SHALL APPLY.

<24> CUSTOMER SUPPLIED CONTACTS MUST BE COMPATIBLE WITH DRY CIRCUIT 12VDC, 45mA RESISTIVE LOAD. SILVER OR GOLD PLATED CONTACTS ARE RECOMMENDED.

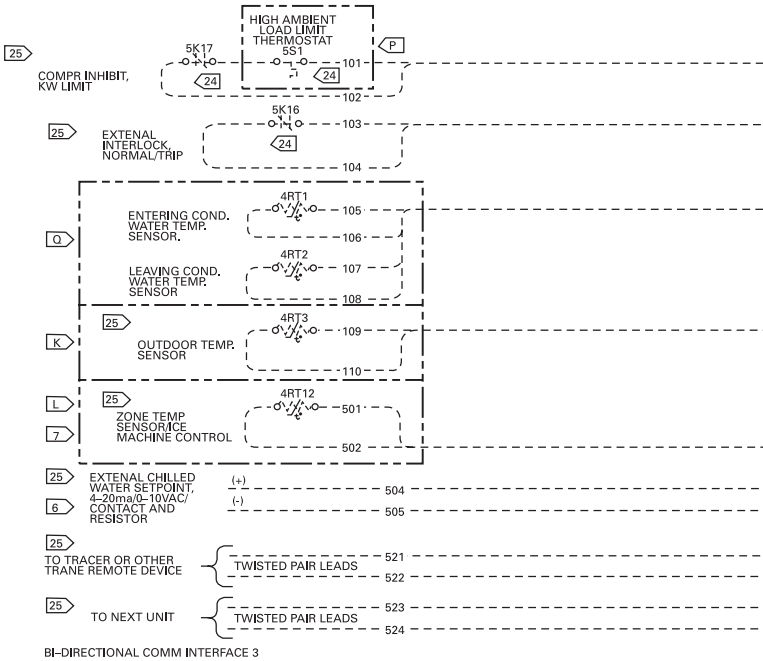
<25> 30 VOLT OR LESS CIRCUIT. DO NOT RUN IN CONDUIT WITH HIGHER VOLTAGE CIRCUITS. USE #14-18 AWG. SEE SELECTION TABLE.

<26> MINIMUM CONTACT RATING AT 115 VAC: 6.9VA INRUSH, 1.3VA SEALED.

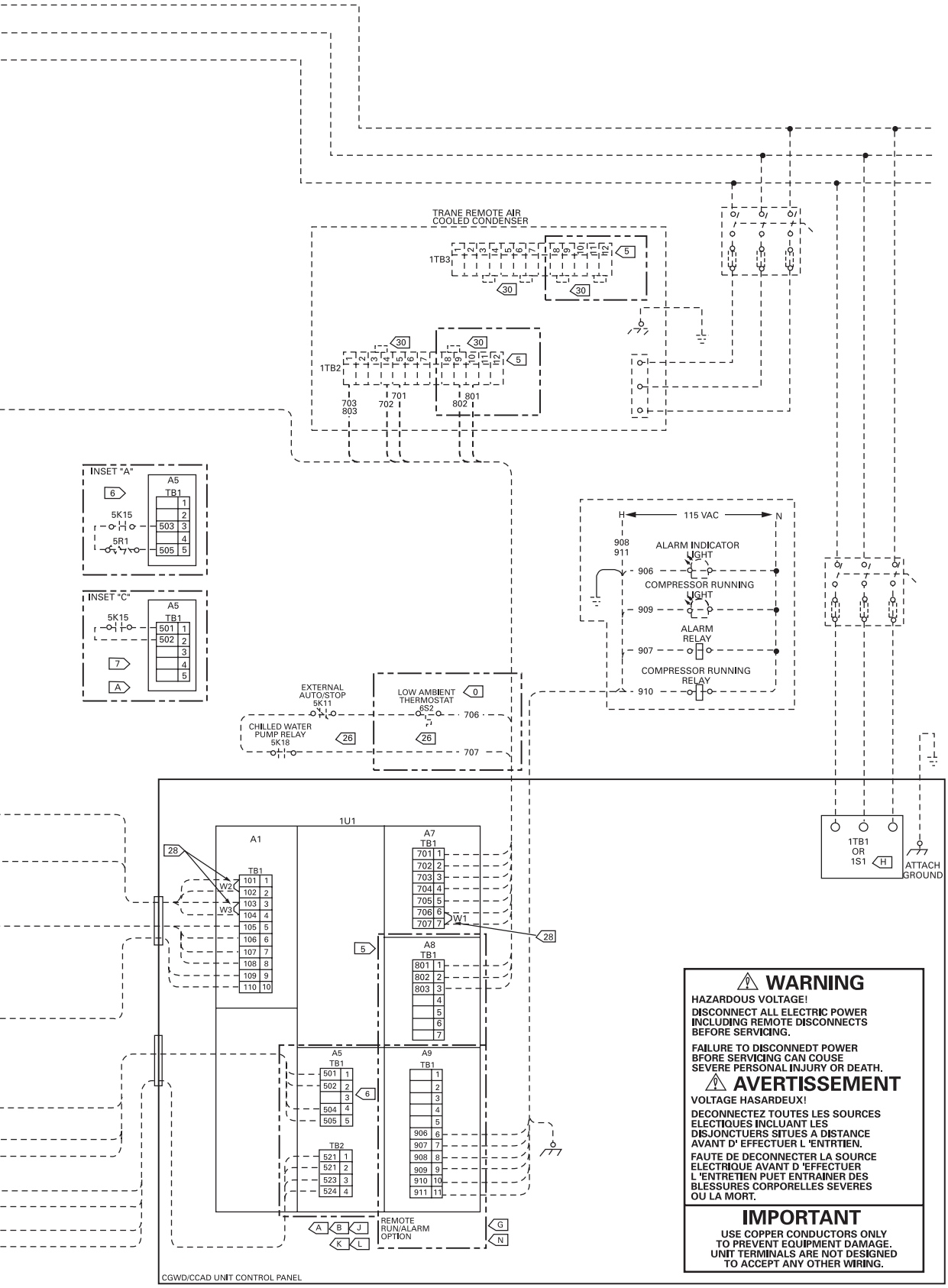
<28> WHEN CUSTOMER INPUT IS REQUIRED, REMOVE JUMPER AND INSTALL CUSTOMER WIRING.

<29> LOSS OF CHILLED WATER FLOW PROTECTION IS PROVIDED BY THE UNIT WITHOUT THE NEED FOR A CHILLED WATER FLOW SWITCH. THE USE OF A CHILLED WATER FLOW SWITCH IS AT THE CUSTOMER'S DISCRETION.

<30> FAN STAGING IS CONTROLLED BY THE COMPRESSOR CHILLER. TO INSURE PROPER FAN OPERATION ADD JUMPER TERMINALS ON 1TB3 AS SHOWN. REMOVE JUMPER FROM 1TB2-4 TO 1TB2-3 ON ALL CAUC UNITS. REMOVE JUMPER FROM 1TB2-9 TO 1TB2-8 ON ALL 40, 50 AND 60 TON CAUC UNITS. IF LOW AMBIENT OPTION, ADD JUMPER FROM 1TB3-6 TO 1TB3-7 AND FROM 1TB3-11 TO 1TB3-12.



Typical Wiring Diagrams



Features Summary

Advanced Design for Efficiency and Reliability

- Trane scroll compressor has 64 percent fewer parts than equal capacity reciprocating compressors for greater reliability. Part load efficiency is unmatched by any reciprocating compressor.
- Factory installed microprocessor controls provides accurate chilled water temperature control. The microprocessor also incorporates optimal start-up logic, load limiting, compressor anti-recycle timing, automatic lead-lag function and compressor protection features.
- Easy operation provided by menu-driven digital display. Display provides temperatures, pressures, setpoints and over 40 diagnostic readouts.
- Compressor protection from start and run overloads, under and over voltage, phase loss and phase reversal, and rapid recycling.
- Easy installation through small size, factory wiring, easy lifting provisions and start-up control logic.
- Availability. Trane has the industry's fastest ship cycles on both stock and built-to-order units.
- Other standard features include:
  - — Control power transformer
  - — Auto lead-lag (on or off)
  - — Solid-state motor protection
  - — Insulation
  - — Condenser water pump interlock
  - — Filter-dryer
  - — Built-in loss of chilled water flow sensors
  - — Chillers fit through standard single-width door
- Options
  - — Trane Integrated Comfort™ systems communication
  - — Generic building automation systems (BAS) interface
  - — Chilled water reset (ambient, zone, return)
  - — Unit mounted disconnect
  - — Ice making
  - — Hot gas bypass
  - — Remote display/control panel
  - — Remote running indication and alarm contact
  - — Gauges
  - — Sound attenuation
  - — Neoprene isolators
  - — Compressor cycle counter/hour meter
  - — Water regulating valves
  - — Condenser water temperature sensors

Mechanical Specifications

Water-Cooled Liquid Chillers and Compressor Chillers CGWD and CCAD Models 20 to 60 Tons

General
All Cold Generator® chillers are factory tested and monitored for power and control operation (CGWD only). CGWD units ship with a full operating charge of refrigerant and oil. Exposed surfaces are painted with an air-dry beige primer-finisher prior to shipment.

Compressor-Motor
Direct-drive, hermetic, 3600 rpm, fixed compression, scroll compressors (20 to 30 tons - two compressors; 40 to 60 tons - four compressors). Each compressor has: centrifugal oil pump, oil level sightglass, oil charging valve, two point lubrication for each motor bearing, flooded lubrication for the journal and thrust bearings, and a check valve on the scroll discharge port.

Motor is suction gas-cooled, hermetically sealed, two-pole, squirrel cage induction type.

Evaporator
Shell and tube design with seamless copper tubes roller expanded into tube sheets. Designed, tested, and stamped in accordance with ASME Code for refrigerant side working pressure of 300 psig. Water side working pressure is 300 psig. One water pass with a series of internal baffles. Each shell includes drain connections, entering and leaving temperature sensors, and $^{3}/_{4}$-inch Armaflex II (or equal) insulation (K = 0.26).

Condenser (CGWD Only)
Shell and tube design with seamless internally enhanced copper tubes. Designed and tested for refrigerant side working pressure of 450 psig. Water side working pressure is 300 psig. Two pass construction with six-inch diameter shell (20 to 30 tons). One pass construction with two separate condensers connected in series (40 to 60 tons). Each condenser includes a subcooler circuit. Tubes are cleanable and replaceable.

Refrigerant Circuit
Each refrigeration circuit shall be completely independent and shall include liquid line and discharge line service valves, filter dryer, combination moisture indicator-sightglass, charging port, insulated suction line, liquid line solenoid valve and thermal expansion valve.

Isolation valves provide means of isolating refrigerant charge in either the high or low pressure side while servicing. One refrigerant circuit on 20 to 30 tons; two refrigerant circuits on 40 to 60 tons.

Condenserless units (CCAD) shall have filter dryer and liquid line service valve. Units shall be equipped with discharge check valve and moisture indicator sightglass at the very minimum.

Control Panel
Factory-mounted microprocessor based control panel uses 120/60/1 power. Automatic shutdown protection with manual reset is provided for low evaporator outlet refrigerant temperature and pressure, high condenser refrigerant pressure, motor current overload, and phase reversal. Automatic shutdown protection with automatic reset after condition is corrected is provided for low line voltage and loss of chilled water flow.

The unit control module (UCM) automatically takes action to prevent complete shutdown by shedding compressors one at a time. This occurs in the event of low evaporator refrigerant temperature, high condenser refrigerant pressure, motor current overload; preventing the motor current from exceeding setpoint.

Solid-state chilled water temperature sensors are included for precise and accurate control. A menu driven display indicates the operating code, the last diagnostic code, chilled water setpoint, current limit setpoint, condenser water and chilled water temperature sensors. Factory-installed entering and leaving condenser water temperature sensors (optional) are available for microprocessor display or Trane Tracer® monitoring. Over 40 diagnostic checks are made and will be displayed when a problem is detected.

Starter
The unit control panel contains both a control section and a starter section. The panel is a painted, NEMA 1 enclosure. The starter section contains: top access for power wiring, single point power hook-up, three-phase solid-state overload protection, customer wired grounding lug, and control power transformer with fused protection.

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The Trane Company
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An American Standard Company

Library	**Product Literature**
Product Section	**Refrigeration**
Product	**Scroll Liquid Chillers**
Model	**000**
Literature Type	**Data Sales Catalog**
Sequence	**1**
Date	**March 1999**
File No.	**PL-RF-SLC-000-DS-1-399**
Supersedes	**SLC-DS-1 194**
Ordering No.	**SLC-DS-1**