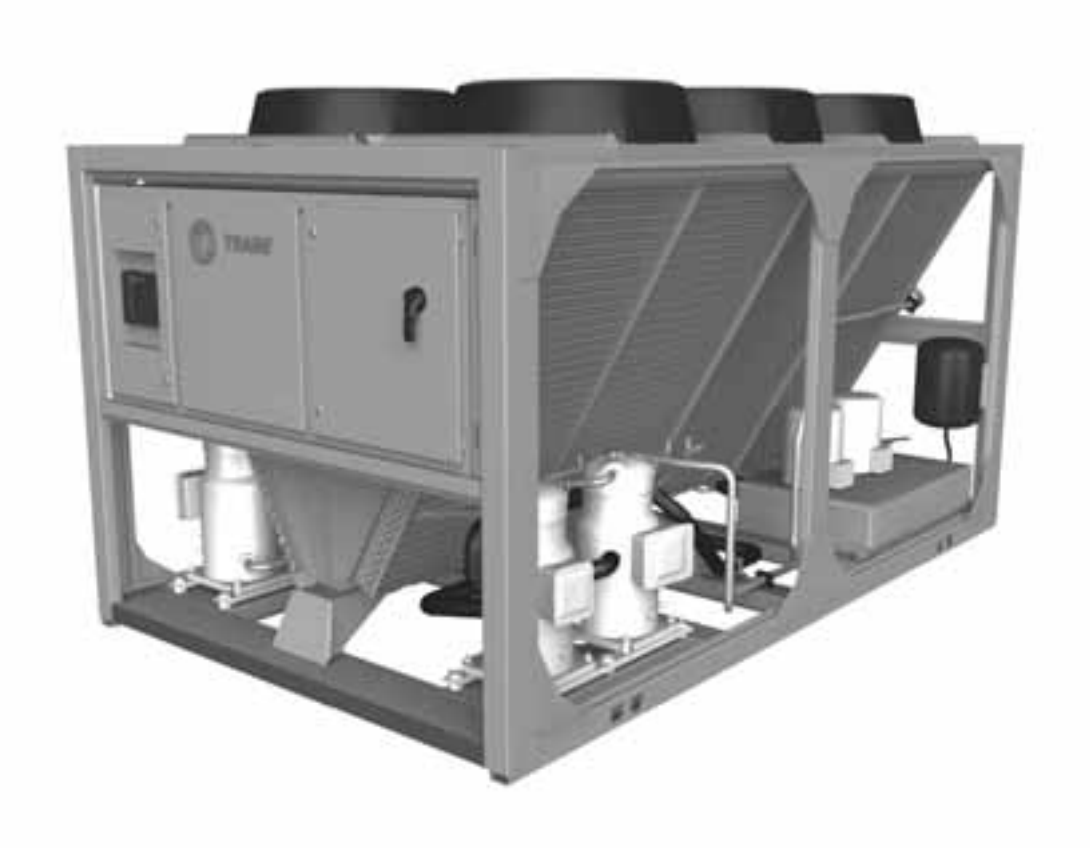
TRANE®

Product Catalog

AquaStream™ Air-Cooled Liquid Chillers

Model CGAM

20—120 Tons - Made in USA



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CG-PRC017-EN

Introduction

Design and manufacturing excellence makes Trane a leader in the air-cooled chiller marketplace. This tradition of using excellence to meet market demands is illustrated with the new Trane AquaStream the 20-120 ton air-cooled chiller. The introduction of this next-generation chiller is an exciting step forward in energy-efficiency, sound, reliability, ease of serviceability, control precision, application versatility, and operational cost-effectiveness. The new chiller is designed to deliver proven AquaStream performance based on the redesign of a European model that has been a market leader, plus all the benefits of new heat transfer and fan designs, as well as, low-speed, direct-drive scroll compressors.

Important Design Advances and New Features

- Higher full-load and part-load energy efficiency that exceeds ASHRAE 90.1 and reduce operating costs.
- Significantly lower noise levels than other scroll compressor chillers.
- HFC-410A optimized design.
- Factory-installed evaporator pump and buffer tank available to make installation easier.
- Flow switch and water strainer factory are installed in the optimum locations for seamless operation and reduced chiller installation and maintenance time.
- Trane CH530™ with Adaptive Controls™ have improved fan algorithms for more reliable operation at extreme conditions.
- Single chiller time of day scheduling communication for easier control of small jobs.
- Easily integrated with existing BAS via BACnet™ or LonTalk™ communication interface.
- All major service components are close to the unit edge for safe and easy maintenance.
- The chiller is designed for easy serviceability with input from our extended experience in design, testing and field operation.

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Features and Benefits

Reliability

- Years of laboratory testing including running the chiller at extreme operating conditions have resulted in optimized compressor and chiller systems reliability by confirming a robust design and verifying quality each step of the way.
- Direct-drive, low-speed scroll compressors with fewer moving parts provide maximum efficiency, high reliability, and low maintenance requirements. Suction gas-cooled motor stays at a uniformly low temperature for long motor life.
- The third generation microprocessor control system provides improved control capabilities with Adaptive Control™ to keep the unit operating even in adverse conditions. Advanced microelectronics protect both the compressor and the motor from typical electrical fault conditions like thermal overload and phase rotation.
- Standard factory-installed water strainer helps prevent system debris from affecting unit flow or heat transfer.
- Flow switch is factory-installed at the optimum location in the piping for reduced chiller installation cost and superior flow sensing, reducing the potential for nuisance trips.
- Exceptionally rigid condenser coil structure is manufactured with hairpin tubes which halves the number of braze joints significantly reducing the potential for leaks.
- Innovative condenser pressure integrated fan control algorithms and optional variable frequency drive on circuits' lead fans provides more reliable operation at extreme temperature conditions.

Life Cycle Cost-Effectiveness

- Industry leading full- and part-load efficiency
- Electronic expansion valve and high speed suction temperature sensor enables tight chilled water temperature control and low superheat, resulting in more efficient full-load and part-load operation than previously available.
- Partial heat recovery available to save energy on pre-heat or reheat applications.
- Available pump package features standard variable speed drive on the pump motors eliminating the need for expensive and energy sapping chilled water system triple duty or balancing valves. Additionally, system commissioning and flexibility is greatly enhanced. Chilled water supply reliability is increased with the dual pump design.

Application Versatility

- Industrial/low temperature process cooling - Excellent operating temperature range and precise control capabilities enable tight control.
- Ice/thermal storage - Utilities and owners benefit from reduced cooling energy cost. The AquaStream chiller's dual setpoint control and industry leading ice energy storage efficiency assures reliable operation and superior system efficiency Trane's partnership with CALMAC, brings a proven track record of successful installations across many markets; from churches and schools to sky scrapers and office buildings.
- Partial heat recovery - An optional factory-installed heat exchanger provides hot water for many needs; water preheat and reheat for enhanced system humidity control are just two. This option reduces operating costs associated with boilers/hot water heaters.

Simple, Economical Installation

- Standard sound levels are roughly 5-8 dBa less than the previous Trane air-cooled models.
- System integration available with LonTalk or BACnet through a single twisted-pair wire for a less expensive translation to an existing building automation system.
- Powder-coated paint provides superior durability, corrosion protection, and is less likely to be damaged while rigging/lifting/installing the chiller.
- Single point or dual point power connection options provide installation flexibility to meet specific application requirements.
- Factory commissioned unit-mounted starter reduces overall job cost and improves system reliability by eliminating job site design, installation and labor coordination requirements.

Precision Control

- Microprocessor-based Trane CH530 controls monitor and maintain optimal operation of the chiller and its associated sensors, actuators, relays, and switches, all of which are factory-installed, powered up and tested prior to shipping.
- Adaptive Control maintains chiller operation under adverse conditions, when many other chillers might simply shut down. Operating conditions that are compensated for include high condensing pressure and low suction pressure.
- AquaStream advanced microprocessor controls enable variable primary flow applications providing chilled water temperature control accuracy of ±2°F (1.1°C) for flow changes up to 10 percent per minute, plus handling of flow changes up to 30 percent per minute with continuous operation.
- Easy-to-use operator interface displays all operating and safety messages, with complete diagnostics information, on a highly readable panel with a scrolling touch-screen display. Status and diagnostic messages are in plain language - no codes to interpret - and are available in 20 languages.

Improved Serviceability

- All major serviceable components are close to the edge. Service shutoff valves and water strainer are conveniently located to enable easy service.
- Water piping connections are factory piped to the edge of the unit to make installation safer and faster.
- Electronic expansion valve designed so controls can be removed and serviced without refrigerant handling.
- The optional pump package is designed to be serviced in place. The unit structure includes a rigging point for pump servicing, making inspection, cleaning and pump seal changes easier
- High pressure transducer and temperature sensors mountings enable troubleshooting and replacement without removing refrigerant charge, greatly improving serviceability over the life of the unit.
- Dead front panel construction provides for enhanced service technician safety.

Application Considerations

Certain application constraints should be considered when sizing, selecting and installing Trane AquaStream chillers. Unit and system reliability is often dependent upon proper and complete compliance with these considerations. Where the application varies from the guidelines presented, it should be reviewed with your local Trane account manager.

Note: *The terms water and solution are used interchangeably in the following paragraphs.*

Unit Sizing

Intentionally over-sizing a unit to assure adequate capacity is not recommended. Erratic system operation and excessive compressor cycling are often a direct result of an oversized chiller. In addition, an oversized unit is usually more expensive to purchase, install, and operate. If over sizing is desired consider using two smaller units.

Water Treatment

The use of untreated or improperly treated water in chillers may result in scaling, erosion, corrosion, and algae or slime buildup. This will adversely affect heat transfer between the water and system components. Proper water treatment must be determined locally and depends on the type of system and local water characteristics.

Neither salt nor brackish water is recommend for use in Trane air-cooled AquaStream chillers. Use of either will lead to a shortened life. Trane encourages the employment of a qualified water treatment specialist, familiar with local water conditions, to assist in the establishment of a proper water treatment program.

Foreign matter in the chilled water system can also increase pressure drop and, consequently, reduce water flow. For this reason it is important to thoroughly flush all water piping to the unit before making the final piping connections to the unit.

Effect of Altitude on Capacity

At elevations substantially above sea level, the decreased air density will decrease condenser capacity and, therefore, unit capacity and efficiency.

Ambient Limitations

Trane AquaStream chillers are designed for year-round operation over a range of ambient temperatures. The air-cooled model CGAM chiller will operate in ambient temperatures of 32°F to 125°F (0°C to 52°C). Selecting the wide ambient option will allow the chiller to operate down to 0°F (-18°C). Without the wide ambient option freeze damage can occur with operation below 32°F (52°C).

The minimum ambient temperatures are based on still conditions (winds not exceeding five mph). Greater wind velocities will result in a drop in head pressure, therefore increasing the minimum starting and operating ambient temperature. The Adaptive Control™ microprocessor will attempt to keep the chiller on-line when high or low ambient conditions exist, making every effort to avoid nuisance trip-outs and provide the maximum allowable tonnage.

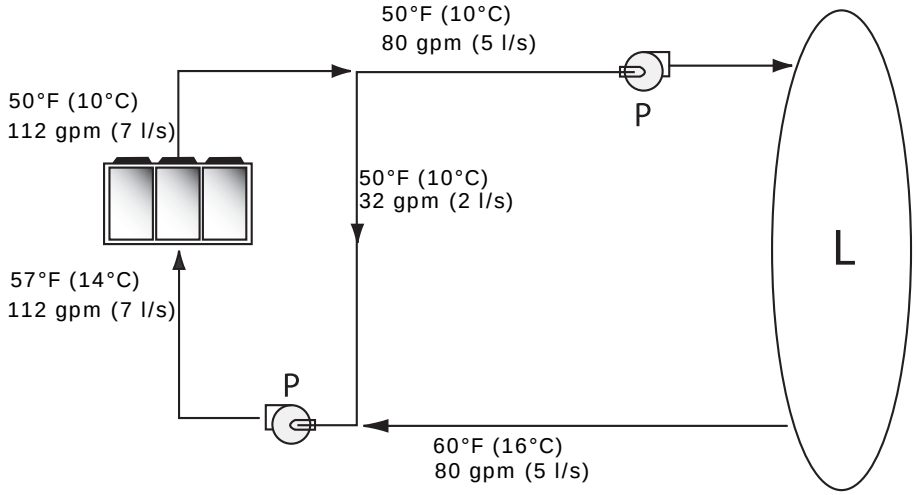
Water Flow Limits

The minimum water flow rates are given in the General Data section of this catalog. Evaporator flow rates below the tabulated values will result in laminar flow causing freeze-up problems, scaling, stratification and poor control. The maximum evaporator water flow rate is also given. Flow rates exceeding those listed may result in very high pressure drop across the evaporator.

Flow Rates Out of Range

Many process cooling jobs require flow rates that cannot be met with the minimum and maximum published values within the AquaStream evaporator. A simple piping change can alleviate this problem. For example: a plastic injection molding process requires 80 gpm (5.0 l/s) of 50°F (10°C) water and returns that water at 60°F (15.5°C). The selected chiller can operate at these temperatures, but has a minimum flow rate of 106 gpm (6.6 l/s). The system layout in Figure 1 can satisfy the process.

Figure 1. Flow Rate Out of Range Systems Solution



Flow Proving

Trane provides a factory-installed water flow switch monitored by CH530 which protects the chiller from operating in loss of flow conditions.

Variable Flow in the Evaporator

An attractive chilled water system option may be a Variable Primary Flow (VPF) system. VPF systems present building owners with several cost-saving benefits when compared with Primary/Secondary chilled water systems. The most obvious cost savings results from eliminating the constant volume chiller pump(s), which in turn eliminates the related expenses of the associated piping connections (material, labor), and electrical service and switch gear. In addition to the installed cost advantage building owners often cite pump related energy savings as the reasons that prompted them to select a VPF system.

The AquaStream has the capability to handle variable evaporator flow without losing leaving water temperature control. The microprocessor and capacity control algorithms are designed to take a 10 percent change in water flow rate per minute while maintaining a ±2°F (1.1°C) leaving water temperature control accuracy. The chiller tolerates up to 30 percent per minute water flow variation as long as the flow is equal or above the minimum flow rate requirement.

With the help of a software analysis tool such as System Analyzer™, DOE-2 or TRACE™, you can determine whether the anticipated energy savings justify the use of variable primary flow in a particular application. Existing constant flow chilled water systems may be relatively easily converted to VPF and benefit greatly from the inherent efficiency advantages.

Water Temperature

Leaving Water Temperature Limits

Trane AquaStream chillers have three distinct leaving water categories:

- standard, with a leaving solution range of 42 to 65°F (5.5 to 18°C)
- low temperature process cooling, with leaving solution range of 10 to 65°F (-12.2 to 18°C)
- ice-making, with leaving solution range of 20 to 65°F (-7 to 18°C)

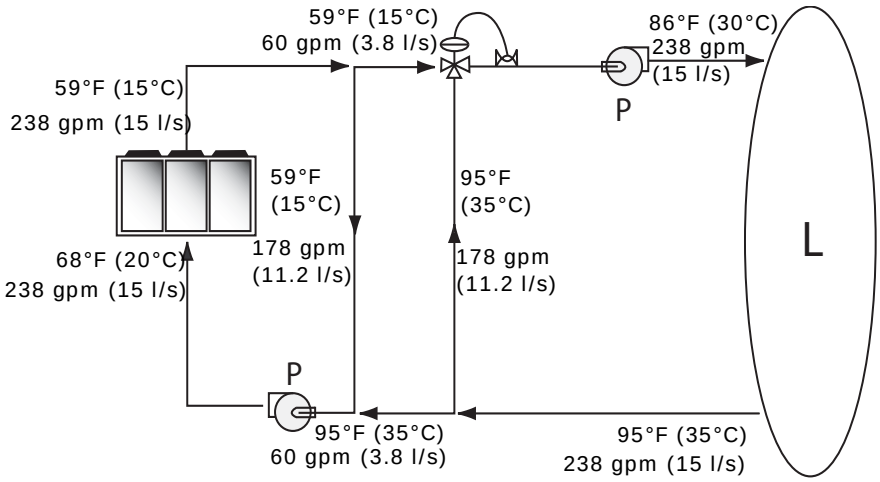
Since leaving solution temperature below 42°F (5.5°C) results in suction temperature at or below the freezing point of water, a glycol solution is required for all low temperature and ice-making machines. Ice making control includes dual setpoint controls and safeties for ice making and standard cooling capabilities. Consult your local Trane account manager for applications or selections involving low temperature or ice making machines.

The maximum water temperature that can be circulated through the CGAM evaporator when the unit is not operating is 125°F (51.7°C). Evaporator damage may result above this temperature.

Leaving Water Temperature Out of Range

Similar to the flow rate limitations above, many process cooling jobs require temperature ranges that are outside the allowable minimum and maximum operating values for the chiller. Figure 2 below shows a simple example of a mixed water piping arrangement change that can permit reliable chiller operation while meeting such cooling conditions. For example, a laboratory load requires 238 gpm (5 l/s) of water entering the process at 86°F (30°C) and returning at 95°F (35°C). The chiller's maximum leaving chilled water temperature of 65°F (15.6°C) prevents direct supply to the load. In the example shown, both the chiller and process flow rates are equal, however, this is not necessary. For example, if the chiller had a higher flow rate, there would simply be more water bypassing and mixing with warm water returning to the chiller.

Figure 2. Temperature Out of Range System Solution



Supply Water Temperature Drop

Full load chilled water temperature drops from 6 to 18°F (3.3 to 10°C) may be used as long as minimum and maximum water temperature and minimum and maximum flow rates are not violated. Temperature drops outside this range at full load conditions are beyond the optimum range for control and may adversely affect the microcomputer's ability to maintain an acceptable supply water temperature range. Furthermore, full load temperature drops of less than 6°F (3.3°C) may result in inadequate refrigerant superheat which is critical to long term efficient and reliable operation. Sufficient superheat is always a primary concern in any refrigerant system and is especially important in a packaged chiller where the evaporator is closely coupled to the compressor.

Typical Water Piping

All building water piping must be flushed prior to making final connections to the chiller. To reduce heat loss and prevent condensation, insulation should be applied. Expansion tanks are also usually required so that chilled water volume changes can be accommodated.

Avoidance of Short Water Loops

Adequate chilled water system water volume is an important system design parameter because it provides for stable chilled water temperature control and helps limit unacceptable short cycling of chiller compressors.

The AquaStream chiller's temperature control sensor is located in the supply (outlet) water connection or pipe. This location allows the building to act as a buffer to slow the rate of change of the system water temperature. If there is not a sufficient volume of water in the system to provide an adequate buffer, temperature control can suffer, resulting in erratic system operation and excessive compressor cycling.

Typically, a two-minute water loop circulation time is sufficient to prevent short water loop issues. Therefore, as a guideline, ensure the volume of water in the chilled water loop equals or exceeds two times the evaporator flow rate. For systems with a rapidly changing load profile the amount of volume should be increased.

If the installed system volume does not meet the above recommendations, the following items should be given careful consideration to increase the volume of water in the system and, therefore, reduce the rate of change of the return water temperature.

- A volume buffer tank located in the return water piping.
- Larger system supply and return header piping (which also reduces system pressure drop and pump energy use).

An optional factory-installed buffer tank is designed to meet the minimum two minute loop time without additional job site piping. The buffer tank can also be used on jobs that already meet or exceed the minimum loop time to further reduce the potential for compressor cycling, increasing the compressor life span, and reducing system temperature fluctuations.

Minimum water volume for a process application

If a chiller is attached to an on/off load such as a process load, it may be difficult for the controller to respond quickly enough to the very rapid change in return solution temperature if the system has only the minimum water volume recommended. Such systems may cause chiller low temperature safety trips or in the extreme case evaporator freezing. In this case, it may be necessary to add or increase the size of the mixing tank in the return line or consider the optional factory-installed buffer tank with the chiller.

Multiple Unit Operation

Whenever two or more units are used on one chilled water loop, Trane recommends that their operation be coordinated with a higher level system controller for best system efficiency and reliability. The Trane Tracer system has advanced chilled plant control capabilities designed to provide such operation.

Ice Storage Operation

An ice storage system uses the chiller to make ice at night when utilities generate electricity more efficiently and charge less for electricity with lower demand and energy charges. The stored ice reduces or even replaces mechanical cooling during the day when utility rates are at their highest. This reduced need for cooling results in significant utility cost savings and source energy savings.

Another advantage of an ice storage system is its ability to eliminate chiller over sizing. A "rightsized" chiller plant with ice storage operates more efficiently with smaller support equipment while lowering the connected load and reducing operating costs. Best of all this system still provides a capacity safety factor and redundancy by building it into the ice storage capacity for practically no cost compared to over sized systems.

The Trane air-cooled chiller is uniquely suited to low temperature applications like ice storage because of the ambient relief experienced at night. Chiller ice making efficiencies are typically similar to or even better than standard cooling daytime efficiencies as a result of night-time dry-bulb ambient relief.

Standard smart control strategies for ice storage systems are another advantage of the AquaStream chiller. The dual mode control functionality are integrated right into the chiller. Trane Tracer building management systems can measure demand and receive pricing signals from the utility and decide when to use the stored cooling and when to use the chiller.

Partial Heat Recovery Operation

Partial heat recovery is designed to salvage a portion of the heat that is normally rejected to the atmosphere through the air cooled condenser coil and put it to beneficial use. With the addition of a heat recovery cycle, heat removed from the building cooling load can be transferred to a preheat application. Keep in mind that the heat recovery cycle is only possible if a cooling load exists to act as a heat source.

To provide a heat recovery cycle, a supplemental heat exchanger is mounted in series to the air cooled condenser. The supplemental heat exchanger is piped into a preheat circuit. During the heat recovery cycle, the unit operates just as it does in the cooling-only mode except that a portion of the cooling load heat is rejected to the water heating circuit rather than to the air through the air-cooled condenser. Water circulated through the heat recovery heat exchanger by the pumps absorbs cooling load heat from the compressed refrigerant gas discharged by the compressors. The heated water is then used to satisfy heating requirements.

Partial heat recovery can be used in applications where hot water is needed for use in kitchens, lavatories, etc. It is comparatively smaller in size and its heating capacity is not controlled. The partial heat recovery heat exchanger cannot operate alone without a load of the chiller.

Unit Placement

Setting The Unit

A base or foundation is not required if the selected unit location is level and strong enough to support the unit's operating weight (see "Weights" section of this catalog).

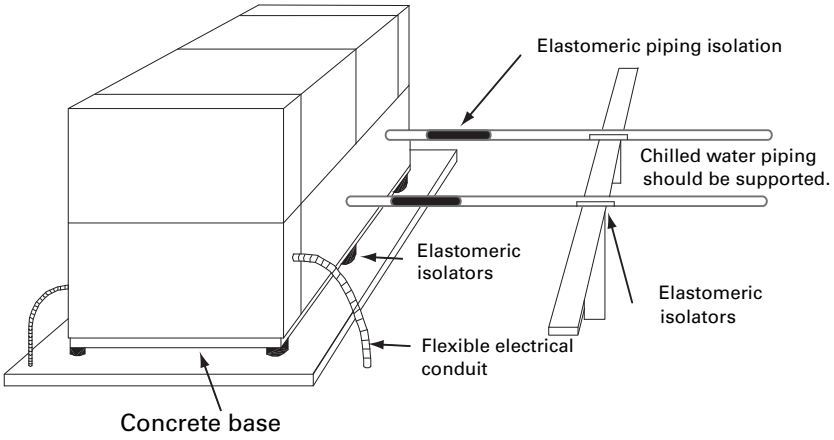
For a detailed discussion of base and foundation construction, refer to the sound engineering bulletin or the unit IOM. Manuals are available through the local Trane office.

HVAC equipment must be located to minimize sound and vibration transmission to the occupied spaces of the building structure it serves. If the equipment must be located in close proximity to a building, it should be placed next to an unoccupied space such as a storage room, mechanical room, etc. It is not recommended to locate the equipment near occupied, sound sensitive areas of the building or near windows. Locating the equipment away from structures will also prevent sound reflection, which can increase sound levels at property lines or other sensitive points.

Isolation and Sound Emission

Structurally transmitted sound can be reduced by elastomeric vibration eliminators. Elastomeric isolators are generally effective in reducing vibratory noise generated by compressors, and therefore, are recommended for sound sensitive installations. An acoustical engineer should always be consulted on critical applications.

Figure 3. Installation Example



For maximum isolation effect, water lines and electrical conduit should also be isolated. Wall sleeves and rubber isolated piping hangers can be used to reduce the sound transmitted through water piping. To reduce the sound transmitted through electrical conduit, use flexible electrical conduit.

Local codes on sound emissions should always be considered. Since the environment in which a sound source is located affects sound pressure, unit placement must be carefully evaluated. Sound power levels for chillers are available on request.

Servicing

Adequate clearance for evaporator and compressor servicing should be provided. Recommended minimum space envelopes for servicing are located in the dimensional data section and can serve as a guideline for providing adequate clearance. The minimum space envelopes also allow for control panel door swing and routine maintenance requirements. Local code requirements may take precedence.

Unit Location

General

Unobstructed flow of condenser air is essential to maintain chiller capacity and operating efficiency. When determining unit placement, careful consideration must be given to assure a sufficient flow of air across the condenser heat transfer surface. Two detrimental conditions are possible and must be avoided: warm air recirculation and coil starvation. Air recirculation occurs when discharge air from the condenser fans is recycled back to the condenser coil inlet. Coil starvation occurs when free airflow to the condenser is restricted.

Condenser coils and fan discharge must be kept free of snow or other obstructions to permit adequate airflow for satisfactory unit operation. Debris, trash, supplies, etc., should not be allowed to accumulate in the vicinity of the air-cooled chiller. Supply air movement may draw debris into the condenser coil, blocking spaces between coil fins and causing coil starvation.

Both warm air recirculation and coil starvation cause reductions in unit efficiency and capacity because of the higher head pressures associated with them. The air-cooled AquaStream chiller offers an advantage over competitive equipment in these situations. Operation is minimally affected in many restricted air flow situations due to its advanced Adaptive Control™ microprocessor which has the ability to understand the operating environment of the chiller and adapt to it by first optimizing its performance and then staying on line through abnormal conditions. For example, high ambient temperatures combined with a restricted air flow situation will generally not cause the air-cooled model CGAM chiller to shut down. Other chillers would typically shut down on a high pressure nuisance cut-out in these conditions.

Cross winds, those perpendicular to the condenser, tend to aid efficient operation in warmer ambient conditions. However, they tend to be detrimental to operation in lower ambients due to the accompanying loss of adequate head pressure. Special consideration should be given to low ambient units. As a result, it is advisable to protect air-cooled chillers from continuous direct winds exceeding 10 mph (4.5 m/s) in low ambient conditions.

The recommended lateral clearances are depicted in the close spacing engineering bulletin available from your local office.

Provide Sufficient Unit-to-Unit Clearance

Units should be separated from each other by sufficient distance to prevent warm air recirculation or coil starvation. Doubling the recommended single unit air-cooled chiller clearances will generally prove to be adequate.

Walled Enclosure Installations

When the unit is placed in an enclosure or small depression, the top of the surrounding walls should be no higher than the top of the fans. The chiller should be completely open above the fan deck. There should be no roof or structure covering the top of the chiller. Ducting individual fans is not recommended.

Model Number Descriptions

Digit 1-4 — Chiller Model

CGAM = Air-Cooled Scroll Packaged Chiller

Digit 5-7 — Unit Nominal Tonnage

020 = 20 Tons
026 = 26 Tons
030 = 30 Tons
035 = 35 Tons
040 = 40 Tons
052 = 52 Tons
060 = 60 Tons
070 = 70 Tons
080 = 80 Tons
090 = 90 Tons
100 = 100 Tons
110 = 110 Tons
120 = 120 Tons

Digit 8 — Unit Voltage

A = 200 Volt 60 Hz 3 Phase
B = 230 Volt 60 Hz 3 Phase
D = 380 Volt 60 Hz 3 Phase
E = 400 Volt 50 Hz 3 Phase
F = 460 Volt 60 Hz 3 Phase
G = 575 Volt 60 Hz 3 Phase

Digit 9 — Manufacturing Plant

2 = Pueblo, USA

Digit 10-11 — Design Sequence

A-Z = Factory/ABU Assigned

Digit 12 — Unit Type

2 = High Efficiency/Performance

Digit 13 — Agency Listing

X = No Agency Listing
A = UL Listed to US and Canadian Safety Standard

Digit 14 — Pressure Vessel Code

X = No Pressure Vessel Code
1 = ASME Pressure Vessel Code and CRN

Digit 15 — Unit Application

B = High Ambient (32-125F/0-52C)
D = Wide Ambient (0 to 125F/-18 to 52C)

Digit 16 — Refrigerant Isolation Valves

2 = Refrigerant Isolation Valves (Discharge Valve)

Digit 17 — Seismically Rated Unit

A = Not Seismically Rated Unit

Digit 18 — Freeze Protection (Factory-Installed Only)

1 = With Freeze Protection (External T-Stat Control)

Digit 19 — Insulation

A = Factory Insulation - All Cold Parts
B = Insulation for High Humidity/ Low Evap Temp

Digit 20 — Factory Charge

1 = Full Factory Refrigerant Charge (HFC-410A)
2 = Nitrogen Charge

Digit 21 — Evaporator Application

A = Standard Cooling (42 to 65°F/5.5 to 18°C)
B = Low Temperature Processing (lower than 42°F/5.5°C)
C = Ice-Making - hardwired interface (20 to 65°F/-7 to 18°C)

Digit 22 — Water Connection (Evap)

1 = Grooved Pipe Connection

Digit 23 — Condenser Fin Material

A = Lanced Aluminum Fins
D = Lanced Aluminum Fins w/ CompleteCoat™

Digit 24 — Condenser Heat Recovery

X = No Heat Recovery
1 = Partial Heat Recovery w/ Fan Control (10-15% of cooling)

Digit 25

X

Digit 26 — Starter Type

A = Across the Line Starter/ Direct on Line

Digit 27 — Incoming Power Line Connection

1 = Single Point Power Connection
2 = Dual Point Power Connection

Digit 28 — Power Line Connection Type

A = Terminal Block Conn. For Incoming Lines
C = Circuit Breaker
D = Circuit Breaker with High Fault Rated Control Panel

Digit 29 — Enclosure Type

1 = Water Tight (Per UL 1995 Standard)

Digit 30 — Unit Operator Interface

A = Dyna-View/English
B = Dyna-View/Spanish
C = Dyna-View/Spanish-Mexico
D = Dyna-View/French
E = Dyna-View/German
F = Dyna-View/Dutch
G = Dyna-View/Italian
H = Dyna-View/Japanese
J = Dyna-View/Portuguese-Portugal
K = Dyna-View/Portuguese-Brazil
L = Dyna-View/Korean
M = Dyna-View/Thai
N = Dyna-View/Simplified Chinese
P = Dyna-View/Traditional Chinese
R = Dyna-View/Russian
T = Dyna-View/Polish
U = Dyna-View/Czech
V = Dyna-View/Hungarian
W = Dyna-View/Greek
Y = Dyna-View/Romanian
Z = Dyna-View/Swedish

Digit 31 — Remote Interface (digital comm)

X = No Remote Digital Communication
2 = LonTalk/Tracer Summit Interface
3 = Time of Day Scheduling
4 = BACNet Interface

Digit 32 — Ext. Chilled/Hot Water and Curr. Demand Limit Setpoint

X = No Ext. Chilled Water Setpoint
A = Ext. Ch Water and Demand Limit Setpnt - 4-20mA
B = Ext. Ch Water and Demand Limit Setpnt - 2-10Vdc

Digit 33 —% Capacity

X = Without % Capacity
1 = With % Capacity

Digit 34 — Programmable Relays

X = No Programmable Relays
A = Programmable Relays

Digit 35 — Pump Type

X = No Pumps and no Contactors
7 = Dual Standard Pump
8 = Dual High Head Pump

Digit 36 — Pump Flow Control

X = No Pump Flow Control
B = Pump Flow Controlled by Variable Speed Drive

Digit 37 — Buffer Tank

X = No Tank
1 = With Tank

Digit 38 — Short Circuit Rating

A = Default A Short Circuit Rating
B = High A Short Circuit Rating

Digit 39 — Installation Accessories

X = No Installation Accessories
1 = Elastomeric Isolators

Digit 40 — Water Strainer

A = With Water Strainer Factory-Installed

Digit 41 — Sound Attenuator Package

3 = Super Quiet
5 = Comprehensive Acoustic Package

Digit 42 — Appearance Options

X = No Appearance Options
A = Architectural Louvered Panels
B = Half Louvers

Digit 43 — Exterior Finish

1 = Standard Paint

Digit 44 — Label and Literature Language

B = Spanish and English
D = English
E = French and English
V = Portuguese

Digit 45

X

Digit 46 — Shipping Package

X = No Skid (Standard)

Digit 47 — Performance Test Options

X = No Performance Test
1 = Customer Inspection
2 = 1 Point Test with Report
3 = Witness 1 Point Test with Report

Digit 48

X

Digit 49

X

Digit 50 — Specials

X = None
S = Special

Notes:

1. If a digit is not defined it may be held for future use.

General Data

Table 1. General Data - 60 Hz - IP

Size		20	26	30	35	40	52	60	70	80	90	100	110	120
Compressor														
Number	#	2	2	2	2	4	4	4	4	4	4	4	4	4
Tonnage/circuit[1]		10+10	13+13	15+15	15+20	10+10	13+13	15+15	15+20	20+20	20+25	25+25	25+30	30+30
Evaporator														
Water storage	(gal)	1.4	1.8	2.2	2.8	2.5	3.9	5.0	5.7	7.0	7.5	8.6	10.3	10.3
Min. flow[2]	(gpm)	24	30	35	41	47	60	71	83	94	106	119	129	141
Max. flow[2]	(gpm)	72	75	106	110	110	132	213	247	282	316	356	365	365
Water connection	(in)	2	2.5	2.5	2.5	3	3	3	3	4	4	4	4	4
Pump Package														
Evap head pressure avail- std head	(ft H2O)	25	22	18	17	27	23	39	31	39	32	25	35	25
Power - std head	(HP)	1.5	1.5	1.5	1.5	3.0	3.0	5.4	5.4	5.4	5.4	5.4	7.6	7.6
Evap head pressure avail- high head	(ft H2O)	85	83	78	77	67	60	76	61	62	54	67	64	73
Power - high head	(HP)	5.0	5.0	5.0	5.0	5.0	5.0	7.6	7.6	7.6	7.6	10.2	10.2	15.2
Expansion tank volume	(gal)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	6.3	6.3	6.3	6.3	6.3
Expansion tank capacity	(gal)	111	111	111	111	111	111	111	111	145	145	145	145	145
Buffer tank volume	(gal)	143	143	143	143	136	136	136	136	156	156	201	201	201
Condenser														
Qty of coils	#	1	1	1	1	2	2	2	2	4	4	4	4	4
Coil length	(in)	73	91	109	127	73	91	109	127	121	121	144	144	144
Coil height/circuit[1]	(in)	68	68	68	68	68	68	68	68	84	84	84	84	84
Number of rows	#	2	2	2	2	2	2	2	2	3	3	3	3	3
Fins per foot	(fpf)	192	192	192	192	192	192	192	192	192	192	192	192	192
Fan														
Quantity/circuit[1]	#	2	2	3	3	2	2	3	3	2	3	4	4	4
Diameter	(in)	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
Airflow per fan	(cfm)	8560	9399	8539	9150	8559	9398	8539	9150	10394	9444	9061	9063	9065
Power per motor	(kW)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Motor RPM	(rpm)	840	840	840	840	840	840	840	840	840	840	840	840	840
Tip speed	(ft/min)	6333	6333	6333	6333	6333	6333	6333	6333	6333	6333	6333	6333	6333
General Unit														
Refrig circuits	#	1	1	1	1	2	2	2	2	2	2	2	2	2
Capacity steps	%	50-100	50-100	50-100	43-100	25-50-75-100	25-50-75-100	25-50-75-100	21-43-71-100	25-50-75-100	22-44-72-100	25-50-75-100	23-45-73-100	25-50-75-100
Refrig charge/circuit [1]	(lbs)	28	34	44	48	29	32	44	48	74	74	82	86	86
Oil charge/circuit[1]	(gal)	1.7	1.7	3.5	3.5	1.7	1.7	3.5	3.5	3.5	3.5	3.5	3.7	3.8
Min ambient														
High ambient	(°F)	32	32	32	32	32	32	32	32	32	32	32	32	32
Wide ambient	(°F)	0	0	0	0	0	0	0	0	0	0	0	0	0

1. Data shown for circuit one only. The second circuits always matches.
2. Flow limits are for water only.

Table 2. General Data - 60 Hz - SI

Size		20	26	30	35	40	52	60	70	80	90	100	110	120
Compressor														
Number	#	2	2	2	2	4	4	4	4	4	4	4	4	4
Tonnage/circuit[1]		10+10	13+13	15+15	15+20	10+10	13+13	15+15	15+20	20+20	20+25	25+25	25+30	30+30
Evaporator														
Water storage	(l)	5.3	6.8	8.3	10.6	9.5	14.8	18.9	21.6	26.5	28.4	32.6	39.0	39.0
Min. flow[2]	(l/s)	1.5	1.9	2.2	2.6	3.0	3.8	4.5	5.2	5.9	6.7	7.5	8.1	8.9
Max. flow[2]	(l/s)	4.5	4.7	6.7	6.9	6.9	8.3	13.4	15.6	17.8	19.9	22.5	23.0	23.0
Water connection	(mm)	50.8	63.5	63.5	63.5	76.2	76.2	76.2	76.2	101.6	101.6	101.6	101.6	101.6
Pump Package														
Evap head pressure avail- std head	(kPa)	56.2	27.8	40.7	39.8	58.3	68.5	116	93.6	117.8	95.9	73.5	105.2	74.1
Power - std head	(HP)	1.5	1.5	1.5	1.5	3.0	3.0	5.1	5.1	5.1	5.1	5.1	5.1	7.6
Evap head pressure avail- high head	(kPa)	252.6	246.6	232.8	229	201.5	180.5	227.8	183.2	185.6	162.0	201.5	190.4	218.8
Power - high head	(HP)	5.0	5.0	5.0	5.0	5.0	5.0	7.6	7.6	7.6	7.6	10.2	10.2	15.2
Expansion tank volume	(l)	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	23.8	23.8	23.8	23.8	23.8
Expansion volume capacity	(l)	420.2	420.2	420.2	420.2	420.2	420.2	420.2	420.2	548.9	548.9	548.9	548.9	548.9
Buffer tank volume	(l)	541.3	541.3	541.3	541.3	514.8	514.8	514.8	514.8	590.5	590.5	760.9	760.9	760.9
Condenser														
Qty of coils	#	1	1	1	1	2	2	2	2	4	4	4	4	4
Coil length	(mm)	1854	2311	2769	3226	1854	2311	2769	3226	3073	3073	3658	3658	3658
Coil height/circuit[1]	(mm)	1727	1727	1727	1727	1727	1727	1727	1727	2134	2134	2134	2134	2134
Number of rows	#	2	2	2	2	2	2	2	2	3	3	3	3	3
Fins per foot	(fpf)	192	192	192	192	192	192	192	192	192	192	192	192	192
Fan														
Quantity/circuit[1]	#	2	2	3	3	2	2	3	3	2	3	4	4	4
Diameter	(mm)	732	732	732	732	732	732	732	732	732	732	732	732	732
Airflow per fan	(m^3/h)	14544	15969	14508	15546	14542	15967	14508	15546	17660	16045	15395	15398	15402
Power per motor	(kW)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Motor RPM	(rpm)	840	840	840	840	840	840	840	840	840	840	840	840	840
Tip speed	(m/s)	32	32	32	32	32	32	32	32	32	32	32	32	32
General Unit														
Refrig circuits	#	1	1	1	1	2	2	2	2	2	2	2	2	2
Capacity steps	%	50-100	50-100	50-100	43-100	25-50-75-100	25-50-75-100	25-50-75-100	21-43-71-100	25-50-75-100	22-44-72-100	25-50-75-100	23-45-73-100	25-50-75-100
Refrig charge/ circuit[1]	(kg)	12.7	15.4	20.0	21.8	13.2	14.5	20.0	21.8	33.6	33.6	37.2	39.0	39.0
Oil charge /circuit[1]	(l)	6.4	6.4	13.2	13.2	6.4	6.4	13.2	13.2	13.2	13.2	13.2	14	14.4
Min ambient														
High ambient	(°C)	0	0	0	0	0	0	0	0	0	0	0	0	0
Wide ambient	(°C)	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18

1. Data shown for circuit one only. The second circuit always matches.
2. Flow limits are for water only.

General Data

Table 3. General Data - 50 Hz - IP

Size		20	26	30	35	40	52	60	70	80	90	100	110	120
Compressor														
Number	#	2	2	2	2	4	4	4	4	4	4	4	4	4
Tonnage/circuit[1]		10+10	13+13	15+15	15+20	10+10	13+13	15+15	15+20	20+20	20+25	25+25	25+30	30+30
Evaporator														
Water storage	(gal)	1.4	1.8	2.2	2.8	2.5	3.9	5.0	5.7	7.0	7.5	8.6	10.3	10.3
Min. flow[2]	(gpm)	21	26	29	34	40	51	58	69	81	91	101	110	118
Max. flow[2]	(gpm)	62	75	87	103	110	110	175	207	242	272	302	331	354
Water connection	(in)	2	2	2.5	2.5	2.5	2.5	3	3	4	4	4	4	4
Condenser														
Qty of coils	#	1	1	1	1	2	2	2	2	4	4	4	4	4
Coil length	(in)	73	91	109	127	73	91	109	127	121	121	144	144	144
Coil height/circuit[1]	(in)	68	68	68	68	68	68	68	68	84	84	84	84	84
Number of rows	#	2	2	2	2	2	2	2	2	3	3	3	3	3
Fins per foot	(fpf)	192	192	192	192	192	192	192	192	192	192	192	192	192
Fan														
Quantity/circuit[1]	#	2	2	2	3	2	2	2	3	2	3	3	4	4
Diameter	(in)	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
Airflow/fan	(cfm)	7043	7764	8210	7550	7043	7764	8210	7550	8612	7780	8197	7448	7450
Power/motor	(kW)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Motor RPM	(rpm)	700	700	700	700	700	700	700	700	700	700	700	700	700
Tip speed	(ft/ min)	5278	5278	5278	5278	5278	5278	5278	5278	5278	5278	5278	5278	5278
General Unit														
Refrig circuits	#	1	1	1	1	2	2	2	2	2	2	2	2	2
Capacity steps	%	50-100	50-100	50-100	43-100	25-50-75-100	25-50-75-100	25-50-75-100	21-43-71-100	25-50-75-100	22-44-72-100	25-50-75-100	23-45-73-100	25-50-75-100
Refrig charge/ circuit[1]	(lbs)	28	34	44	48	29	32	44	48	74	74	82	86	84
Oil charge/circuit[1]	(gal)	1.7	1.7	3.5	3.5	1.7	1.7	3.5	3.5	3.5	3.5	3.5	3.7	3.8
Min ambient														
High ambient	(°F)	32	32	32	32	32	32	32	32	32	32	32	32	32
Wide ambient	(°F)	0	0	0	0	0	0	0	0	0	0	0	0	0

1. Data shown for circuit one only. The second circuit always matches.
2. Flow limits are for water only.

Table 4. General Data - 50 Hz - SI

Size		20	26	30	35	40	52	60	70	80	90	100	110	120
Compressor														
Number	#	2	2	2	2	4	4	4	4	4	4	4	4	4
Tonnage/circuit[1]		10+10	13+13	15+15	15+20	10+10	13+13	15+15	15+20	20+20	20+25	25+25	25+30	30+30
Evaporator														
Water storage	(l)	5.3	6.8	8.3	10.6	9.5	14.8	18.9	21.6	26.5	28.4	32.6	39.0	39.0
Min. flow[2]	(l/s)	1.3	1.6	1.8	2.2	2.5	3.2	3.7	4.4	5.1	5.7	6.4	7.0	7.4
Max. flow[2]	(l/s)	3.9	4.7	5.5	6.5	6.9	6.9	11.0	13.1	15.3	17.2	19.1	20.9	22.3
Water connection	(mm)	50	50	65	65	65	65	80	80	100	100	100	100	100
Condenser														
Qty of coils	#	1	1	1	1	2	2	2	2	4	4	4	4	4
Coil length	(mm)	1854	2311	2769	3226	1930	2311	2769	3226	3073	3073	3658	3658	3658
Coil height/circuit[1]	(mm)	1727	1727	1727	1727	1727	1727	1727	1727	2134	2134	2134	2134	2134
Number of rows	#	2	2	2	2	2	2	2	2	3	3	3	3	3
Fins per foot	(fpf)	192	192	192	192	192	192	192	192	192	192	192	192	192
Fan														
Quantity/circuit[1]	#	2	2	2	3	2	2	2	3	2	3	3	4	4
Diameter	(mm)	732	732	732	732	732	732	732	732	732	732	732	732	732
Airflow/fan	(m^3/h)	11966	13191	13949	12828	11966	13191	13949	12828	14632	13218	13927	12654	12658
Power/motor	(kW)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Motor RPM	(rpm)	700	700	700	700	700	700	700	700	700	700	700	700	700
Tip speed	(m/s)	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8
General Unit														
Refrig circuits	#	1	1	1	1	2	2	2	2	2	2	2	2	2
Capacity steps	%	50-100	50-100	50-100	43-100	25-50-75-100	25-50-75-100	25-50-75-100	21-43-71-100	25-50-75-100	22-44-72-100	25-50-75-100	23-45-73-100	25-50-75-100
Refrig charge/circuit[1]	(kg)	12.7	15.4	20.0	21.8	13.2	14.5	20.0	21.8	33.6	33.6	37.2	39.0	38.1
Oil charge/circuit [1]	(l)	6.4	6.4	13.2	13.2	6.4	6.4	13.2	13.2	13.2	13.2	13.2	14	14.4
Min ambient														
High ambient	(°C)	0	0	0	0	0	0	0	0	0	0	0	0	0
Wide ambient	(°C)	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18

1. Data shown for circuit one only. The second circuit always matches.
2. Flow limits are for water only.

Controls

LCD Touch-Screen Display with Multi-Language Support

The standard DynaView display provided with the Trane CH530 control panel features an LCD touch-screen that is navigated by file tabs. This is an advanced interface that allows the user to access any important information concerning setpoints, active temperatures, modes, electrical data, pressure, and diagnostics. It uses full text display available in 19 languages.

Display Features Include:

- LCD touch-screen with LED backlighting, for scrolling access to input and output operating information
- Single-screen, folder/tab-style display of all available information on individual components (evaporator, condenser, compressor, etc.)
- Password entry/lockout system to enable or disable display
- Automatic and immediate stop capabilities for standard or immediate manual shutdown
- Fast, easy access to available chiller data in tabbed format, including:
  - Modes of operation, including normal cooling as well as ice making
  - Water temperatures and setpoints
  - Loading and limiting status and setpoints
  - Outdoor air temperature
  - Start/stop differential timers
  - Pump status and override
  - Chilled water reset settings
- Optional external setpoints, including:
  - Chilled water
  - Demand limit
  - Ice building

Reports, listed on a single tabbed screen for easy access, including:

- ASHRAE, containing all guideline 3 report information
- Evaporator
- Condenser
- Compressor

Evaporator, condenser, and compressor reports containing all operational information on individual components, including:

- Water temperatures
- Refrigerant pressures, temperatures, and approach
- Flow switch status
- EXV position
- Compressor starts and run-time

Alarm and diagnostic information, including:

- Flashing alarms with touch-screen button for immediate address of alarm condition
- Scrollable list of last ten active diagnostics
- Specific information on applicable diagnostic from list of over one-hundred
- Automatic or manual resetting diagnostic types

Adaptive Controls

Adaptive Controls directly sense the control variables that govern the operation of the chiller: evaporator pressure and condenser pressure. When any one of these variables approaches a limit condition when damage may occur to the unit or shutdown on a safety, Adaptive Controls takes corrective action to avoid shutdown and keep the chiller operating. This happens through combined actions of compressor and/or fan staging. Whenever possible, the chiller is allowed to continue making chilled water. This keeps cooling capacity available unit the problem can be solved. Overall, the safety controls help keep the building or process running and out of trouble.

Stand-Alone Controls

Single chillers installed in applications without a building management system is simple to install and control: only a remote auto/stop for scheduling is required for unit operation. Signals from the chilled-water pump contactor auxiliary, or a flow switch, are wired to the chilled-water flow interlock. Signals from a time clock or some other remote device are wired to the external auto/stop input.

Standard Features

- Auto/Stop - A job-site provided contact closure turns the unit on and off.
- External Interlock - A job-site provided contact opening wired to this input turns the unit off and require a manual reset of the unit microcomputer. This closure is typically triggered by a job-site provided system such as a fire alarm.

Hardwire Points

Microcomputer controls allow simple interface with other control systems, such as time clocks, building automation systems, and ice storage systems via hardwire points. This means you have the flexibility to meet job requirements while not having to learn a complicated control system.

Remote devices are wired from the control panel to provide auxiliary control to a building automation system. Inputs and outputs can be communicated via a typical 4–20 mA electrical signal, an equivalent 2–10 Vdc signal, or by utilizing contact closures.

This setup has the same stand features as a stand-alone water chiller, with the possibility of having additional optional features:

- Ice making control
- External chilled water setpoint
- External demand limit setpoint
- Chilled water temperature reset
- Programmable relays - available outputs are: alarm-latching, alarm-auto reset, general alarm, warning, chiller limit mode, compressor running, and Tracer control

BACnet Interface

BACnet interface capabilities are available, with communication link via single twisted-pair wiring to a factory-installed and tested communication board.

Required features:

- BACnet Interface (selectable option with chiller)

BACnet is a data communication protocol for building automation and control networks developed by American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

LonTalk LCI-C Interface

LonTalk (LCI-C) communications capabilities are available, with communication link via single twisted-pair wiring to factory-installed, tested communication board.

Required features:

- LonTalk/Tracer Summit Interface (selectable option with chiller)

LonTalk is a communications protocol developed by the Echelon Corporation. The LonMark association develops control profiles using the LonTalk communication protocol. LonTalk is a unit level communications protocol.

LonTalk Communications Interface for Chillers (LCI-C) provides a generic automation system with the LonMark chiller profile inputs/outputs. In addition to the standard points, Trane provides other commonly used network output variables for greater interoperability with any automation system. The complete reference list of Trane LonTalk points is available on the LonMark web site.

Trane controls or another vendor's system can use the predefined list of points with ease to give the operator a complete picture of how the system is running

Tracer Summit

The chiller plant control capabilities of the Trane Tracer Summit building automation system are unequaled in the industry. Trane's depth of experience in chillers and controls makes us a well-qualified choice for automation of chiller plants using air-cooled AquaStream chillers. Our chiller plant automation software is fully pre-engineered and tested.

Required features:

- LonTalk/Tracer Summit Interface (selectable option with chiller)
- Building Control Unit (external device required)

Energy Efficiency

- Sequences starting of chillers to optimize the overall chiller plant energy efficiency
  - Individual chillers operate as base, peak, or swing based on capacity and efficiency
  - Automatically rotates individual chiller operation to equalize runtime and wear between chillers.
  - Evaluates and selects the lowest energy consumption alternative from an overall system perspective.

Regulatory Compliance Documentation

- Gathers information and generates the reports mandated in ASHRAE Guideline 3.

Easy Operation and Maintenance

- Remote monitoring and control
- Displays both current operation conditions and scheduled automated control actions
- Concise reports assist in planning for preventative maintenance and verifying performance
- Alarm notification and diagnostic messages aid in quick and accurate troubleshooting

When integrated with a Tracer Summit building management system the total building operation can be optimized. With this system option, the full breadth of Trane's HVAC and controls experience are applied to offer solutions to many facility issues. If your project calls for an interface to other systems, Tracer Summit can share data via BACnet, the ASHRAE open systems protocol.

Time of Day Scheduling

Time of day scheduling allows the customer to perform simple chiller scheduling without the need for a building automation system.

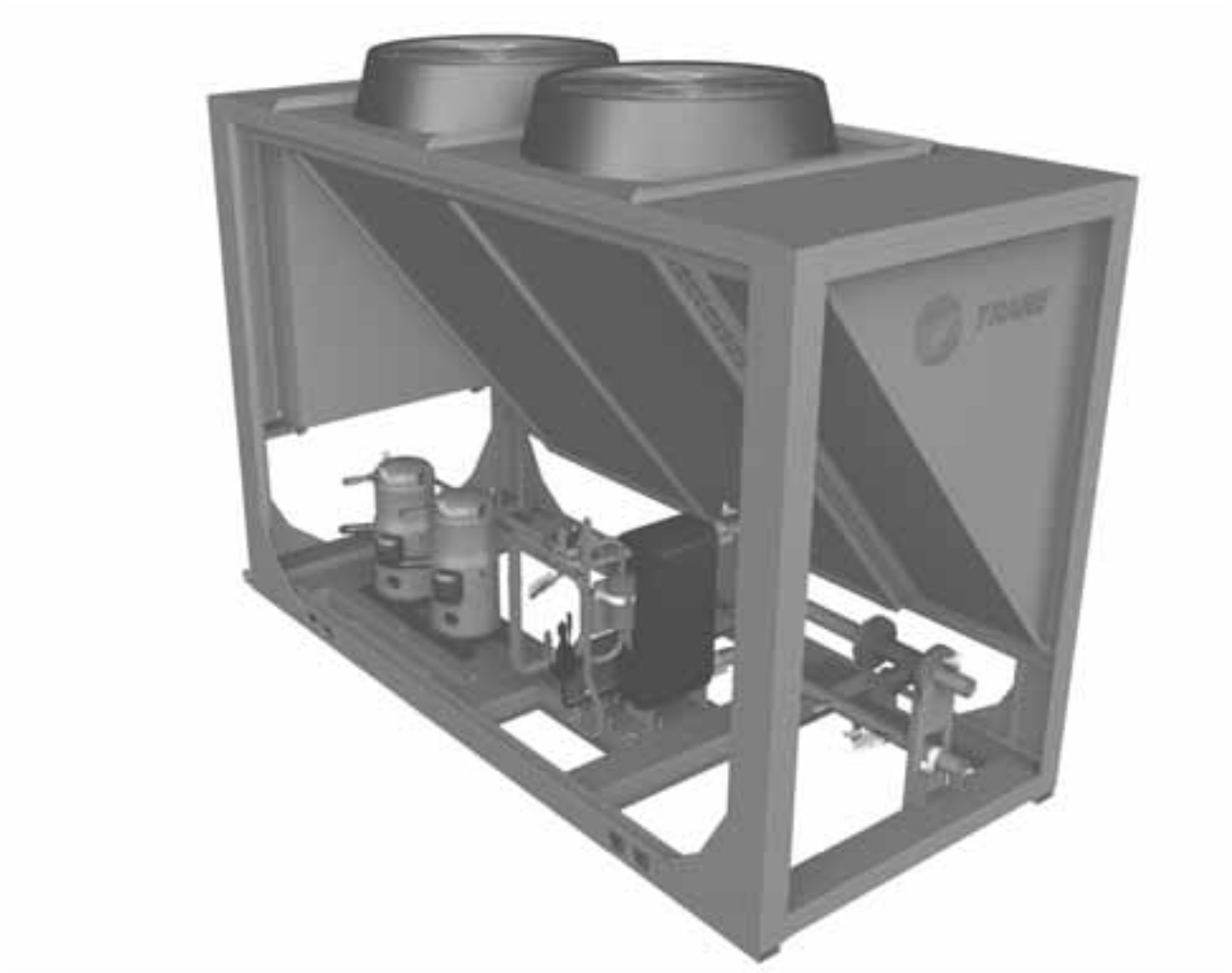
This feature allows the user to set ten events in a seven day time period. For each event the user can specify an activation time and the days of the week the event is active. Any available setpoints can be specified for each event, such as the leaving chilled water temperature (standard) and the demand limit setpoint (optional if ordered).

Required features:

- Time of day scheduling (selectable option with chiller)

Additional options that if ordered may be incorporated into the scheduling:

- External chilled water setpoint
- External demand limit setpoint
- Ice-making initiation



Chiller Level Controls

Building Level Controls

LCI-C
LCI - Lon Talk/Tracer Summit Interface
1A15 - Analog input/output
J2-1, 2

→ Tracer Sumit or LON

BACnet
BCNT - Unit level BACnet interface
1A15 - Analog input/output
J2-1, 2

→ BACnet

Programmable Relay
PRLY - Programmable relay outputs
1A18 - Binary output
1A18 - J2-1, 3/J2-2, 3 NO/NC
J2-4, 6/J2-5, 6 NO/NC
J2-7, 9/J2-8, 9 NO/NC
J2-10, 12/J2-11,12 NO/NC

→ BMS

External Chilled Water Setpoint
Demand Limit Setpoint
SETA 4-20mA
SETB 2-10VDC
1A14 Analog input/output
J2-2, 3 Chilled water set point
J2-5, 6 Demand limit set point

→ BMS

Ice Making with hard wire interface
ICE - Ice making status
1A16 - Binary input
J2-1, 2 NO

→ BMS

Capacity Output
PCAP 2-10VDC output
1A25 Analog output
J2-4, 6

→ BMS

NO - Normaly open contacts
NC - Normaly closed contacts
BMS - Generic building managment system

Electrical Data

Table 5. Electrical Data - 60 Hz

Unit Size	Rated Power	Number Circuits	Qty Comp[1]	Qty Fans[1]	Fan Motor Power (kw)	Cond Fan FLA	Compressor RLA[1] [2]	Compressor LRA[1] [3]
	200/60/3	1	2	2	1	6.7	38.8-38.8	278-278
	230/60/3	1	2	2	1	5.9	33.7-33.7	278-278
20	380/60/3	1	2	2	1	3.5	23.7-23.7	177-177
	460/60/3	1	2	2	1	2.9	18.6-18.6	130-130
	575/60/3	1	2	2	1	2.3	15.4-15.4	104-104
	200/60/3	1	2	2	1	6.7	45.7-45.7	338-338
	230/60/3	1	2	2	1	5.9	44-44	338-338
26	380/60/3	1	2	2	1	3.5	26.3-26.3	196-196
	460/60/3	1	2	2	1	2.9	22.4-22.4	158-158
	575/60/3	1	2	2	1	2.3	18.6-18.6	126-126
	200/60/3	1	2	3	1	6.7	57.8-57.8	485-485
	230/60/3	1	2	3	1	5.9	50.3-50.3	485-485
30	380/60/3	1	2	3	1	3.5	32-32	210-210
	460/60/3	1	2	3	1	2.9	25.8-25.8	160-160
	575/60/3	1	2	3	1	2.3	20.2-20.2	135-135
	200/60/3	1	2	3	1	6.7	57.8-81	485-485
	230/60/3	1	2	3	1	5.9	50.3-76.5	485-485
35	380/60/3	1	2	3	1	3.5	32-41.1	210-260
	460/60/3	1	2	3	1	2.9	25.8-33	160-215
	575/60/3	1	2	3	1	2.3	20.2-26.3	135-175
	200/60/3	2	2	2	1	6.7	38.8-38.8	278-278
	230/60/3	2	2	2	1	5.9	33.7-33.7	278-278
40	380/60/3	2	2	2	1	3.5	23.7-23.7	177-177
	460/60/3	2	2	2	1	2.9	18.6-18.6	130-130
	575/60/3	2	2	2	1	2.3	15.4-15.4	104-104
	200/60/3	2	2	2	1	6.7	45.7-45.7	338-338
	230/60/3	2	2	2	1	5.9	44-44	338-338
52	380/60/3	2	2	2	1	3.5	26.3-26.3	196-196
	460/60/3	2	2	2	1	2.9	22.4-22.4	158-158
	575/60/3	2	2	2	1	2.3	18.6-18.6	126-126
	200/60/3	2	2	3	1	6.7	57.8-57.8	485-485
	230/60/3	2	2	3	1	5.9	50.3-50.3	485-485
60	380/60/3	2	2	3	1	3.5	32-32	210-210
	460/60/3	2	2	3	1	2.9	25.8-25.8	160-160
	575/60/3	2	2	3	1	2.3	20.2-20.2	135-135

1. Data shown for circuit one. The second circuit is always the same.
2. RLA - Rated Load Amps - Rated in accordance with UL Standard 1995.
3. LRA - Locked Rotor Amps - Based on full winding starts.
4. Units have single point power connection as standard. Optional dual point power connections are available for 40-120 ton units.
5. Voltage Utilization Range:
   Rated voltage (use range): 200/60/3 (180-220), 230/60/3(208-254), 380/60/3 (342-418), 460/60/3 (414-506), 575/60/3 (516-633)
6. One separate 120/60/1, 15 amp customer provided power connection is required to power the heaters. An additional 120/60/1, 15 amp customer provided power connection is required if the optional buffer tank is selected.

Table 5. Electrical Data - 60 Hz

Unit Size	Rated Power	Number Circuits	Qty Comp[1]	Qty Fans[1]	Fan Motor Power (kw)	Cond Fan FLA	Compressor RLA[1] [2]	Compressor LRA[1] [3]
	200/60/3	2	2	3	1	6.7	57.8-81	485-485
	230/60/3	2	2	3	1	5.9	50.3-76.5	485-485
70	380/60/3	2	2	3	1	3.5	32-41.1	210-260
	460/60/3	2	2	3	1	2.9	25.8-33	160-215
	575/60/3	2	2	3	1	2.3	20.2-26.3	135-175
	200/60/3	2	2	2	1	6.7	81-81	485-485
	230/60/3	2	2	2	1	5.9	76.5-76.5	485-485
80	380/60/3	2	2	2	1	3.5	41.1-41.1	260-260
	460/60/3	2	2	2	1	2.9	33-33	215-215
	575/60/3	2	2	2	1	2.3	26.3-26.3	175-175
	200/60/3	2	2	3	1	6.7	81-94.5	485-560
	230/60/3	2	2	3	1	5.9	76.5-89.1	485-560
90	380/60/3	2	2	3	1	3.5	41.1-54.5	260-310
	460/60/3	2	2	3	1	2.9	33-43	215-260
	575/60/3	2	2	3	1	2.3	26.3-34.4	175-210
	200/60/3	2	2	4	1	6.7	94.5-94.5	560-560
	230/60/3	2	2	4	1	5.9	89.1-89.1	560-560
100	380/60/3	2	2	4	1	3.5	54.5-54.5	310-310
	460/60/3	2	2	4	1	2.9	43-43	260-260
	575/60/3	2	2	4	1	2.3	34.4-34.4	210-210
	200/60/3	2	2	4	1	6.7	94.5-110.6	560-680
	230/60/3	2	2	4	1	5.9	89.1-104.4	560-680
110	380/60/3	2	2	4	1	3.5	54.5-60.3	310-360
	460/60/3	2	2	4	1	2.9	43-50.6	260-320
	575/60/3	2	2	4	1	2.3	34.4-38.5	210-235
	200/60/3	2	2	4	1	6.7	110.6-110.6	680-680
	230/60/3	2	2	4	1	5.9	104.4-104.4	680-680
120	380/60/3	2	2	4	1	3.5	60.3-60.3	360-360
	460/60/3	2	2	4	1	2.9	50.6-50.6	320-320
	575/60/3	2	2	4	1	2.3	38.5-38.5	235-235

1. Data shown for circuit one. The second circuit is always the same.
2. RLA - Rated Load Amps - Rated in accordance with UL Standard 1995.
3. LRA - Locked Rotor Amps - Based on full winding starts.
4. Units have single point power connection as standard. Optional dual point power connections are available for 40-120 ton units.
5. Voltage Utilization Range:
   Rated voltage (use range): 200/60/3 (180-220), 230/60/3(208-254), 380/60/3 (342-418), 460/60/3 (414-506), 575/60/3 (516-633)
6. One separate 120/60/1, 15 amp customer provided power connection is required to power the heaters. An additional 120/60/1, 15 amp customer provided power connection is required if the optional buffer tank is selected.

Table 6. Electrical Data - 60 Hz - Unit Wiring - MCA/MOPD

Unit Size	Rated Power	Without Pump Package		Standard Head Pump Package		High Head Pump Package	
		MCA[1]	MOPD[2]	MCA[1]	MOPD[2]	MCA[1]	MOPD[2]
20	200/60/3	105.1	125	111.1	125	121.1	150
	230/60/3	92.3	125	98.3	125	108.3	125
	380/60/3	61.6	80	n/a		n/a	
	460/60/3	49.2	60	52.0	70	58.3	70
	575/60/3	41.0	50	43.5	50	47.2	60
26	200/60/3	120.6	150	126.6	150	136.6	175
	230/60/3	115.5	150	121.5	150	131.5	175
	380/60/3	67.4	90	n/a		n/a	
	460/60/3	57.7	80	60.5	80	66.8	80
	575/60/3	48.2	60	50.7	60	54.4	70
30	200/60/3	154.6	200	160.6	200	170.6	225
	230/60/3	135.5	175	141.5	175	151.5	200
	380/60/3	83.8	110	n/a		n/a	
	460/60/3	68.3	90	71.1	90	77.4	100
	575/60/3	54.1	70	56.6	70	60.3	80
35	200/60/3	183.6	250	189.6	250	199.6	250
	230/60/3	168.3	225	174.3	250	184.3	250
	380/60/3	95.1	125	n/a		n/a	
	460/60/3	77.3	110	80.1	110	86.4	110
	575/60/3	61.7	80	64.2	90	67.9	90

1. MCA - Minimum Circuit Ampacity-125 percent of largest compressor RLA plus 100 percent of all other loads per NEC 440-33 2008.
2. Max Fuse or HACR type breaker or MOPD -225 percent of the largest compressor RLA plus all other loads per NEC 440-22 2008.
3. Local codes may take precedence.
4. n/a - means option not available with voltage.

Table 7. Electrical Data - 60 Hz - Unit Wiring - MCA/MOPD

		Without Pump Package				Standard Head Pump Package						High Head Pump Package					
		Single Point Power		Dual Point Power		Single Point Power		Dual Point Power				Single Point Power		Dual Point Power			
Unit	Rated							Circuit 1		Circuit 2				Circuit 1		Circuit 2	
Size	Power	MCA[1]	MOPD[2]	MCA[1]	MOPD[2]	MCA[1]	MOPD[2]	MCA[1]	MOPD[2]	MCA[1]	MOPD[2]	MCA[1]	MOPD	MCA[1]	MOPD	MCA[1]	MOPD
40	200/60/3	196.4	225	105.1	125	206.4	225	115.1	150	101.0	125	212.4	250	121.1	150	101.0	125
	230/60/3	172.6	200	92.3	125	182.6	200	102.3	125	88.7	110	188.6	200	108.3	125	88.7	110
	380/60/3	115.2	125	61.6	80	n/a						n/a					
	460/60/3	91.8	110	49.1	60	97.1	110	54.4	70	47.4	60	100.9	110	58.2	70	47.4	60
	575/60/3	76.6	90	40.9	50	80.6	90	44.9	60	39.5	50	82.8	90	47.1	60	39.5	50
52	200/60/3	225.9	250	120.7	150	235.9	250	130.7	175	116.6	150	241.9	250	136.7	175	116.6	150
	230/60/3	216.3	250	115.4	150	226.3	250	125.4	150	111.8	150	232.3	250	131.4	175	111.8	150
	380/60/3	126.0	150	67.4	90	n/a						n/a					
	460/60/3	108.2	125	57.8	80	113.5	125	63.1	80	56.0	70	117.3	125	66.9	80	56.0	70
	575/60/3	90.2	100	48.2	60	94.2	110	52.2	70	46.7	60	96.4	110	54.4	70	46.7	60
60	200/60/3	290.6	300	154.6	200	306.6	350	170.6	225	150.5	200	313.6	350	177.6	225	150.5	200
	230/60/3	254.9	300	135.5	175	270.9	300	151.5	200	132.0	175	277.9	300	158.5	200	132.0	175
	380/60/3	157.4	175	83.8	110	n/a						n/a					
	460/60/3	128.4	150	68.3	90	137.5	150	77.4	100	66.5	90	140.6	150	80.5	100	66.5	90
	575/60/3	101.7	110	54.1	70	107.9	125	60.3	80	52.7	70	110.9	125	63.3	80	52.7	70
70	200/60/3	342.9	400	183.6	250	358.9	400	199.6	250	179.5	250	365.9	400	206.6	250	179.5	250
	230/60/3	313.9	350	168.3	225	329.9	400	184.3	250	164.7	225	336.9	400	191.3	250	164.7	225
	380/60/3	177.8	200	95.1	125	n/a						n/a					
	460/60/3	144.6	175	77.3	110	153.7	175	86.4	110	75.5	100	156.8	175	89.5	110	75.5	100
	575/60/3	115.4	125	61.7	80	121.6	125	67.9	90	60.3	80	124.6	150	70.9	90	60.3	80

1. MCA - Minimum Circuit Ampacity-125 percent of largest compressor RLA plus 100 percent of all other loads per NEC 440-33 2008.
2. Max Fuse or HACR type breaker or MOPD -225 percent of the largest compressor RLA plus all other loads per NEC 440-22 2008.
3. Data shown for circuit one. The second circuit is always the same.
4. Local codes may take precedence.
5. n/a - not available

Table 7. Electrical Data - 60 Hz - Unit Wiring - MCA/MOPD

		Without Pump Package				Standard Head Pump Package						High Head Pump Package					
		Single Point Power		Dual Point Power		Single Point Power		Dual Point Power				Single Point Power		Dual Point Power			
Unit	Rated							Circuit 1		Circuit 2				Circuit 1		Circuit 2	
Size	Power	MCA[1]	MOPD[2]	MCA[1]	MOPD[2]	MCA[1]	MOPD[2]	MCA[1]	MOPD[2]	MCA[1]	MOPD[2]	MCA[1]	MOPD	MCA[1]	MOPD	MCA[1]	MOPD
	200/60/3	376.0	450	200.2	250	392.0	450	216.2	250	196.1	250	399.0	450	223.2	300	196.1	250
	230/60/3	354.5	400	188.6	250	370.5	400	204.6	250	185.0	250	377.5	450	211.6	250	185.0	250
80	380/60/3	189.0	200	100.7	125	n/a						n/a					
	460/60/3	153.1	175	81.6	110	162.2	175	90.7	110	79.8	110	165.3	175	93.8	125	79.8	110
	575/60/3	122.9	125	65.5	90	129.1	150	71.7	90	64.0	90	132.1	150	74.7	100	64.0	90
	200/60/3	419.6	500	223.7	300	435.6	500	239.7	300	219.6	300	442.6	500	246.7	300	219.6	300
	230/60/3	394.6	450	210.2	250	410.6	450	226.2	300	206.7	250	417.6	500	233.2	300	206.7	250
90	380/60/3	226.2	250	121.0	175	n/a						n/a					
	460/60/3	181.5	200	97.0	125	190.6	225	106.1	125	95.2	125	193.7	225	109.2	150	95.2	125
	575/60/3	145.8	175	77.9	110	152.0	175	84.1	110	76.5	110	155.0	175	87.1	110	76.5	110
	200/60/3	459.9	500	243.8	300	475.9	500	259.8	350	239.7	300	489.9	500	273.8	350	239.7	300
	230/60/3	431.6	500	228.7	300	447.6	500	244.7	300	225.2	300	461.6	500	258.7	300	225.2	300
100	380/60/3	259.9	300	137.9	175	n/a						n/a					
	460/60/3	207.3	250	109.9	150	216.4	250	119.0	150	108.1	150	222.3	250	124.9	150	108.1	150
	575/60/3	166.6	200	88.3	110	172.8	200	94.5	125	86.9	110	177.8	200	99.5	125	86.9	110
	200/60/3	496.2	600	264.0	350	519.2	600	287.0	350	259.9	350	526.2	600	294.0	400	259.9	350
	230/60/3	466.1	500	247.9	350	489.1	500	270.9	350	244.3	300	496.1	600	277.9	350	244.3	300
110	380/60/3	273.0	300	145.1	200	n/a						n/a					
	460/60/3	224.5	250	119.5	150	236.7	250	131.7	175	117.7	150	239.5	250	134.5	175	117.7	150
	575/60/3	175.9	200	93.5	125	185.1	200	102.7	125	92.0	125	187.1	225	104.7	125	92.0	125
	200/60/3	528.5	600	280.1	350	551.5	600	303.1	400	276.0	350	574.5	600	326.1	400	276.0	350
	230/60/3	496.7	600	263.2	350	519.7	600	286.2	350	259.6	350	542.7	600	309.2	400	259.6	350
120	380/60/3	284.6	300	150.9	200	n/a						n/a					
	460/60/3	239.8	250	127.1	175	252.0	300	139.3	175	125.3	175	263.8	300	151.1	200	125.3	175
	575/60/3	184.1	200	97.6	125	193.3	200	106.8	125	96.1	125	202.1	225	115.6	150	96.1	125

1. MCA - Minimum Circuit Ampacity-125 percent of largest compressor RLA plus 100 percent of all other loads per NEC 440-33 2008.
2. Max Fuse or HACR type breaker or MOPD -225 percent of the largest compressor RLA plus all other loads per NEC 440-22 2008.
3. Data shown for circuit one. The second circuit is always the same.
4. Local codes may take precedence.
5. n/a - not available

Table 8. Lug Range Size - 60 Hz - Standard Unit

		Single Point Power			Dual Point Power		
Unit Size	Rated Power	Terminal Blocks	Std Fault Ckt Breaker[1]	High Fault Ckt Breaker[1]	Terminal Blocks	Std Fault Ckt Breaker[1]	High Fault Ckt Breaker[1]
	200/60/3	#14 - 2/0	#3 - 3/0	#3 - 3/0			
	230/60/3	#14 - 2/0	#3 - 3/0	#3 - 3/0			
20	380/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0		n/a	
	460/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0			
	575/60/3	#14 - 2/0	#10 - 1/0	n/a			
	200/60/3	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM			
	230/60/3	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM			
26	380/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0		n/a	
	460/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0			
	575/60/3	#14 - 2/0	#10 - 1/0	n/a			
	200/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM			
	230/60/3	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM			
30	380/60/3	#14 - 2/0	#3 - 3/0	#3 - 3/0		n/a	
	460/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0			
	575/60/3	#14 - 2/0	#10 - 1/0	n/a			
	200/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM			
	230/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM			
35	380/60/3	#14 - 2/0	#3 - 3/0	#3 - 3/0		n/a	
	460/60/3	#14 - 2/0	#3 - 3/0	#3 - 3/0			
	575/60/3	#14 - 2/0	#10 - 1/0	n/a			
	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
40	380/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#14 - 2/0	#10 - 1/0	#10 - 1/0
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#14 - 2/0	#10 - 1/0	n/a
	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
52	380/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#14 - 2/0	#10 - 1/0	n/a
	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
60	380/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#14 - 2/0	#6 - 350 MCM	n/a

1. Optional circuit breaker and high fault circuit breaker.
2. Will accept two conduits per phase in this size.
3. Copper wire only, based on nameplate Minimum Circuit Ampacity (MCA).
4. Data shown for circuit one. The second circuit is always the same.
5. n/a - not available

Table 8. Lug Range Size - 60 Hz - Standard Unit

		Single Point Power			Dual Point Power		
Unit Size	**Rated Power**	**Terminal Blocks**	**Std Fault Ckt Breaker[1]**	**High Fault Ckt Breaker[1]**	**Terminal Blocks**	**Std Fault Ckt Breaker[1]**	**High Fault Ckt Breaker[1]**
70	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	380/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#14 - 2/0	#6 - 350 MCM	n/a
80	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	380/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#14 - 2/0	#6 - 350 MCM	n/a
90	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	380/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#14 - 2/0	#6 - 350 MCM	n/a
100	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
	380/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#14 - 2/0	#6 - 350 MCM	n/a
110	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
	380/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	n/a	#14 - 2/0	#6 - 350 MCM	n/a
120	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
	380/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	n/a	#14 - 2/0	#6 - 350 MCM	n/a

1. Optional circuit breaker and high fault circuit breaker.
2. Will accept two conduits per phase in this size.
3. Copper wire only, based on nameplate Minimum Circuit Ampacity (MCA).
4. Data shown for circuit one. The second circuit is always the same.
5. n/a - not available

Table 9. Lug Range Size - 60 Hz - Pump Package - Standard Head

		Single Point Power			Dual Point Power		
Unit Size	Rated Voltage	Terminal Blocks	Std Fault Ckt Breaker[1]	High Fault Ckt Breaker[1]	Terminal Blocks	Std Fault Ckt Breaker[1]	High Fault Ckt Breaker[1]
20	200/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0		n/a	
	230/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0			
	460/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0			
	575/60/3	#14 - 2/0	#10 - 1/0	n/a			
26	200/60/3	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM		n/a	
	230/60/3	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM			
	460/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0			
	575/60/3	#14 - 2/0	#10 - 1/0	n/a			
30	200/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM		n/a	
	230/60/3	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM			
	460/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0			
	575/60/3	#14 - 2/0	#10 - 1/0	n/a			
35	200/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM		n/a	
	230/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM			
	460/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0			
	575/60/3	#14 - 2/0	#10 - 1/0	n/a			
40	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM/ #10 - 1/0	#6 - 350 MCM/ #10 - 1/0
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#4 - 500 MCM	#10 - 1/0	n/a
52	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#4 - 500 MCM	#6 - 350 MCM/ #10 - 1/0	n/a
60	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#4 - 500 MCM	#6 - 350 MCM	n/a
70	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#4 - 500 MCM	#6 - 350 MCM	n/a

1. Optional circuit breaker and high fault circuit breaker.
2. Will accept two conduits per phase in this size.
3. Copper wire only, based on nameplate Minimum Circuit Ampacity (MCA).
4. Data shown for circuit one. The second circuit is always the same.
5. n/a - not available
6. Pump package not available with 80-120 tons or 380/60/3 or 400/50/3 power.

Table 10. Lug Range Size - 60 Hz - Pump Package - High Head Pump

		Single Point Power			Dual Point Power		
Unit Size	Rated Voltage	Terminal Blocks	Std Fault Ckt Breaker[1]	High Fault Ckt Breaker[1]	Terminal Blocks	Std Fault Ckt Breaker[1]	High Fault Ckt Breaker[1]
20	200/60/3	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM	n/a		
	230/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0			
	460/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0			
	575/60/3	#14 - 2/0	#10 - 1/0	n/a			
26	200/60/3	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM	n/a		
	230/60/3	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM			
	460/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0			
	575/60/3	#14 - 2/0	#10 - 1/0	n/a			
30	200/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	n/a		
	230/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM			
	460/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0			
	575/60/3	#14 - 2/0	#10 - 1/0	n/a			
35	200/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	n/a		
	230/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM			
	460/60/3	#14 - 2/0	#10 - 1/0	#10 - 1/0			
	575/60/3	#14 - 2/0	#10 - 1/0	n/a			
40	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM/ #10 - 1/0	#6 - 350 MCM/ #10 -1/0
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#4 - 500 MCM	#10 - 1/0	n/a
52	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#4 - 500 MCM	#6 - 350 MCM/ #10 - 1/0	n/a
60	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#4 - 500 MCM	#6 - 350 MCM	n/a
70	200/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#4 - 500 MCM	#6 - 350 MCM	n/a

1. Optional circuit breaker and high fault circuit breaker.
2. Will accept two conduits per phase in this size.
3. Copper wire only, based on nameplate Minimum Circuit Ampacity (MCA).
4. Data shown for circuit one. The second circuit is always the same.
5. n/a - not available
6. Pump package not available with 80-120 tons or 380/60/3 or 400/50/3 power.

Table 11. Electrical Data - 50Hz

Unit Size	Rated Power	Number Circuits	Qty Comp[1]	Qty Fans[1]	Fan Motor Power (kW)	Cond Fan FLA	Compressor RLA[1] [2]	Compressor LRA[1] [3]
20	400/50/3	1	2	2	1	2.1	18.6-18.6	130-130
26	400/50/3	1	2	2	1	2.1	22.4-22.4	158-158
30	400/50/3	1	2	3	1	2.1	26.6-26.6	160-160
35	400/50/3	1	2	3	1	2.1	26.6-33.3	160-215
40	400/50/3	2	2	2	1	2.1	18.6-18.6	130-130
52	400/50/3	2	2	2	1	2.1	22.4-22.4	158-158
60	400/50/3	2	2	2	1	2.1	26.6-26.6	160-160
70	400/50/3	2	2	3	1	2.1	26.6-33.3	160-215
80	400/50/3	2	2	2	1	2.1	33.3-33.3	175-175
90	400/50/3	2	2	3	1	2.1	33.3-43.7	175-210
100	400/50/3	2	2	3	1	2.1	43.7-43.7	210-210
110	400/50/3	2	2	4	1	2.1	43.7-50.6	210-235
120	400/50/3	2	2	4	1	2.1	50.6-50.6	235-235

1. Data shown for circuit one. The second circuit is always the same.
2. RLA - Rated Load Amps - Rated in accordance with UL Standard 1995.
3. LRA - Locked Rotor Amps - Based on full winding starts.
4. Units have single point power connection as standard. Optional dual point power connections are available for 40-120 ton units.
5. Voltage Utilization Range:
   Rated voltage (use range): 400/50/3 (360-440)
6. One separate 120/50/1, 15 amp customer provided power connection is required to power the heaters. An additional 120/50/1, 15 amp customer provided power connection is required if the optional buffer tank is selected.

Table 12. Electrical Data - 50 Hz - Unit Wiring - MCA/MOPD

Unit	Rated	Single Point Power		Dual Point Power	
Size	Power	MCA[1]	MOPD[2]	MCA[1]	MOPD[2]
20	400/50/3	48.6	60	n/a	
26	400/50/3	57.1	70		
30	400/50/3	66.6	90		
35	400/50/3	77.0	110		
40	400/50/3	90.4	100	48.5	60
52	400/50/3	106.6	125	57.1	70
60	400/50/3	124.4	150	66.6	90
70	400/50/3	143.6	175	77.0	110
80	400/50/3	152.9	175	81.6	110
90	400/50/3	180.4	200	96.7	125
100	400/50/3	201.2	225	107.1	150
110	400/50/3	221.0	250	117.8	150
120	400/50/3	234.8	250	124.8	175

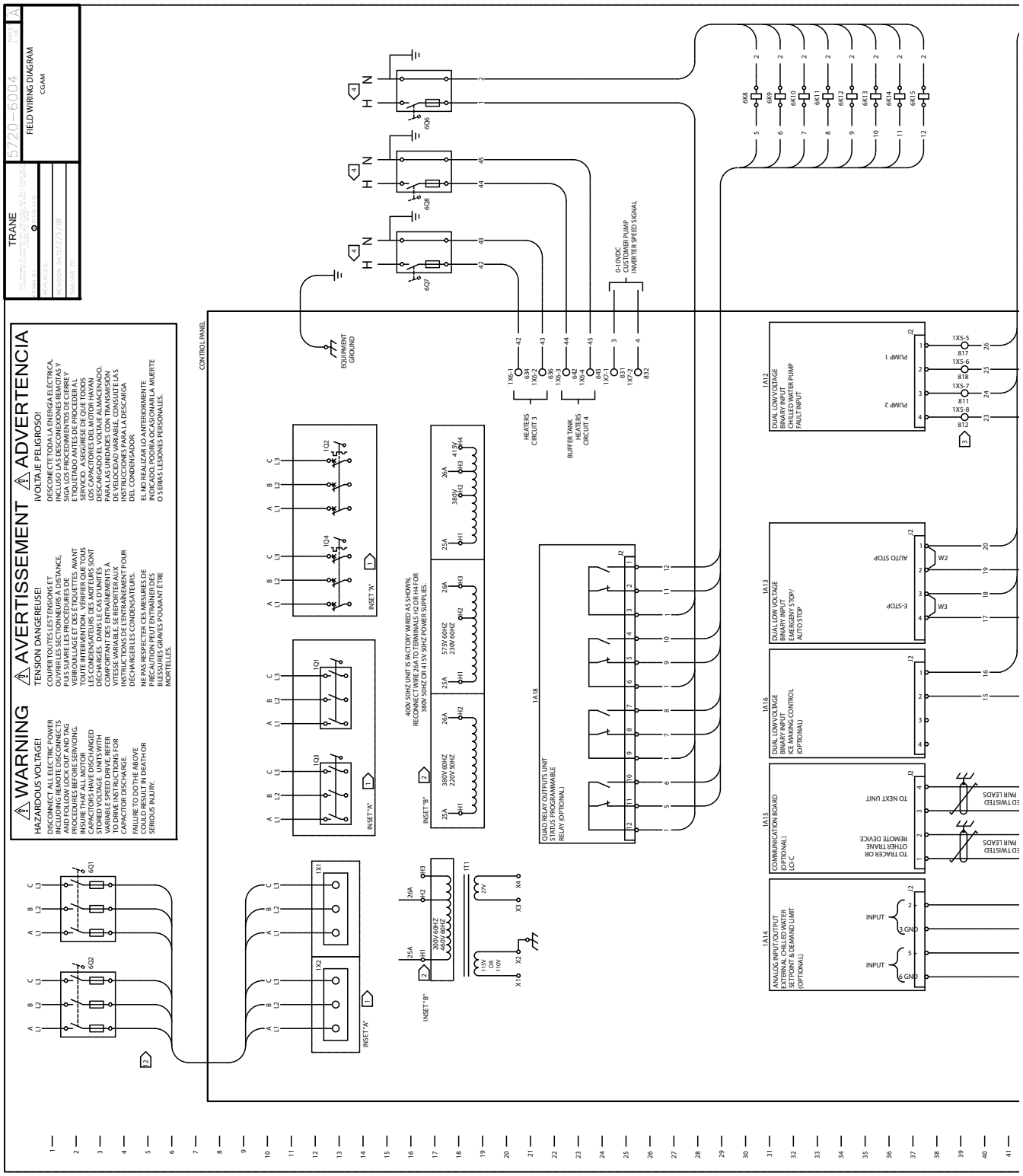
1. MCA - Minimum Circuit Ampacity-125 percent of largest compressor RLA plus 100 percent of all other loads per NEC 440-33 2008.
2. MOPD or Max Fuse or HACR type breaker-225 percent of the largest compressor RLA plus 100 percent of all other loads per NEC 440-22 2008.
3. Data shown for circuit one. The second circuit is always the same.
4. Local codes may take precedence.
5. n/a - means option not available with voltage.
6. 50 Hz chillers not available with pump package option.

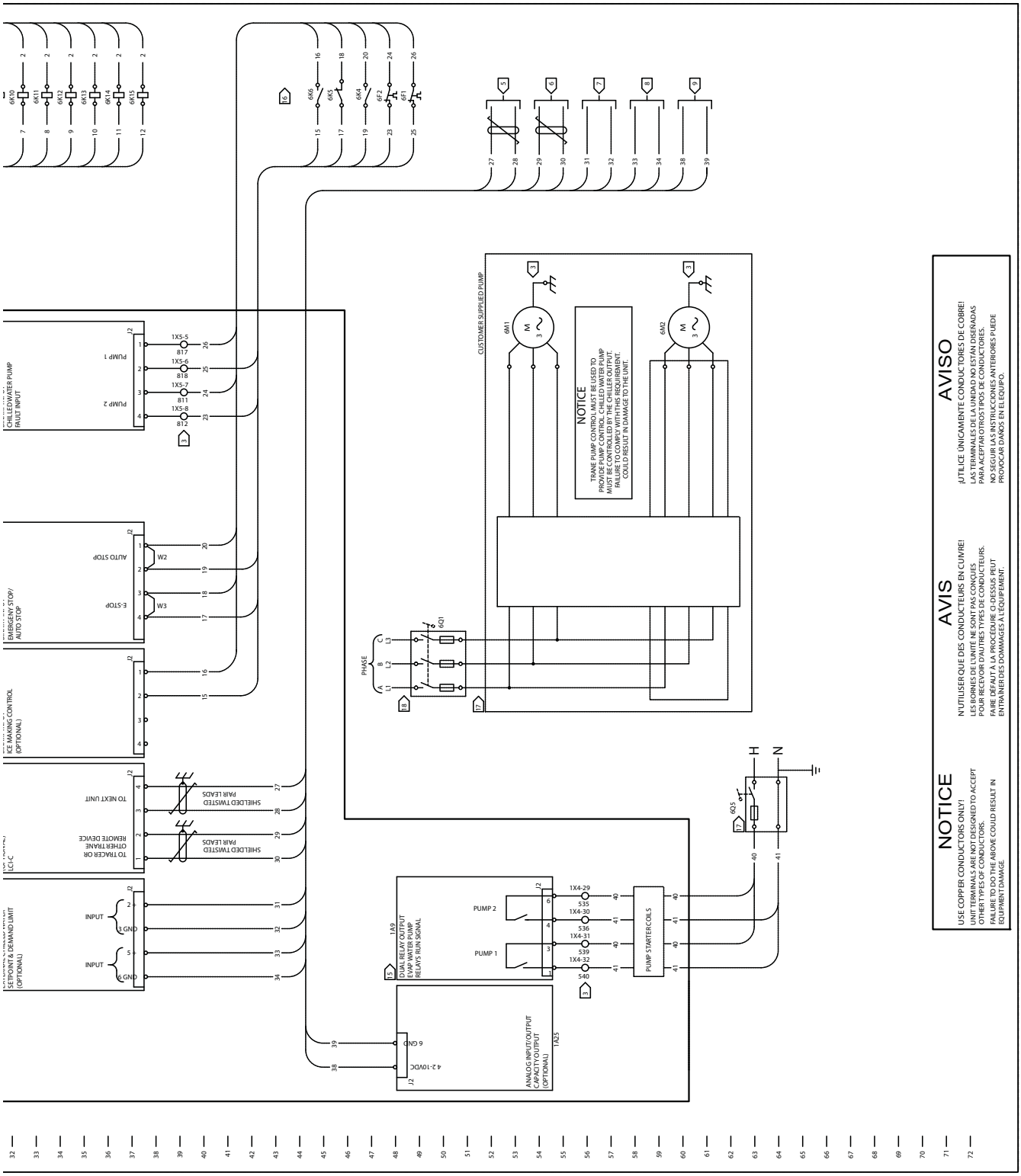
Table 13. Lug Size Range - 50 Hz

		Single Point Power			Dual Point Power		
Unit Size	**Rated Power**	**Terminal Blocks**	**Std Fault Ckt Breaker[1]**	**High Fault Ckt Breaker[1]**	**Terminal Blocks**	**Std Fault Ckt Breaker[1]**	**High Fault Ckt Breaker[1]**
20	400/50/3	#14 - 2/0	#10 - 1/0	#10 - 1/0	n/a		
26	400/50/3	#14 - 2/0	#10 - 1/0	#10 - 1/0			
30	400/50/3	#14 - 2/0	#10 - 1/0	#10 - 1/0			
35	400/50/3	#14 - 2/0	#3 - 3/0	#3 - 3/0			
40	400/50/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#14 - 2/0	#10 - 1/0	#10 - 1/0
52	400/50/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
60	400/50/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
70	400/50/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
80	400/50/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
90	400/50/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
100	400/50/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
110	400/50/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM
120	400/50/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#14 - 2/0	#6 - 350 MCM	#6 - 350 MCM

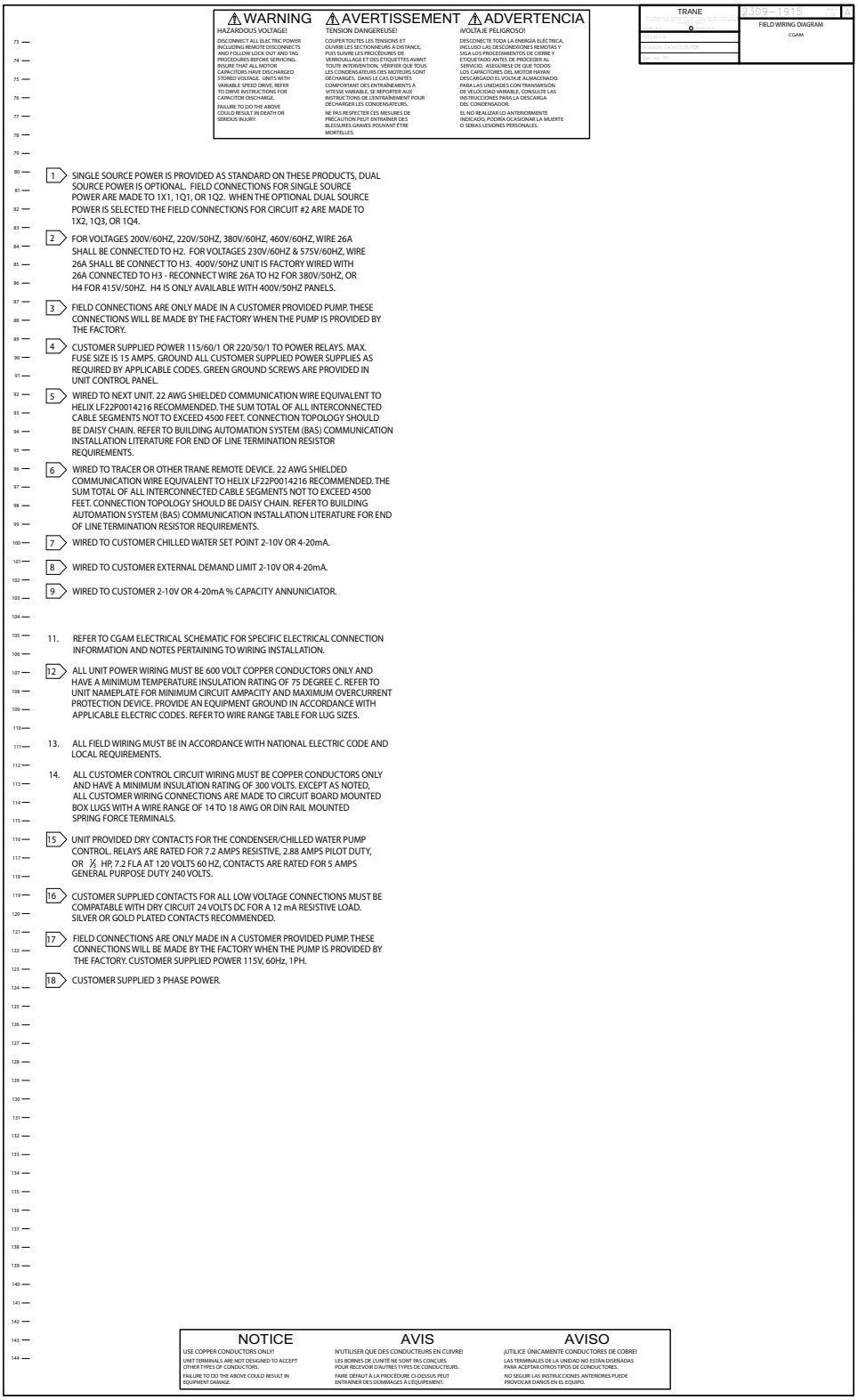
1. Optional circuit breaker and high fault circuit breaker.
2. Will accept two conduits per phase in this size.
3. Copper wire only, based on nameplate Minimum Circuit Ampacity (MCA).
4. Data shown for circuit one. The second circuit is always the same.
5. n/a - not available
6. Pump package not available with 50 Hz units.

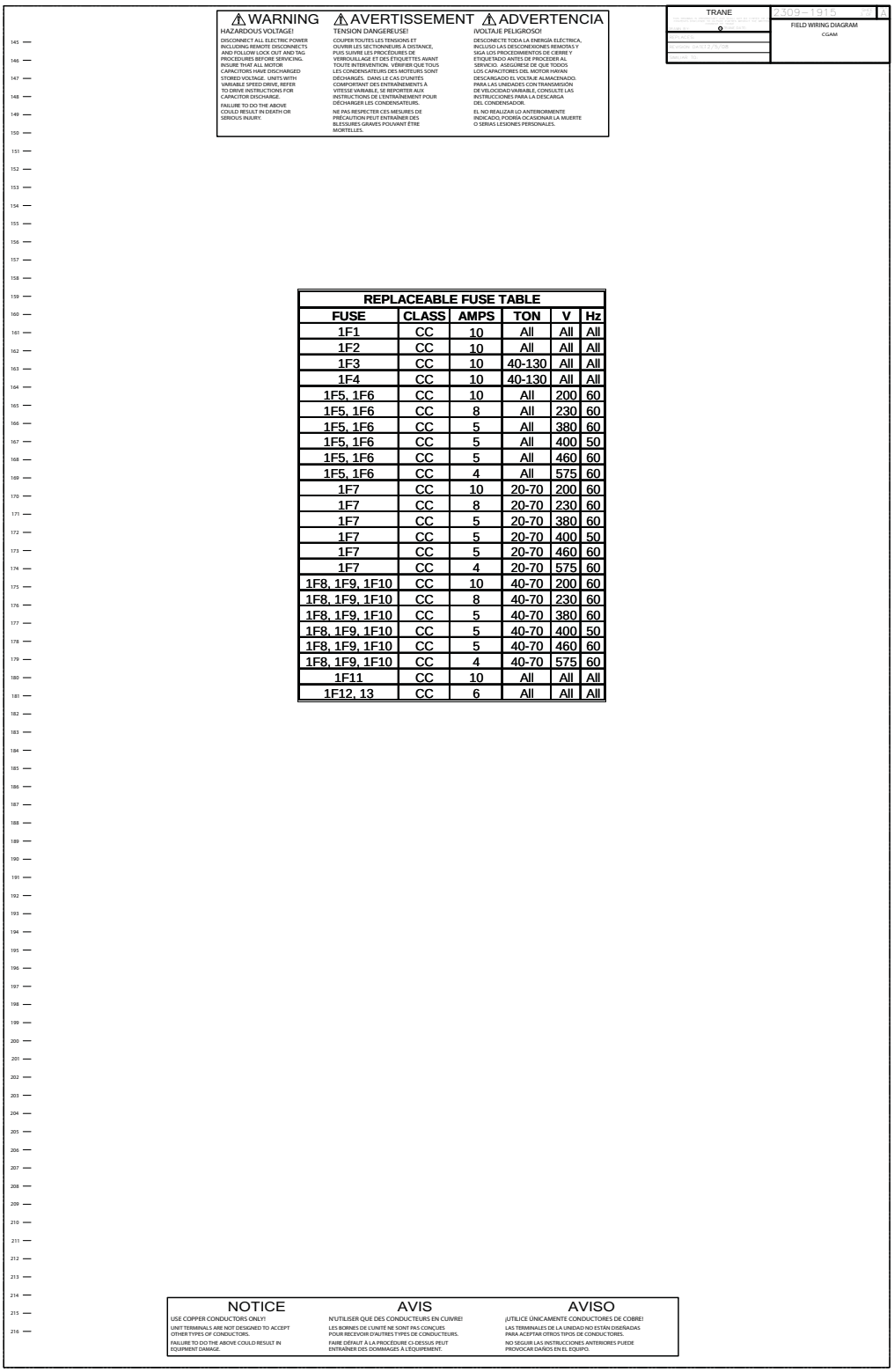
Electrical Connections




NOTICE
USE COPPER CONDUCTORS ONLY!
UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.
FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE
AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!
LES BORNES DE L'UNITE NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.
FAIRE DÉFAUT À LA PROCÉDURE CI DESSUS PEUT ENTRAÎNER DES DOMMAGES À L'ÉQUIPEMENT.
AVISO
¡ÚTILICE ÚNICAMENTE CONDUCTORES DE COBRE!
LAS TERMINALES DE LA UNIDAD NO ESTAN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.
NO SEGUIR LAS INSTRUCCIONES ANTERIORES PUEDE PROVOCAR DAÑOS EN EL EQUIPO.
CHILLED WATER PUMP FAULT INPUT
PUMP 1
PUMP 2
EMERGENCY STOP/ AUTO STOP
AUTO STOP
E-STOP
ICE MAKING CONTROL (OPTIONAL)
LCI-C
TO TRACER OR OTHER TRANE REMOTE DEVICE
TO NEXT UNIT
SHIELDED TWISTED PAIR LEADS
SETPOINT & DEMAND LIMIT (OPTIONAL)
INPUT
GND
CUSTOMER SUPPLIED PUMP
NOTICE
TRANE PUMP CONTROL MUST BE USED TO PROVIDE PUMP CONTROL. CHILLED WATER PUMP MUST BE CONTROLLED BY THE CHILLER OUTPUT. FAILURE TO CONFIGURE THIS RELAY OUTPUT COULD RESULT IN DAMAGE TO THE UNIT.
PHASE
DUAL RELAY OUTPUT EVAP WATER PUMP RELAYS RUN SIGNAL
PUMP 2
PUMP 1
PUMP STARTER COILS
ANALOG INPUT/OUTPUT CAPACITY OUTPUT (OPTIONAL)
4-20VDC
GND

Electrical Connections





⚠WARNING
HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.
FAILURE TO DO THE ABOVE COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠AVERTISSEMENT
TENSION DANGEREUSE!
COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.
NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.

⚠ADVERTENCIA
¡VOLTAJE PELIGROSO!
DESCONECTE TODA LA ENERGÍA ELÉCTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEGÚRESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON TRANSMISIÓN DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.
EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.

TRANE
2309-1915
FIELD WIRING DIAGRAM
CGAM

REPLACEABLE FUSE TABLE

FUSE	CLASS	AMPS	TON	V	Hz
1F1	CC	10	All	All	All
1F2	CC	10	All	All	All
1F3	CC	10	40-130	All	All
1F4	CC	10	40-130	All	All
1F5, 1F6	CC	10	All	200	60
1F5, 1F6	CC	8	All	230	60
1F5, 1F6	CC	5	All	380	60
1F5, 1F6	CC	5	All	400	50
1F5, 1F6	CC	5	All	460	60
1F5, 1F6	CC	4	All	575	60
1F7	CC	10	20-70	200	60
1F7	CC	8	20-70	230	60
1F7	CC	5	20-70	380	60
1F7	CC	5	20-70	400	50
1F7	CC	5	20-70	460	60
1F7	CC	4	20-70	575	60
1F8, 1F9, 1F10	CC	10	40-70	200	60
1F8, 1F9, 1F10	CC	8	40-70	230	60
1F8, 1F9, 1F10	CC	5	40-70	380	60
1F8, 1F9, 1F10	CC	5	40-70	400	50
1F8, 1F9, 1F10	CC	5	40-70	460	60
1F8, 1F9, 1F10	CC	4	40-70	575	60
1F11	CC	10	All	All	All
1F12, 13	CC	6	All	All	All

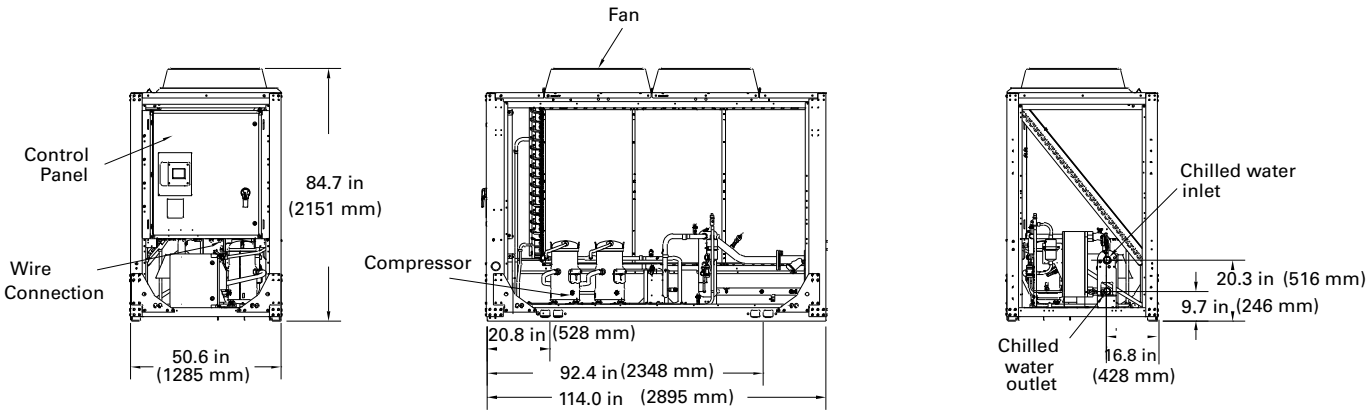
NOTICE
USE COPPER CONDUCTORS ONLY!
UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.
FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.

AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!
LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.
FAIRE DÉFAUT À LA PROCÉDURE CI-DESSUS PEUT ENTRAÎNER DES DOMMAGES À L'ÉQUIPEMENT.

AVISO
¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!
LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.
NO SEGUIR LAS INSTRUCCIONES ANTERIORES PUEDE PROVOCAR DAÑOS EN EL EQUIPO.

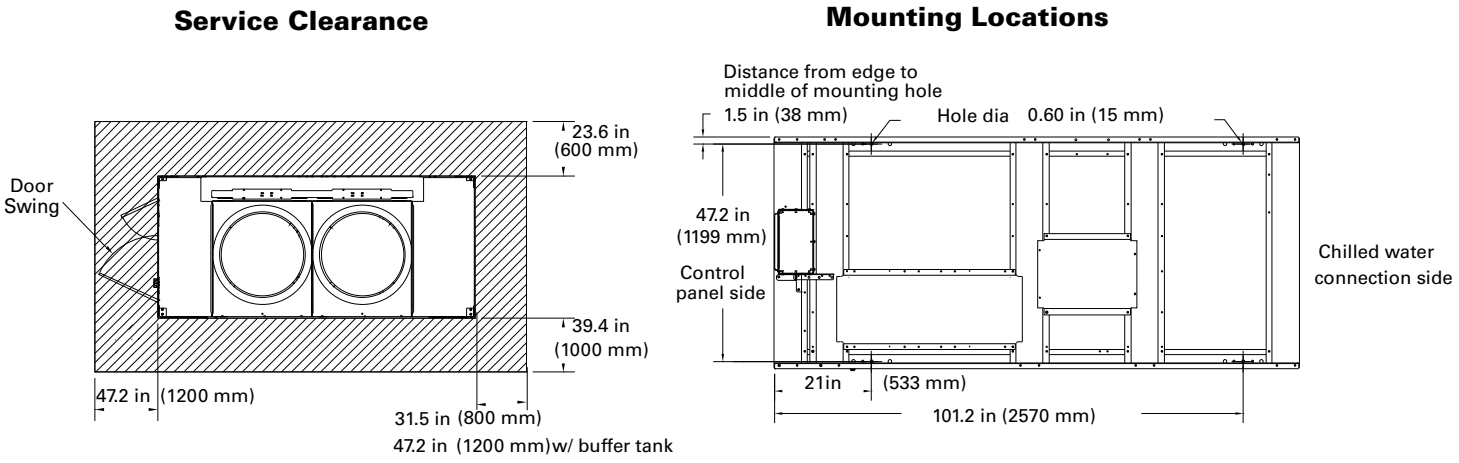
Dimensions

Figure 4. Sizes 20 and 26 ton - standard unit



Water connections are 1.6 in (39.9 mm) from the end.

Figure 5. Sizes 20 and 26 ton - service clearances and mounting locations



More clearance may be needed for airflow depending on the installation.

Total of four mounting locations.

Figure 6. Sizes 20 and 26 ton - pump package, buffer tank, partial heat recovery units

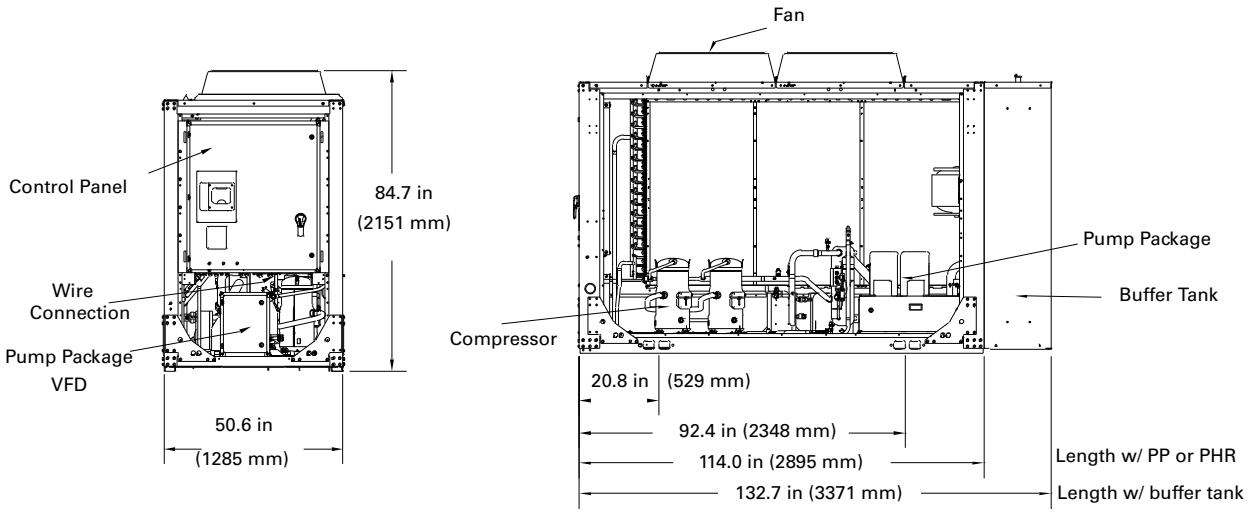
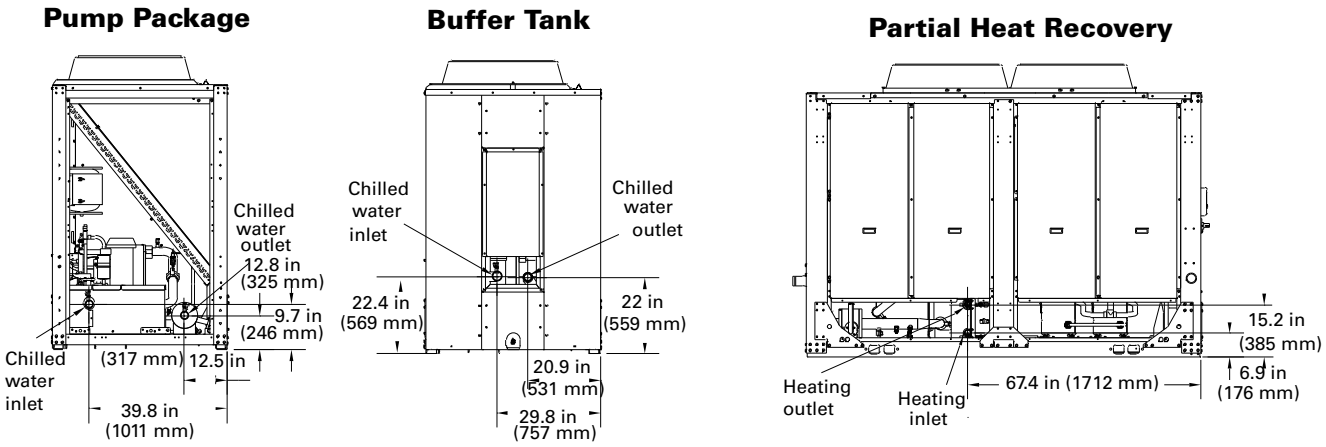


Figure 7. Sizes 20 and 26 ton - pump package, buffer tank, partial heat recovery unit water connections



Water connections are 1.3 in (33mm) from unit end.

Water outlet connection is 14.8 in (377 mm) and inlet is 0.3 in (7.8 mm) from unit end.

Partial heat recovery connections are even with unit edge.

The chilled water inlet and outlet connections are the same as the standard unit unless pump package or buffer tank are ordered.

Dimensions

Figure 8. Sizes 30 and 35 ton - standard unit

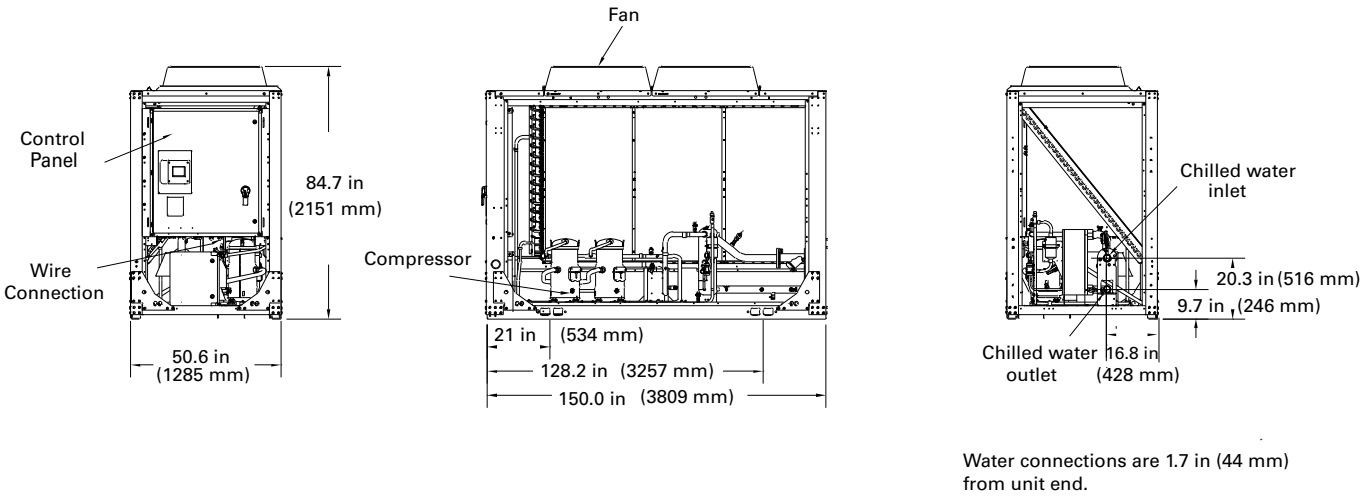


Figure 9. Sizes 30 and 35 ton - service clearances and mounting locations

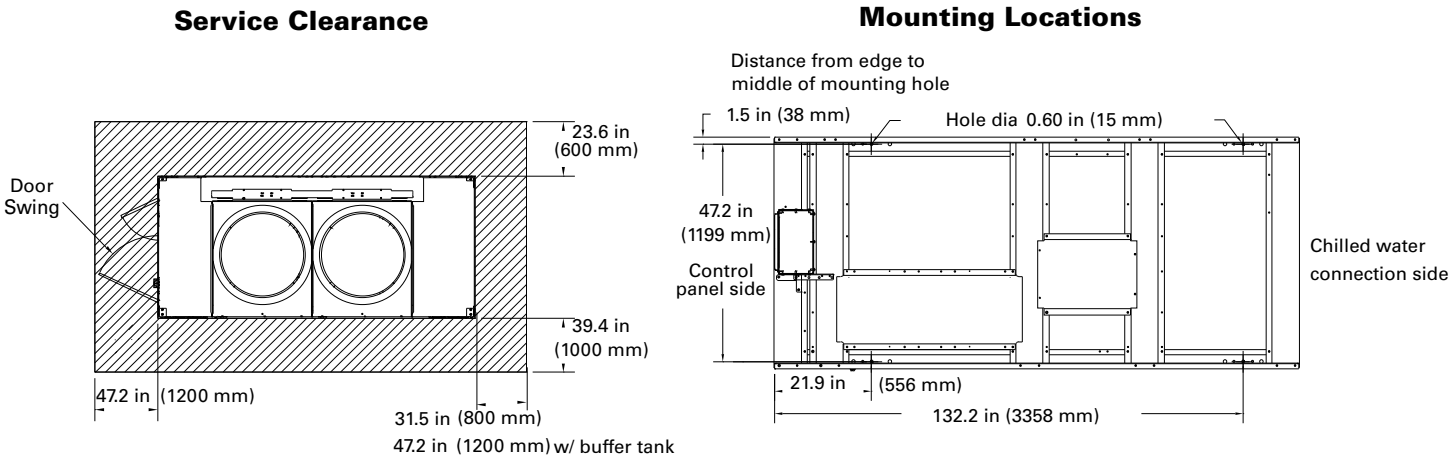


Figure 10. Sizes 30 and 35 ton - pump package, buffer tank, partial heat recovery units

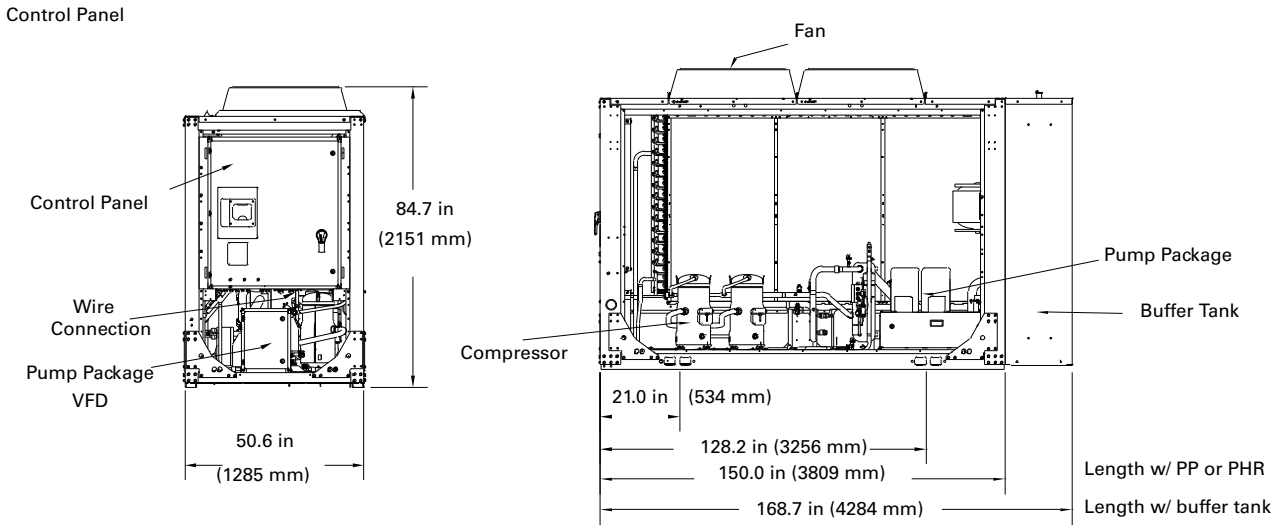
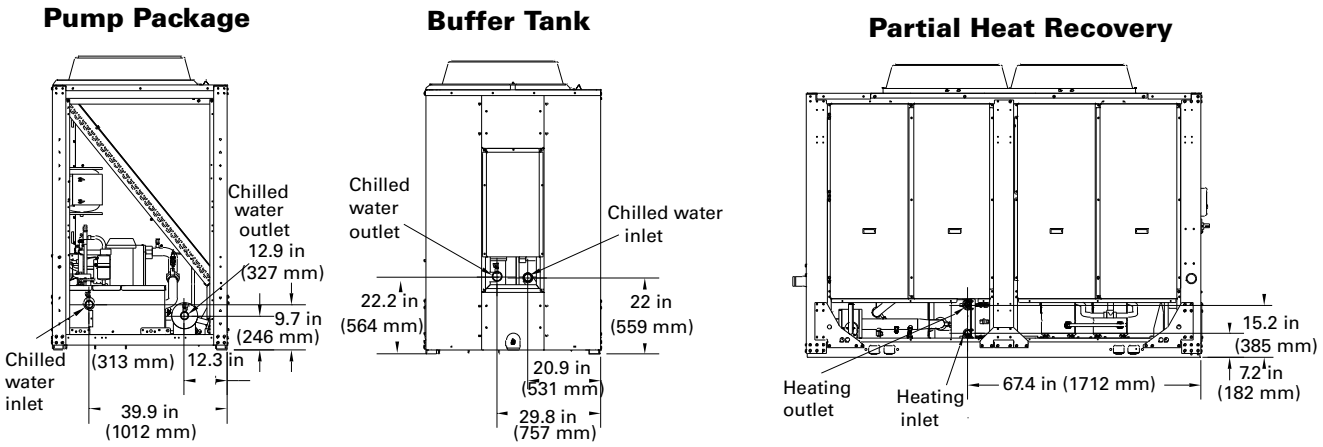


Figure 11. Sizes 30 and 35 ton - pump package, buffer tank, partial heat recovery unit water connections



Water connections are 1.3 in (33 mm) from unit end.

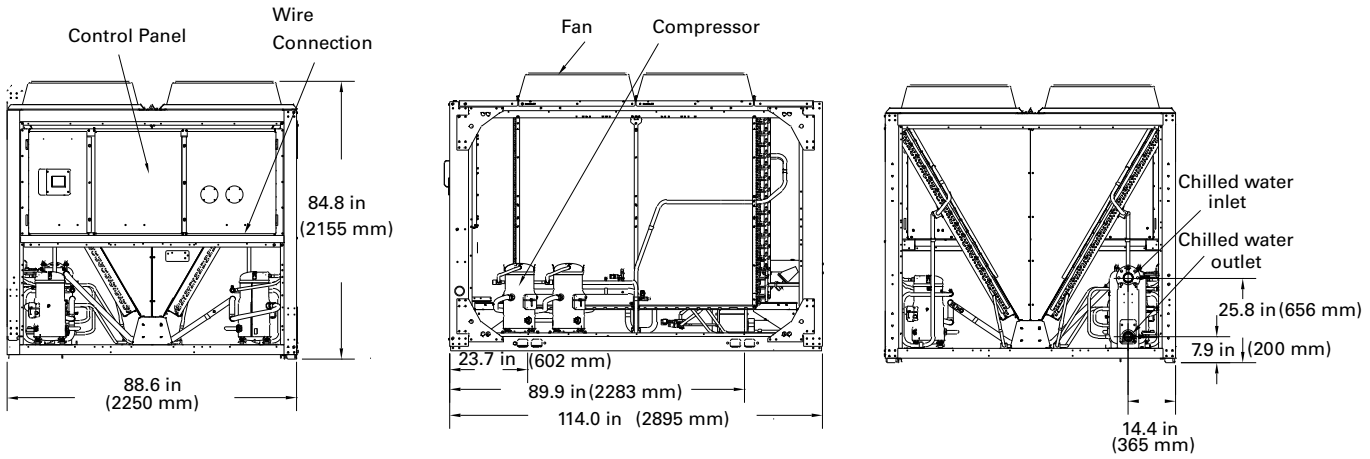
Water outlet connection is 14.9 in (379 mm) and inlet is 5.3 in (135 mm) from unit end.

Partial heat recovery connections are even with unit edge.

The chilled water connections are the same as the standard unit unless pump package or buffer tank are ordered.

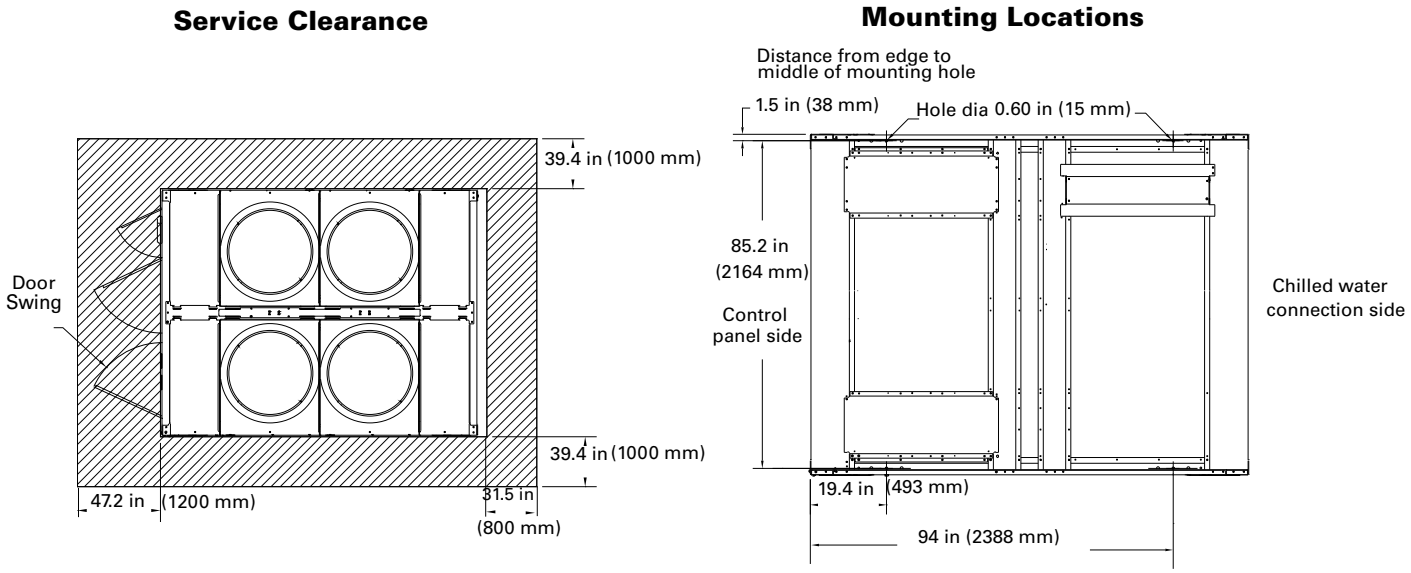
Dimensions

Figure 12. Sizes 40 and 52 ton - standard unit



Water connections even with unit end.

Figure 13. Sizes 40 and 52 ton - service clearances and mounting locations



More clearance may be needed for airflow depending on the installation.

Total of four mounting locations.

Figure 14. Sizes 40 and 52 ton - pump package, buffer tank or partial heat recovery unit dimensions

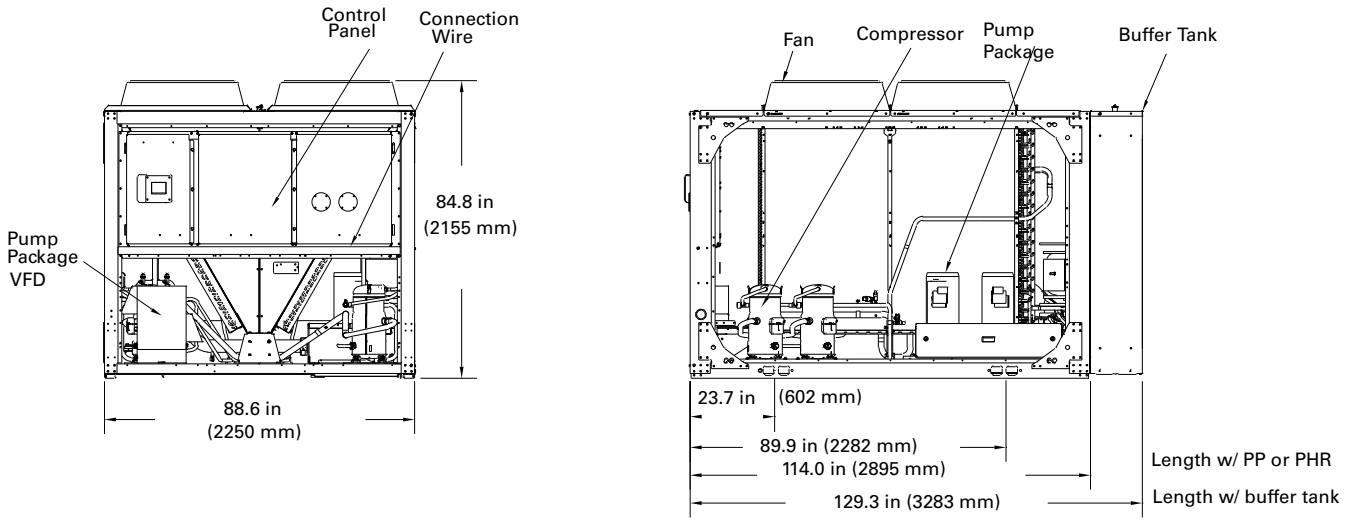
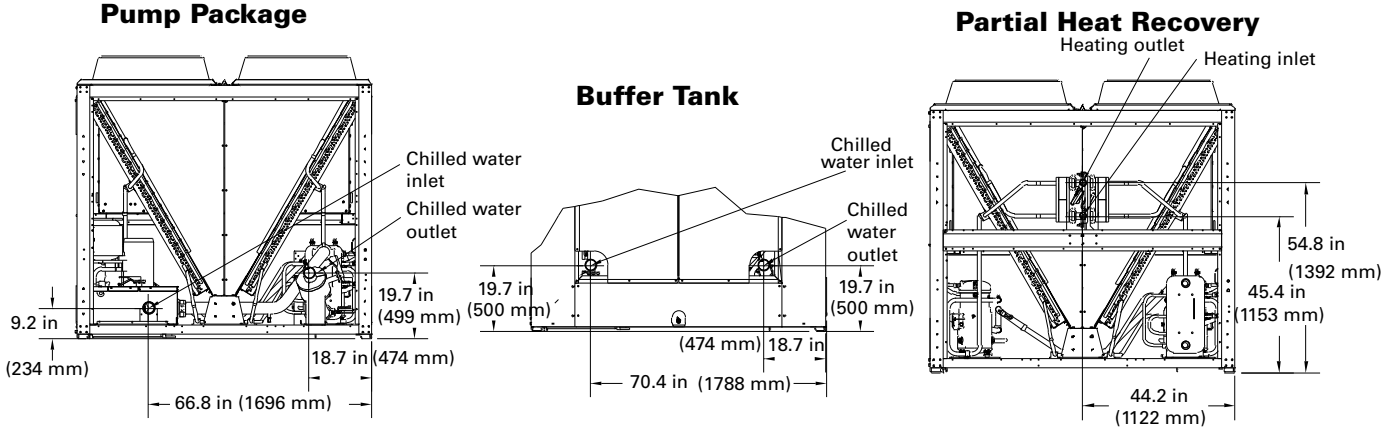


Figure 15. Sizes 40 and 52 ton - pump package, buffer tank, partial heat recovery unit water connections



Water outlet connection is even with unit end, inlet is 6.1 in (154 mm) from unit end.

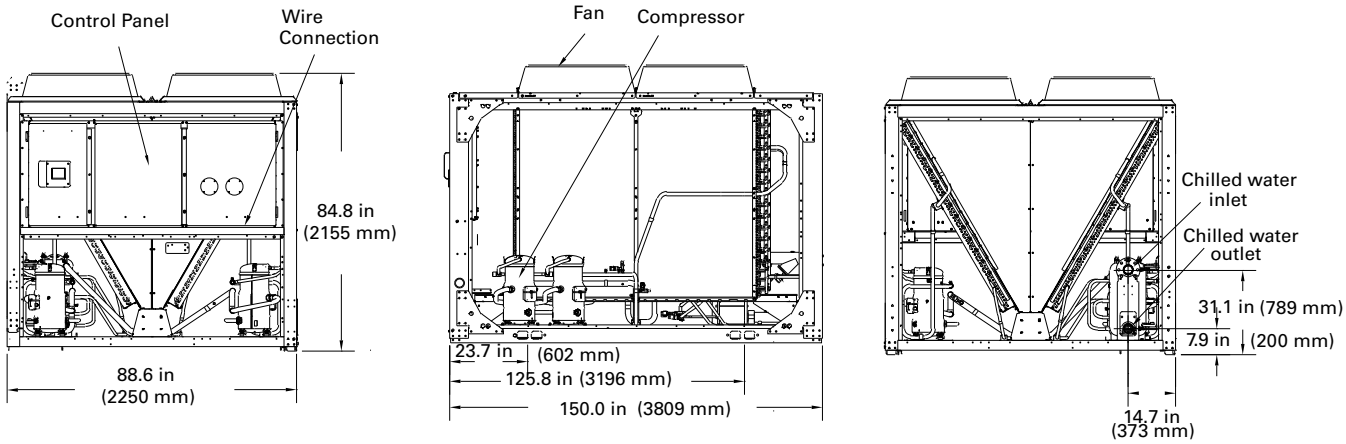
Water inlet connection is even with unit end, outlet is 14.8 in (376 mm) from unit end.

Partial heat recovery connections are even with unit end.

The chilled water connections are the same as the standard unit unless pump package or buffer tank are ordered.

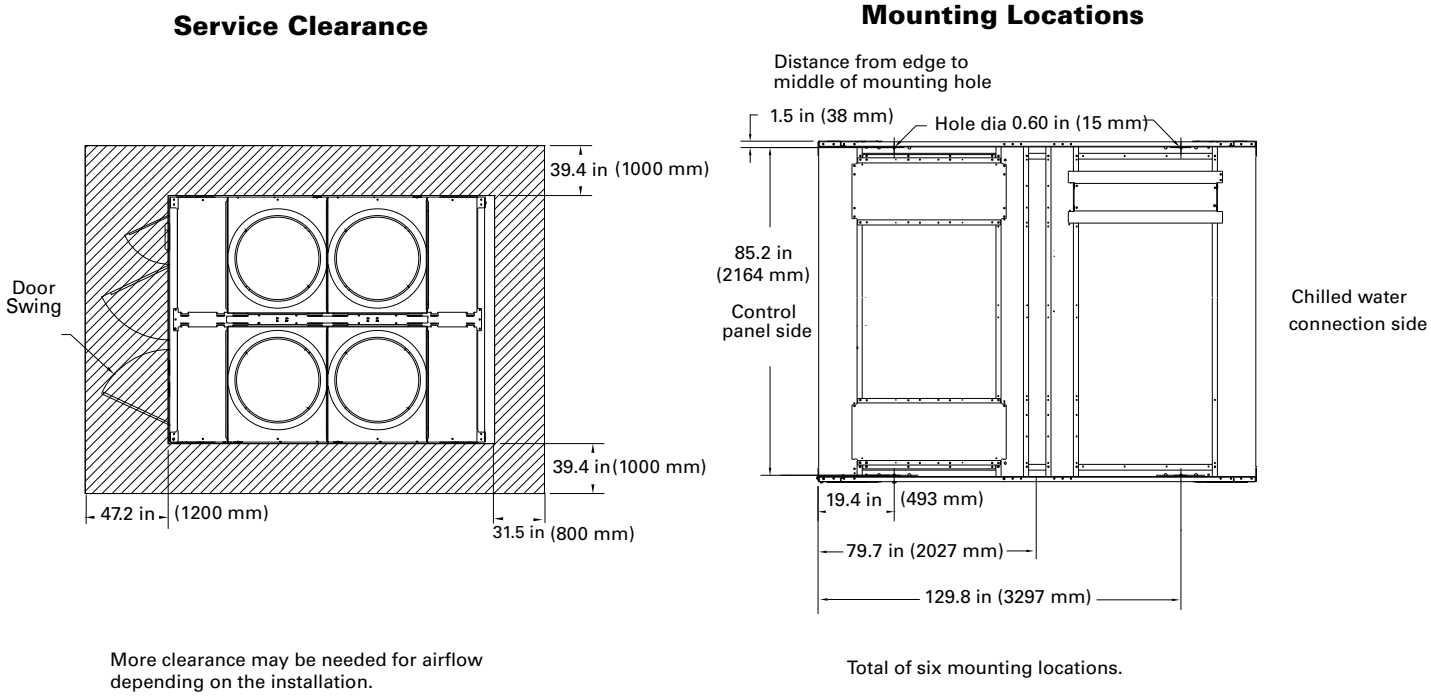
Dimensions

Figure 16. Sizes 60 and 70 ton - standard unit



Water connections are even with unit end.

Figure 17. Sizes 60 and 70 ton - service clearances and mounting locations



More clearance may be needed for airflow depending on the installation.

Total of six mounting locations.

Figure 18. Sizes 60 and 70 ton - pump package, buffer tank or partial heat recovery unit dimensions

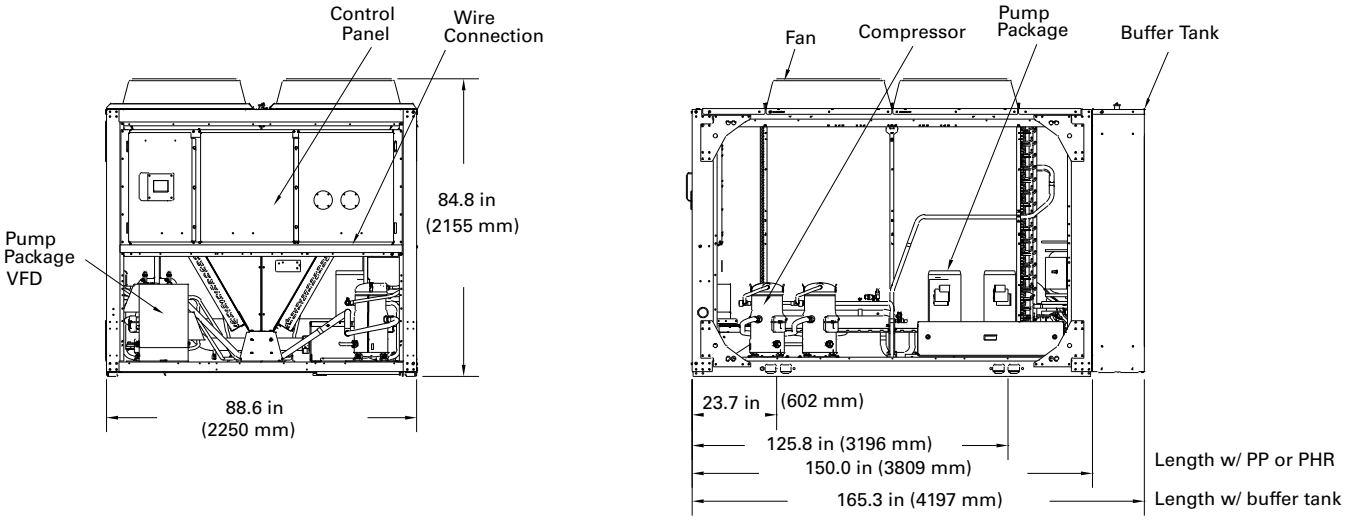
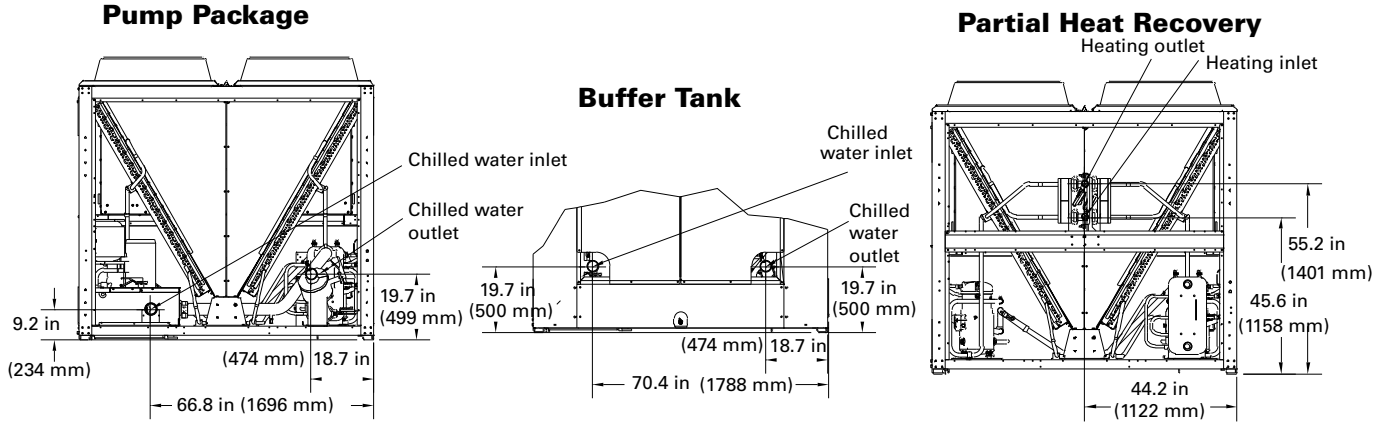


Figure 19. Sizes 60 and 70 ton - pump package, buffer tank, partial heat recovery unit water connections



Water outlet connection even with end, inlet 6.1 in (154 mm) from unit end.

Water inlet connection even with end, outlet 14.8 in (376 mm) from unit end.

Partial heat recovery connections are even with unit end.

The chilled water connections are the same as standard unless pump package or buffer tank are ordered.

Dimensions

Figure 20. Sizes 80 and 90 ton - standard unit

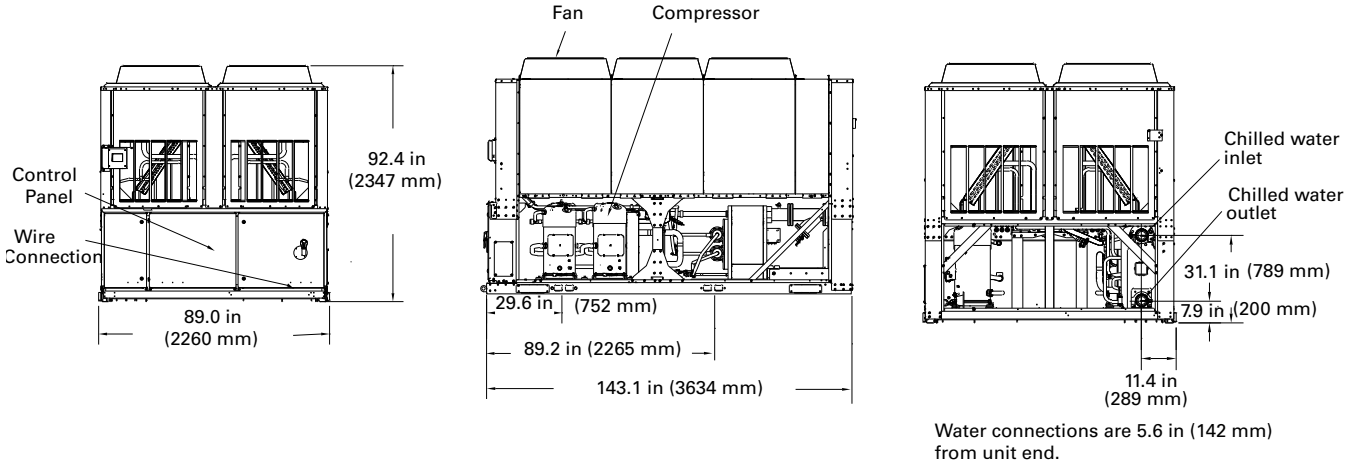


Figure 21. Sizes 80 and 90 ton - service clearances and mounting locations

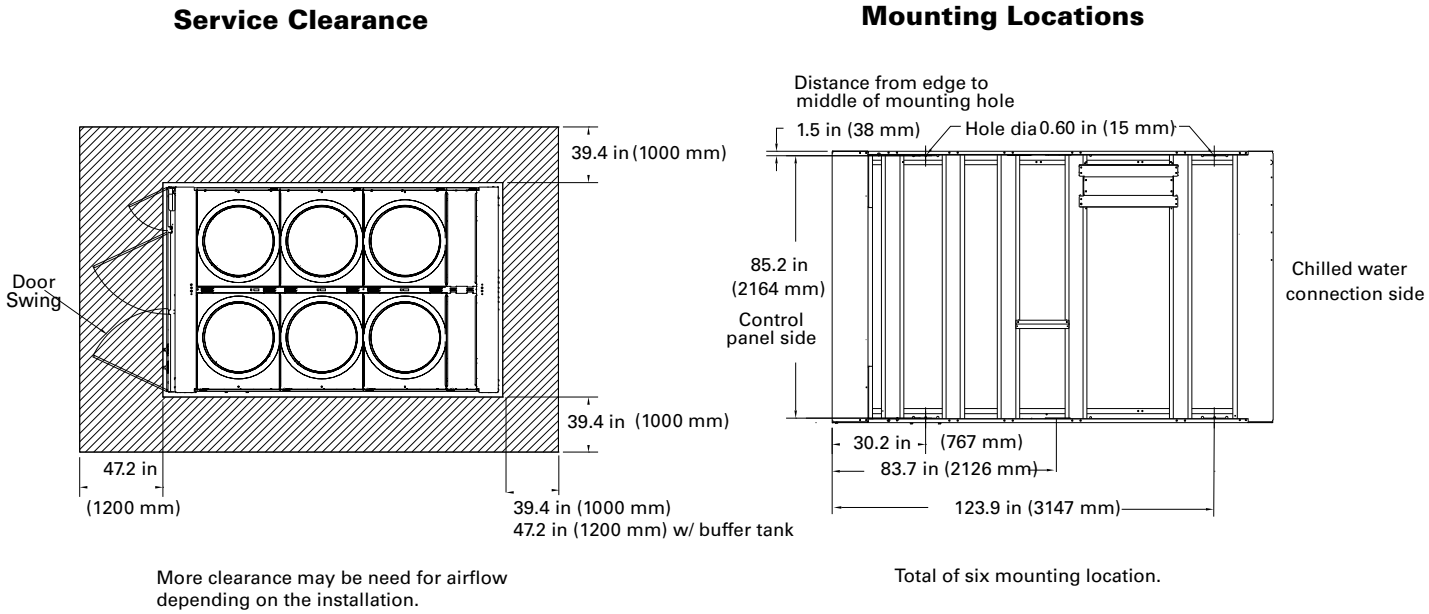
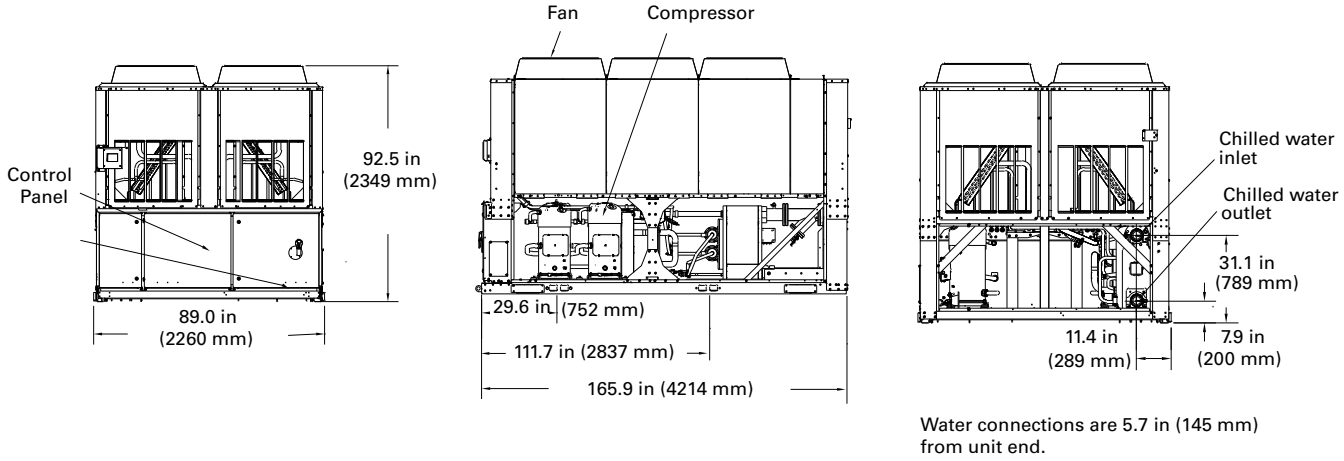
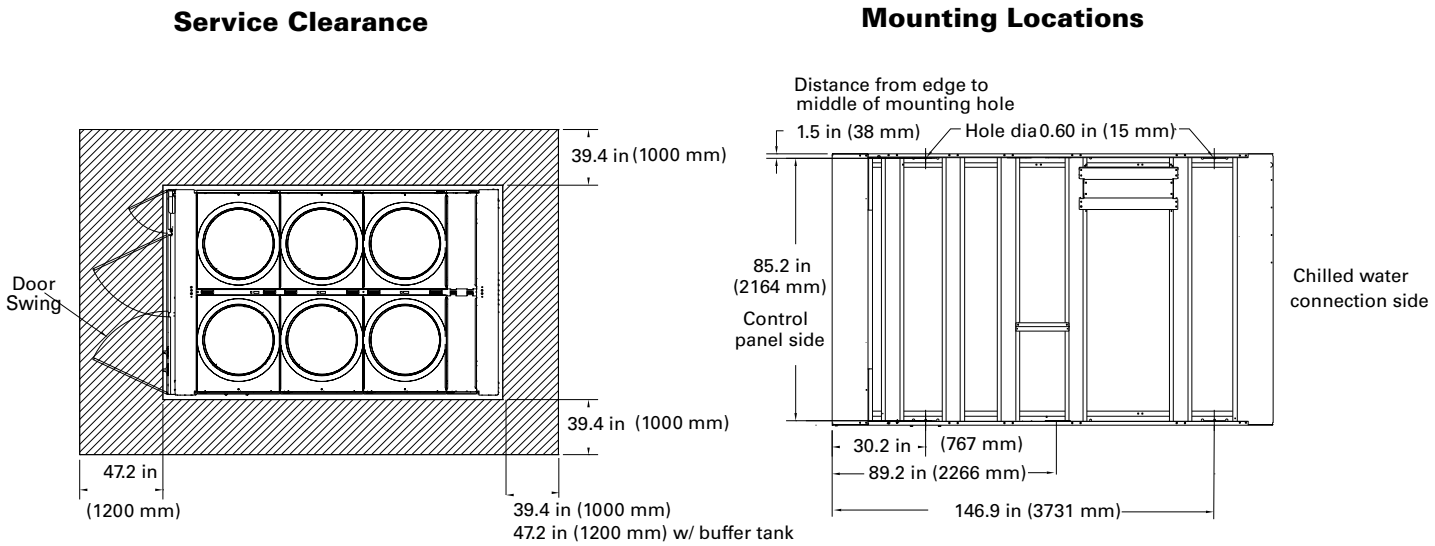


Figure 22. Sizes 100, 110 and 120 ton - standard unit



Water connections are 5.7 in (145 mm) from unit end.

Figure 23. Sizes 100, 110 and 120 ton - service clearances and mounting locations



More clearance may be needed for airflow depending on the installation.

Total of six mounting locations.

Weights

Table 14. Weights - 60 Hz

Tons	Shipping Weight		Operating Weight	
	pounds	kilograms	pounds	kilograms
20	1898	861	1919	870
26	1966	892	1989	902
30	2501	1134	2527	1146
35	2557	1160	2588	1174
40	3359	1524	3377	1532
52	3492	1584	3516	1595
60	4498	2040	4526	2053
70	4574	2075	4605	2089
80	5083	2306	5120	2322
90	5441	2468	5480	2486
100	6261	2840	6304	2859
110	6303	2859	6353	2882
120	6303	2859	6353	2882

1. Weights based on aluminum fins.
2. Weights do not include pump package, buffer tank, partial heat recovery, etc.
3. All weights ±5%.

Table 15. Weights - 50 Hz

Tons	Shipping Weight		Operating Weight	
	pounds	kilograms	pounds	kilograms
20	1824	827	1844	836
26	1891	858	1914	868
30	2303	1045	2329	1056
35	2458	1115	2489	1129
40	3209	1456	3228	1464
52	3342	1516	3367	1527
60	4159	1886	4188	1899
70	4376	1985	4407	1999
80	4832	2192	4869	2209
90	5191	2355	5229	2372
100	5812	2636	5855	2656
110	6052	2745	6102	2768
120	6052	2745	6102	2768

1. Weights based on aluminum fins.
2. Weights do not include pump package, buffer tank, partial heat recovery, etc.
3. All weights ±5%.

Mechanical Specifications

General

Units are constructed of galvanized steel frame with galvanized steel panels and access doors. Component surfaces are finished with a powder-coated paint. Each unit ships with full operating charges of refrigerant and oil.

Compressor and Motor

The unit is equipped with two or more hermetic, direct-drive, 3600 rpm 60 Hz (3000 rpm 50 Hz) suction gas-cooled scroll compressors. The simple design has only three major moving parts and a completely enclosed compression chamber which leads to increased efficiency. The compressor includes: centrifugal oil pump, oil level sight glass and oil charging valve. Each compressor will have crankcase heaters installed and properly sized to minimize the amount of liquid refrigerant present in the oil sump during off cycles.

Unit-Mounted Starter

The control panel is designed per UL 1995 type enclosure with three-phase, overload protection. The starter is in across-the-line configuration, factory-mounted and fully pre-wired to the compressor motor and control panel. A factory-installed, factory-wired 820 VA control power transformer provides all unit control power (120 Vac secondary) and Trane CH530 module power (24 Vac secondary). Power line connection type is standard with a terminal block.

Evaporator

Braze plate evaporator is made of stainless steel with copper as the braze material. It is designed to withstand a refrigerant side working pressure of 430 psig (29.6 bars) and a waterside working pressure of 150 psig (10.5 bars). Evaporator is tested at 1.1 times maximum allowable refrigerant side working pressure and 1.5 times maximum allowable water side working pressure. It has one water pass. Immersion heaters protect the evaporator to an ambient of -20°F (-29°C).

The evaporator is covered with factory-installed 0.75 inch (19.05 mm) Armaflex II or equal (k=0.28) insulation. Foam insulation is used on the suction line.

Condenser

Air-cooled condenser coils have aluminum fins mechanically bonded to internally-finned copper tubing. The condenser coil has an integral subcooling circuit. The maximum allowable working pressure of the condenser is 650 psig (44.8 bars). Condensers are factory proof and leak tested at 715 psig (49.3 bars).

Direct-drive vertical discharge condenser fans are balanced. Three-phase condenser fan motors with permanently lubricated ball bearings and external thermal overload protection are provided.

High ambient units start and operate from 32°F to 125°F (0°C to 52°C) - standard offering.

Refrigerant Circuit and Capacity Modulation

The 20-35 ton units have single refrigerant circuits. The 40-120 ton units have dual refrigerant circuits. Each refrigerant circuit has Trane scroll compressors piped in parallel with a passive oil management system. A passive oil management system maintains proper oil levels within compressors and has no moving parts. Each refrigerant circuit includes filter drier, liquid line, electronic expansion valve, and liquid line service valves.

Capacity modulation is achieved by turning compressors on and off. The 20-35 ton units have two capacity stages. The 40-120 ton units have four capacity stages.

Unit Controls (Trane CH530)

The microprocessor-based control panel is factory-installed and factory-tested. The control system is powered by a pre-wired control power transformer, and will turn on and off compressors to meet the load. Microprocessor-based chilled water reset based on return water is standard.

The Trane CH530 microprocessor automatically acts to prevent unit shutdown due to abnormal operating conditions associated with low evaporator refrigerant temperature and high condensing temperature. If an abnormal operating condition continues and the protective limit is reached, the machine will shut down.

The panel includes machine protection for the following conditions:

- Low evaporator refrigerant temperature and pressure
- High condenser refrigerant pressure
- Critical sensor or detection circuit faults
- High compressor discharge temperature
- Lost communication between modules
- Electrical distribution faults: phase loss, phase reversal or over temperature protection
- External and local emergency stop
- Loss of evaporator water flow

When a fault is detected, the control system conducts more than 100 diagnostic checks and displays results. The display will identify the fault, indicate date, time, and operating mode at time of occurrence, and provide type of reset required and a help message.

Clear Language Display Panel

Factory-mounted to the control panel door, the operator interface has an LCD touch-screen display for operator input and information output. This interface provides access to the following information: evaporator report, condenser report, compressor report, ASHRAE Guideline 3 report, operator settings, service settings, service tests, and diagnostics. All diagnostics and messages are displayed in "clear language."

Data contained in available reports includes:

- Water and air temperatures
- Refrigerant pressures and temperatures
- Flow switch status
- EXV position
- Compressor starts and run-time

All necessary settings and setpoints are programmed into the microprocessor-based controller via the operator interface. The controller is capable of receiving signals simultaneously from a variety of control sources, in any combination, and priority order of control sources can be programmed. The control source with priority determines active setpoints via the signal it sends to the control panel. Control sources may be:

- Local operator interface (standard)
- Hard-wired 4-20 mA or 2-10 Vdc signal from an external source (interface optional; control source not supplied)
- Time of day scheduling (optional capability available from local operator interface)
- LonTalk LCI-C (interface optional; control source not supplied)
- BACNet (interface optional; control source not supplied)
- Trane Tracer Summit system (interface optional; control source not supplied)

Quality Assurance

The quality management system applied by Trane has been subject to independent third-party assessment and approval to ISO 9001. The products described in this catalog are designed, manufactured and tested in accordance with the approved system requirements described in the Trane Quality Manual.

Options

Application Options

Wide Ambient

A variable speed drive on the first fan of each circuit allows for ambient temperatures between 0°F (-18°C) to 125°F (52°C).

Ice-Making with Hardwired Interface

Unit controls are factory set to handle ice-making for thermal storage application. This option allows for full load operation of the chiller with leaving evaporator water temperature between 20°F (-7°C) and 65°F (18°C).

Low-Temperature Processing

An additional temperature sensor enables leaving evaporator water temperature below 42°F (5.5°C).

Partial Heat Recovery with Fan Control

A supplemental brazed plate heat exchanger is mounted in series to the condenser coil. Connecting piping and inlet and outlet water sensors are included. CH530 controls display heat recovery inlet and outlet water temperatures and controls the fans. The heat rejection to the partial heat recovery heat exchanger is not controlled. Flow and temperature variations through the partial heat recovery heat exchanger will vary. The partial heat recovery heat exchanger is typically used to preheat water before it enters a boiler or other water heating process.

Pump Options

Dual Standard and High Head Pump Package

Pump package includes: two standard or high head pumps, VFD, air separators with vents, expansion vessels, drainage valves, shut-off valves at entering and leaving connections, and service valves to isolate each pump for repair/replacement.

The pump package is single point power integrated into the chiller unit power with a separate factory wired control panel. The control of the pump is integrated into the chiller controller. The CH530 displays evaporator pump starts and run-times. Freeze protection down to an ambient of -20°F (-29°C) is included as standard. The cold parts of the pump package will also be insulated.

Designed with one redundant pump, it is controlled to operate both pumps through a lead/lag and failure/recovery functionality. There is a variable flow option with factory-installed bypass line.

A variable speed drive is installed in an additional panel to control the pump. The inverter is adjusted upon start up to balance the system flow and head requirements. The purpose is to save on wasted pump energy caused by a traditional balancing valve.

Standard head pump is offered for applications that have short water loops or are de-coupled. High head pump is offered for applications where the integrated chiller pump serves the entire loop volume or where there is substantial vertical rise.

Buffer Tank (only available with pump package)

The water tank is factory-installed for easy installation at the building site. The tank is engineered for continuous flow and is fully insulated as standard and is designed with freeze protection down to -20°F (-29°C). The purpose of the tank is to increase the chilled water circuit inertia, which is necessary with short water loops. A high circuit inertia reduces the compressor's cycling to increase the compressor life span and allow for more precise water temperature accuracy. It also saves energy as compared to hot gas bypass.

Electrical Options:

Circuit Breaker

A molded case standard interrupting capacity circuit breaker, factory pre-wired with terminal block power connections and equipped with a lockable external operator handle, is available to disconnect the chiller from main power.

Circuit Breaker with High Fault Rated Control Panel

A molded case high interrupting capacity circuit breaker, factory pre-wired with terminal block power connections and equipped with a lockable external operator handle, is available to disconnect the chiller from main power.

Dual Point Power Connection

Dual circuit machines (40-120 tons) are available with dual point power connections.

Control Options:

BACNet Interface

Allows user to easily interface with BACNet via a single twisted-pair wiring to a factory-installed and tested communication board.

LonTalk/Tracer Summit Interface

LonTalk (LCI-C) or Tracer Summit communications capabilities are available with communication link via single twisted-pair wiring to factory-installed and tested communication board. This option will support the functionality required to obtain Lon Mark certification.

Time of Day Scheduling

Time of day scheduling capabilities are available for scheduling single chiller applications through Trane CH530 panel (without the need for building automation system - BAS). This feature allows the user to set up to ten events in a seven day time period.

External Chilled Water and Demand Limit Setpoint

Controls, sensors, and safeties allow reset of chilled water temperature, based on temperature signal, during periods of low outdoor air temperature (chilled water reset based on return chilled water temperature is standard). The demand limit setpoint is communicated to a factory-installed and tested communication board through a 2-10 Vdc or 4-20 mA signal.

Percent Capacity

Output the number of compressors that are operating as an analog 2-10 Vdc or 4-20 mA signal.

Programmable Relays

Predefined, factory-installed, programmable relays allow the operation to select four relay outputs. Available outputs are: Alarm-Latching, Alarm-Auto Reset, General Alarm, Warning, Chiller Limit Mode, Compressor Running, and Tracer Control.

Other Options

ASME Evaporator

The evaporator will be tested and stamped in accordance with ASME.

Architectural Louvered Panels

Louvered panels cover the complete condensing coil and service area beneath the condenser.

Half Louvers

Louvered panels cover the condenser coil only. Available on the largest W coil units only.

CompleteCoat Condenser Coil

Allow for the operation in coastal environments. This option includes condenser coil box coating that resists bi-metallic corrosion.

Comprehensive Acoustic Package

This option includes acoustical treatment for compressor and refrigerant lines.

Isolators

Molded elastomeric isolators sized to reduce vibration transmission to the supporting structure when the unit is installed. Isolators ship with the chiller.

Insulation for High Humidity

The evaporator is covered with factory-installed 1.5 inch (38.1 mm) Armaflex II or equal (k=0.28) insulation. Foam insulation is used on the suction line.

Nitrogen Charge

Unit is shipped with oil and a nitrogen holding charge in lieu of refrigerant.

Performance Tests

Performance tests are available to certify chiller performance before shipment.

TRANE

www.trane.com

For more information, contact your local Trane office or e-mail us at comfort@trane.com

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Date	December 2008
Supersedes	New