Product Catalog

# Air-Cooled Scroll Chillers Model CGAM

With Symbio™ Controls

20 to 130 Nominal Tons (60 Hz)


April 2026

**CG-PRC017AA-EN**

# Introduction

Design and manufacturing excellence makes Trane a leader in the air-cooled chiller market place. This tradition of using excellence to meet market demands is illustrated with the Trane 20 to 130 ton air-cooled scroll chiller. 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 chiller is designed to deliver proven Trane 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 Features and New Features**

- Higher full-load and part-load energy efficiency that exceed ASHRAE 90.1 and reduce operating costs.
- Significantly lower noise levels than other scroll compressor chillers.
- R-454B optimized design.
- Symbio™ 800 microprocessor controls with Adaptive Control™ has 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®, LonTalk®, or Modbus™ 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 extensive experience in design, testing and field operation.

## Copyright



## Trademarks



## Revision History

Removed AdaptiSpeed™ Control section from Controls chapter.

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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 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.
- The round tube and plate fin condenser with its exceptionally rigid coil structure is manufactured with hairpin tubes which reduces the number of braze joints by half, significantly reducing the potential for leaks.
- Innovative condenser pressure integrated fan control algorithms and 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 efficiencies.
- 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 provides energy saving for pre-heating or re-heating applications.
- Optional pump package features variable speed drive on the pump motors, eliminating the need for 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, due to standard failure/recovery functionality.

## 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 chiller dual setpoint control and industry leading energy storage efficiency assures reliable operation and superior system efficiency. Trane partnership with CALMAC brings a proven track record of successful installations across many markets; from churches and schools to skyscrapers and office buildings.
- Partial heat recovery - Optional factory-installed heat exchanger provides hot water for various applications, such as water preheating and reheating for enhanced system humidity control. Partial heat recovery reduces operating costs associated with boilers/domestic hot water.

## Simple, Economical Installation

- Reduced sound levels, compared to other scroll compressor chillers, perfect for applying outdoor HVAC equipment in neighborhoods, such as K-12 schools.
- System integration available with LonTalk®, BACnet®, or Modbus™ 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.
- 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

- Easily integrated with existing building automation system (BAS) via BACnet® or LonTalk® communication interfaces.
- Microprocessor-based controls monitor and maintain optimal operation of the chiller and its associated sensors, actuators, relays, and switches, all of which are factory installed and tested prior to shipping.
- Adaptive Control™ maintains chiller operation under adverse conditions, when many other chillers might simply shutdown. The chiller control is able to compensate for conditions such as high condensing pressure and low suction pressure.
- Advanced microprocessor controls enable variable primary flow applications providing chilled water temperature control accuracy of ±2°F (1.1°C) with flow changes up to 10 percent per minute, while keeping the chiller online through flow changes up to 30 percent per minute.
- 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 27 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.
- Touch safe panel construction provides for enhanced service technician safety.

# Application Considerations

Certain application constraints should be considered when sizing, selecting, and installing Trane chillers. Unit and system reliability is often dependent on properly and completely complying with these considerations. When the application varies from the guidelines presented, it should be reviewed with your local sales engineer.

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

## Unit Sizing

See TSA™ performance selection software for unit capacities. Intentionally oversizing a unit to ensure 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 oversizing is desired, consider using two units.

## Water Treatment

The use of untreated or improperly treated water 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. The chloride content of the coolant should be no higher than 200PPM to avoid corrosion.

Neither salt nor brackish water is recommended for use in Trane 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, decreased air density will reduce condenser capacity and, therefore, unit capacity and efficiency.

## Ambient Limitations

Trane chillers are designed for year-round operation over a range of ambient temperatures.

- **High Ambient Range** = 32° to 125°F (0 to 52°C)
- **Wide Ambient Range** = 0° to 125°F (-18 to 52°C)
- **Extreme Low Ambient Range** = down to -20°F (-28.9°C)
- **Partial Heat Recovery Ambient Range** = 45° to 125°F (7.2 to 52°C)

Operation below 32°F requires the use of variable speed fans unless otherwise specified.

The minimum ambient temperatures are based on still conditions (winds not exceeding five mph). Greater wind speeds 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 chapter 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 in General Data. Flow rates exceeding those listed may result in very high pressure drop across the evaporator and/or excessive tube erosion.

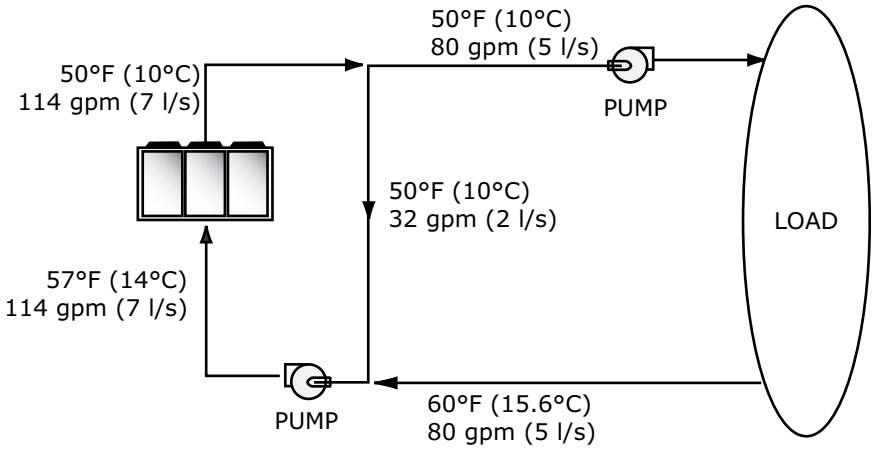
***Note:*** *Flow rates in the general data tables are for water only. They do not include freeze inhibitors.*

### Flow Rate Out of Range

Many process cooling applications require flow rates that cannot be met with the minimum and maximum published values within the 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 (15.6°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 the figure below 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 Symbio™ 800 controller which protects the chiller from operating in loss of flow conditions.

## Variable Flow in the Evaporator

Variable Primary Flow (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 chiller is capable of handling variable evaporator flow without losing control of the leaving water temperature.The microprocessor and capacity control algorithms will respond to 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 orTRACE™, anticipated energy savings can be determined, and used to justify 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 chillers have distinct leaving water categories:

- Standard, with a leaving solution range of 40 to 65°F (4.4 to 18°C)
- Low temperature process cooling, with leaving solution 10 to 40°F (-12 to 4.4°C)
- Ice-making, with leaving solution range of 20 to 65°F (-7 to 18°C)
- Low leaving temperature, with leaving solution below 10°F (-12.2°C)

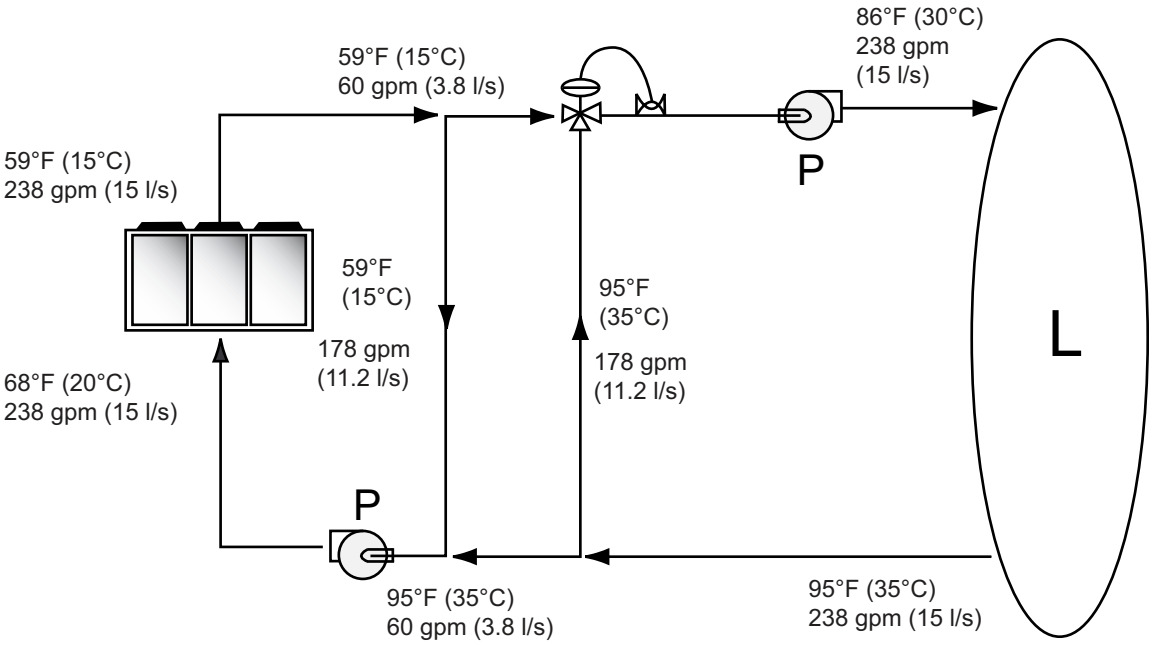
Since leaving solution temperatures below 42°F (5.5°C) result in suction temperature at or below the freezing point of water, a glycol solution is required for all low temperature and ice-making chillers. Ice making control includes dual setpoint controls and safeties for ice making and standard cooling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

The maximum water temperature that can be circulated through the evaporator when the unit is not operating is 125°F (52°C). Evaporator damage may result above this temperature.

## Leaving Water Temperature Out of Range

Many process cooling applications require temperature ranges that are outside the allowable minimum and maximum operating values for the chiller. The following figure shows a simple example of a mixed water piping arrangement change that can enable 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 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

Cataloged performance data is based on a chilled water temperature drop of 10°F (6°C) for I-P data and 9°F (5°C) for SI data. 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 exceeded. Temperature drops outside this range at full load conditions are beyond the optimum range for control and may adversely affect the microprocessor ability to maintain an acceptable supply water temperature. 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 limits compressor short cycling.

The chiller 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).

### Minimum Water Volume for a Process Application

If a chiller is attached to an on/off load such as a process application, 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 recommended water volume. Such systems may cause chiller low temperature diagnostics 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.

## 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 optimum system efficiency and reliability. The Trane Tracer® system has advanced chilled plant control capabilities designed to provide such operation.

## Thermal Battery Cooling System Operation

A Thermal Battery™ cooling system uses the chiller to make (cooling) ice at night when utilities generate electricity more efficiently with lower demand and energy charges. The stored cooling energy reduces or even replaces mechanical cooling during the day when utility rates are at their highest. This reduced electrical demand for cooling results in significant utility cost savings and source energy savings.

Another advantage of an ice energy storage system is its ability to eliminate chiller over sizing. A “right-sized” chiller plant with ice energy 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 designing reserve capacity into the ice storage system for practically no cost compared to oversized systems.

Trane air-cooled chillers are 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 chiller. The dual mode control functionality is 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

Partial heat recovery is designed to capture a portion of the heat that is normally rejected to the atmosphere 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. The heat recovery cycle is only possible if a cooling load exists to act as a heat source. In other words, the partial heat recovery heat exchanger cannot operate alone without a load on the chiller.

To provide a heat recovery cycle, a supplemental heat exchanger is mounted in series to the air-cooled condenser. During the heat recovery cycle, the unit operates just as it does in the cooling-only mode, except a portion of the cooling load heat is rejected to the water heating circuit rather than to the air through the air-cooled condenser. In order to recover more heat, fan speed can be selected as heat recovery priority, slowing fans below the cooling priority speed. A factory-installed refrigerant side two-way valve protects the unit from running trip and adjusts the leaving hot water temperature. Water circulated through the heat recovery heat exchanger absorbs heat from the compressed refrigerant gas discharged by the compressors.

Partial heat recovery can be used in applications where hot water is needed, i.e.kitchens, lavatories, etc. The partial heat recovery heat exchanger provides up to 140°F (60°C) leaving hot water temperature. For more information see Trane Select Assist™ (TSA) performance selection program.

# 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 operating weights shown in Weights chapter.

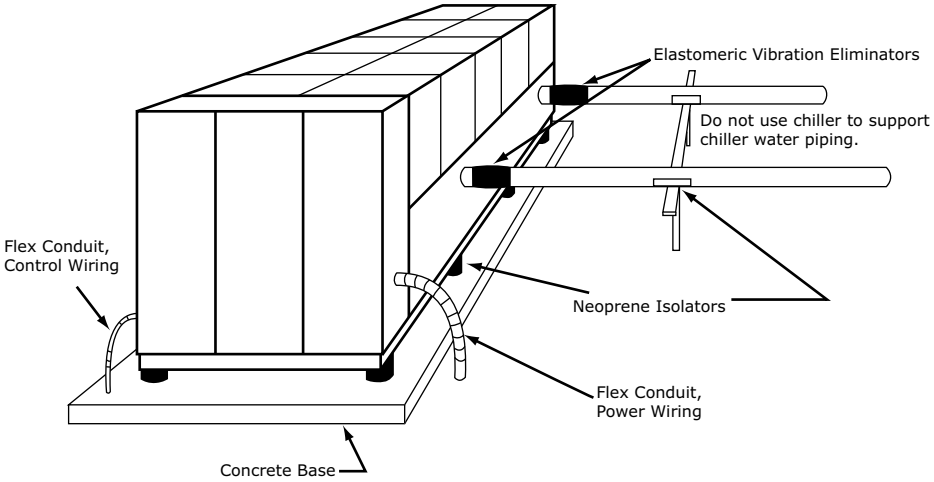
For a detailed discussion of base and foundation construction, see the unit Installation, Operation or Maintenance (IOM) manual. Manuals are available through trane.com or from your local office.

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 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, condenser 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.

## Application Considerations

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 due to higher head pressures. The air-cooled 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 chiller to shutdown. Other chillers would typically shutdown 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.See *Close-Spacing and Restricted Airflow Situations Air-Cooled Scroll Chillers 20-120 CGAM, 50-60 Hz, Engineering Bulletin* (CG-PRB011*-EN) for more information.

### 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. See *Close-Spacing and Restricted Airflow Situations Air-Cooled Scroll Chillers 20-120 CGAM, 50-60 Hz, Engineering Bulletin* (CG-PRB011*-EN) for more information.

# Model Number Descriptions

## Unit Model Number

**Digit 1, 2, 3, 4 – Unit Model**

**CGAM** = Air-Cooled Scroll Packaged Chiller

**Digit 5, 6, 7 – 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
**130** = 130 Tons

**Digit 8 – Unit Voltage**

**A** = 200V/60Hz/3 phase
**B** = 230V/60Hz/3 phase
**D** = 380V/60Hz/3 phase
**F** = 460V/60Hz/3 phase
**G** = 575V/60Hz/3 phase

**Digit 9 – Manufacturing Location**

**2** = Trane Commercial Systems, Pueblo, CO USA

**Digits 10, 11 – Design Sequence**

**** = Factory assigned

**Digit 12 – Unit Type**

**2** = High Efficiency
**3** = Extra Efficiency

**Digit 13 – Agency Listing**

**X** = No Agency Listing
**E** = ETL Listed/Certified to CSA/Conforms to UL

**Digit 14 – Pressure Vessel Code**

**X** = Not Applicable
**1** = CRN or Canada Equivalent

**Digit 15 – Unit Application**

**B** = High Ambient (32-125°F/0-52°C)
**D** = Wide Ambient (0-125°F/-18-52°C)
**J** = Extreme Low Ambient — down to -20°F (-28.9°C)

**Digit 16 – Refrigerant Isolation Valves**

**2** = Refrigerant Isolation Valves (Discharge)

**Digit 17 – Structural Options**

**A** = Standard Unit Structure
**B** = Seismic to International Building Code (IBC)
**C** = California Office of Statewide Health Planning and Development (OSHPD)
**D** = Wind Load for Florida Hurricane

**Digit 18 – Freeze Protection (Factor-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**

**3** = Full Factory Refrigerant Charge R-454B
**4** = Nitrogen Charge — R-454B Field Supplied

**Digit 21 – Evaporator Application**

**A** = Standard Cooling (40 to 65°F/4.4 to 18°C)
**B** = Low Temperature Process (10 to 40°F/-12.2 to 4.4°C)
**C** = Ice-Making - Hardwired Interface (20 to 65°F/-7 to 18°C)
**D** = Low Leaving Water (Below 10°F/-12.2°C)

**Digit 22 – Water Connections**

**1** = Grooved Pipe Connection

**Digit 23 – Condenser Fin Material**

**A** = Lanced Aluminum Fins
**D** = Lanced Aluminum Fins with CompleteCoat™

**Digit 24 – Condenser Heat Recovery**

**X** = No Heat Recovery
**1** = Partial Heat Recovery with Fan Control

**Digit 25 – Not Used**

**Digit 26 – Starter Type**

**A** = Across the Line Starter/Direct On Line

**Digit 27 – Incoming Power Line Connection**

**1** = Single Point Power Connect

**Digit 28 – Power Line Connection Type**

**A** = Terminal Block
**C** = Circuit Breaker Standard Fault
**D** = Circuit Breaker with High Fault Rated Control Panel
**E** = Circuit Breaker with High Fault Rated Control Panel with Energy Meter

**Digit 29 – Enclosure Type**

**2** = Enclosure type UL 60335 Rated for Outdoor Applications

**Digit 30 – Unit Operator Interface**

**B** = Tracer® AdaptiView™ TD-7

**Digit 31 – Remote Interface (Digital Comm)**

**X** = No Remote Digital Communication
**2** = LonTalk®/Tracer® Summit Interface
**4** = BACNet® Interface

**Digit 32 – External Chilled/Hot Water and Current Demand Limit Setpoint**

**X** = No External Chilled Water Setpoint
**A** = External Chilled Water and Demand Limit Setpoint 4-20 mA
**B** = External Chilled Water and Demand Limit Setpoint 2-10 Vdc

**Digit 33 – Percent Capacity**

**X** = Without Percent Capacity
**1** = With Percent Capacity

**Digit 34 – Programmable Relays**

**X** = No Programmable Relays
**A** = With Programmable Relays

**Digit 35 – Pump Type**

**X** = No Pumps and No Contactors
**8** = Dual High Head Pump

## Model Number Descriptions

**Digit 36 – Pump Flow Control**

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

**Digit 37 – Buffer Tank**

**X** = No Buffer Tank
**1** = Buffer Tank

**Digit 38 – Short Circuit Rating**

**X** = No 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
**3** = Seismic Neoprene Pads
**5** = Elastomeric Pads

**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, Literature Language**

**B** = Spanish and English
**D** = English
**E** = French and English

**Digit 45 – Phase Reversal Protection**

**1** = Phase Reversal Protection
**2** = Convenience Outlet and Phase Reversal Protection

**Digit 46 – Shipping Package**

**X** = No Skid (Standard)
**A** = Unit Containerization Package
**B** = Shipped with tarp Covering Full Unit
**C** = Unit Containerization Package and Tarp

**Digit 47 – Performance Test Options**

**X** = No Performance Test
**1** = Customer Inspection
**2** = One-Point Test with Report
**3** = Witness One-Point Test with Report
**4** = Operational Test with Water

**Digit 48 – Flow Switch Setpoint**

**C** = Flow Switch Setpoint 15
**F** = Flow Switch Setpoint 35
**H** = Flow Switch Setpoint 45
**L** = Flow Switch Setpoint 60

**Digit 49 – Wireless Connectivity Options**

**X** = None
**A** = Wi-Fi®
**B** = LTE Modem
**C** = Air-Fi™
**D** = Wi-Fi and LTE Modem
**E** = Wi-Fi and Air-Fi
**F** = LTE Modem and Air-Fi
**G** = Wi-Fi, LTE Modem and Air-Fi

**Digit 50 – Specials**

**X** = None
**S** = Special

***Note:*** *If a digit is not defined, it may be held for future use.*

# General Data

**Table 1. General data, 60 Hz (I-P)**

| Size | Unit | 20 | 26 | 30 | 35 | 40 | 52 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Compressor** | | | | | | | | | | | | | | | |
| Number | # | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 6 |
| Tonnage/Ckt | | 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 | 20+20 +25 |
| **Evaporator** | | | | | | | | | | | | | | | |
| Water Storage | gal | 1.4 | 2.2 | 2.2 | 2.8 | 3.4 | 4.1 | 5 | 6.3 | 7 | 8.6 | 10.3 | 10.3 | 11.5 | 11.5 |
| Min. flow[a] (LWT ≥42°F) | gpm | 23.2 | 29.8 | 33.1 | 38.5 | 45 | 58.8 | 67.1 | 79.5 | 91.8 | 102.6 | 115.5 | 125.2 | 135.9 | 146.9 |
| Min. flow[a] (LWT 40 to 41.9°F) | gpm | 29.1 | 37.2 | 41.8 | 48.2 | 56.3 | 73.5 | 83.9 | 99.4 | 114.7 | 128.3 | 144.4 | 156.5 | 169.9 | 183.7 |
| Max. flow[a] | gpm | 69 | 89 | 100 | 115 | 134.8 | 176 | 201 | 238 | 275 | 307 | 346 | 375 | 407 | 440 |
| Water Connection | in | 2.0 | 2.5 | 2.5 | 2.5 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Max. Water Temperature | °F | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 |
| Min. Water Pressure | psig | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. Water Pressure | psig | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| **Condenser** | | | | | | | | | | | | | | | |
| Quantity of Coils | # | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 4 |
| Coil Length | in | 91 | 91 | 127 | 127 | 91 | 91 | 127 | 127 | 121 | 121 | 144 | 144 | 144 | 180 |
| Coil Height | in | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 42 | 42 | 42 | 42 | 42 | 42 |
| Number of Rows | # | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Fins per Foot | fpf | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 |
| **Fan** | | | | | | | | | | | | | | | |
| Quantity | # | 2 | 2 | 3 | 3 | 4 | 4 | 6 | 6 | 6 | 6 | 8 | 8 | 8 | 10 |
| 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 | 28.8 |
| Airflow per Fan | cfm | 9413 | 9420 | 9168 | 9173 | 9413 | 9420 | 9168 | 9173 | 9470 | 9472 | 9094 | 9096 | 9098 | 9094 |
| Power per Motor | HP | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| Motor RPM | rpm | 840 | 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 | 6333 |
| **General Unit** | | | | | | | | | | | | | | | |
| Refrig Circuits | # | 1 | 1 | 1 | 1 | 2 | 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 | 15-31-46-62-81-100 |
| Min Ambient - Wide | °F | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Min Ambient - High | °F | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| Min Ambient - Extreme Low | °F | -20 | -20 | -20 | -20 | -20 | -20 | -20 | -20 | -20 | -20 | -20 | -20 | -20 | -20 |
| Refrig Charge/Ckt[b] | lbs | 35 | 37 | 48 | 51 | 34 | 38 | 51 | 52 | 67 | 69 | 81 | 74 | 77 | 97 |
| Oil Charge/Ckt[b] | gal | 1.9 | 1.9 | 2.1 | 2.7 | 1.9 | 1.9 | 2.1 | 2.7 | 3.9 | 3.9 | 3.8 | 4.1 | 4.2 | 7.2 |
| **Pump Package** | | | | | | | | | | | | | | | |
| Avail Head Pressure[c] | ft H2O | 78.2 | 77.7 | 71.1 | 67.6 | 67.1 | 58.6 | 76.7 | 63.5 | 82 | 78.1 | 69 | 61.9 | 71.3 | 62.2 |
| Power | HP | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 7.5 | 7.5 | 10.0 | 10.0 | 10.0 | 10.0 | 15.0 | 15.0 |

### Table 1. General data, 60 Hz (I-P) (continued)

| Size | Unit | 20 | 26 | 30 | 35 | 40 | 52 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Expansion Tank Volume | gal | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 |
| Buffer Tank Volume | gal | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 152 | 152 | 195 | 195 | 195 | 195 |
| **Partial Heat Recovery** | | | | | | | | | | | | | | | |
| Water Storage/Ckt[b] | gal | 0.02 | 0.02 | 0.02 | 0.03 | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.04 | 0.04 | 0.04 | 0.06 | 0.06 |
| Max Flow | gpm | 39 | 39 | 39 | 39 | 78 | 78 | 78 | 78 | 127 | 127 | 127 | 127 | 127 | 127 |
| Water Connection | in | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |

[a] Minimum and maximum flow rates apply to constant-flow chilled water sytem running at AHRI conditions, without freeze inhibitors added to the water loop.
[b] Data shown for one circuit only. The second circuit always matches.
[c] Pump available head pressure is based on 44/54°F evaporator with water, .0001 hr-ft2-°F/Btu, 95°F ambient and 0 ft elevation.

### Table 2. General data, 60 Hz (SI)

| Size | Unit | 20 | 26 | 30 | 35 | 40 | 52 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Compressor** | | | | | | | | | | | | | | | |
| Number | # | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 6 |
| Tonnage/Ckt | | 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 | 20+20 +25 |
| **Evaporator** | | | | | | | | | | | | | | | |
| Water storage | L | 5.3 | 8.3 | 8.3 | 10.6 | 12.9 | 15.5 | 18.9 | 23.8 | 26.5 | 32.6 | 39.0 | 39.0 | 43.5 | 43.5 |
| Min. flow[a] (LWT ≥5.56°C) | L/s | 1.5 | 1.9 | 2.1 | 2.4 | 2.8 | 3.7 | 4.2 | 5.0 | 5.8 | 6.5 | 7.3 | 7.9 | 8.6 | 9.3 |
| Min. flow[a] (LWT 4.44 to 5.55°C) | L/s | 1.8 | 2.3 | 2.6 | 3.0 | 3.6 | 4.6 | 5.3 | 6.3 | 7.2 | 8.1 | 9.1 | 9.9 | 10.7 | 11.6 |
| Max. flow[a] | L/s | 4.4 | 5.6 | 6.3 | 7.3 | 8.5 | 11.1 | 12.7 | 15.0 | 17.3 | 19.4 | 21.8 | 23.7 | 25.7 | 27.8 |
| 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 | 101.6 |
| Max. Water Temperature | °C | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |
| Min. Water Pressure | kPa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. Water Pressure | kPa | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 |
| **Condenser** | | | | | | | | | | | | | | | |
| Quantity of Coils | # | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 4 |
| Coil Length | mm | 2311 | 2311 | 3226 | 3226 | 2311 | 2311 | 3226 | 3226 | 3073 | 3073 | 3658 | 3658 | 3658 | 4572 |
| Coil Height | mm | 1727 | 1727 | 1727 | 1727 | 1727 | 1727 | 1727 | 1727 | 1067 | 1067 | 1067 | 1067 | 1067 | 1067 |
| Number of Rows | # | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 |
| Fins per Foot | fpf | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 |
| **Fan** | | | | | | | | | | | | | | | |
| Quantity | # | 2 | 2 | 3 | 3 | 4 | 4 | 6 | 6 | 6 | 6 | 8 | 8 | 8 | 10 |
| Diameter | mm | 732 | 732 | 732 | 732 | 732 | 732 | 732 | 732 | 732 | 732 | 732 | 732 | 732 | 732 |
| Airflow per Fan | m³/h | 15993 | 16005 | 15577 | 15585 | 15993 | 16005 | 15577 | 15585 | 16090 | 16093 | 15451 | 15454 | 15458 | 15451 |
| Power per Motor | HP | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| Motor RPM | rpm | 840 | 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 | 32 |
| **General Unit** | | | | | | | | | | | | | | | |
| Refrig Circuits | # | 1 | 1 | 1 | 1 | 2 | 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 | 15-31-46-62-81-100 |
| Min Ambient - Wide | °C | -18 | -18 | -18 | -18 | -18 | -18 | -18 | -18 | -18 | -18 | -18 | -18 | -18 | -18 |
| Min Ambient - High | °C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Min Ambient - Extreme Low | °C | -28.9 | -28.9 | -28.9 | -28.9 | -28.9 | -28.9 | -28.9 | -28.9 | -28.9 | -28.9 | -28.9 | -28.9 | -28.9 | -28.9 |
| Refrig Charge/Ckt[b] | kg | 15.9 | 16.8 | 21.8 | 23.1 | 15.4 | 17.2 | 23.1 | 23.6 | 30.4 | 31.3 | 36.7 | 33.6 | 34.9 | 44.0 |

**Table 2. General data, 60 Hz (SI) (continued)**

| Size | Unit | 20 | 26 | 30 | 35 | 40 | 52 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oil Charge/Ckt[b] | L | 7.2 | 7.2 | 7.9 | 10.2 | 7.2 | 7.2 | 7.9 | 10.2 | 14.8 | 14.8 | 14.4 | 15.5 | 15.9 | 27.3 |
| **Pump Package** | | | | | | | | | | | | | | | |
| Avail Head Pressure [c] | kPa | 233.7 | 232.2 | 212.5 | 202.1 | 200.6 | 175.2 | 229.3 | 189.8 | 245.1 | 233.4 | 206.2 | 185.0 | 213.1 | 185.9 |
| Power | HP | 5 | 5 | 5 | 5 | 5 | 5 | 7.5 | 7.5 | 10 | 10 | 10 | 10 | 15 | 15 |
| Expansion Tank Volume | L | 18.9 | 18.9 | 18.9 | 18.9 | 18.9 | 18.9 | 18.9 | 18.9 | 22.7 | 22.7 | 22.7 | 22.7 | 22.7 | 22.7 |
| Buffer Tank Volume | L | 530 | 530 | 530 | 530 | 530 | 530 | 530 | 530 | 575 | 575 | 738 | 738 | 738 | 738 |
| **Partial Heat Recovery** | | | | | | | | | | | | | | | |
| Water Storage/Ckt[b] | L | 0.08 | 0.08 | 0.08 | 0.11 | 0.08 | 0.08 | 0.08 | 0.11 | 0.11 | 0.15 | 0.15 | 0.15 | 0.23 | 0.23 |
| Max Flow | L/s | 2.5 | 2.5 | 2.5 | 2.5 | 4.9 | 4.9 | 4.9 | 4.9 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| Water Connection | mm | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 63.5 | 63.5 | 63.5 | 63.5 | 63.5 | 63.5 |

[a] Minimum and maximum flow rates apply to constant-flow chilled water sytem running at AHRI conditions, without freeze inhibitors added to the water loop.
[b] Data shown for one circuit only. The second circuit always matches.
[c] Pump available head pressure is based on 6.7/12.2°C evaporator with water, .01761 m²°C/kW, 35°C ambient and 0 m elevation.

# Controls

## Symbio 800 Controller

Trane chillers offer predictive controls that anticipate and compensate for load changes. Other strategies made possible with the Symbio™ 800 controls are:

### Feedforward Adaptive Control

Feedforward is an open-loop, predictive control strategy designed to anticipate and compensate for load changes. It uses evaporator entering-water temperature as an indication of load change. This allows the controller to respond faster and maintain stable leaving-water temperatures.

### Soft Loading

The chiller controller uses soft loading except during manual operation. Large adjustments to setpoint changes are made gradually, preventing the compressor from cycling unnecessarily. It does this by internally filtering the setpoints to avoid reaching the differential-to-stop or the demand limit. Soft loading applies to the leaving chilled-water temperature and demand limit setpoints.

### 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 approach a limit condition when damage may occur to the unit or shutdown on a safety, Adaptive Controls take 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 until the problem can be solved. Overall, the safety controls help keep the building or process running and out of trouble.

### Integrated Rapid Restart

Bringing a chiller back online rapidly after a loss of power is critical to operations in mission critical environments like data centers and hospitals which demand the highest levels of reliability.

A loss of cooling capacity can be costly, which is why Trane chillers are designed and engineered for Rapid Restart™. In the event of a power interruption, the chiller will start a compressor before the front panel display is fully powered up eliminating the need for UPS. This not only helps the chiller get back online faster, but it also provides a simple and reliable solution to minimize the risks of financially devastating damage to assets caused by overheating due to a power loss.

Of course, the truest test of a chiller restart capabilities is the amount of time it takes to resume full-load cooling, and this is where the chiller really shines. An 80 percent cooling load can be achieved in less than 2.5 minutes after power restoration—your assurance that the cooling capacity your equipment requires is just a few minutes away.

### Rapid Restart Test

After completion of a standard full load witness test, power to the chiller will be cut and then reapplied to demonstrate the rapid restart capabilities of the chiller for disaster relief.

## Tracer® AdaptiView™ TD-7 Operator Interface

The standard Tracer® AdaptiView™ TD-7 display provided with the Symbio™ 800 controller features a 7-inch LCD touch-screen, allowing access to all operational inputs and outputs. This advanced interface allows the user to access important information concerning setpoints, active temperatures, modes, electrical data, pressure, and diagnostics. The full text display is available in 27 languages.

### Display Feature Settings

- 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.)
- Manual override indication.
- 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:
  - Easy to view Operating Modes
  - Logical Subcomponent Reports:
    - Evaporator
    - Condenser
    - Compressor
    - Motor
  - 3 User Programmable Custom Reports
  - ASHRAE Report
  - Log Sheet Report
  - Alarms Report
  - 8 Pre-defined Standard Graphs
  - 4 User Programmable Custom Graphs
  - Unit Settings
  - Service Settings
  - Feature Settings
  - Chilled Water Reset
  - Manual Control Settings
  - Display Preferences
  - Support of 27 languages
  - Brightness Setting
  - Cleaning Mode

# System Integration

## Stand-Alone Controls

Single chillers installed in applications without a building management system are 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.

- Auto/Stop - A job-site provided contact closure turns the unit on and off.
- Emergency Stop - A job-site provided contact opening wired to this input turns the unit off and requires 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 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.

## Tracer SC

The Tracer® SC system controller acts as the central coordinator for all individual equipment devices on a Tracer® building automation system. The Tracer®SC scans all unit controllers to update information and coordinate building control, including building subsystems such as VAV and chiller water systems. With this system option, the full breadth of Trane's HVAC and controls experience are applied to offer solutions to many facility issues. The LAN allows building operators to manage these varied components as one system from any personal computer with web access. The benefits of this system are:

- Improved usability with automatic data collection, enhanced data logging, easier to create graphics, simpler navigation, pre-programmed scheduling, reporting, and alarm logs.
- Flexible technology allows for system sizes from 30 to 120 unit controllers with any combination of LonTalk® or BACnet® unit controllers.
- LEED certification through site commissioning report, energy data collection measurement, optimizing energy performance, and maintaining indoor air quality.

Energy savings programs include: fan pressure optimization, ventilation reset, and chiller plant control (adds and subtracts chillers to meet cooling loads).

## Building Automation Systems

### BACnet® Building Automation Control Network

The BACnet control network for Symbio™ 800 expands communications from the unit controls network to the Tracer® Ensemble™ or Tracer® SC+ building automation system (BAS) or third party building automation system. Utilizing BACnet, the BAS allows external setpoint and configuration adjustment and monitoring of status and diagnostics. The Symbio 800 utilizes the BACnet defined TP protocol as defined in ASHRAE standard 135-2004. This controller works in standalone mode, with Tracer Ensemble, Tracer SC+ or when connected to a third party building automation system that supports BACnet.

### Modbus® Automation Control Network

Allows the user to easily interface with Modbus RTU communication protocol via a single twisted pair wiring or Modbus TCP over Ethernet from the Symbio™ 800 controller to a factory installed device.

### LonTalk® Building Automation Systems

The LonTalk communication protocol for the Symbio™ 800 controller expands communications from the unit controls network to a Tracer® Ensemble™ building automation system or third party building automation system. Utilizing LonTalk, the BAS allows external setpoint and configuration adjustment and monitoring of status and diagnostics. The Symbio 800 utilizes an FTT-10A free topology transceiver, which supports non-polarity sensitive, free topology wiring—which in turn allows the system installer to utilize star, bus, and loop architectures. This controller works in standalone mode, peer-to-peer with one or more other units, or when connected to a Tracer Ensemble, Tracer SC+, or a third party building automation system that supports LonTalk.

***Note:*** *An optional module is required for Symbio 800 support of LonTalk. See Tracer® USB LonTalk Module Installation Instructions (BAS-SVN138*-EN).*

# Symbio 800 Controls

## Overview

The Symbio™ 800 controller is a factory-installed, application specific and programmable controller designed to control chillers and large packaged HVAC equipment. A 7–inch user interface features a touch-sensitive color screen that provides facility managers at-a-glance operating status, performance monitoring, scheduling changes, and operating adjustments. Other advanced features include automated controller back-up, and optional features such as secure remote connectivity, wireless building communications, mobile device connectivity, and custom programming with expandable I/O.

| **Symbio™ 800 Advantages** | | **Benefits** |
|---|---|---|
| Connected | Convenient, on-the-go access to advanced monitoring, troubleshooting, and energy management | • Minimum first cost.<br>• Maximum comfort.<br>• Minimized downtime.<br>• Minimum operating costs.<br>• Superior building and occupant productivity. |
| Flexible | Minimized installation hardware and labor costs – able to use existing devices for maximum convenience, lower controls upgrades and relocation | |
| Reliable | Maximum equipment uptime and life, minimized maintenance and troubleshooting cost | |

## Features and Benefits

| Symbio™ 800 Feature | Benefits |
|---|---|
| Multiple, open standard protocol support<br>• BACnet® TP.<br>• BACnet®/IP.<br>• LON (Optional).<br>• Modbus®. | Simplified, lower cost, and more flexible integration with all common open standard protocols using Trane or competitive BAS systems and controllers. |
| Remote connection to building or equipment | Trane Connect™ provides an easy, secure option to connect remotely to a Tracer® SC+ or directly to your Trane equipment. |
| Common integration strategies and equipment specific points lists | Simplified, lower cost, and uncompromised integration. |
| Application specific and configurable | Reduced project costs with superior reliability, comfort, performance - applications specific and configurable system confirms machine continues to run within operating envelope. Ability to upgrade firmware with a simple file transfer. |
| Smart Analytics | Smart analytics provide superior reliability through the life of the equipment with minimum downtime. |
| Data logging | Standard, local or remote Intuitive review and analysis of equipment, zone, and building performance. |
| Local scheduling | Capable of operating in stand-alone operation without a building automation system as a temporary back-up schedule for ongoing comfort and energy savings. |
| Rugged, 7-inch color touch screen user interface | Easy, touch navigation for viewing data and making operational changes. |
| Display preferences | Choose how to view dates, times, units (SI, IP), screen brightness, data format, and backlight timeout. A total of 27 built-in languages are supported and selectable for all TD-7 screens. |
| Intuitive navigation | Helps operators access data and alarms for quick and accurate response and resolution. |
| At-a-glance status | Easily readable color display showing key operating parameters of major equipment components. |
| Reports | Quickly summarizes data for clear understanding and interpretation to enable local monitoring of expected performance and operating efficiency. |
| Graphs | Easily visualize trend data for local troubleshooting and fine-tuning. |
| Multiple language support | Suitable for operation in multiple geographies. |
| Adaptive Control™ Algorithms | Pre-empts potential equipment disruptions during rapidly changing conditions – providing consistent equipment performance and building comfort. |
| SD card backup/restore | Faster, lower cost repairs with reduced downtime. |
| Modbus® device support | Capable of integrating optional Modbus® devices for local or remote diagnostics — provides faster, lower cost troubleshooting and increased equipment performance. |

## Options

| Symbio™ 800 Feature | Benefits |
|---|---|
| Remote connection to building or equipment | Trane Connect™ provides an easy, secure option to connect remotely to a Tracer® SC+ or directly to your Trane equipment. |
| Programmable | Equipment application flexibility and cost-reduced control of nearby equipment. |
| Expandable I/O | Field or factory installed I/O for programmable feature for reduced installation costs and increased installation flexibility. |
| User security with audit trail support | Flexible and secure access for multiple users allows monitoring, overriding/releasing points, release of all overrides, custom report editing, and tracking changes by user. |
| LonTalk® | |

# Specifications

| Controller Specifications | |
|---|---|
| Input power | 24 Vdc +/- 10%, 400mA max. |
| Storage temperature | -67°F to 185°F (-55°C to 85°C), Humidity: Between 5% to 100% (Condensing). |
| Operating temperature | -40°F to 158°F (-40°C to 70°C). |
| Environmental rating (enclosure) | IP3x. |
| Time clock | On-board real time clock with 10 year battery backup. |
| Mounting weight | Mounting surface must support 1.3 lb. (0.6 kg). |
| Overall dimensions | 5.65 in. (143.5 mm) wide x 4.00 in. (101.6 mm) high x 2.38 in. (60.6 mm) deep. |
| **Agency Compliance** | |
| • UL PAZX, Energy Management Equipment.<br>• UL94-5V Flammability.<br>• CE.<br>• FCC CFR Title 47, Part 15.109: Class B Limit, (30 MHz—10 GHz).<br>• BTL Listed—Advanced Application Profile (B-AAC). | |
| **User Interface Specifications** | |
| Input power | 24 Vdc +/- 10%, 400 mA max |
| Storage temperature | -67°F to 203°F (-55°C to 95°C), Humidity: Between 5% to 100% (Condensing). |
| Operating temperature | -40°F to 158°F (-40°C to 70°C), Humidity: Between 5% to 100% (Condensing). |
| Environmental rating (enclosure) | IP56 (dust and strong water jet protected) with optional sealed Ethernet cable (PN: X19070632020). |
| Mounting weight | Mounting surface must support 1.6 lb. (0.74 kg). |
| Overall dimensions | 8.3 in. (211.6 mm) wide x 6.3 in. (158.8 mm) high x 2.1 in. (53.2 mm) deep [bezel depth 0.4 in. (11.3 mm)]. |
| **Agency Compliance** | |
| • UL PAZX, Energy Management Equipment.<br>• UL94-5V, Flammability.<br>• FCC CFR Title 47, Part 15.109: Class A Limit, (30 MHz—4 GHz).<br>• CE EMC Directive 2004/108/EC. | |

# Electrical Data

**Table 3. Electrical data**

| Unit Size | Rated Power | Ckt Qty | Comp Qty | Fans Qty | Cond Fan FLA | | Pump FLA | Compressor | | No pump | | | Pump | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | MCA[a] | | MOP[b] | MCA[a] | | MOP[b] |
| | | | | | VFD | No VFD | VFD | RLA[c] | LRA[c] | VFD | No VFD | | VFD | No VFD | |
| 20 | 208/60/3 | 1 | 2 | 2 | 7.0 | 6.7 | 13.6 | 39-39 | 267-267 | 106.5 | n/a | 150 | 120.1 | n/a | 175 |
| | 230/60/3 | 1 | 2 | 2 | 6.7 | 6.5 | 12.3 | 39-39 | 267-267 | 105.5 | n/a | 150 | 117.8 | n/a | 175 |
| | 380/60/3 | 1 | 2 | 2 | 3.9 | 3.7 | n/a | 22-22 | 160-160 | 60.6 | n/a | 90 | n/a | | |
| | 460/60/3 | 1 | 2 | 2 | 3.5 | 3.3 | 6.1 | 19-19 | 142-142 | 50.8 | n/a | 70 | 56.9 | n/a | 80 |
| | 575/60/3 | 1 | 2 | 2 | 2.8 | 2.7 | 4.9 | 15-15 | 103-103 | 41.4 | n/a | 60 | 46.3 | n/a | 70 |
| 26 | 208/60/3 | 1 | 2 | 2 | 7.0 | 6.7 | 13.6 | 51-51 | 315-315 | 134.2 | n/a | 200 | 147.8 | n/a | 200 |
| | 230/60/3 | 1 | 2 | 2 | 6.7 | 6.5 | 12.3 | 45-45 | 315-315 | 118.8 | n/a | 175 | 131.1 | n/a | 200 |
| | 380/60/3 | 1 | 2 | 2 | 3.9 | 3.7 | n/a | 26-26 | 177-177 | 69.4 | n/a | 100 | n/a | | |
| | 460/60/3 | 1 | 2 | 2 | 3.5 | 3.3 | 6.1 | 21-21 | 158-158 | 57.3 | n/a | 80 | 63.4 | n/a | 90 |
| | 575/60/3 | 1 | 2 | 2 | 2.8 | 2.7 | 4.9 | 19-19 | 126-126 | 48.6 | n/a | 70 | 53.5 | n/a | 80 |
| 30 | 208/60/3 | 1 | 2 | 3 | 7.0 | 6.7 | 13.6 | 50-50 | 345-345 | 139.1 | 137.9 | 200 | 152.7 | 151.5 | 225 |
| | 230/60/3 | 1 | 2 | 3 | 6.7 | 6.5 | 12.3 | 48-48 | 345-345 | 133.4 | 132.5 | 200 | 145.7 | 144.8 | 200 |
| | 380/60/3 | 1 | 2 | 3 | 3.9 | 3.7 | n/a | 32-32 | 195-195 | 87.5 | n/a | 125 | n/a | | |
| | 460/60/3 | 1 | 2 | 3 | 3.5 | 3.3 | 6.1 | 25-25 | 155-155 | 68.5 | 68.1 | 100 | 74.6 | 74.2 | 100 |
| | 575/60/3 | 1 | 2 | 3 | 2.8 | 2.7 | 4.9 | 22-22 | 126-126 | 59.8 | n/a | 90 | 64.7 | n/a | 90 |
| 35 | 208/60/3 | 1 | 2 | 3 | 7.0 | 6.7 | 13.6 | 50-74 | 345-485 | 168.2 | 167.0 | 250 | 181.8 | 180.6 | 250 |
| | 230/60/3 | 1 | 2 | 3 | 6.7 | 6.5 | 12.3 | 48-67 | 345-485 | 156.8 | 155.9 | 225 | 169.1 | 168.2 | 250 |
| | 380/60/3 | 1 | 2 | 3 | 3.9 | 3.7 | n/a | 32-40 | 195-260 | 96.5 | n/a | 150 | n/a | | |
| | 460/60/3 | 1 | 2 | 3 | 3.5 | 3.3 | 6.1 | 25-33 | 155-215 | 78.5 | 78.1 | 125 | 84.6 | 84.2 | 125 |
| | 575/60/3 | 1 | 2 | 3 | 2.8 | 2.7 | 4.9 | 22-26 | 126-175 | 64.8 | n/a | 100 | 69.7 | n/a | 100 |
| 40 | 208/60/3 | 2 | 4 | 4 | 7.0 | 6.7 | 13.6 | 39-39/39-39 | 267-267/ 267-267 | 198.4 | n/a | 250 | 212.0 | n/a | 300 |
| | 230/60/3 | 2 | 4 | 4 | 6.7 | 6.5 | 12.3 | 39-39/39-39 | 267-267/ 267-267 | 196.9 | n/a | 250 | 209.2 | n/a | 250 |
| | 380/60/3 | 2 | 4 | 4 | 3.9 | 3.7 | n/a | 22-22/22-22 | 160-160/ 160-160 | 113.0 | n/a | 150 | n/a | | |
| | 460/60/3 | 2 | 4 | 4 | 3.5 | 3.3 | 6.1 | 19-19/19-19 | 142-142/ 142-142 | 94.8 | n/a | 125 | 100.9 | n/a | 125 |
| | 575/60/3 | 2 | 4 | 4 | 2.8 | 2.7 | 4.9 | 15-15/15-15 | 103-103/ 103-103 | 77.1 | n/a | 100 | 82.0 | n/a | 100 |
| 52 | 208/60/3 | 2 | 4 | 4 | 7.0 | 6.7 | 13.6 | 51-51/51-51 | 315-315/ 315-315 | 250.7 | n/a | 300 | 264.3 | n/a | 350 |
| | 230/60/3 | 2 | 4 | 4 | 6.7 | 6.5 | 12.3 | 45-45/45-45 | 315-315/ 315-315 | 222.0 | n/a | 300 | 234.3 | n/a | 300 |
| | 380/60/3 | 2 | 4 | 4 | 3.9 | 3.7 | n/a | 26-26/26-26 | 177-177/ 177-177 | 129.6 | n/a | 175 | n/a | | |
| | 460/60/3 | 2 | 4 | 4 | 3.5 | 3.3 | 6.1 | 21-21/21-21 | 158-158/ 158-158 | 107.1 | n/a | 150 | 113.2 | n/a | 150 |
| | 575/60/3 | 2 | 4 | 4 | 2.8 | 2.7 | 4.9 | 19-19/19-19 | 126-126/ 126-126 | 90.8 | n/a | 110 | 95.7 | n/a | 125 |

**Table 3. Electrical data (continued)**

| Unit Size | Rated Power | Ckt Qty | Comp Qty | Fans Qty | Cond Fan FLA | | Pump FLA | Compressor | | No pump | | | Pump | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | MCA[a] | | MOP[b] | MCA[a] | | MOP[b] |
| | | | | | VFD | No VFD | VFD | RLA[c] | LRA[c] | VFD | No VFD | | VFD | No VFD | |
| 60 | 208/60/3 | 2 | 4 | 6 | 7.0 | 6.7 | n/a | 50-50/50-50 | 345-345/ 345-345 | 260.7 | 258.3 | 350 | n/a | | |
| | 230/60/3 | 2 | 4 | 6 | 6.7 | 6.5 | n/a | 48-48/48-48 | 345-345/ 345-345 | 250.3 | 248.5 | 300 | n/a | | |
| | 380/60/3 | 2 | 4 | 6 | 3.9 | 3.7 | n/a | 32-32/32-32 | 195-195/ 195-195 | 164.2 | n/a | 200 | n/a | | |
| | 460/60/3 | 2 | 4 | 6 | 3.5 | 3.3 | 9.0 | 25-25/25-25 | 155-155/ 155-155 | 128.6 | 127.8 | 175 | 137.6 | 136.8 | 175 |
| | 575/60/3 | 2 | 4 | 6 | 2.8 | 2.7 | 7.2 | 22-22/22-22 | 126-126/ 126-126 | 112.3 | n/a | 150 | 119.5 | n/a | 150 |
| 70 | 208/60/3 | 2 | 4 | 6 | 7.0 | 6.7 | n/a | 50-74/74-50 | 345-485/ 485-345 | 313.1 | 310.7 | 400 | n/a | | |
| | 230/60/3 | 2 | 4 | 6 | 6.7 | 6.5 | n/a | 48-67/67-48 | 345-485/ 485-345 | 292.4 | 290.6 | 400 | n/a | | |
| | 380/60/3 | 2 | 4 | 6 | 3.9 | 3.7 | n/a | 32-40/40-32 | 195-260/ 260-195 | 180.4 | n/a | 225 | n/a | | |
| | 460/60/3 | 2 | 4 | 6 | 3.5 | 3.3 | 9.0 | 25-33/33-25 | 155-215/ 215-155 | 146.6 | 145.8 | 200 | 155.6 | 154.8 | 200 |
| | 575/60/3 | 2 | 4 | 6 | 2.8 | 2.7 | 7.2 | 22-26/26-22 | 126-175/ 175-126 | 121.3 | n/a | 150 | 128.5 | n/a | 175 |
| 80 | 208/60/3 | 2 | 4 | 6 | 7.0 | 6.7 | 26.5 | 74-74/ 74-74 | 485-485/ 485-485 | 359.7 | 357.3 | 450 | 386.2 | 383.8 | 500 |
| | 230/60/3 | 2 | 4 | 6 | 6.7 | 6.5 | 24.0 | 67-67/ 67-67 | 485-485/ 485-485 | 329.8 | 328.0 | 400 | 353.8 | 352.0 | 450 |
| | 380/60/3 | 2 | 4 | 6 | 3.9 | 3.7 | n/a | 40-40/ 40-40 | 260-260/ 260-260 | 194.8 | n/a | 250 | n/a | | |
| | 460/60/3 | 2 | 4 | 6 | 3.5 | 3.3 | 12.0 | 33-33/ 33-33 | 215-215/ 215-215 | 162.6 | 161.8 | 200 | 174.6 | 173.8 | 225 |
| | 575/60/3 | 2 | 4 | 6 | 2.8 | 2.7 | 9.6 | 26-26/ 26-26 | 175-175/ 175-175 | 129.3 | n/a | 175 | 138.9 | n/a | 175 |
| 90 | 208/60/3 | 2 | 4 | 6 | 7.0 | 6.7 | 26.5 | 74-91/ 91-74 | 485-560/ 560-485 | 398.8 | 396.4 | 500 | 425.3 | 422.9 | 600 |
| | 230/60/3 | 2 | 4 | 6 | 6.7 | 6.5 | 24.0 | 67-85/ 85-67 | 485-560/ 560-485 | 368.7 | 366.9 | 500 | 392.7 | 390.9 | 500 |
| | 380/60/3 | 2 | 4 | 6 | 3.9 | 3.7 | n/a | 40-55/ 55-40 | 260-310/ 310-260 | 227.6 | n/a | 300 | n/a | | |
| | 460/60/3 | 2 | 4 | 6 | 3.5 | 3.3 | 12.0 | 33-42/ 42-33 | 215-260/ 260-215 | 182.6 | 181.8 | 225 | 194.6 | 193.8 | 250 |
| | 575/60/3 | 2 | 4 | 6 | 2.8 | 2.7 | 9.6 | 26-34/ 34-26 | 175-210/ 210-175 | 146.4 | n/a | 200 | 156.0 | n/a | 200 |
| 100 | 208/60/3 | 2 | 4 | 8 | 7.0 | 6.7 | 26.5 | 91-91/ 91-91 | 560-560/ 560-560 | 447.0 | 446.4 | 600 | 473.5 | 472.9 | 600 |
| | 230/60/3 | 2 | 4 | 8 | 6.7 | 6.5 | 24.0 | 85-85/ 85-85 | 560-560/ 560-560 | 416.3 | 415.9 | 600 | 440.3 | 439.9 | 600 |
| | 380/60/3 | 2 | 4 | 8 | 3.9 | 3.7 | n/a | 55-55/ 55-55 | 310-310/ 310-310 | 264.2 | 263.8 | 350 | n/a | | |
| | 460/60/3 | 2 | 4 | 8 | 3.5 | 3.3 | 12.0 | 42-42/ 42-42 | 260-260/ 260-260 | 207.0 | 206.6 | 250 | 219.0 | 218.6 | 300 |
| | 575/60/3 | 2 | 4 | 8 | 2.8 | 2.7 | 9.6 | 34-34/ 34-34 | 210-210/ 210-210 | 167.0 | 167.8 | 225 | 176.6 | 177.4 | 225 |

**Table 3. Electrical data (continued)**

| Unit Size | Rated Power | Ckt Qty | Comp Qty | Fans Qty | Cond Fan FLA | | Pump FLA | Compressor | | No pump | | | Pump | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | MCA[a] | | MOP[b] | MCA[a] | | MOP[b] |
| | | | | | VFD | No VFD | VFD | RLA[c] | LRA[c] | VFD | No VFD | | VFD | No VFD | |
| 110 | 208/60/3 | 2 | 4 | 8 | 7.0 | 6.7 | 26.5 | 91-110/ 110-91 | 560-680/ 680-560 | 488.0 | 487.4 | 600 | 514.5 | 513.9 | 700 |
| | 230/60/3 | 2 | 4 | 8 | 6.7 | 6.5 | 24.0 | 85-109/ 109-85 | 560-680/ 680-560 | 471.2 | 470.8 | 600 | 495.2 | 494.8 | 700 |
| | 380/60/3 | 2 | 4 | 8 | 3.9 | 3.7 | n/a | 55-60/ 60-55 | 310-360/ 360-310 | 275.7 | 275.3 | 350 | n/a | | |
| | 460/60/3 | 2 | 4 | 8 | 3.5 | 3.3 | 12.0 | 42-51/ 51-42 | 260-320/ 320-260 | 226.7 | 226.3 | 300 | 238.7 | 238.3 | 300 |
| | 575/60/3 | 2 | 4 | 8 | 2.8 | 2.7 | 9.6 | 34-39/ 39-34 | 210-235/ 235-210 | 177.4 | 178.2 | 225 | 187.0 | 187.8 | 250 |
| 120 | 208/60/3 | 2 | 4 | 8 | 7.0 | 6.7 | n/a | 110-110/ 110-110 | 680-680/ 680-680 | 524.4 | 523.8 | 700 | n/a | | |
| | 230/60/3 | 2 | 4 | 8 | 6.7 | 6.5 | n/a | 109-109/ 109-109 | 680-680/ 680-680 | 520.0 | 519.6 | 700 | n/a | | |
| | 380/60/3 | 2 | 4 | 8 | 3.9 | 3.7 | n/a | 60-60/ 60-60 | 360-360/ 360-360 | 285.9 | 285.5 | 350 | n/a | | |
| | 460/60/3 | 2 | 4 | 8 | 3.5 | 3.3 | 18.1 | 51-51/ 51-51 | 320-320/ 320-320 | 244.2 | 243.8 | 300 | 262.3 | 261.9 | 350 |
| | 575/60/3 | 2 | 4 | 8 | 2.8 | 2.7 | 14.5 | 39-39/ 39-39 | 235-235/ 235-235 | 186.6 | 187.4 | 250 | 201.1 | 201.9 | 250 |
| 130 | 208/60/3 | 2 | 6 | 10 | 7.0 | 6.7 | n/a | 74-74-91/ 91-74-74 | 485-485-560/ 560-485-485 | 573.4 | 572.8 | 700 | n/a | | |
| | 230/60/3 | 2 | 6 | 10 | 6.7 | 6.5 | n/a | 67-67-85/ 85-67-67 | 485-485-560/ 560-485-485 | 529.3 | 528.9 | 700 | n/a | | |
| | 380/60/3 | 2 | 6 | 10 | 3.9 | 3.7 | n/a | 40-40-55/ 55-40-40 | 260-260-310/ 310-260-260 | 322.2 | 321.8 | 400 | n/a | | |
| | 460/60/3 | 2 | 6 | 10 | 3.5 | 3.3 | 18.1 | 33-33-42/ 42-33-33 | 215-215-260/ 260-215-215 | 261.8 | 261.4 | 350 | 279.9 | 279.5 | 350 |
| | 575/60/3 | 2 | 6 | 10 | 2.8 | 2.7 | 14.5 | 26-26-34/ 34-26-26 | 175-175-210/ 210-175-175 | 210.0 | 210.8 | 250 | 224.5 | 225.3 | 300 |

**Notes:**

1. Local codes may take precedence.
2. Voltage Utilization Range: +/- 10% of rated voltage. Rated voltage (use range): 208/60/3 (187.2-228.8), 230/60/3(208-254), 380/60/3 (342-418), 460/60/3 (414-506), 575/60/3 (516-633).
3. One separate 120/60/1, 15 amp customer provided power connection is required to power the heaters.
4. n/a - not available.

[a] MCA - Minimum Circuit Ampacity - 125 percent of largest compressor RLA plus 100 percent of all other loads.

[b] MOP or Max fuse size - 225 percent of the largest compressor RLA plus all other loads.

[c] RLA - Rated Load Amps - Rated in accordance with UL Standard 1995.

**Table 4. Lug size range**

| Unit Size | Rated Power | No Pump | | | Pump | | |
|---|---|---|---|---|---|---|---|
| | | Terminal Blocks | Std Fault Ckt Breaker[a] | High Fault Ckt Breaker[a] | Terminal Blocks | Std Fault Ckt Breaker[a] | High Fault Ckt Breaker[a] |
| 20 | 208/60/3 | #6 - 350 MCM | #4 - 4/0 | #4 - 300MCM | #6 - 350 MCM | #4 - 4/0 | #4 - 300MCM |
| | 230/60/3 | #6 - 350 MCM | #4 - 4/0 | #4 - 300MCM | #6 - 350 MCM | #4 - 4/0 | #4 - 300MCM |
| | 380/60/3 | #6 - 350 MCM | #8 - 3/0 | #14 - 1/0 AWG | n/a | | |
| | 460/60/3 | #6 - 350 MCM | #8 - 3/0 | #14 - 1/0 AWG | #6 - 350 MCM | #8 - 3/0 | #14 - 1/0 AWG |
| | 575/60/3 | #6 - 350 MCM | #8 - 3/0 | #8 - 3/0 | #6 - 350 MCM | #8 - 3/0 | #8 - 3/0 |
| 26 | 208/60/3 | #6 - 350 MCM | #4 - 4/0 | #4 - 300MCM | #6 - 350 MCM | #4 - 4/0 | #4 - 300MCM |
| | 230/60/3 | #6 - 350 MCM | #4 - 4/0 | #4 - 300MCM | #6 - 350 MCM | #4 - 4/0 | #4 - 300MCM |
| | 380/60/3 | #6 - 350 MCM | #8 - 3/0 | #14 - 1/0 AWG | n/a | | |
| | 460/60/3 | #6 - 350 MCM | #8 - 3/0 | #14 - 1/0 AWG | #6 - 350 MCM | #8 - 3/0 | #14 - 1/0 AWG |
| | 575/60/3 | #6 - 350 MCM | #8 - 3/0 | #8 - 3/0 | #6 - 350 MCM | #8 - 3/0 | #8 - 3/0 |
| 30 | 208/60/3 | #6 - 350 MCM | n/a | #4 - 300MCM | #6 - 350 MCM | 3/0 - 350 MCM | #4 - 300MCM |
| | 230/60/3 | #6 - 350 MCM | n/a | #4 - 300MCM | #6 - 350 MCM | #4 - 4/0 | #4 - 300MCM |
| | 380/60/3 | #6 - 350 MCM | #8 - 3/0 | #14 - 1/0 AWG | n/a | | |
| | 460/60/3 | #6 - 350 MCM | #8 - 3/0 | #14 - 1/0 AWG | #6 - 350 MCM | #8 - 3/0 | #14 - 1/0 AWG |
| | 575/60/3 | #6 - 350 MCM | #8 - 3/0 | #8 - 3/0 | #6 - 350 MCM | #8 - 3/0 | #8 - 3/0 |
| 35 | 208/60/3 | #6 - 350 MCM | n/a | #4 - 300MCM | #6 - 350 MCM | 3/0 - 350 MCM | #4 - 300MCM |
| | 230/60/3 | #6 - 350 MCM | n/a | #4 - 300MCM | #6 - 350 MCM | 3/0 - 350 MCM | #4 - 300MCM |
| | 380/60/3 | #6 - 350 MCM | #4 - 4/0 | #4 - 300MCM | n/a | | |
| | 460/60/3 | #6 - 350 MCM | #8 - 3/0 | #14 - 1/0 AWG | #6 - 350 MCM | #8 - 3/0 | #14 - 1/0 AWG |
| | 575/60/3 | #6 - 350 MCM | #8 - 3/0 | #8 - 3/0 | #6 - 350 MCM | #8 - 3/0 | #8 - 3/0 |
| 40 | 208/60/3 | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300MCM | #4 - 500 MCM | 2/0 - 500MCM | 2/0 - 500MCM |
| | 230/60/3 | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300MCM | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300MCM |
| | 380/60/3 | #4 - 500 MCM | #4 - 4/0 | #4 - 300MCM | n/a | | |
| | 460/60/3 | #4 - 500 MCM | #8 - 3/0 | #14 - 1/0 | #4 - 500 MCM | #8 - 3/0 | #14 - 1/0 |
| | 575/60/3 | #4 - 500 MCM | #8 - 3/0 | #8 - 3/0 | #4 - 500 MCM | #8 - 3/0 | #8 - 3/0 |
| 52 | 208/60/3 | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500MCM | #4 - 500 MCM | 2/0 - 500MCM | 2/0 - 500MCM |
| | 230/60/3 | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500MCM | #4 - 500 MCM | 2/0 - 500MCM | 2/0 - 500MCM |
| | 380/60/3 | #4 - 500 MCM | #4 - 4/0 | #4 - 300MCM | n/a | | |
| | 460/60/3 | #4 - 500 MCM | #4 - 4/0 | #4 - 300MCM | #4 - 500 MCM | #4 - 4/0 | #4 - 300MCM |
| | 575/60/3 | #4 - 500 MCM | #8 - 3/0 | #8 - 3/0 | #4 - 500 MCM | #8 - 3/0 | #8 - 3/0 |
| 60 | 208/60/3 | #4 - 500 MCM | n/a | 2/0 - 500MCM | n/a | | |
| | 230/60/3 | #4 - 500 MCM | n/a | 2/0 - 500MCM | | | |
| | 380/60/3 | #4 - 500 MCM | #4- 4/0 | #4 - 300MCM | | | |
| | 460/60/3 | #4 - 500 MCM | #4- 4/0 | #4 - 300MCM | #4 - 500 MCM | #4 - 4/0 | #4 - 300MCM |
| | 575/60/3 | #4 - 500 MCM | #4- 4/0 | #4 - 300MCM | #4 - 500 MCM | #4 - 4/0 | #4 - 300MCM |
| 70 | 208/60/3 | #4 - 500 MCM | n/a | 2/0 - 500MCM | n/a | | |
| | 230/60/3 | #4 - 500 MCM | n/a | 2/0 - 500MCM | | | |
| | 380/60/3 | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300MCM | | | |
| | 460/60/3 | #4 - 500 MCM | #4- 4/0 | #4 - 300MCM | #4 - 500 MCM | #4- 4/0 | #4 - 300MCM |
| | 575/60/3 | #4 - 500 MCM | #4- 4/0 | #4 - 300MCM | #4 - 500 MCM | #4- 4/0 | #4 - 300MCM |

**Table 4. Lug size range (continued)**

| Unit Size | Rated Power | No Pump | | | Pump | | |
|---|---|---|---|---|---|---|---|
| | | Terminal Blocks | Std Fault Ckt Breaker[a] | High Fault Ckt Breaker[a] | Terminal Blocks | Std Fault Ckt Breaker[a] | High Fault Ckt Breaker[a] |
| 80 | 208/60/3 | #4 - 500 MCM | n/a | 2/0 - 500 MCM | #4 - 500 MCM[b] | 2/0 - 500 MCM[b] | 2/0 - 500 MCM[b] |
| | 230/60/3 | #4 - 500 MCM | n/a | 2/0 - 500 MCM | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500 MCM |
| | 380/60/3 | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300 MCM | n/a | | |
| | 460/60/3 | #4 - 500 MCM | #4 - 4/0 | #4 - 300 MCM | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300 MCM |
| | 575/60/3 | #4 - 500 MCM | #4 - 4/0 | #4 - 300 MCM | #4 - 500 MCM | #4 - 4/0 | #4 - 300 MCM |
| 90 | 208/60/3 | #4 - 500 MCM[b] | n/a | 2/0 - 500 MCM[b] | #4 - 500 MCM[b] | 2/0 - 500 MCM[b] | 2/0 - 500 MCM[b] |
| | 230/60/3 | #4 - 500 MCM | n/a | 2/0 - 500 MCM | #4 - 500 MCM[b] | 2/0 - 500 MCM[b] | 2/0 - 500 MCM[b] |
| | 380/60/3 | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500 MCM | n/a | | |
| | 460/60/3 | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300 MCM | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300 MCM |
| | 575/60/3 | #4 - 500 MCM | #4 - 4/0 | #4 - 300 MCM | #4 - 500 MCM | #4 - 4/0 | #4 - 300 MCM |
| 100 | 208/60/3 | #4 - 500 MCM[b] | n/a | 2/0 - 500 MCM[b] | #4 - 500 MCM[b] | 2/0 - 500 MCM[b] | 2/0 - 500 MCM[b] |
| | 230/60/3 | #4 - 500 MCM[b] | n/a | 2/0 - 500 MCM[b] | #4 - 500 MCM[b] | 2/0 - 500 MCM[b] | 2/0 - 500 MCM[b] |
| | 380/60/3 | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500 MCM | n/a | | |
| | 460/60/3 | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300 MCM | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500 MCM |
| | 575/60/3 | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300 MCM | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300 MCM |
| 110 | 208/60/3 | #4 - 500 MCM[b] | n/a | 2/0 - 500 MCM[b] | #4 - 500 MCM[b] | 3/0 - 500 MCM[b] | 2/0 - 400 MCM[b] |
| | 230/60/3 | #4 - 500 MCM[b] | n/a | 2/0 - 500 MCM[b] | #4 - 500 MCM[b] | 3/0 - 500 MCM[b] | 2/0 - 400 MCM[b] |
| | 380/60/3 | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500 MCM | n/a | | |
| | 460/60/3 | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500 MCM | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500 MCM |
| | 575/60/3 | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300 MCM | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300 MCM |
| 120 | 208/60/3 | #4 - 500 MCM[b] | n/a | 2/0 - 400 MCM[b] | n/a | | |
| | 230/60/3 | #4 - 500 MCM[b] | n/a | 2/0 - 400 MCM[b] | n/a | | |
| | 380/60/3 | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500 MCM | n/a | | |
| | 460/60/3 | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500 MCM | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500 MCM |
| | 575/60/3 | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300 MCM | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300 MCM |
| 130 | 208/60/3 | #4 - 500 MCM[b] | n/a | 2/0 - 400 MCM[b] | n/a | | |
| | 230/60/3 | #4 - 500 MCM[b] | n/a | 2/0 - 400 MCM[b] | n/a | | |
| | 380/60/3 | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500 MCM | n/a | | |
| | 460/60/3 | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500 MCM | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500 MCM |
| | 575/60/3 | #4 - 500 MCM | 3/0 - 350 MCM | #4 - 300 MCM | #4 - 500 MCM | 2/0 - 500 MCM | 2/0 - 500 MCM |

**Notes:**

**1**. Copper wire only, based on nameplate Minimum Circuit Ampacity (MCA).

**2**. Data shown for circuit one. The second circuit is always the same.

**3**. n/a - not available.

[a] Optional circuit breaker and high fault circuit breaker.

[b] Will accept two conduits per phase in this size.

# Dimensions

## Unit Dimensions

### Unit Without Options

***Note:*** *The number of fans shown does not represent the number of fans installed.*

**Figure 4. Dimensions, 20 to 35 ton units, no options**

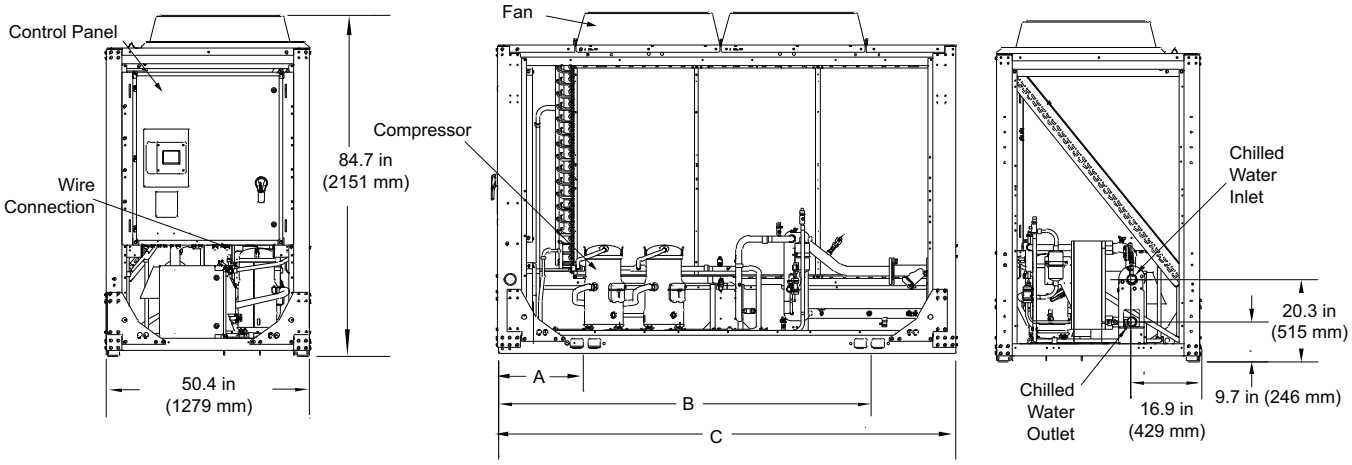



**Table 5. Dimensions, 20 to 35 ton units, no options**

| Unit Size (tons) | A | | B | | C | | Water Connection (from end of chiller) | |
|---|---|---|---|---|---|---|---|---|
| | in. | mm | in. | mm | in. | mm | in. | mm |
| 20, 26 | 21.2 | 535 | 92.7 | 2354 | 113.8 | 2890 | 1.7 | 44 |
| 30, 35 | 21.3 | 541 | 128.4 | 3263 | 149.8 | 3804 | 1.6 | 40 |

**Figure 5. Dimensions, 40 to 70 ton units, no options**

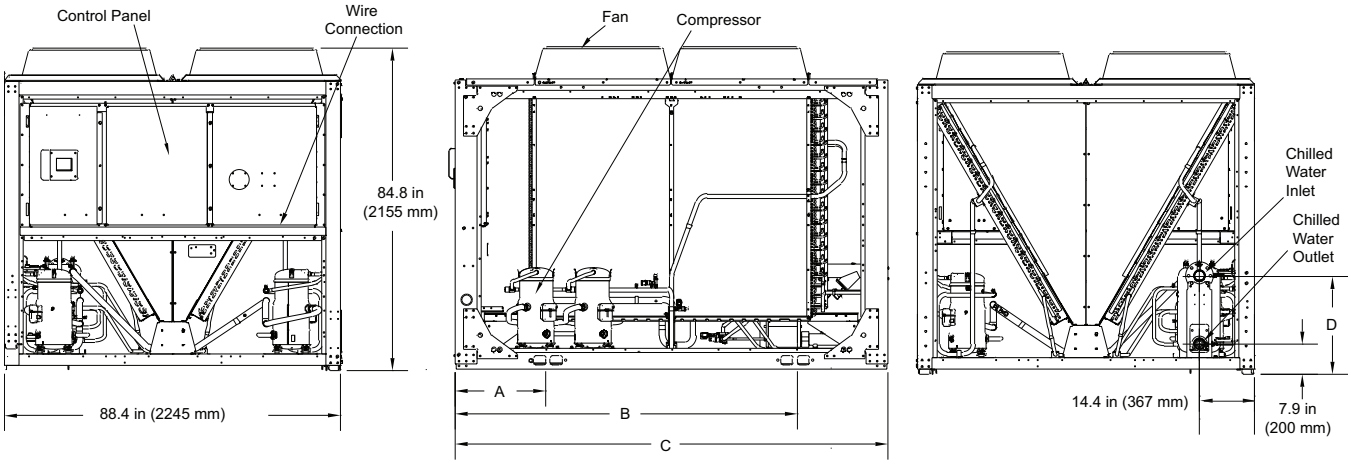


**Table 6. Dimensions, 40 to 70 ton units, no options**

| Unit Size (tons) | A | | B | | C | | D | | Water Connection (from end of chiller) |
|---|---|---|---|---|---|---|---|---|---|
| | in. | mm | in. | mm | in. | mm | in. | mm | |
| 40 | 23.8 | 603 | 89.9 | 2282 | 113.8 | 2890 | 31.1 | 790 | Even with unit end |
| 52 | 23.8 | 603 | 89.9 | 2282 | 113.8 | 2890 | 31.1 | 790 | Even with unit end |
| 60, 70 | 23.8 | 603 | 125.8 | 3196 | 149.8 | 3804 | 31.1 | 790 | Even with unit end |

**Figure 6. Dimensions, 80 to 120 ton units, no options**

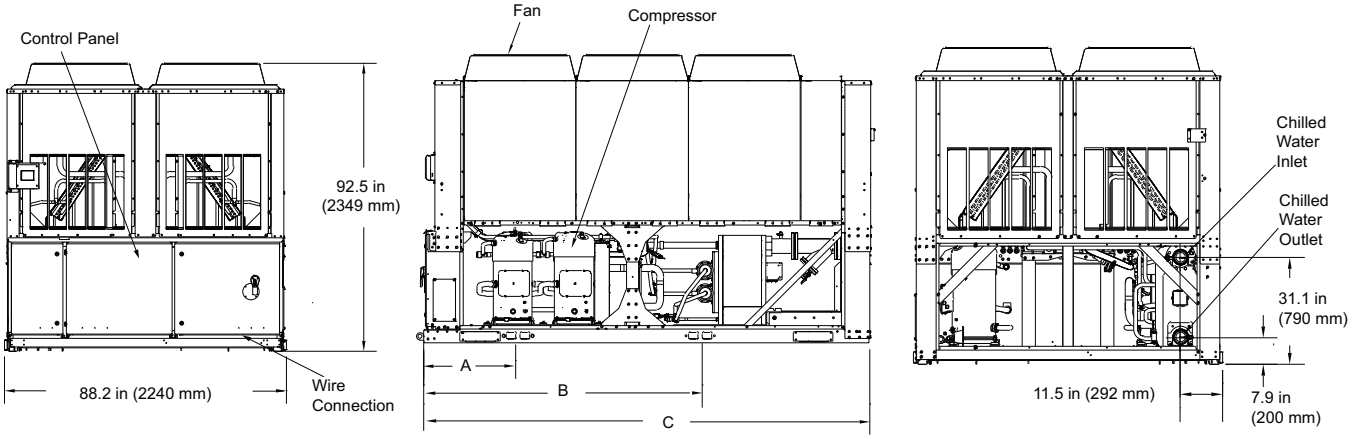
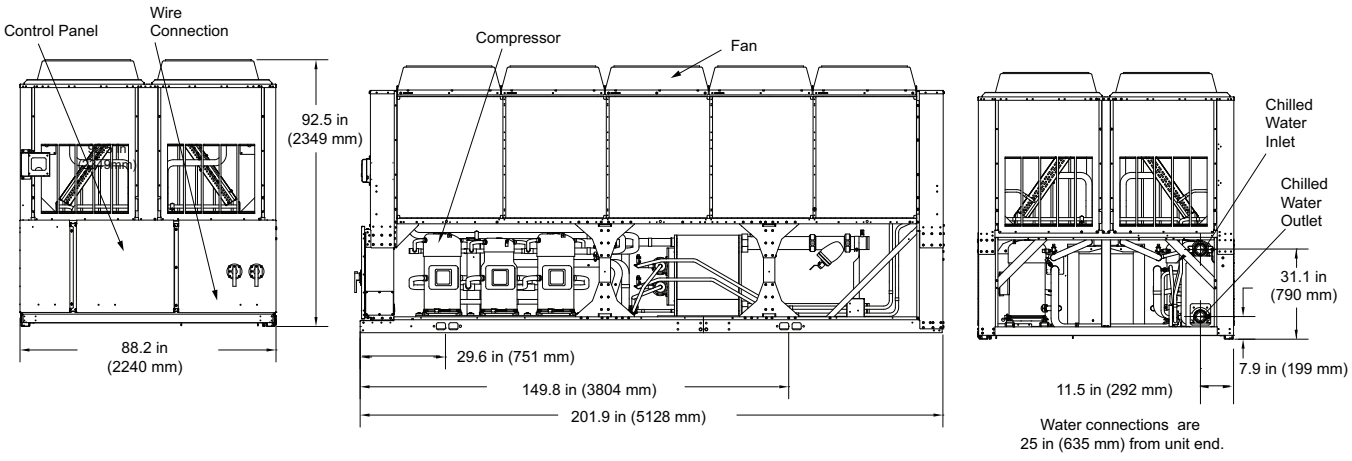



**Table 7. Dimensions, 80 to 120 ton units, no options**

| Unit Size (tons) | A | | B | | C | | Water Connection (from end of chiller) | |
|---|---|---|---|---|---|---|---|---|
| | in. | mm | in. | mm | in. | mm | in. | mm |
| 80, 90 | 29.6 | 751 | 89.2 | 2265 | 143.1 | 3634 | 5.5 | 139 |
| 100, 110, 120 | 29.6 | 751 | 111.7 | 2837 | 165.9 | 4214 | 5.5 | 139 |

**Figure 7. Dimensions, 130 ton unit, no options**



# Unit With Options – Pump Package, Buffer Tank, Partial Heat Recovery

## General Dimensions and Components

***Notes:***

- *Graphics in this section use the following acronyms:* ***PP – Pump Package, BT – Buffer Tank, PHR – Partial Heat Recovery***
- *See Table 13, p. 35, for dimensions of water connections for various options.*

**Figure 8. Dimensions, 20 to 35 ton units with options**

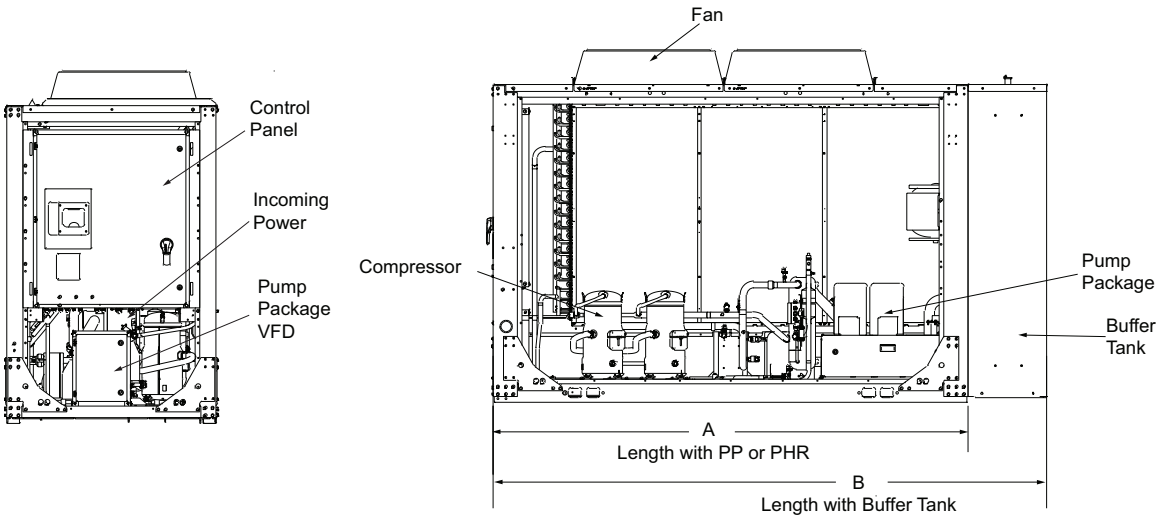



**Table 8. Dimensions, 20 to 35 ton units with options**

| Unit Size (tons) | A | | B | |
|---|---|---|---|---|
| | in. | mm | in. | mm |
| 20, 26 | 113.8 | 2890 | 134 | 3404 |
| 30, 35 | 149.8 | 3804 | 170.1 | 4320 |

**Figure 9. Dimensions, 40 to 70 ton units with options**

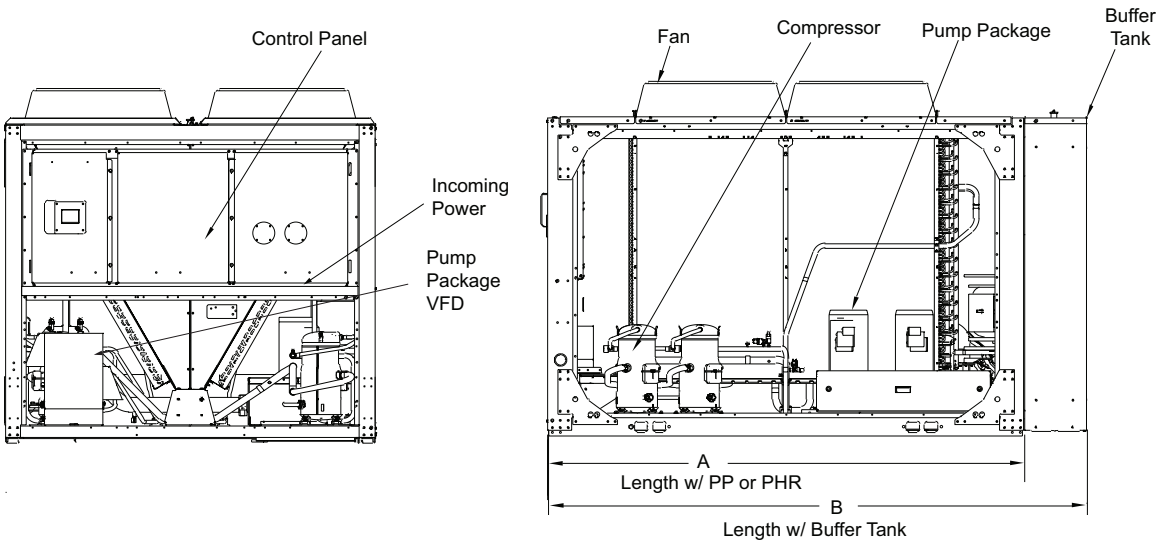


**Table 9. Dimensions, 40 to 70 ton units with options**

| Unit Size (tons) | A | | B | |
|---|---|---|---|---|
| | in. | mm | in. | mm |
| 40, 52 | 113.8 | 2890 | 134.2 | 3409 |
| 60, 70 | 149.8 | 3804 | 170 | 4318 |

**Figure 10. Dimensions, 80 to 120 ton units with options**

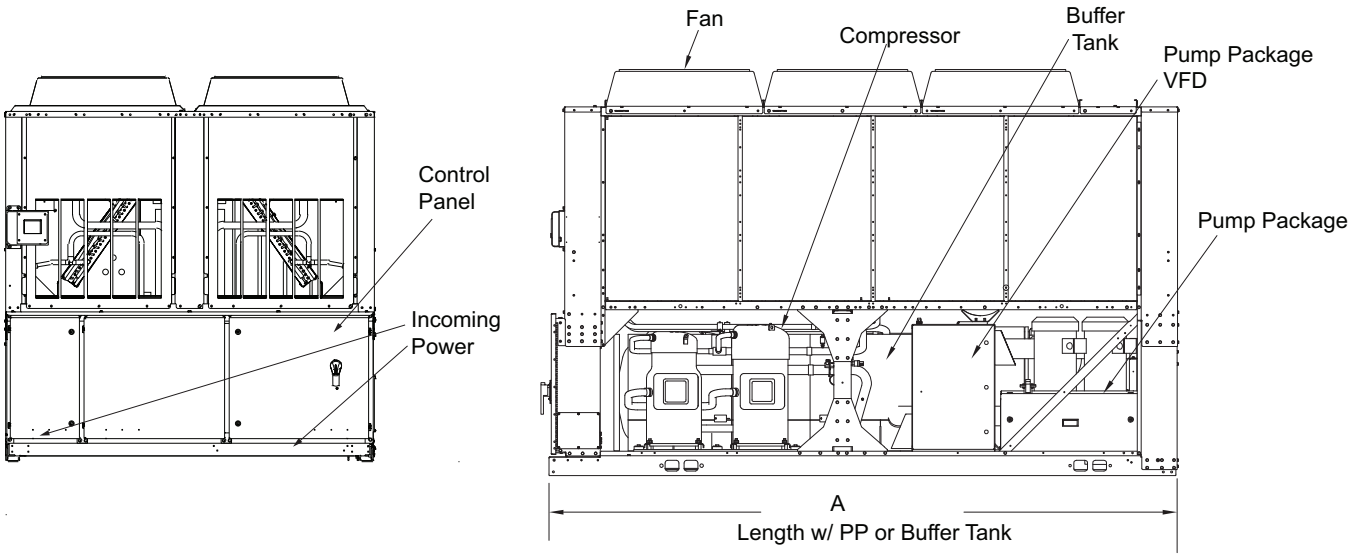
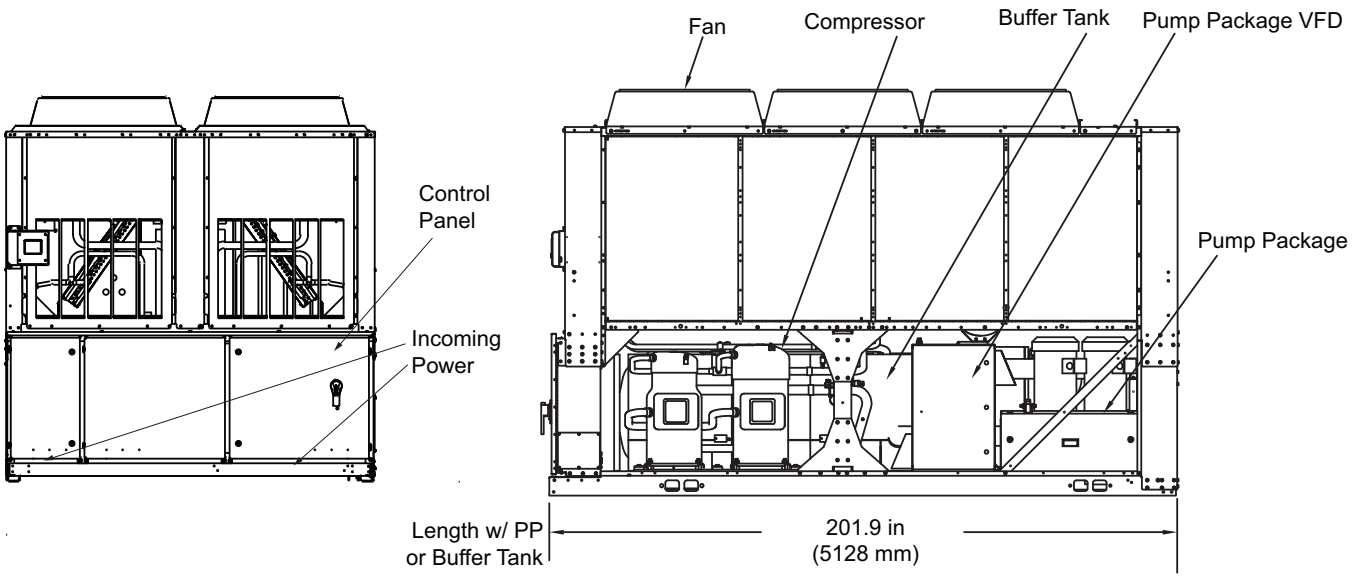



**Table 10. Dimensions, 80 to 120 ton units with options**

| Unit Size (tons) | A | |
|---|---|---|
| | in. | mm |
| 80, 90, 100 | 143.1 | 3634 |
| 110, 120 | 165.9 | 4214 |

***Note:*** *For PHR units, add 2.2-inch (56 mm) to overall length.*

**Figure 11. CGAM 130 ton, with options**

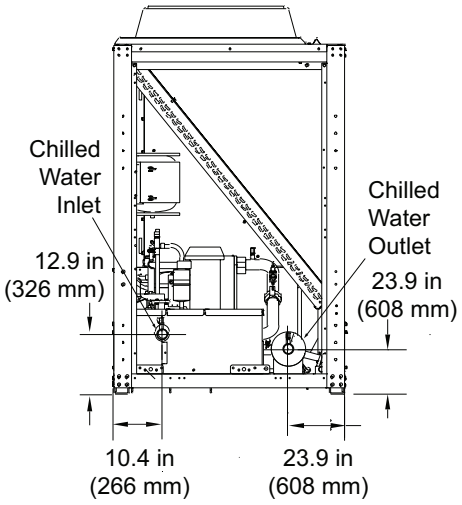



***Note:*** *For PHR units, add 2.2-inch (56 mm) to overall length.*

## Water Connections

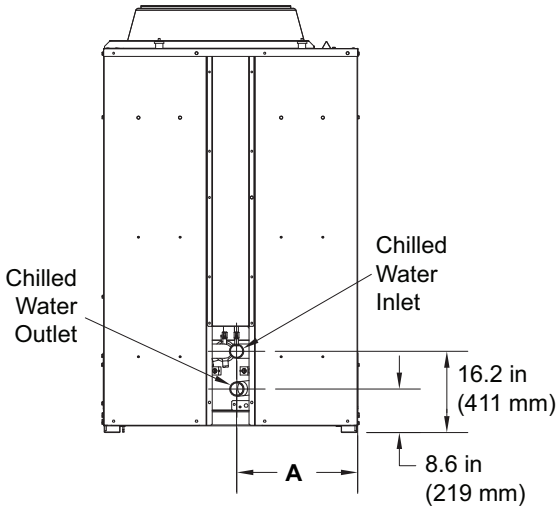
**Figure 12. Water connection dimensions – 20 to 35 ton units with options**

### PUMP PACKAGE



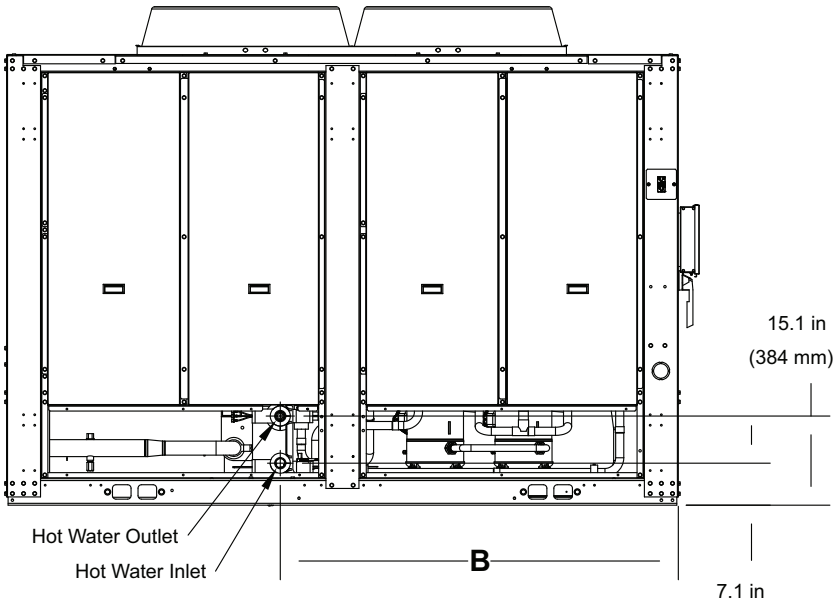

Water connections are recesssed 1.3 in (33 mm) from unit end.

### BUFFER TANK




Water connections are recesssed from unit end.
Inlet: 3.2 in (81 mm)
Outlet: 10.3 in (262 mm)

### PARTIAL HEAT RECOVERY




Partial heat recovery connections are even with unit end.

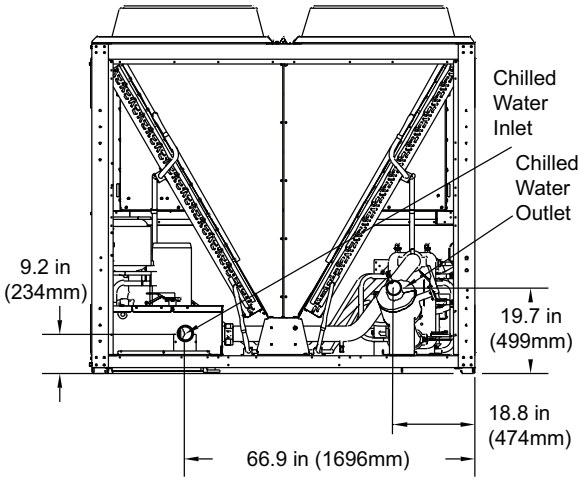
The chilled water connections are the same as the standard unit unless pump packageor buffer tank are ordered.

**Table 11. Water connection dimensions – 20 to 35 ton units with options**

| Unit Size (tons) | A | | B | |
|---|---|---|---|---|
| | in. | mm | in. | mm |
| 20, 26 | 24.1 | 613 | 70.3 | 1784 |
| 30, 35 | 23.9 | 608 | 67.4 | 1712 |

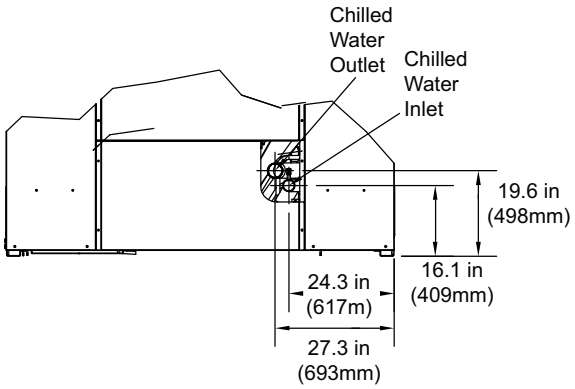
**Figure 13. Water connection dimensions – 40 to 70 ton units with options**

## PUMP PACKAGE



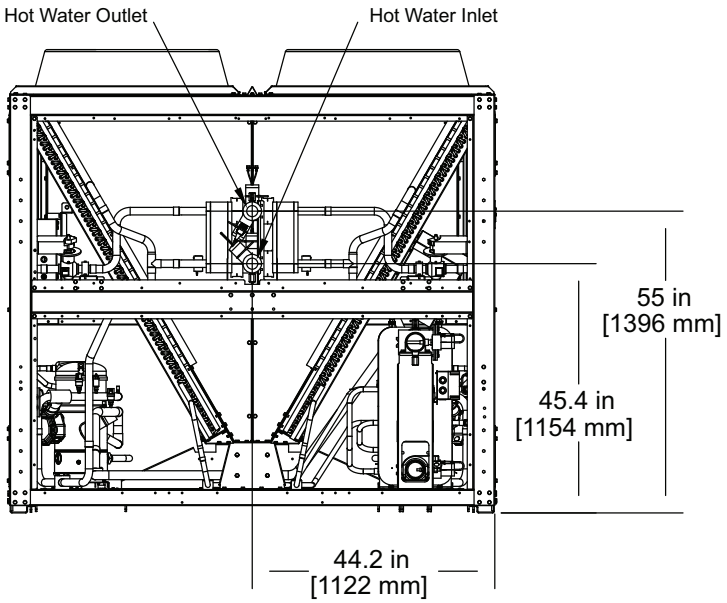

Water connections are recessed 1.3 in (33mm) from unit end.

## BUFFER TANK




Water connections are recessed from unit end:
Inlet:3.2 in (81mm)
Outlet: 8.5 in (216mm)

## PARTIAL HEAT RECOVERY

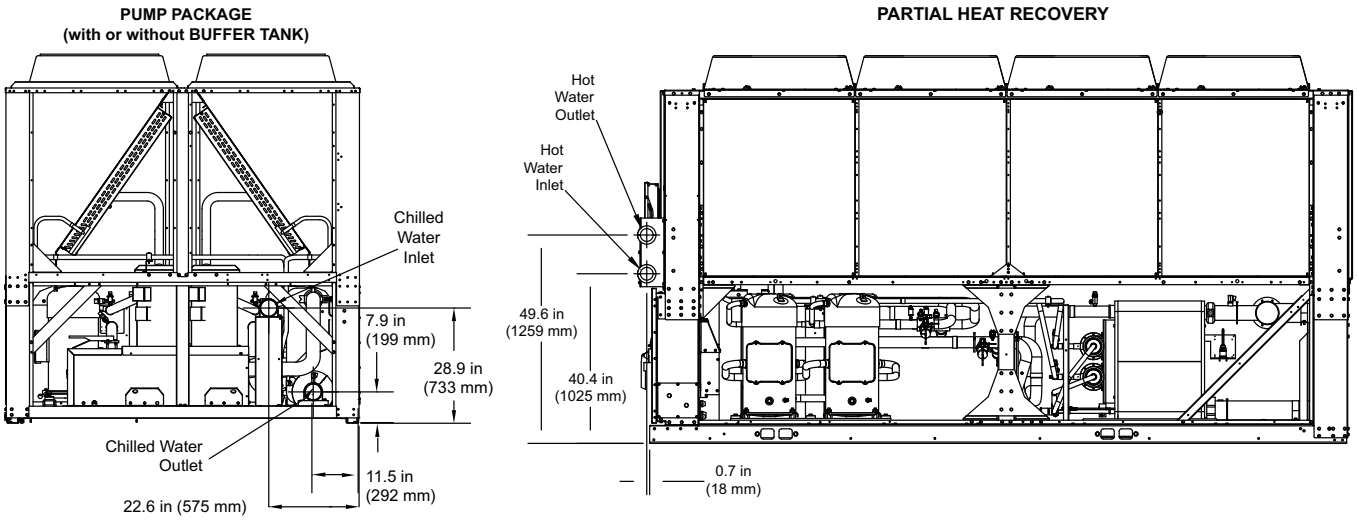



Partial heat recovery connections are even with unit end.
The chilled water connections are the same as the standard unit unless pump packageor buffer tank are ordered.

**Table 12. Water connection dimensions – 40 to 70 ton units with options**

| Unit Size (tons) | A | | B | | C | |
|---|---|---|---|---|---|---|
| | in. | mm | in. | mm | in. | mm |
| 40, 52 | 24.3 | 617 | 45.3 | 1149 | 54.8 | 1392 |
| 60, 70 | 24.2 | 615 | 45.6 | 1158 | 55.2 | 1401 |

**Figure 14. Water connection dimensions – 80 to 130 ton units with options**




***Note:*** *See Table 13, p. 35 for water connections distance from end/side of unit.*

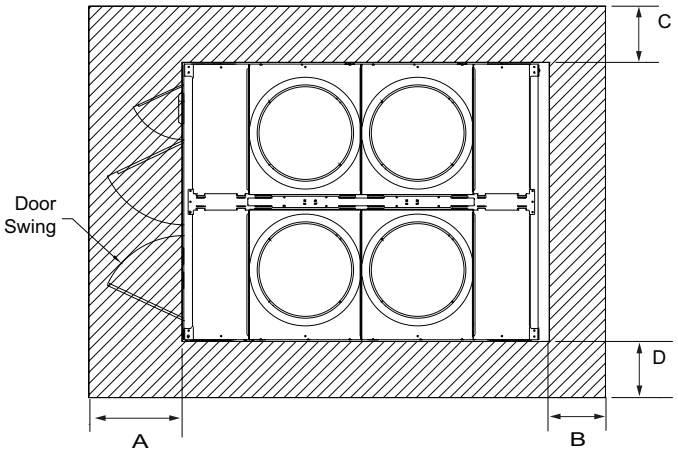
**Table 13. Water connection dimensions, 80 to 130 ton units with options**

| Unit Size (tons) | Pump Package[a] | | | | Buffer Tank | | | | Partial Heat Recovery[b] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Inlet | | Outlet | | Inlet | | Outlet | | Inlet | | Outlet | |
| | in. | mm | in. | mm | in. | mm | in. | mm | in. | mm | in. | mm |
| 80, 90 | 5.9 | 151 | 5.9 | 151 | 6.2 | 158 | 6.2 | 158 | 1.1 | 28 | 1.1 | 28 |
| 100, 110, 120 | 5.9 | 151 | 5.9 | 151 | 6 | 153 | 6 | 153 | 1.1 | 28 | 1.1 | 28 |
| 130 | 6.3 | 159 | 25 | 635 | 5.9 | 150 | 27.7 | 703 | 1.1 | 28 | 1.1 | 28 |

(a) Distance from end of unit.
(b) Distance from side of unit.

# Service Clearances

**Figure 15. CGAM service clearances**




| Unit Size (Tons) | A | | B | | C | | D | |
|---|---|---|---|---|---|---|---|---|
| | in. | mm | in. | mm | in. | mm | in. | mm |
| 20 to 35 | 47.2 | 1200 | 31.5 | 800 | 23.6 | 600 | 39.4 | 1000 |
| 40 to 70 | 47.2 | 1200 | 31.5 | 800 | 39.4 | 1000 | 39.4 | 1000 |
| 80 to 130 | 47.2 | 1200 | 39.4 | 1000 | 39.4 | 1000 | 39.4 | 1000 |

***Notes:***

- *Number of fans and panel doors shown does not represent the number of fans installed.*
- *More clearance may be needed for airflow, depending on installation.*

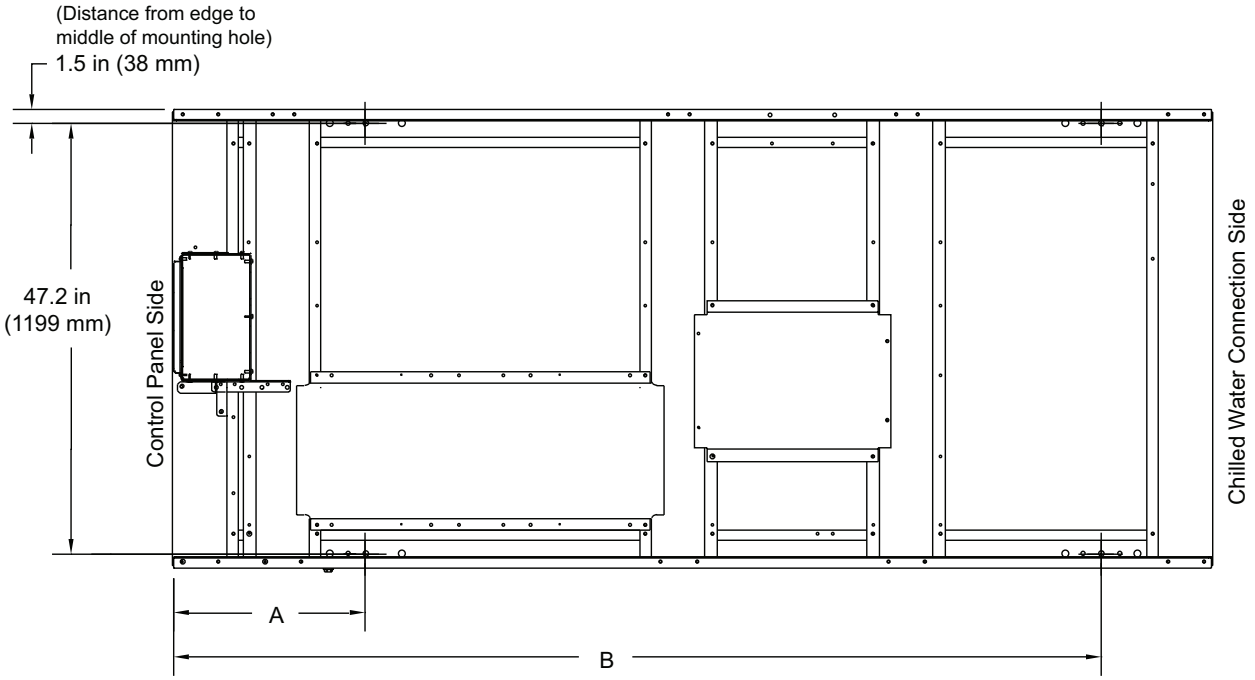
# Mounting Locations

***Note:*** *All mounting holes are 0.75 in. (19 mm) in diameter.*

## Units Without Wind Load Rating

***Note:*** *Mounting locations shown below are for units without wind load rating. For units with wind load rating (model number digit 17=D), additional mounting points are required. See the following section Units with Wind Load Rating.*

**Figure 16. Mounting locations, 20 to 35 ton units without wind load option**




Total of four (4) mounting holes

**Table 14. Mounting locations, 20 to 35 ton units without wind load option**

| Unit Size (tons) | A | | B | |
|---|---|---|---|---|
| | in. | mm | in. | mm |
| 20, 26 | 21 | 533 | 101.2 | 2570 |
| 30, 35 | 21.9 | 556 | 132.2 | 3358 |

**Figure 17. Mounting locations, 40 and 52 ton units without wind load option**

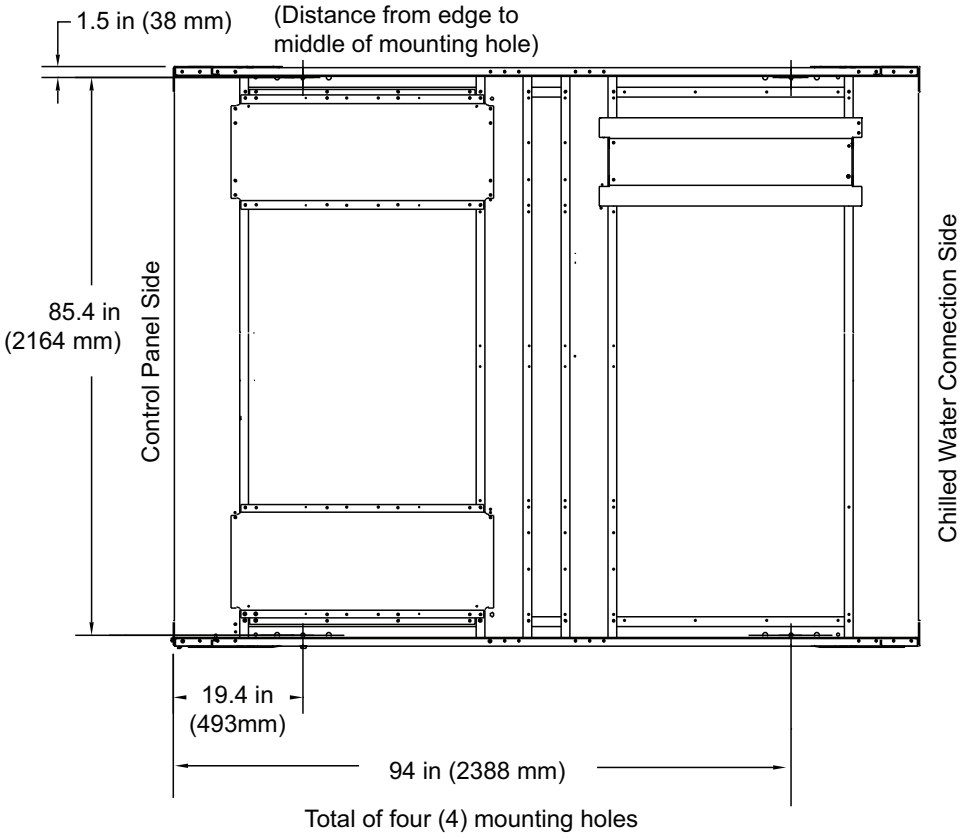


**Figure 18. Mounting locations, 60 and 70 ton units without wind load option**

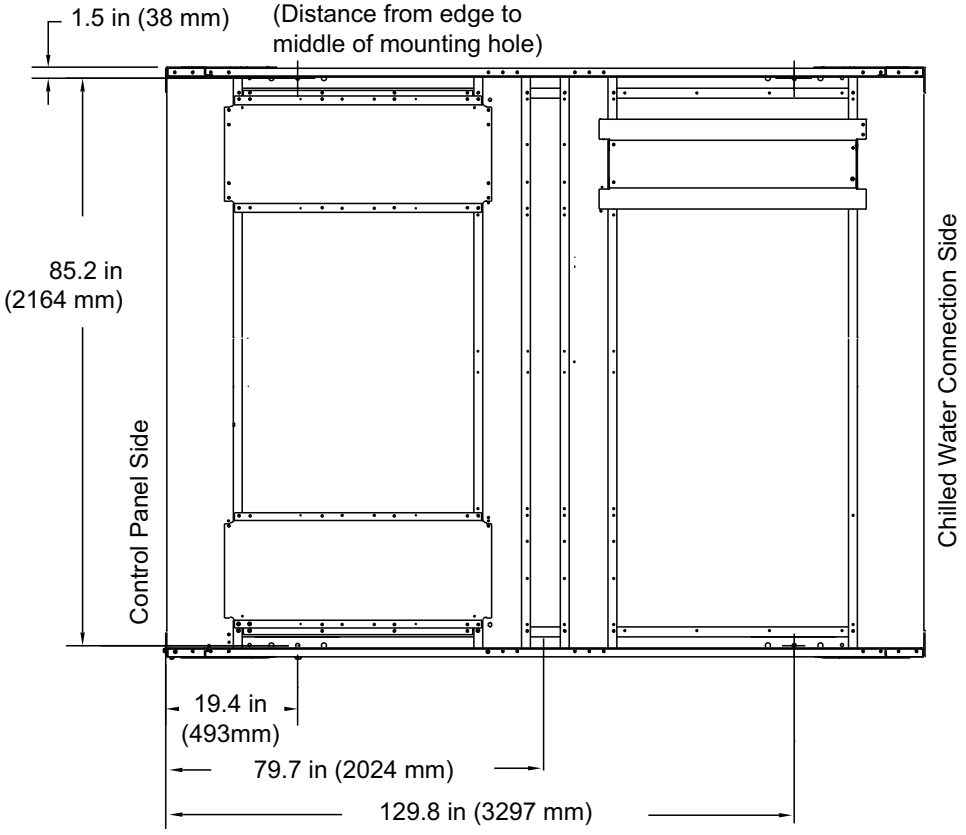



**Figure 19. Mounting locations, 80 to 120 ton units without wind load option**

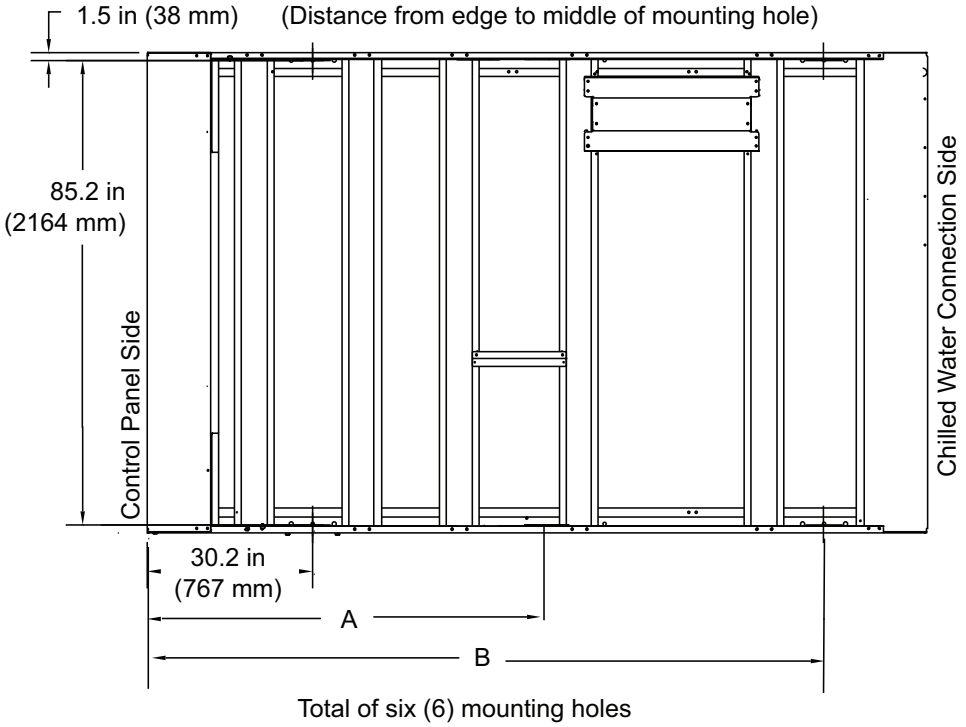
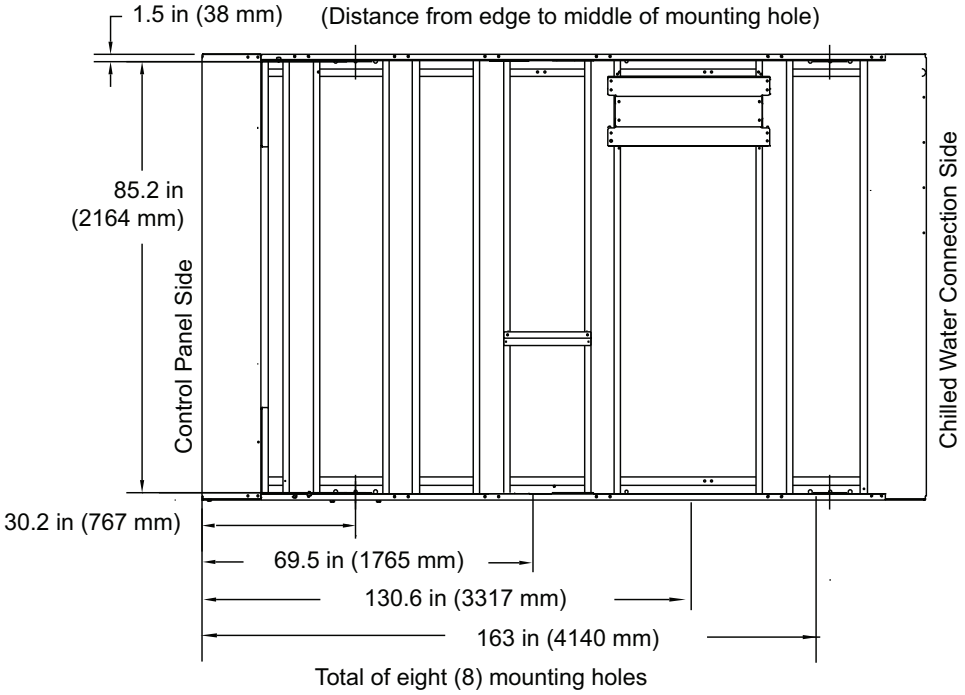


**Table 15. Mounting locations, 80 to 120 ton units without wind load option**

| Unit Size (tons) | A | | B | |
|---|---|---|---|---|
| | in. | mm | in. | mm |
| 80, 90 | 83.7 | 2126 | 123.9 | 3147 |
| 100, 110, 120 | 89.2 | 2266 | 146.9 | 3731 |

**Figure 20. Mounting locations, 130 ton units without wind load option**




***Note:*** *For 130 ton units with seismic option, seismically rated isolator must be glued to the bottom of the unit at each of the four corners for installation.*

## Units with Wind Load Rating

***Note:*** *For units with wind load rating (model number digit 17 = D), additional mounting points are required as shown below. All mounting points in previous section remain the same.*

**Figure 21. Additional mounting locations for 40 and 52 ton units with wind load option**

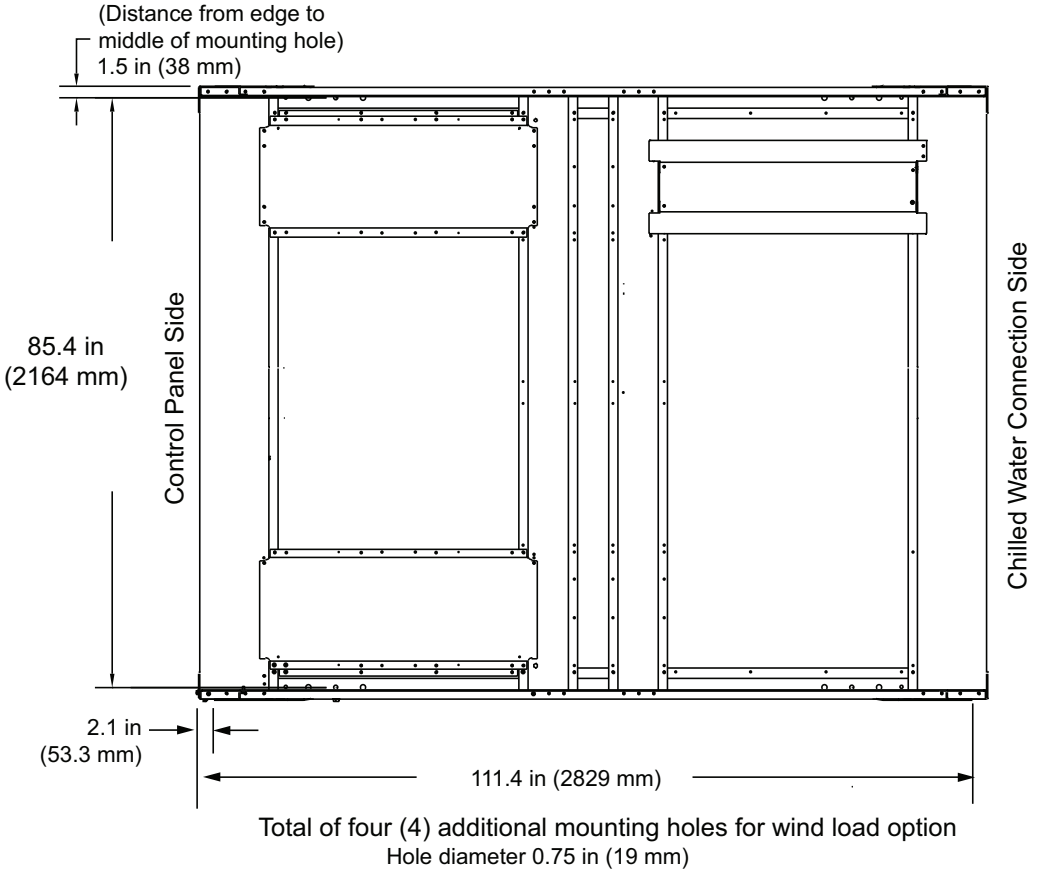
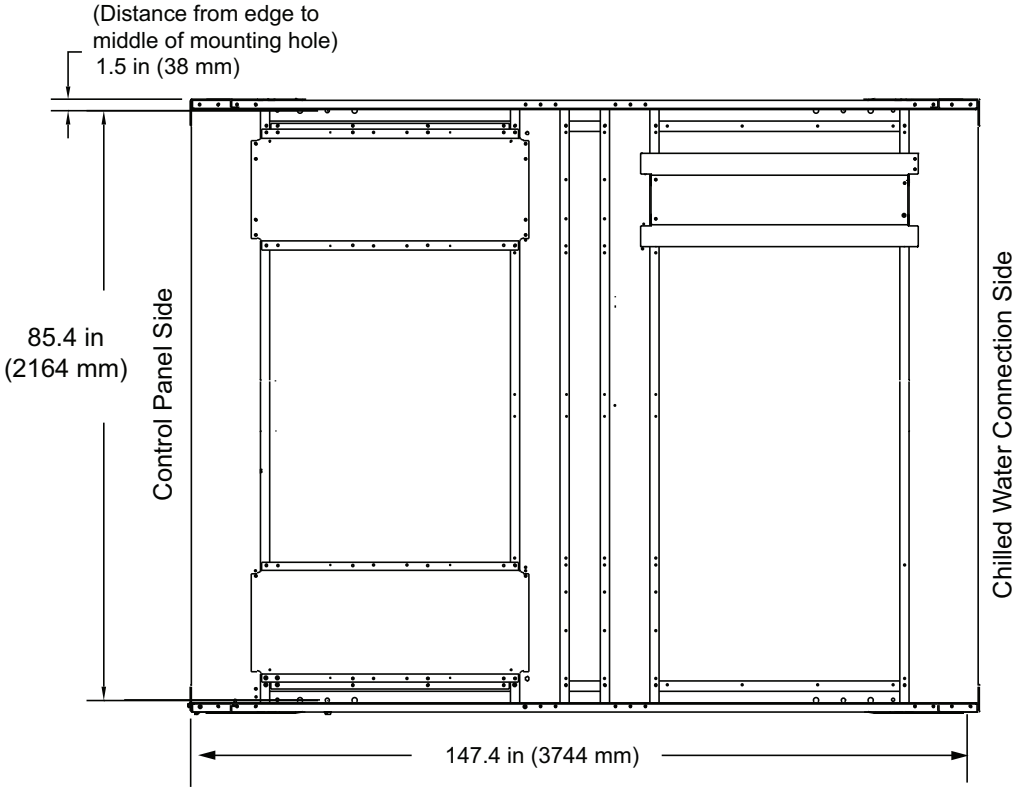
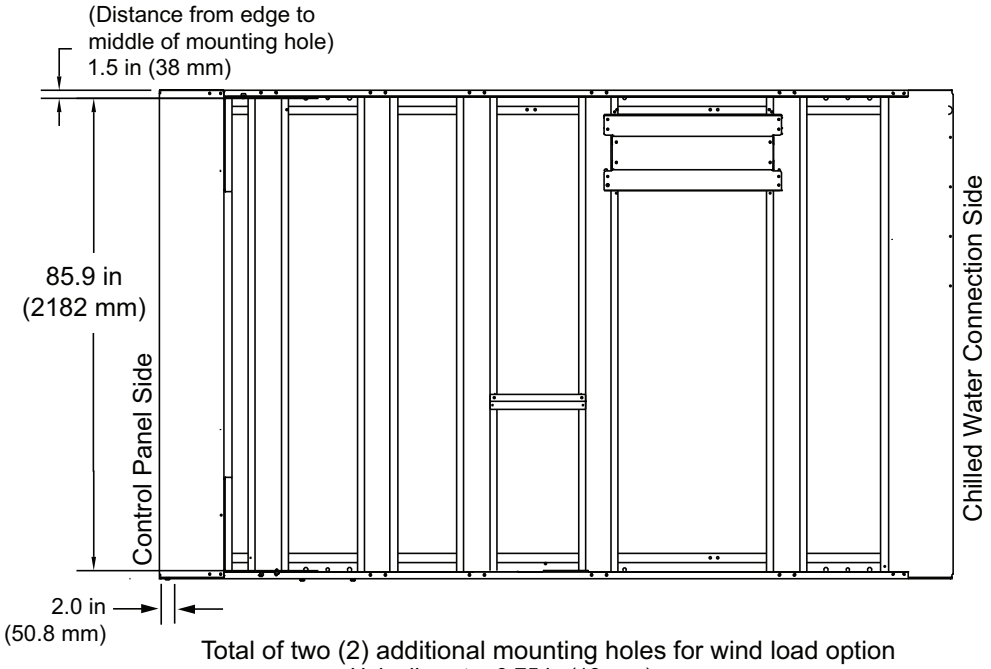


**Figure 22. Additional mounting locations for 60 and 70 ton units with wind load option**




Total of two (2) additional mounting holes for wind load option
Hole diameter 0.75 in (19 mm)

**Figure 23. Additional mounting locations for 80 to 130 ton units with wind load option**




Total of two (2) additional mounting holes for wind load option
Hole diameter 0.75 in (19 mm)

# Weights

## Base Units

***Notes:***

- *Weights are applicable to units with seismic or wind load options.*
- *These weights do NOT include the partial heat recovery option. See "Option Weights," p. 44.*

**Table 16. Base unit weights — I-P (lb)**

| Unit Size (Tons) | Base Unit | | Base Unit with Pump Package | | Base Unit with Pump Package and Buffer Tank | | Base Unit with Partial Heat Recovery | |
|---|---|---|---|---|---|---|---|---|
| | Shipping | Operating | Shipping | Operating | Shipping | Operating | Shipping | Operating |
| 20 | 2258 | 2281 | 2798 | 2887 | 3325 | 4564 | 2297 | 2344 |
| 26 | 2322 | 2351 | 2863 | 2964 | 3389 | 4634 | 2361 | 2421 |
| 30 | 2945 | 2979 | 3487 | 3596 | 4014 | 5262 | 2992 | 3061 |
| 35 | 3023 | 3065 | 3565 | 3691 | 4092 | 5349 | 3070 | 3156 |
| 40 | 3812 | 3843 | 4431 | 4529 | 5022 | 6262 | 3906 | 3971 |
| 52 | 3959 | 4004 | 4578 | 4705 | 5169 | 6423 | 4053 | 4147 |
| 60 | 5177 | 5232 | 6013 | 6184 | 6604 | 7893 | 5288 | 5402 |
| 70 | 5118 | 5194 | 5954 | 6166 | 6545 | 7855 | 5229 | 5385 |
| 80 | 5607 | 5692 | 6486 | 6790 | 7077 | 8561 | 5777 | 5952 |
| 90 | 5859 | 5961 | 6738 | 7075 | 7329 | 8830 | 6029 | 6240 |
| 100 | 6646 | 6759 | 7549 | 7909 | 8265 | 10136 | 6824 | 7057 |
| 110 | 6724 | 6846 | 7627 | 8005 | 8343 | 10223 | 6902 | 7153 |
| 120 | 6762 | 6884 | 8018 | 8396 | 8733 | 10614 | 6940 | 7194 |
| 130 | 7753 | 7900 | 9006 | 9430 | 9722 | 11623 | 7931 | 8235 |

**Note:** All weights ±3%.

**Table 17. Base unit weights — SI (kg)**

| Unit Size (Tons) | Base Unit | | Base Unit with Pump Package | | Base Unit with Pump Package and Buffer Tank | | Base Unit with Partial Heat Recovery | |
|---|---|---|---|---|---|---|---|---|
| | Shipping | Operating | Shipping | Operating | Shipping | Operating | Shipping | Operating |
| 20 | 1024 | 1035 | 1269 | 1310 | 1508 | 2070 | 1042 | 1063 |
| 26 | 1053 | 1066 | 1298 | 1344 | 1537 | 2102 | 1071 | 1098 |
| 30 | 1336 | 1351 | 1582 | 1631 | 1821 | 2387 | 1357 | 1388 |
| 35 | 1371 | 1390 | 1617 | 1674 | 1856 | 2426 | 1392 | 1431 |
| 40 | 1729 | 1743 | 2010 | 2054 | 2278 | 2840 | 1772 | 1801 |
| 52 | 1796 | 1816 | 2077 | 2134 | 2345 | 2914 | 1839 | 1881 |
| 60 | 2348 | 2373 | 2727 | 2805 | 2996 | 3580 | 2398 | 2450 |
| 70 | 2322 | 2356 | 2701 | 2797 | 2969 | 3563 | 2372 | 2443 |
| 80 | 2543 | 2582 | 2942 | 3080 | 3210 | 3883 | 2620 | 2700 |
| 90 | 2658 | 2704 | 3056 | 3209 | 3324 | 4005 | 2735 | 2830 |
| 100 | 3015 | 3066 | 3424 | 3587 | 3749 | 4598 | 3096 | 3201 |
| 110 | 3050 | 3105 | 3460 | 3631 | 3784 | 4637 | 3131 | 3244 |
| 120 | 3067 | 3122 | 3637 | 3808 | 3961 | 4814 | 3148 | 3262 |
| 130 | 3517 | 3583 | 4085 | 4277 | 4410 | 5272 | 3598 | 3735 |

**Note:** All weights ±3%.

# Option Weights

**Table 18. Option weights**

| Unit Size (Tons) | I-P Units (lb) | | | | SI Units (kg) | | | |
|---|---|---|---|---|---|---|---|---|
| | Partial Heat Recovery | | Copper Fins | Seismic Isolator | Partial Heat Recovery | | Copper Fins | Seismic Isolator |
| | Shipping | Operating | | | Shipping | Operating | | |
| 20 | 39 | 63 | 258 | — | 18 | 28 | 117 | — |
| 26 | 39 | 70 | 258 | — | 18 | 32 | 117 | — |
| 30 | 47 | 82 | 360 | — | 21 | 37 | 163 | — |
| 35 | 47 | 91 | 360 | — | 21 | 41 | 163 | — |
| 40 | 94 | 128 | 516 | — | 43 | 58 | 234 | — |
| 52 | 94 | 143 | 516 | — | 43 | 65 | 234 | — |
| 60 | 111 | 170 | 720 | — | 50 | 77 | 326 | — |
| 70 | 111 | 191 | 720 | — | 50 | 87 | 326 | — |
| 80 | 170 | 260 | 1270 | 240 | 77 | 118 | 576 | 109 |
| 90 | 170 | 279 | 1270 | 240 | 77 | 126 | 576 | 109 |
| 100 | 178 | 298 | 1512 | 240 | 81 | 135 | 686 | 109 |
| 110 | 178 | 307 | 1512 | 240 | 81 | 139 | 686 | 109 |
| 120 | 178 | 310 | 1512 | 240 | 81 | 140 | 686 | 109 |
| 130 | 178 | 335 | 1889 | 320 | 81 | 152 | 857 | 145 |

**Note:** All weights ±3%.

# 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.

## Certified AHRI Performance

Trane air-cooled chillers are rated within the scope of the Air-Conditioning, Heating and Refrigeration Institute (AHRI) Certification Program and display the AHRI Certified® mark as a visual confirmation of conformance to the certification sections of AHRI Standard 550/590 (I-P) and ANSI/AHRI Standard 551/591 (SI).The applications in this catalog specifically excluded from the AHRI certification program are:

- Custom Units.
- Units produced outside of the USA for installations outside the USA.
- Evaporatively-cooled chillers.
- Units with evaporators that use fluid other than fresh water except units containing freeze protection fluids in the evaporator with a leaving chilled fluid temperature above 32°F [0°C] are certified when rated per the Standard with water.

## Compressor and Motor

The unit is equipped with two or more hermetic, direct-drive, 3600 rpm 60 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. Overload protection is included. The compressor includes: centrifugal oil pump, oil level sight glass and oil charging valve. Each compressor will have compressor 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. The starter is an across-the-line configuration, factorymounted 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 chiller control module power (24 Vac secondary). Power line connection type is standard with a terminal block.

## Evaporator

Braze plate heat exchanger 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 bar) and a waterside working pressure of 150 psig (10.5 bar). 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. Water pipe extensions with insulation go from the evaporator to the edge of the unit.

## Condenser

Round tube and plate fin (RTPF) 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 bar). Condensers are factory proof tested at 650 psig (44.8 bar) and leak tested at 585 psig (40.3 bar).

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.

Units start and operate from 0°F to 125°F (-18°C to 52°C) for wide ambient. Wide ambient allows operation down to 0°F which is accomplished by a variable speed fan on each circuit that modulates to maintain system differential pressure.

# Refrigerant Circuit and Capacity Modulation

The 20 to 35 ton units have single refrigerant circuits. The 40-130 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, electronic expansion valve, and liquid line and discharge service valves.

Capacity modulation is achieved by turning compressors on and off. The 20 to 35 ton units have two capacity stages. The 40-120 ton units have four capacity stages. The 130 ton unit has six capacity stages.

# Unit Controls

All unit controls are housed in an outdoor rated weather tight enclosure with removable plates to allow connection of power wiring and remote interlocks. All controls, including sensors, are factory mounted and tested prior to shipment.

Microcomputer controls provide all control functions including start-up and shutdown, leaving chilled water temperature control, evaporator flow proving, compressor staging and speed control, electronic expansion valve modulation, condenser fan sequencing and speed control, anti-recycle logic, automatic lead/lag compressor starting, and load limiting.

## Symbio™ 800 Controller

The Symbio™ 800 controller is an application-specific, programmable controller that is factory installed and designed to control packaged HVAC equipment. A 7–inch user interface features a touch-sensitive color screen that provides facility managers with at-a-glance operating status, performance monitoring, scheduling changes and operating adjustments. Other advanced features include automated controller backup and optional features such as secure remote connectivity, wireless building communications, and custom programming with expandable I/O.

The Symbio™ 800 control module, utilizing Adaptive Control™ microprocessor, automatically takes action to avoid unit shutdown due to abnormal operating conditions associated with low refrigerant pressure, high condensing pressure, compressor current overload, low oil return, low suction superheat, and high compressor discharge temperature. Should the abnormal operating condition continue until a protective limit is violated, the unit will be shutdown.

Unit protective functions of the controller include: loss of chilled water flow, evaporator freezing, loss of refrigerant, low refrigerant pressure, high refrigerant pressure, and high compressor motor temperature.

### BACnet® Communication Protocol

The Symbio™ 800 controller supports standard BACnet® communication protocol through a RS485, two-wire communication link or BACnet®/IP over Ethernet.

### Trane LonTalk® Communication Protocol

The LonTalk® module provides an interface to a Tracer® building automation system or other control system that supports LonTalk® and is factory installed, allowing for control and monitoring of the unit through a RS485, two-wire communication link. Requires an additional LonTalk® Communication Kit to be installed.

### Modbus® Communication Protocol

The Symbio™ 800 controller supports standard Modbus® RTU communication protocol through an RS485, two-wire communication link.

### Controls Expansion Hardware

Symbio™ 800 includes field applied controls capability. Factory installed expansion hardware (XM70) has 19 inputs/outputs. Additional expansions may be added in the field.

## Tracer® AdaptiView™ TD-7 Display

A full color Tracer® AdaptiView™ TD-7 touch screen display indicates all important unit and circuit parameters, in logical groupings on various screens. The parameters including chilled water setpoint, leaving evaporator temperature, demand limit setpoint, evaporator and condenser refrigerant temperatures and pressures, compressor and fan speeds, and all pertinent electrical information. The display also provides on screen data graphs of predefined parameters as well as customizable data graphs based on user defined parameters from a list of all available parameters. The display also provides indication of the chiller and circuits' top level operating modes with detailed sub-mode reports available with a single key press, as well as diagnostics annunciation and date and time stamped diagnostic history. The color display is fully outdoor rated, and can be viewed in full daylight without opening any control panel doors.

Standard power connections include main three phase power to the compressors, condenser fans and control power transformer and optional connections are available for the 115 volt/60 Hz single phase power for the thermostatically controlled evaporator heaters for freeze protection.

- Outdoor capable:
  - UV Resistant Touchscreen
  - Operating Temperature: -40°C to 70°C
  - IP56 rated (Power Jets of Water from all directions)
- RoHS Compliant
- UL PAZX, Open Energy Management Equipment
- CE Certification
- Emissions: EN55011 (Class B)
- Immunity: EN61000 (Industrial)
- Display:
  - 7-inch diagonal
  - 800x480 pixels.
  - TFT LCD @ 600 nits brightness
  - 16 bit color graphic display
- Display Features:
  - Alarms
  - Reports
  - Unit Settings
  - Display Settings
- Graphing
- Global Application with Support for 27 Languages

# Options

## Application Options

### Ice-Making with Hardwired Interface

Unit controls are factory set to handle ice-making for thermal storage application. An additional temperature sensor, at the compressor discharge, enables full load operation of the chiller with entering evaporator fluid temperature between 20°F (-7°C) and 65°F (18°C) with glycol.

### High Ambient

The unit starts and operates from 32°F to 125°F (0°C to 52°C).

### Low-Temperature Processing

An additional temperature sensor, at the compressor discharge, enables leaving evaporator fluid temperature between 10°F (-12.2°C) and 40°F (4.4°C) with glycol.

Leaving evaporator fluid temperatures below 10°F (-12.2°C) are also possible for specific applications.

### Dual High Head Pump Package

Pump package includes: two high head pumps, VFD, expansion vessels, drainage valves, shut-off valves at entering and leaving connections.

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 chiller front panel displays evaporator pump starts and run-times. Freeze protection down to-20°F (-29°C) ambient is included as standard. The cold parts of the pump package will also be insulated.

Designed with one redundant pump, the chiller controls both pumps through a lead/lag and failure/ recovery functionality.

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.

### Buffer Tank

***Note:*** *Buffer tank is an option only available on units with pump package option selected.*

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.

### Partial Heat Recovery

Instead of exhausting it to the atmosphere, the heat recovery option re-uses the waste heat generated during the cooling cycle, allowing the unit to operate as a standard chiller when heat is not required. It can simultaneously produce chilled and hot water, which can be used for applications such as:

- Heating or preheating of boiler systems or domestic cater
- Air conditioning/ventilation air preheating
- Industrial processes

***Note:*** *The heat recovery exchanger is not suited for food and beverage applications, where a primary loop is mandatory. The brazed plate heat recovery exchanger is connected to the compressor discharge line, mounted in series to the air-cooled condenser, and sized to recover up to 60% of the nominal cooling capacity. Inlet and outlet water sensors and two two-way valve are included.*

Symbio™800 controls the two-way valves and condenser fans to maximize heat recovery capacity. Inlet, outlet water temperatures and the thermal switch can be viewed on the Tracer® AdaptiView™ TD-7 and Tracer® TU.

The amount of net heat recovery depends on:

- Percentage of cooling load available.

- Ambient temperature.
- Inlet water temperature.

# 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.

## Circuit Breaker — Standard Fault with Energy Meter

A molded case standard interrupting capacity circuit breaker, equipped with a lockable external operating handle to disconnect the main power from the chiller, plus the added features included with the Energy Meter described below.

## Circuit Breaker — High Fault with Energy Meter

A molded case high interrupting capacity circuit breaker, equipped with a lockable external operating handle to disconnect the main power from the chiller, plus the added features included with the Energy Meter described below.

## Energy Meter

Energy meter capable of measuring line current by phase, average current, voltage by phase, average voltage, frequency, unit power consumption, reactive and apparent power, and power factor.

## Short Circuit Rating

Short circuit rating of 5 kA or up to 65 kA is available.

# Control Options

## BACnet® Communications Interface

Allows the user to easily interface with BACnet via a single twisted pair or Ethernet wiring to a factory-installed Symbio™ 800 controller.

## LonTalk® Communications Interface

Provides the LonMark® chiller profile inputs/outputs for use with a generic building automation system via a single twisted pair wiring to a factory-installed Symbio™ 800 controller.

## Modbus® Communications Interface

Allows the user to easily interface with Modbus® via a single twisted pair wiring to a factory-installed Symbio™ 800 controller.

## 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 communication board through a 2-10 Vdc or 4-20 mA signal.

## Percent Capacity

When utilized, the control module will indicate 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

## Architectural Louvered Panels

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

## Half Louvers

Louvered panels cover the condenser coil only. Available on 80 to 130 ton units only.

## Comprehensive Acoustic Package

This option includes acoustical treatment for compressor.

## Condenser Corrosion Protection

CompleteCoat™ is available on all size units for corrosion protection. Job site conditions should be considered to determine the need to order coating to inhibit coil corrosion and ensure extended equipment life. CompleteCoat™ option provides fully assembled coils with a flexible dip and bake epoxy coating.

## Isolators - Elastomeric and Neoprene Pads

Elastomeric isolators and neoprene pads provide isolation between chiller and structure to help eliminate vibration transmission.

## Insulation for High Humidity

The evaporator is covered with factory-installed 1.25 inch (31.8 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 charge in lieu of refrigerant.

## Performance Test

Performance tests are available to certify chiller performance before shipment.

## Seismically Rated Unit – IBC

Unit is built and certified for seismic applications in accordance with the following International Building Code (IBC) releases: 2012, 2015, 2018, and 2021.

## Seismically Rated Unit - OSHPD

Unit is built and certified for seismic applications in accordance with California Office of Statewide Health Planning and Development (OSHPD).

## Wind Load for Florida Hurricane

Wind Load for Florida Hurricane Unit is built and certified to meet the requirements of the 2021 Florida Building Code and ASCE 7 -10 for 186 mph wind speed, Exposure 'C', Risk Category III. Available for non-rooftop mounted units only.



The AHRI Certified mark indicates Trane U.S. Inc. participation in the AHRI Certification program. For verification of individual certified products, go to ahridirectory.org.

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