



Product Catalog

# Ascend™ Air-Cooled Chiller Models ACS and ACX with Symbio™ Controls 140 to 230 Nominal Tons





## Introduction

Design and manufacturing excellence makes Trane a leader in the air-cooled chiller marketplace. This tradition of using excellence to meet market demands is illustrated with the Trane Ascend™ line of air-cooled chiller. This 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 and reliability.

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## Revision History

- Updated Ambient Limitations section in Application Considerations chapter.
- ACSA model numbers are updated in Model Number Descriptions chapter.
- Updated General Data chapter with ACSA information.
- Updated Symbio™ 800 information in Controls, Dimension and Weights, Mechanical Specifications and Options chapters.
- Updated Electrical Data chapter.
- Updated Electrical Connections drawings.
- Running edits.



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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 intermediate discharge valve to increase seasonal efficiency. Suction gas-cooled motor stays at a uniformly low temperature for long motor life.
- Powered by Symbio™ 800 industry-leading control algorithms — Enhanced flow management provides unmatched system performance in variable flow water systems.
- 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.
- On cooling-only ACS units, the microchannel condenser uses all-aluminum coils with fully-brazed construction. This design reduces risk of leaks. Their flat streamlined tubes with small ports and metallurgical tube-to-fin bond enable exceptional heat transfer and dramatic reduction in refrigerant use.
- Variable speed permanent magnet motors on ALL condenser fans for increased efficiency and lower sound.

## Life Cycle Cost-Effectiveness

- Optimized for part load performance.
- Scroll compressors with intermediate discharge valve to increase seasonal efficiency.
- 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

- Low temperature process cooling - Excellent operating temperature range and precise control capabilities enable tight control.
- Thermal energy storage - Utilities and owners benefit from reduced cooling energy cost. The AquaStream chiller's dual setpoint control and industry leading energy storage efficiency assures reliable operation and superior system efficiency. Trane's partnership with CALMAC® brings a proven track record of successful installations across many markets; from churches and schools to sky scrapers and office buildings.

## Simple, Economical Installation

- Compressor sound attenuation, variable speed fans, and night noise setback help reduce sound levels, making it the perfect solution for chiller installation in a neighborhood.
- System integration available with LonTalk®, ModBus™, or BACnet ®through a single twisted-pair wire for a less expensive translation to an existing building automation system.
- Powder-coated paint provides superior durability, corrosion protection, and is less likely to be damaged while rigging/lifting/installing the chiller.
- Factory commissioned unit-mounted starter reduces overall job cost and improves system reliability by eliminating job site design, installation and labor coordination requirements.



## Features and Benefits

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### Precision Control

- 7-inch color touch screen display with graphics
- Powered by Symbio™ 800 industry-leading control algorithms — Enhanced flow management provides unmatched system performance in variable flow water systems
- Adaptive Control™ keeps the chiller running in extreme conditions
  - Tight set point control
  - Graphical trending
  - Maximized chiller update
- BACnet®, Modbus™, LonTalk®, communications protocol interface available without the need for gateways
- Optional condenser fan speed control to help meet preset nighttime sound requirements

### Improved Serviceability

- All major serviceable components are close to the edge. Service shutoff valves and water strainer are conveniently located to enable easy service.
- Full on-site serviceability
- Electronic expansion valve designed so controls can be removed and serviced without refrigerant handling.



## 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 TOPSS™ 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.

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

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

### Effect of Altitude on Capacity

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

### Ambient Limitations

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

- Standard Ambient Range = 32 to 115°F (0 to 46 °C)
- Low Ambient Range = -20 to 115°F (-29 to 46°C)
- High Ambient Range = 32 to 130°F (0 to 54.4°C)
- Wide Ambient Range = -20 to 130°F (-29 to 54.4°C)
- Cooling Mode Ambient Range for Heat Pump = -4 to 125°F (-20 to 51.7°C)
- Heating Mode Ambient Range for Heat Pump = 0 to 95°F (-17.8 to 35°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.

## Application Considerations

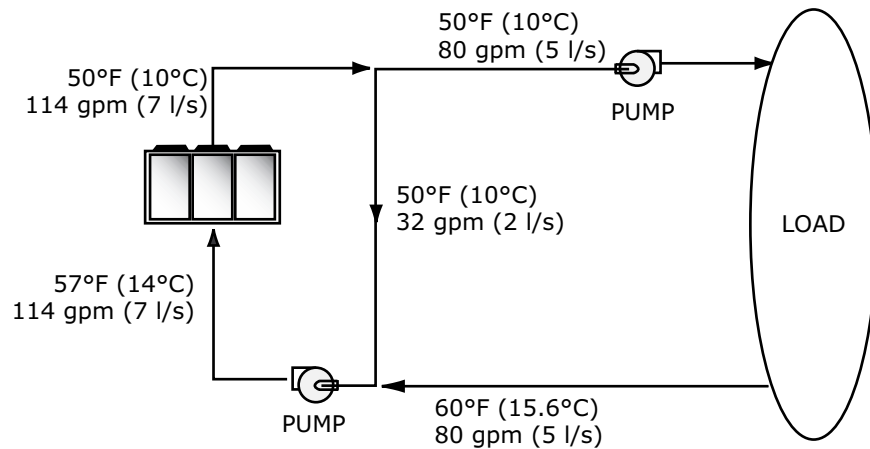
The maximum evaporator water flow rate is also given in General Data. Flow rates exceeding those listed may result in very high pressure drop across the evaporator and/or excessive tube erosion.

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

### Flow Rates Out of Range

Many process cooling jobs 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 are designed to handle a 10 percent change in water flow rate per minute while maintaining a  $\pm 2^\circ\text{F}$  (1.1°C) leaving water temperature control accuracy. The chiller tolerates up to 30 percent per minute water flow variation as long as the flow is equal or above the minimum flow rate requirement.

With the help of a software analysis tool such as System Analyzer™, DOE-2 or TRACE™, 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 68°F (5.5 to 20°C)
- Low temperature process cooling, with leaving solution less than 40°F (4.4°C)
- Ice-making, with leaving solution less than 40°F

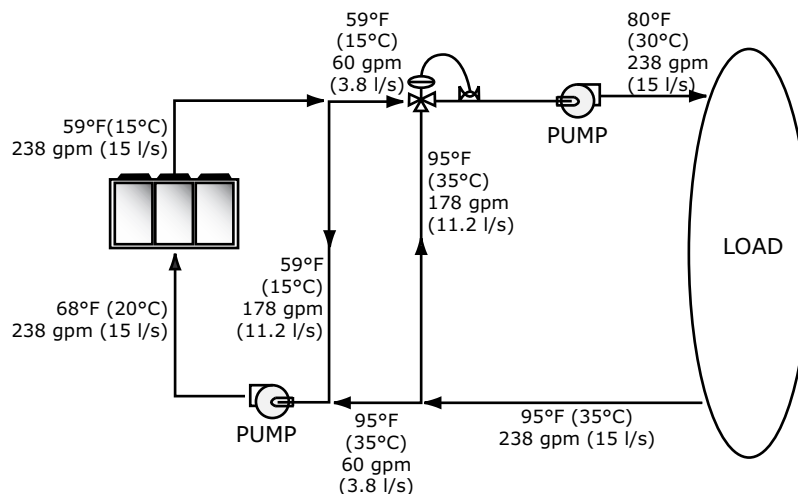
Since leaving solution temperatures below 40°F (4.4°C) result in suction temperature at or below the freezing point of water, a glycol solution is required for all low temperature and ice-making machines. Ice making control includes dual setpoints and safeties for ice making and standard cooling capabilities. Consult your local Trane account manager for applications or selections involving low temperature or ice making machines.

The maximum water temperature that can be circulated through the 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 jobs require temperature ranges that cannot be met with the minimum and maximum published values for the chiller. A simple piping change can alleviate this problem. For example, a laboratory load requires 238 gpm (15 l/s) of water entering the process at 86°F (30°C) and returning at 95°F (35°C). The chiller's maximum leaving chilled water temperature of 68°F (20°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 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

The cataloged performance data for the chiller 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 microcomputer's ability to maintain an acceptable supply water temperature range. Furthermore, full load temperature drops of less than 6°F (3.3°C) may result in inadequate refrigerant superheat which is critical to long term efficient and reliable operation. Sufficient superheat is always a primary concern in any refrigerant system and is especially important in a packaged chiller where the evaporator is closely coupled to the compressor.

## Typical Water Piping

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



### Avoidance of Short Water Loops

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

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

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

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

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

### Minimum Water Volume for a Process Application

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

### 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.

## Heat Pump

A typical HVAC system has a cooling requirement in the summer and shoulder seasons and a heating requirement in the winter and shoulder seasons. A modular air-source heat pump unit is well suited as the core of a centralized geo-thermal system to meet these varying cooling and heating demands. The heat pump system can be sized for the greater of the cooling or heating demand. When the smaller of the demands is operating, not all Modules function thereby saving energy costs and improving efficiency. This also allows for the non-operating Modules to be on reserve should any of the Modules require servicing.

When the HVAC system demand switches between heating and cooling the heat pump mode is switched and the reversing valve in each functioning Module reverses the refrigerant cycle to produce the required heating or cooling supply. The air-source heat pump unit does not simultaneously heat and cool. It only produces either heating or cooling at any moment in time depending on the commanded mode of operation. The ambient air surrounding the unit provides for the heat source/sink and units are typically located outdoors. When operating in heating mode in low temperature moist climates frost may form on the outdoor coils. The units will periodically defrost the outdoor coils by reversing the refrigerant cycle for a period of time. Modules are sequentially defrosted to minimize the impact to heating capacity. The defrost cycle must be taken into account when sizing the hydronic system volume to ensure heating supply capacity.

## Unit Placement

### Setting the Unit

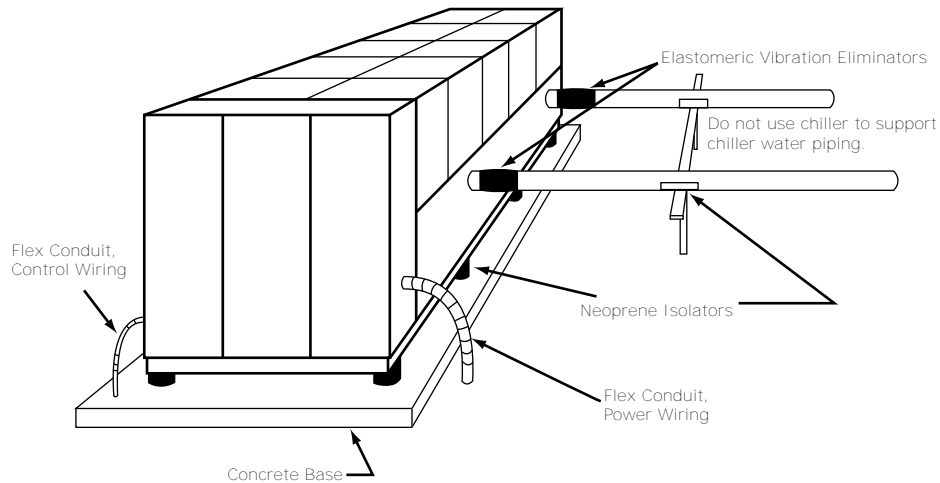
A base or foundation is not required if the selected unit location is level and strong enough to support the unit's operating weights shown in Weights chapter.

For a detailed discussion of base and foundation construction, see the unit Installation, Operation or Maintenance (IOM) manual. Manuals are available through online product portal pages 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.

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 shut down. Other chillers would typically shut down on a high pressure nuisance cut-out in these conditions.

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

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

### **Provide Sufficient Unit-to-Unit Clearance**

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

### **Walled Enclosure Installations**

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



# Model Number Descriptions

## Unit Model Number

### Digit 1, 2, 3, 4 – Unit Model

**ACSA** = Air-Cooled Scroll Chiller  
**ACXA** = Air-Cooled Scroll Heat Pump Chiller

### Digit 5, 6, 7 – Nominal Tonnage

**140** = 140 Tons  
**160** = 160 Tons  
**180** = 180 Tons  
**200** = 200 Tons  
**215** = 215 Tons  
**230** = 230 Tons

### Digit 8 – Compressor Type

**2** = Scroll with Variable Volume Ratio

### Digit 9 – Unit Voltage

**A** = 200/60/3  
**B** = 230/60/3  
**E** = 460/60/3  
**F** = 575/60/3

### Digit 10 – Manufacturing Location

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

### Digits 11, 12 – Design Sequence

\*\* = Factory assigned

### Digit 13 – Unit Sound Package

**X** = Standard Unit  
**L** = Superior  
**R** = Standard with Noise Reduction Request  
**Q** = Superior with Noise Reduction Request

### Digit 14 – Agency Listing

**U** = UL/cUL Listing  
**C** = No Agency Listing

### Digit 15 – Pressure Vessel Code

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

### Digit 16 – Factory Charge

**A** = Refrigerant Charge R-410A  
**B** = Nitrogen Charge  
**L** = Refrigerant Charge R-454B  
**M** = Nitrogen Charge - R-454B Field Supplied

### Digit 17 – Auxiliary Items

**X** = No Auxiliary Items  
**D** = Condenser Drain Pan - HP Units Only

### Digit 18 – Evaporator Application

**N** = Standard Cooling (above 40°F)  
**P** = Low Temp Process Cooling (below 40°F)  
**C** = Ice Making

### Digit 19, 20 – Evaporator Type

**B2** = Brazen Plate Heat Exchanger (Standard)

### Digit 21 – Water Connection

**X** = Grooved Pipe  
**A** = Grooved Pipe + Flange Adapter

### Digit 22 – Flow Switch Set Point

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

### Digit 23 – Insulation

**A** = Factory Insulation — All Cold Parts 0.75 inch  
**B** = Evaporator-Only Insulation for High Humidity/Low Evap Temp 1.25 inch

### Digit 24 – Unit Application

**X** = Standard Ambient (32 to 115°F)  
**L** = Low Ambient (-20 to 115°F)  
**H** = High Ambient (32 to 130°F)  
**W** = Wide Ambient (-20 to 130°F)

### Digit 25 – Condenser Length

**S** = Standard

### Digit 26 – Condenser Fin Options

**M** = Aluminum Microchannel  
**C** = CompleteCoat™ Microchannel  
**R** = Copper round tube, aluminum plate fin  
**K** = Coated Copper Round Tube, Aluminum Plate Fin

### Digit 27 – Fan Type

**E** = EC Condenser Fan Motors

### Digit 28 – Compressor Starter

**X** = Across-the-Line Starter

### Digit 29 – Incoming Unit Power Line Connection

**1** = Single Point Unit Power Connection

### Digit 30 – Power Line Connection Type

**T** = Terminal Block  
**C** = Circuit Breaker  
**M** = High Fault Rated Circuit Breaker with Energy Meter  
**H** = Circuit Breaker with High Fault Rated Control Panel

### Digit 31 – Short Circuit Current Rating

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

### Digit 32 – Electrical Accessories

**X** = None  
**U** = Under/Over Voltage Protection  
**C** = 15A - 115V Convenience Outlet  
**N** = 20A - 115V Convenience Outlet  
**B** = Convenience Outlet and Under/Over Voltage Protection

### Digit 33 – Remote Communications Options

**X** = None  
**B** = BACnet® Interface  
**M** = Modbus™ Interface  
**L** = LonTalk® Interface

### Digit 34 – Hard Wire Communication

**X** = None  
**A** = Hard Wired Bundle — All  
**D** = Unit Status Programmable Relay

### Digit 35 – Smart Flow Control

**X** = None  
**T** = Variable Primary Flow (Constant Delta T)

### Digit 36 – Structural Options

**A** = Standard Unit Structure

### Digit 37 – Appearance Options

**X** = No Appearance Options

**Digit 38 – Unit Isolation**

**X** = None  
**1** = Elastomeric Isolators

**Digit 39 – Shipping Package**

**X** = No Shipping Package  
**T** = Tarp Covering Full Unit

**Digit 40 – Pump Package**

**X** = No Pump Option  
**2** = Single Pump, High Pressure, Single VFD  
**4** = Dual Pump, High Pressure, Dual VFD

**Digit 41 – Not Used**

**X** = Selection1

**Digit 42 – Not Used**

**X** = Selection1

**Digit 43 – Special Requirement**

**0** = None  
**S** = Special Requirement  
**F** = Ship to Final Finisher

**Digit 44 – Harmonic Filter**

**N** = No Harmonic Filter

**Digit 45 – Wireless Connectivity**

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



# General Data

Table 1. ACSA general data (I-P)

Unit Size (tons)		140	160	180	200	215	230
<b>Compressor Model</b>							
Quantity	#	4	4	6	6	6	6
Tonnage/ckt <sup>(a)</sup>		30+40	40+40	30+30+30	30+30+40	30+40+40	40+40+40
<b>Evaporator</b>							
Water storage	gal	17.4	17.4	17.4	17.4	17.4	21.6
Min. flow <sup>(b)</sup>	gpm	168	192	216	240	258	276
Max. flow <sup>(b)</sup>	gpm	504	576	648	720	774	828
Water connection	in.	4	4	4	4	4	4
<b>Condenser</b>							
Quantity of coils	#	8	8	10	10	12	12
Coil length	in.	75	75	75	75	75	75
Coil height	in.	49	49	49	49	49	49
Tube width	in.	1	1	1	1	1	1
Fins per foot	fpf	276	276	276	276	276	276
<b>Fan</b>							
Quantity	#	8	8	10	10	12	12
Diameter	in.	37.5	37.5	37.5	37.5	37.5	37.5
Airflow per fan	cfm	11337	11334	11336	11334	11337	11335
Power per motor	HP	1.5	1.5	1.5	1.5	1.5	1.5
Motor RPM	rpm	820	820	820	820	820	820
Tip speed	ft/min	7728	7728	7728	7728	7728	7728
<b>General Unit</b>							
Refrigerant circuits	#	2	2	2	2	2	2
Capacity steps	%	21-43-71-100	25-50-75-100	17-33-50-67-83-100	15-30-50-65-80-100	14-32-50-64-82-100	17-33-50-67-83-100
Min ambient - low/wide	°F	-20	-20	-20	-20	-20	-20
Min ambient - std/high	°F	32	32	32	32	32	32
Refrig charge/ckt <sup>(a)</sup>	lb	63	72	81	90	96.8	103.5
Oil charge/ckt <sup>(a)</sup>	gal	3.2	3.2	4.8	4.8	4.8	4.8
<b>Pump Package (Single Pump)</b>							
Avail Head pressure <sup>(c)</sup>	ft H <sub>2</sub> O	95	99	89	90	101	91
Power per motor	HP	21.4	22.3	23.2	27.3	27.1	26.3
<b>Pump Package (Twin Pump)</b>							
Avail Head pressure <sup>(c)</sup>	ft H <sub>2</sub> O	91	94	82	82	92	80
Power per motor	HP	20.9	22.6	22.9	27.1	26.3	26.5

<sup>(a)</sup> Data shown for one circuit only. The second circuit always matches.

<sup>(b)</sup> Minimum and maximum flow rates apply to constant-flow chilled water system running at AHRI conditions, without freeze inhibitors added to the water loop.

<sup>(c)</sup> Pump available head pressure is based on 44/54° evaporator water, 0.0001 hr-ft<sup>2</sup>-°F/Btu, 95°F ambient and 0 ft. elevation.



**Table 2. ACSA general data (SI)**

Unit Size (tons)		140	160	180	200	215	230
<b>Compressor Model</b>							
Quantity	#	4	4	6	6	6	6
Tonnage/ckt <sup>(a)</sup>		30+40	40+40	30+30+30	30+30+40	30+40+40	40+40+40
<b>Evaporator</b>							
Water storage	l	66.0	66.0	66.0	66.0	66.0	81.8
Min. flow <sup>(b)</sup>	l/s	10.6	12.1	13.6	15.1	16.3	17.4
Max. flow <sup>(b)</sup>	l/s	31.8	36.3	40.9	45.4	48.8	52.2
Water connection	mm	101.6	101.6	101.6	101.6	101.6	101.6
<b>Condenser</b>							
Quantity of coils	#	8	8	10	10	12	12
Coil length	mm	1914	1914	1914	1914	1914	1914
Coil height	mm	1252	1252	1252	1252	1252	1252
Tube width	mm	25.4	25.4	25.4	25.4	25.4	25.4
Fins per foot	(fpf)	276	276	276	276	276	276
<b>Fan</b>							
Quantity	#	8	8	10	10	12	12
Diameter	mm	953	953	953	953	953	953
Airflow per fan	m <sup>3</sup> /h	19262	19257	19260	19257	19262	19258
Power per motor	kW	1.1	1.1	1.1	1.1	1.1	1.1
Motor RPM	rpm	820	820	820	820	820	820
Tip speed	m/s	39.3	39.3	39.3	39.3	39.3	39.3
<b>General Unit</b>							
Refrigerant circuits	#	2	2	2	2	2	2
Capacity steps	%	21-43-71-100	25-50-75-100	17-33-50-67-83-100	15-30-50-65-80-100	14-32-50-64-82-100	17-33-50-67-83-100
Min ambient - low/wide	°C	-29	-29	-29	-29	-29	-29
Min ambient - std/high	°C	0	0	0	0	0	0
Refrig charge/ckt <sup>(a)</sup>	kg	28.6	32.7	36.8	40.8	43.9	47.0
Oil charge/ckt <sup>(a)</sup>	l	12	12	18	18	18	18
<b>Pump Package (Single Pump)</b>							
Avail Head pressure <sup>(c)</sup>	kPa	284	297	267	270	302	272
Power per motor	HP	21.4	22.3	23.2	27.3	27.1	26.3
<b>Pump Package (Twin Pump)</b>							
Avail Head pressure <sup>(c)</sup>	kPa	272	280	247	245	274	240
Power per motor	kW	15.6	16.9	17.1	20.2	19.6	19.8

<sup>(a)</sup> Data shown for one circuit only. The second circuit always matches.

<sup>(b)</sup> Minimum and maximum flow rates apply to constant-flow chilled water system running at AHRI conditions, without freeze inhibitors added to the water loop.

<sup>(c)</sup> Pump available head pressure is based on 44/54° evaporator water, 0.0001 hr-ft<sup>2</sup>-°F/Btu, 95°F ambient and 0 ft. elevation.



## General Data

**Table 3. ACXA general data (I-P)**

Unit Size (Tons)		140	160	180	200	215	230
<b>Refrigerant</b>		<b>R410A</b>					
<b>Compressor Model</b>							
Quantity	#	4	4	6	6	6	6
Tonnage/ckt <sup>(a)</sup>		30+40	40+40	30+30+30	30+30+40	40+40+30	40+40+40
<b>Evaporator</b>							
Water storage	gal	17.4	17.4	17.4	17.4	17.4	21.6
Min. flow <sup>(b)</sup>	gpm	168	192	216	240	258	276
Max. flow <sup>(b)</sup>	gpm	504	576	648	720	774	828
Water connection	in.	4	4	4	4	4	4
<b>Condenser</b>							
Quantity of coils	#	8	8	10	10	12	12
Coil length	in.	83.6	83.6	83.6	83.6	83.6	83.6
Coil height	in.	49.2	49.2	49.2	49.2	49.2	49.2
Coil width	in.	3.4	3.4	3.4	3.4	3.4	3.4
Fins per foot	fpf	180	180	180	180	180	180
<b>Fans</b>							
Quantity	#	8	8	10	10	12	12
Diameter	in.	37.5	37.5	37.5	37.5	37.5	37.5
Airflow per fan - cooling mode	cfm	12288	12288	12288	12288	12288	12288
Airflow per fan - heating mode	cfm	10510	10510	10510	10510	10510	10510
Power per motor cooling mode	HP	1.7	1.7	1.7	1.7	1.7	1.7
Power per motor heating mode	HP	1.5	1.5	1.5	1.5	1.5	1.5
Motor RPM - cooling mode	rpm	820	820	820	820	820	820
Motor RPM - heating mode	rpm	740	740	740	740	740	740
Tip speed cooling mode	ft/min	7728	7728	7728	7728	7728	7728
Tip speed heating mode	ft/min	6785	6785	6785	6785	6785	6785
<b>General Unit</b>							
Refrigerant circuits	#	2	2	2	2	2	2
Capacity steps	%	21-43-71-100	25-50-75-100	17-33-50-67-83-100	15-30-50-65-80-100	14-32-50-64-82-100	17-33-50-67-83-100
Min. ambient - heating mode	°F	0	0	0	0	0	0
Max. ambient - heating mode	°F	95	95	95	95	95	95
Min. ambient - cooling mode	°F	-4	-4	-4	-4	-4	-4
Max. ambient - cooling mode	°F	125	125	125	125	125	125
<b>Refrigerant charge/ckt</b>							
R410A <sup>(a)</sup>	lb	141	141	189	189	211	216
Oil charge/ckt <sup>(a)</sup>	gal	5.1	5.1	7	7	7	7
<b>Pump package (Single Pump)</b>							
Avail Head pressure <sup>(c)</sup>	ft H <sub>2</sub> O	95	99	89	90	101	91
Power per motor	HP	21.4	22.3	23.2	27.3	271	26.3
<b>Pump package (Twin Pump)</b>							
Avail Head pressure <sup>(c)</sup>	ft H <sub>2</sub> O	91	94	82	82	92	80
Power per motor	HP	20.9	22.6	22.9	27.1	26.3	26.5

<sup>(a)</sup> Data shown for one circuit only. The second circuit always matches.

**Table 3. ACXA general data (I-P) (continued)**

- (b) Minimum and maximum flow rates apply to constant-flow chilled water system running at AHRI conditions, without freeze inhibitors added to the water loop.
- (c) Pump available head pressure is based on 44/54° evaporator water, 0.0001 hr-ft<sup>2</sup>-°F/Btu, 95°F ambient and 0 ft. elevation.



## General Data

**Table 4. ACXA general data (SI)**

Unit Size (Tons)		140	160	180	200	215	230
<b>Refrigerant</b>		<b>R410A</b>					
<b>Compressor Model</b>							
Quantity	#	4	4	6	6	6	6
Tonnage/ckt <sup>(a)</sup>		30+40	40+40	30+30+30	30+30+40	40+40+30	40+40+40
<b>Evaporator</b>							
Water storage	l	65.9	65.9	65.9	65.9	65.9	81.8
Min. flow <sup>(b)</sup>	l/s	10.6	12.1	13.6	15.1	16.3	17.4
Max. flow <sup>(b)</sup>	l/s	31.8	36.3	40.9	45.4	48.8	52.2
Water connection	mm	4	4	4	4	4	4
<b>Condenser</b>							
Quantity of coils	#	8	8	10	10	12	12
Coil length	mm	2123	2123	2123	2123	2123	2123
Coil height	mm	1250	1250	1250	1250	1250	1250
Coil width	mm	86	86	86	86	86	86
Fins per foot	fpf	180	180	180	180	180	180
<b>Fans</b>							
Quantity	#	8	8	10	10	12	12
Diameter	mm	953	953	953	953	953	953
Airflow per fan - cooling mode	m <sup>3</sup> /h	20877	20877	20877	20877	20877	20877
Airflow per fan - heating mode	m <sup>3</sup> /h	17856	17856	17856	17856	17856	17856
Power per motor cooling mode	kW	1.3	1.3	1.3	1.3	1.3	1.3
Power per motor heating mode	kW	1.1	1.1	1.1	1.1	1.1	1.1
Motor RPM - cooling mode	rpm	820	820	820	820	820	820
Motor RPM - heating mode	rpm	740	740	740	740	740	740
Tip speed cooling mode	m/s	39.3	39.3	39.3	39.3	39.3	39.3
Tip speed heating mode	m/s	34.5	34.5	34.5	34.5	34.5	34.5
<b>General Unit</b>							
Refrigerant circuits	#	2	2	2	2	2	2
Capacity steps	%	21-43-71-100	25-50-75-100	17-33-50-67-83-100	15-30-50-65-80-100	14-32-50-64-82-100	17-33-50-67-83-100
Min. ambient - heating mode	°C	-18	-18	-18	-18	-18	-18
Max. ambient - heating mode	°C	35	35	35	35	35	35
Min. ambient - cooling mode	°C	-20	-20	-20	-20	-20	-20
Max. ambient - cooling mode	°C	52	52	52	52	52	52
<b>Refrigerant charge/ckt</b>							
R410A <sup>(a)</sup>	kg	64	64	86	86	96	98
oil charge/ckt <sup>(a)</sup>	l	19.3	19.3	26.5	26.5	26.5	26.5
<b>Pump package (Single Pump)</b>							
Avail Head pressure <sup>(c)</sup>	kPa	284	296	266	269	302	272
Power per motor	HP	21.4	22.3	23.2	27.3	271	26.3
<b>Pump package (Twin Pump)</b>							
Avail Head pressure <sup>(c)</sup>	kPa	272	281	245	245	275	239
Power per motor	kW	15.6	16.9	17.1	20.2	19.6	19.8

<sup>(a)</sup> Data shown for one circuit only. The second circuit always matches.

**Table 4. ACXA general data (SI) (continued)**

- (b) Minimum and maximum flow rates apply to constant-flow chilled water system running at AHRI conditions, without freeze inhibitors added to the water loop.
- (c) Pump available head pressure is based on 44/54° evaporator water, 0.0001 hr-ft<sup>2</sup>-°F/Btu, 95°F ambient and 0 ft. elevation.



# Controls

## Symbio™ 800 Controller

Trane Ascend™ 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.

### Adaptive Controls

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

Rapid restart test is available on model ACS cooling-only units. After completion of a standard full load witness test, power to the chiller will be cut and then reapplied to demonstrate the chiller's rapid restart capabilities for disaster relief.

## AdaptiView TD7 Display

The standard AdaptiView™ TD7 display provided with the Symbio™ 800 controller features a 7" LCD touch-screen, allowing access to all operational inputs and outputs. This is an advanced interface that allows the user to access any important information concerning setpoints, active temperatures, modes, electrical data, pressure, and diagnostics. It uses full text display available in 27 languages.

### Display Features Include:

- LCD touch-screen with LED backlighting, for scrolling access to input and output operating information
- Single-screen, folder/tab-style display of all available information on individual subcomponents (evaporator, condenser, compressor)
- 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 Sub-Component Reports:
    - Evaporator
    - Condenser
    - Compressor
  - 3 User Programmable Custom Reports
  - ASHRAE report
  - Log Sheet Report
  - Alarms Report
  - 8 pre-defined Standard Graphs
  - 4 User Programmable Custom Graphs
  - Unit Settings
  - Feature Settings
  - Chilled/Hot Water Reset
  - Manual Control Settings
  - Display Preferences
  - Support of 27 languages
  - Brightness Setting
  - Cleaning Mode

## System Integration

### Adaptive Control

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

### 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.



## Controls

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: Latching alarm, Non-latching alarm, Alarm, Alarm ckt1, Alarm ckt2, Chiller limit mode, Compressor running, Ckt1 running, Ckt2 running, Warning, Maximum capacity, Evaporator freeze avoidance request, Service request, Ice making status, Refrigerant charge loss detected, Hot water control status and Defrost status.

### 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	<ul style="list-style-type: none"> <li>• Minimum first cost</li> <li>• Maximum comfort</li> <li>• Minimized downtime</li> <li>• Minimum operating costs</li> <li>• Superior building and occupant productivity</li> </ul>
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 <ul style="list-style-type: none"> <li>• BACnet TP</li> <li>• BACnet/IP</li> <li>• LON (Optional)</li> <li>• Modbus</li> </ul>	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 ensures 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



Symbio™ 800 Feature	Benefits
Display preferences	Choose how to view dates, times, units (SI, IP), screen brightness, data format, and backlight timeout. 3 built-in languages are supported and selectable for all TD7 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	

## BACnet Building Automation Control Network

The BACnet® control network for Symbio™ 800 expands communications from the unit UCM network to the Tracer® Ensemble™ or Tracer SC+ building automation system 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 MS/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.

## LonTalk Building Automation Systems

The LonTalk® communication protocol for the Symbio™ 800 controller expands communications from the unit UCM 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®.



## Modbus Automation Control Network

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

## Tracer SC

The Tracer® SC system controller acts as the central coordinator for all individual equipment devices on a Tracer building automation system. The TracerSC 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 and Chiller Plant Control

The Symbio™ 800 controller can communicate with Trane Tracer® SC and Tracer® ES building automation systems, which include pre-engineered and flexible control for chiller plants. These building automation systems can control the operation of the complete installation: chillers, pumps, isolating valves, air handlers, and terminal units. Trane can undertake full responsibility for optimized automation and energy management for the entire chiller plant. The main functions are:

- **Chiller sequencing:** equalizes the number of running hours of the chillers. Different control strategies are available depending on the configuration of the installation.
- **Control of the auxiliaries:** includes input/output modules to control the operation of the various auxiliary equipment (water pumps, valves, etc.)
- **Time-of-day scheduling:** allows the end user to define the occupancy period, for example: time of the day, holiday periods and exception schedules.
- **Optimization of the installation start/stop time:** based on the programmed schedule of occupancy and the historical temperature records. Tracer SC calculates the optimal start/stop time of the installation to get the best compromise between energy savings and comfort of the occupants.
- **Communication capabilities:** local, through a PC workstation keyboard. Tracer® SC can be programmed to send messages to other local or remote workstations and or a pager in the following cases:
  - Analog parameter exceeding a programmed value
  - Maintenance warning
  - Component failure alarm
  - Critical alarm messages. In this latter case, the message is displayed until the operator acknowledges the receipt of the information. From the remote station it is also possible to access and modify the chiller plants control parameters.
- **Remote communication through a modem:** as an option, a modem can be connected to communicate the plant operation parameters through voice grade phone lines. A remote terminal is a PC workstation equipped with a modem and software to display the remote plant parameters.

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## Integrated Comfort System (ICS)

The onboard chiller controller is designed to be able to communicate with a wide range of building automation systems. In order to take full advantage of chiller's capabilities, incorporate your chiller into a Tracer® SC building automation system.

But the benefits do not stop at the chiller plant. At Trane, we realize that all the energy used in your cooling system is important. That is why we worked closely with other equipment manufacturers to predict the energy required by the entire system. We used this information to create patented control logic for optimizing HVAC system efficiency.

The building owners challenge is to tie components and applications expertise into a single reliable system that provides maximum comfort, control, and efficiency. Trane® Integrated Comfort systems (ICS) are a concept that combines system components, controls, and engineering applications expertise into a single, logical, and efficient system. These advanced controls are fully commissioned and available on every piece of Trane equipment, from the largest chiller to the smallest VAV box. As a manufacturer, only Trane offers this universe of equipment, controls, and factory installation and verification.



# Electrical Data

**Table 5. Electrical data – RLA and LRA information**

Unit Size	Rated Voltage <sup>(a)</sup>	RLA						LRA					
		Compressor (Circuit 1)			Compressor (Circuit 2)			Compressor (Circuit 1)			Compressor (Circuit 2)		
		1A	1B	1C	2A	2B	2C	1A	1B	1C	2A	2B	2C
140	200/60/3	119	150	-	119	150	-	717	1010	-	717	1010	-
	230/60/3	119	150	-	119	150	-	717	1010	-	717	1010	-
	460/60/3	54	69	-	54	69	-	294	413	-	294	413	-
	575/60/3	44	55	-	44	55	-	235	327	-	235	327	-
160	200/60/3	150	150	-	150	150	-	1010	1010	-	1010	1010	-
	230/60/3	150	150	-	150	150	-	1010	1010	-	1010	1010	-
	460/60/3	69	69	-	69	69	-	413	413	-	413	413	-
	575/60/3	55	55	-	55	55	-	327	327	-	327	327	-
180	200/60/3	119	119	119	119	119	119	717	717	717	717	717	717
	230/60/3	119	119	119	119	119	119	717	717	717	717	717	717
	460/60/3	54	54	54	54	54	54	294	294	294	294	294	294
	575/60/3	44	44	44	44	44	44	235	235	235	235	235	235
200	200/60/3	119	119	150	119	119	150	717	717	1010	717	717	1010
	230/60/3	119	119	150	119	119	150	717	717	1010	717	717	1010
	460/60/3	54	54	69	54	54	69	294	294	413	294	294	413
	575/60/3	44	44	55	44	44	55	235	235	327	235	235	327
215	200/60/3	150	150	119	150	150	119	1010	1010	717	1010	1010	717
	230/60/3	150	150	119	150	150	119	1010	1010	717	1010	1010	717
	460/60/3	69	69	54	69	69	54	413	413	294	413	413	294
	575/60/3	55	55	44	55	55	44	327	327	235	327	327	235
230	200/60/3	150	150	150	150	150	150	1010	1010	1010	1010	1010	1010
	230/60/3	150	150	150	150	150	150	1010	1010	1010	1010	1010	1010
	460/60/3	69	69	69	69	69	69	423	413	413	413	413	413
	575/60/3	55	55	55	55	55	55	327	327	327	327	327	327

<sup>(a)</sup> Voltage Utilization Range: +/- 10% of Rated voltage (use range): 200/60/3 (187-229), 230/60/3 (207-253), 460/60/3 (414-506), 575/60/3 (517-633)

**Table 6. Electrical data — condenser fan information, MCA and MOP values**

Unit Size	Rated Voltage <sup>(a)</sup>	Compr Qty	Condenser Fans			CPT Amps	No Pump		Pump	
			Qty <sup>(b)</sup>	HP	FLA		MCA	MOP	MCA	MOP
140	200/60/3	4	4/4	3	6.2	5.6	631	700	690	800
	230/60/3	4	4/4	3	5.4	4.8	624	700	683	800
	460/60/3	4	4/4	3	2.7	2.4	287	350	317	350
	575/60/3	4	4/4	3	2.7	1.9	235	250	259	300
160	200/60/3	4	4/4	3	6.2	5.6	693	800	752	800
	230/60/3	4	4/4	3	5.4	4.8	686	800	745	800
	460/60/3	4	4/4	3	2.7	2.4	317	350	347	400
	575/60/3	4	4/4	3	2.7	1.9	257	300	281	300
180	200/60/3	6	5/5	3	6.2	5.6	811	1000	871	1000
	230/60/3	6	5/5	3	5.4	4.8	803	1000	862	1000
	460/60/3	6	5/5	3	2.7	2.4	367	400	397	450
	575/60/3	6	5/5	3	2.7	1.9	304	350	328	350
200	200/60/3	6	5/5	3	6.2	5.6	881	1000	941	1000
	230/60/3	6	5/5	3	5.4	4.8	872	1000	932	1000
	460/60/3	6	5/5	3	2.7	2.4	401	400	430	450
	575/60/3	6	5/5	3	2.7	1.9	329	350	352	400
215	200/60/3	6	6/6	3	6.2	5.6	955	1000	1027	1200
	230/60/3	6	6/6	3	5.4	4.8	945	1000	1017	1200
	460/60/3	6	6/6	3	2.7	2.4	436	500	472	500
	575/60/3	6	6/6	3	2.7	1.9	356	400	385	400
230	200/60/3	6	6/6	3	6.2	5.6	1017	1200	1089	1200
	230/60/3	6	6/6	3	5.4	4.8	1007	1200	1079	1200
	460/60/3	6	6/6	3	2.7	2.4	466	500	502	600
	575/60/3	6	6/6	3	2.7	1.9	378	400	407	450

<sup>(a)</sup> Voltage Utilization Range: +/- 10% of Rated voltage (use range): 200/60/3 (187-229), 230/60/3 (207-253), 460/60/3 (414-506), 575/60/3 (517-633)

<sup>(b)</sup> Values are shown as circuit 1/circuit 2.



## Electrical Data

**Table 7. Customer wire selection**

Unit Size	Rated Voltage	No Pump					Pump <sup>(a)</sup>		
		Terminal Block	SCCR	Circuit Breaker	Standard Fault SCCR	High Fault SCCR	Circuit Breaker	Standard Fault SCCR	High Fault SCCR
140	200/60/3	(2) #4 - 500 MCM	10kA	(3) 3/0 - 500 MCM	10kA	65kA	(3) 3/0 - 500 MCM	10kA	65kA
	230/60/3	(2) #4 - 500 MCM	10kA	(3) 3/0 - 500 MCM	10kA	65kA	(3) 3/0 - 500 MCM	10kA	65kA
	460/60/3	(2) #4 - 500 MCM	10kA	(2) 2/0 - 500 MCM	10kA	65kA	(2) 2/0 - 500 MCM	10kA	65kA
	575/60/3	(2) #4 - 500 MCM	10kA	(2) 2/0 - 500 MCM	10kA	25kA	(2) 2/0 - 500 MCM	10kA	25kA
160	200/60/3	(2) #4 - 500 MCM	10kA	(3) 3/0 - 500 MCM	10kA	65kA	(3) 3/0 - 500 MCM	10kA	65kA
	230/60/3	(2) #4 - 500 MCM	10kA	(3) 3/0 - 500 MCM	10kA	65kA	(3) 3/0 - 500 MCM	10kA	65kA
	460/60/3	(2) #4 - 500 MCM	10kA	(2) 2/0 - 500 MCM	10kA	65kA	(2) 2/0 - 500 MCM	10kA	65kA
	575/60/3	(2) #4 - 500 MCM	10kA	(2) 2/0 - 500 MCM	10kA	25kA	(2) 2/0 - 500 MCM	10kA	25kA
180	200/60/3	(4) #2 - 600 MCM	10kA	(4) 3/0 - 500 MCM	10kA	65kA	(4) 3/0 - 500 MCM	10kA	65kA
	230/60/3	(4) #2 - 600 MCM	10kA	(4) 3/0 - 500 MCM	10kA	65kA	(4) 3/0 - 500 MCM	10kA	65kA
	460/60/3	(2) #4 - 500 MCM	10kA	(2) 2/0 - 500 MCM	10kA	65kA	(3) 3/0 - 500 MCM	10kA	65kA
	575/60/3	(2) #4 - 500 MCM	10kA	(2) 2/0 - 500 MCM	10kA	25kA	(2) 2/0 - 500 MCM	10kA	25kA
200	200/60/3	(4) #2 - 600 MCM	10kA	(4) 3/0 - 500 MCM	10kA	65kA	(4) 3/0 - 500 MCM	10kA	65kA
	230/60/3	(4) #2 - 600 MCM	10kA	(4) 3/0 - 500 MCM	10kA	65kA	(4) 3/0 - 500 MCM	10kA	65kA
	460/60/3	(2) #4 - 500 MCM	10kA	(3) 3/0 - 500 MCM	10kA	65kA	(3) 3/0 - 500 MCM	10kA	65kA
	575/60/3	(2) #4 - 500 MCM	10kA	(2) 2/0 - 500 MCM	10kA	25kA	(2) 2/0 - 500 MCM	10kA	25kA
215	200/60/3	(4) #2 - 600 MCM	10kA	(4) 3/0 - 500 MCM	10kA	65kA	(4) 3/0 - 500 MCM	10kA	65kA
	230/60/3	(4) #2 - 600 MCM	10kA	(4) 3/0 - 500 MCM	10kA	65kA	(4) 3/0 - 500 MCM	10kA	65kA
	460/60/3	(2) #4 - 500 MCM	10kA	(3) 3/0 - 500 MCM	10kA	65kA	(3) 3/0 - 500 MCM	10kA	65kA
	575/60/3	(2) #4 - 500 MCM	10kA	(2) 2/0 - 500 MCM	10kA	25kA	(2) 2/0 - 500 MCM	10kA	25kA
230	200/60/3	(4) #2 - 600 MCM	10kA	(4) 3/0 - 500 MCM	10kA	65kA	(4) 3/0 - 500 MCM	10kA	65kA
	230/60/3	(4) #2 - 600 MCM	10kA	(4) 3/0 - 500 MCM	10kA	65kA	(4) 3/0 - 500 MCM	10kA	65kA
	460/60/3	(2) #4 - 500 MCM	10kA	(3) 3/0 - 500 MCM	10kA	65kA	(3) 3/0 - 500 MCM	10kA	65kA
	575/60/3	(2) #4 - 500 MCM	10kA	(2) 2/0 - 500 MCM	10kA	25kA	(3) 3/0 - 500 MCM	10kA	25kA

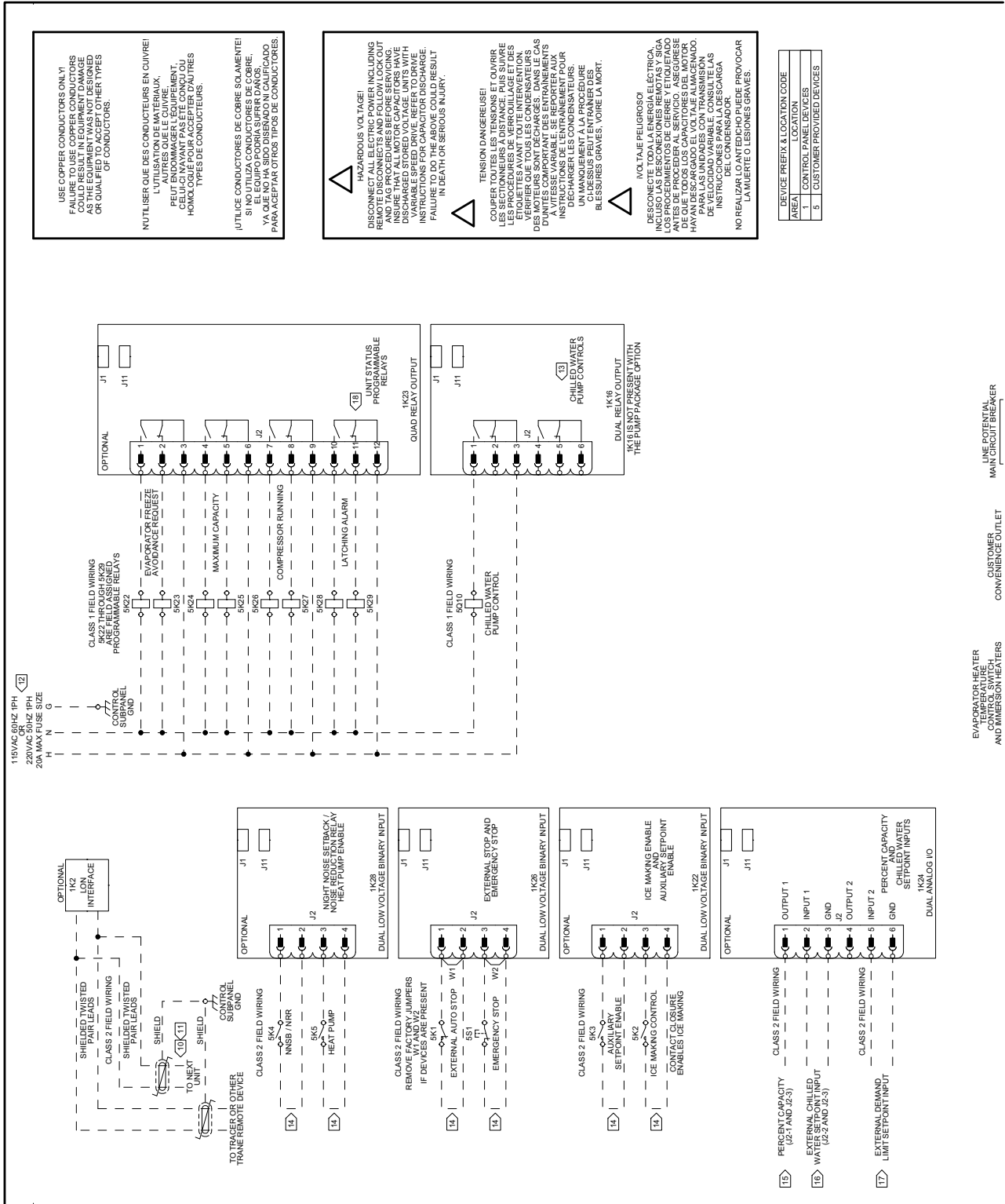
**Note:** Field wire insulation temperature rating must be minimum 90°C unless otherwise specified.

<sup>(a)</sup> Terminal block is not available on units with optional pump package.

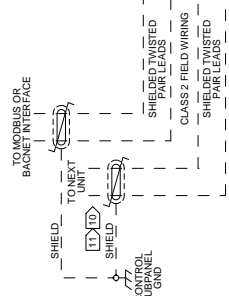
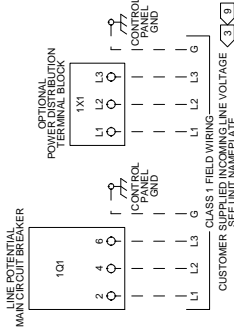
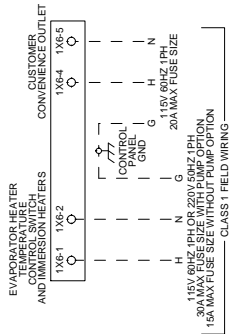
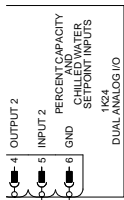


# Electrical Connections

Figure 4. Field wiring







### GENERAL NOTES:

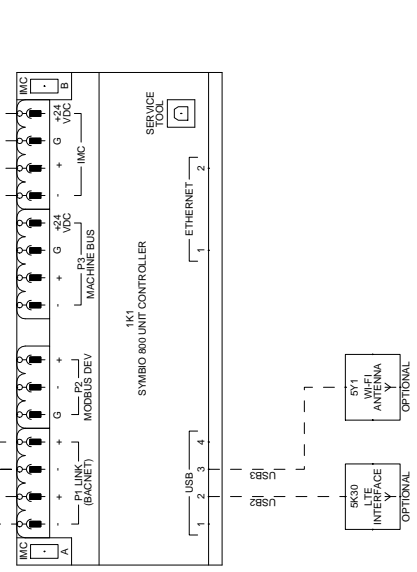
1. WIRE REPRESENTED BY DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS.
2. ALL STANDARD AND OPTIONAL COMPONENTS SHOWN.
3. SINGLE SOURCE POWER IS PROVIDED AS STANDARD ON THIS PRODUCT. FIELD CONNECTIONS ARE MADE TO SERVICES TO OR 1X1.
4. ALL MOTORS ARE PROTECTED FROM PRIMARY SINGLE PHASE FAILURES.
5. CAUTION - TRANE PUMP CONTROL MUST BE USED TO PROVIDE PUMP CONTROL. EVAPORATOR CHILLED WATER PUMP MUST BE CONTROLLED BY THE CHILLER OUTPUT. FAILURE TO COMPLY WITH THIS REQUIREMENT MAY RESULT IN DAMAGE TO THE UNIT.
6. CAUTION - DO NOT ENERGIZE THE UNIT UNTIL CHECK OUT AND STARTUP PROCEDURES HAVE BEEN COMPLETED.

### WIRING REQUIREMENTS:

7. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC), STATE AND LOCAL CODES.
8. DO NOT RUN LOW VOLTAGE WIRINGS (50V OR LESS) IN SEAMOUNT WITH HIGH VOLTAGE WIRINGS. DO NOT EXCEED THE FOLLOWING MAXIMUM RUN LENGTH FOR A GIVEN SIZE: 14 AWG OF 500 FT, 16 AWG OF 2000 FT OR 18 AWG OF 1000 FT.
9. ALL UNIT POWER WIRING MUST BE 800V COPPER CONDUCTORS ONLY AND HAVE A MINIMUM TEMPERATURE OVERCURRENT PROTECTION DEVICE. PROVIDE AN EQUIPMENT GROUNDING IN ACCORDANCE WITH APPLICABLE ELECTRIC CODES. REFER TO WIRE RANGE TABLE FOR LOG SIZES.
10. SHIELDED TWISTED PAIR LEADS ARE REQUIRED FOR CONNECTIONS TO THE COMMUNICATIONS INTERFACE SERVICE TOOL.
11. 22 AWG SHIELDED COMMUNICATION WIRE EQUIVALENT TO UL 1278000 4316 IS RECOMMENDED FOR WIRING TO NEXT UNIT. THE SUM TOTAL OF ALL INTERCONNECTED CABLE SEGMENTS ARE NOT TO EXCEED 6000 FT. CONNECTION TO NEXT UNIT MUST BE MADE THROUGH A TERMINATED RESISTOR CALIBRATED TO THE COMMUNICATIONS INTERFACE.
12. ALL CUSTOMER SUPPLIED CONTROL CIRCUIT WIRING MUST BE COPPER CONDUCTORS ONLY AND HAVE A MINIMUM INSULATION RATING OF 300V. EXCEPT AS NOTED, ALL CUSTOMER WIRING CONNECTIONS ARE MADE TO CIRCUIT BOARD MOUNTED BOX LUGS WITH A WIRE RANGE OF 14 TO 18 AWG OR TO DIN RAIL MOUNTED SPRING FORCE TERMINALS.

### CONTACT RATINGS AND REQUIREMENTS:

13. UNIT PROVIDED DRY CONTACTS FOR THE CONDENSER CHILLED WATER PUMP CONTROL. RELAY CONTACT RATINGS AT 240VAC, 7A RESISTIVE, 2.8VA PILOT DUTY, OR 103 HP, 7.2 FLA CONTACTS ARE RATED FOR 240VAC, 5A GENERAL PURPOSE DUTY.
14. CUSTOMER SUPPLIED CONTACTS FOR ALL LOW VOLTAGE CONNECTIONS MUST BE COMPATIBLE WITH DRY CIRCUIT 240VAC FOR A 12mA RESISTIVE LOAD. SILICER OR GOLD PLATED CONTACTS ARE RECOMMENDED.
15. TERMINALS 1 & 3 ARE TO BE WIRED TO REPORT % CAPACITY. OUTPUT CONFIGURED 2-10 VDC.
16. TERMINALS 2 & 3 ARE TO BE WIRED TO CUSTOMER EXTERNAL CHILLED WATER SETPOINT. INPUT CONFIGURED 2-10 VDC FROM FACTORY. SEE OPERATING INSTRUCTIONS TO CONFIGURE FOR 250 PPM.
17. TERMINALS 4 & 5 ARE TO BE WIRED TO CUSTOMER EXTERNAL CHILLED WATER SETPOINT. INPUT CONFIGURED 2-10 VDC FROM FACTORY. SEE OPERATING INSTRUCTIONS TO CONFIGURE FOR 250 PPM.
18. WHEN ICE MAKING OPTION SELECTED, DEFAULT RELAY SETTING WILL BE REPLACED WITH "ICE MAKING COMPLETE" OUTPUT FUNCTION.



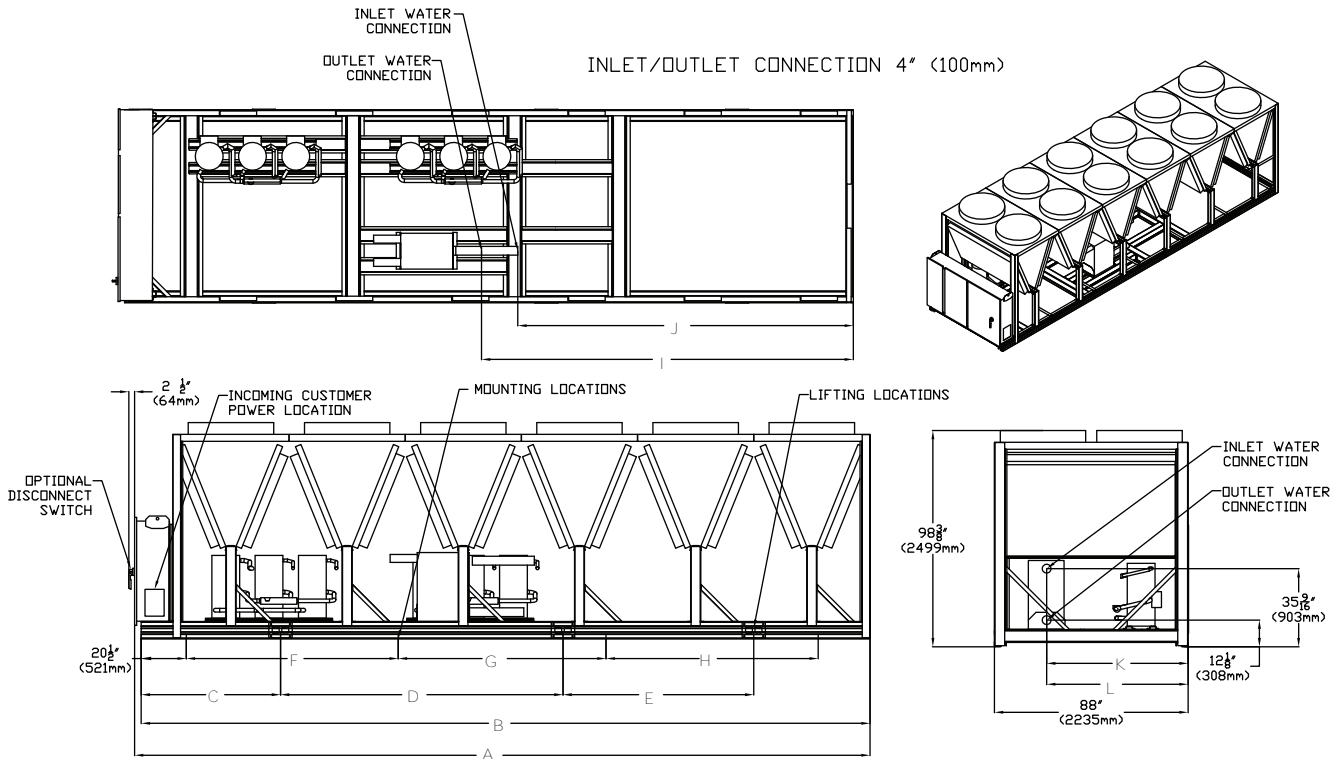
<b>DIAGRAM UNIT FIELD WIRING</b>		
DRAWN BY: LU YANG TRANE DATE: 15 DEC 2020 MASTER FILE: REVISION DATE: 5722387 REPLACES: SIMILAR TO: USED BY:	ACSA - ACSA UNIT <b>57322801</b> DRAWING NUMBER	REV <b>A</b> SHEET 1 OF 1
CAD: CREO SCHEMATICS		



# Dimensions and Weights

## Unit Dimensions

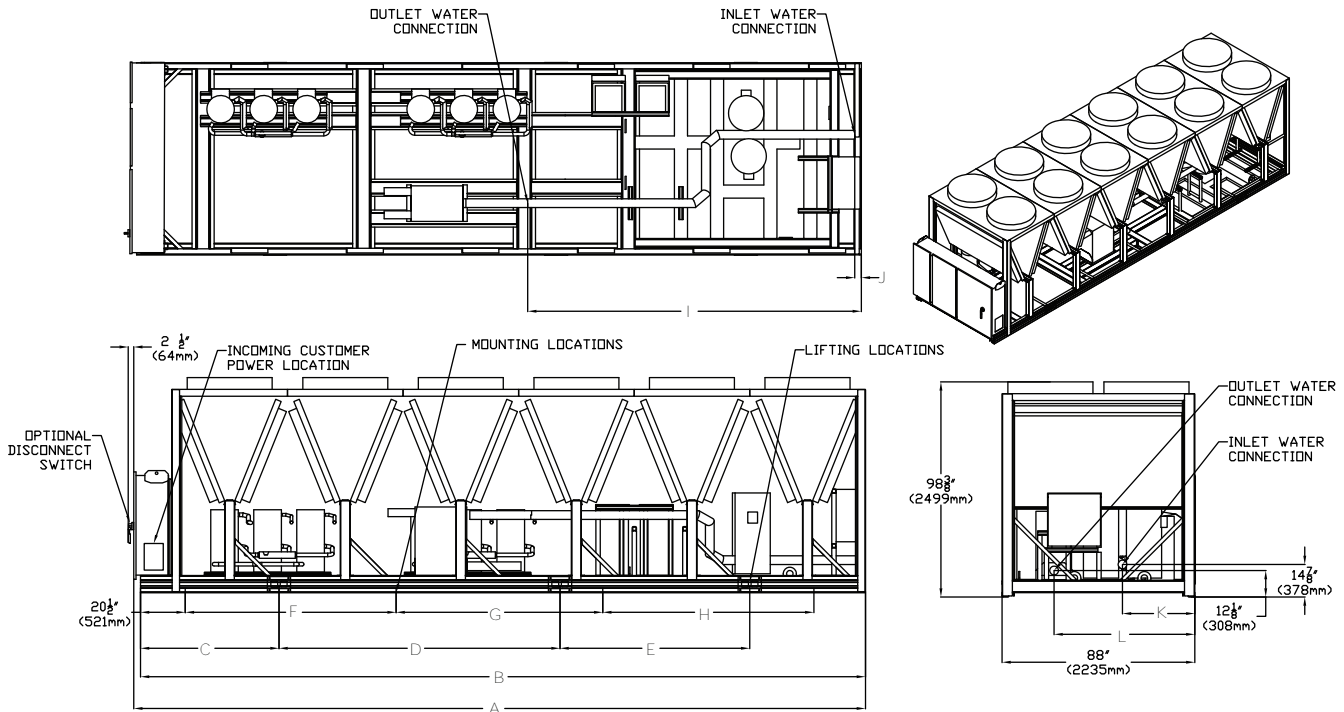
### Standard Unit



Dim	Unit Size											
	140		160		180		200		215		230	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
A	228.9	5513	228.9	5513	281.5	7151	281.5	7151	334.4	8495	334.4	8495.0
B	225.7	5734	225.7	5734	278.6	7076	278.6	7076	331.4	8418	331.4	8418
C	48.3	1226	48.3	1226	63.3	1609	63.3	1609	60.4	1535	60.4	1535
D	172.6	4383	172.6	4383	225.4	5725	225.4	5725	189.1	4803	189.1	4803
E	-	-	-	-	-	-	-	-	275.8	7006	275.8	7006
F	75.6	1920	75.6	1920	116.9	2970	116.9	2970	116.9	2970	116.9	2970
G	134.6	3420	134.6	3420	176.0	4470	176.0	4470	211.4	5370	211.4	5370
H	189.8	4820	189.8	4820	246.9	6270	246.9	6270	307.9	7820	307.9	7820
I	64.1	1628	64.1	1628	99.9	2536	99.9	2536	152.7	3878	152.7	3878
J (ACSA)	58.9	1751	58.9	1751	104.7	2689	104.7	2689	157.5	4001	157.5	4001
J (ACXA)	52.8	1341	52.8	1341	98.6	2504	98.6	2504	151.4	3846	151.4	3846
K	64.3	1633	64.3	1633	64.3	1633	64.3	1633	64.3	1633	64.3	1633
L	64.3	1633	64.3	1633	64.3	1633	64.3	1633	64.3	1633	64.3	1633

## Units with Pump Package Option

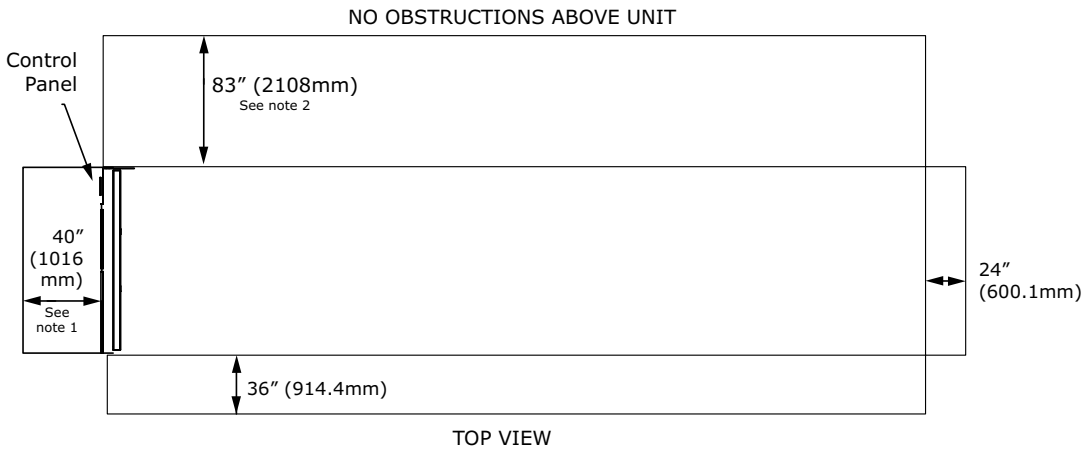
INLET/OUTLET CONNECTION 4" (100mm)



Dim	Unit Size											
	140		160		180		200		215		230	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
A	228.9	5513	228.9	5513	281.5	7151	281.5	7151	334.4	8495	334.4	8495.0
B	225.7	5734	225.7	5734	278.6	7076	278.6	7076	331.4	8418	331.4	8418
C	48.3	1226	48.3	1226	63.3	1609	63.3	1609	60.4	1535	60.4	1535
D	172.6	4383	172.6	4383	225.4	5725	225.4	5725	189.1	4803	189.1	4803
E	-	-	-	-	-	-	-	-	275.8	7006	275.8	7006
F	75.6	1920	75.6	1920	116.9	2970	116.9	2970	116.9	2970	116.9	2970
G	134.6	3420	134.6	3420	176.0	4470	176.0	4470	211.4	5370	211.4	5370
H	189.8	4820	189.8	4820	246.9	6270	246.9	6270	307.9	7820	307.9	7820
I	92.4	2346	92.4	2346	104.4	2652	104.4	2652	157.3	3996	157.3	3996
J	5.5	139	5.5	139	3.3	83	3.3	83	5.6	143	5.6	143
K	33.0	838	33.0	838	33.0	838	33.0	838	33.0	838	33.0	838
L	75.4	1915	75.4	1915	33.0	838	33.0	838	64.3	1633	64.3	1633

## Service Clearance

Figure 5. Unit service clearance requirements



**Notes:**

1. A full 40" clearance is required in front of the control panel. Must be measured from front of panel, not end of unit base. Installer must also follow NEC and local/state codes for electrical clearance requirements.
2. Area above unit is required for operation, maintenance, access panel and air flow. No obstructions above unit.
3. Clearance of 85" on the side of the unit is required for coil replacement. Preferred side for coil replacement is shown (left side of the unit, as facing control panel), however either side is acceptable.
4. For obstructions or multiple units, refer to close spacing bulletin.

## Weights

Table 8. Unit weights

Unit Size (tons)	Standard Unit				Options - Additional Weight	
	Shipping		Operating		Pump Package	
	lb	kg	lb	kg	lb	kg
140	7754	3517	7897	3581	2970	1347
160	7754	3517	7897	3581	2970	1347
180	9434	4278	9577	4343	3205	1454
200	9434	4278	9577	4343	3205	1454
215	10376	4706	10520	4771	3711	1683
230	10523	4772	10701	4853	3711	1683

**Note:** Weights include factory charge of refrigerant and oil.



# Mechanical Specifications

## General

Units are leak tested, pressure tested, then evacuated and charged. All chillers are factory tested prior to shipment. Units ship with a full operating charge of oil and refrigerant as standard. Units can also be shipped with a nitrogen charge if required. Unit panels, structural elements and control boxes are constructed of galvanized steel and mounted on a bolted galvanized steel base. Unit panels, control boxes and the structural base are finished with a baked on powder paint.

## Certified AHRI Performance

Trane air-cooled chillers are rated within the scope of the Air-Conditioning, Heating & 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.

## Refrigeration Circuits

All chiller sizes are designed with two refrigerant circuits.

Each refrigeration circuit includes two or three scroll compressors, a compressor suction and discharge service valve, liquid line shutoff valve, removable core filter, liquid line sight glass with moisture indicator, charging port and an electronic expansion valve.

## 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 460 psig and a waterside working pressure of 150 psig. Evaporator is tested at 1.1 times maximum allowable refrigerant side working pressure and 1.5 times maximum allowable water side working pressure.

Immersion heaters protect the evaporator to an ambient of -20°F (-29°C). The evaporator is covered with factory-installed 0.75 inch (19.05 mm) Armaflex II or equal (k=0.28) insulation. Foam insulation is used on the suction line.

## Condenser and Fans

For ACSA units, the air-cooled microchannel condenser coils are used with all aluminum brazed fin construction. For ACXA units, the round tube plate fin (RTPF) coils are used with aluminum fin constructions. The condenser coil has an integral subcooling circuit. The maximum allowable working pressure of the condenser is 650 psig. Condensers are factory proof and leak tested at 1.1 times maximum allowable refrigerant side working pressure. Coils can be cleaned with high pressure water.

Direct-drive vertical-discharge airfoil condenser fans are dynamically balanced. The condenser fan motors are permanent magnet motors with integrated drive to provide variable speed fan control for all fans.

Chillers are equipped with EC condenser fan motors with permanently lubricated ball bearings and internal thermal and overload protection.



## Mechanical Specifications

---

### Compressor

The unit is equipped with two or more hermetic, direct-drive, 3600 rpm 60 Hz (3000 rpm 50 Hz) suction gas-cooled scroll compressors with intermediate discharge valve to increase seasonal 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 Controls

All unit controls are housed in an outdoor rated weather tight enclosure with removable plates to allow for customer 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 startup and shut down, leaving chilled water temperature control, evaporator flow proving, compressor staging, electronic expansion valve modulation, condenser fan sequencing and speed control, anti-recycle logic, automatic lead/lag compressor starting, and load limiting.

### Symbio™ 800

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

Unit protective functions of the Symbio™ 800 include: loss of chilled water flow, evaporator freezing, loss of refrigerant, low refrigerant pressure, high refrigerant pressure, high compressor motor temperature, and loss of oil to the compressor.

### AdaptiView TD7 Display

A full color AdaptiView™ TD7 touch screen display indicates all important unit and circuit parameters, in logical groupings on various screens. The parameters including chilled water set point, leaving chilled water temperature, demand limit set point, evaporator and condenser refrigerant temperatures and pressures, compressor and fan speeds, and all pertinent electrical information. The display also provides "on screen" trending graphs of predefined parameters as well as customizable trend 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 announcement 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:
  - Removable Cover
  - UV Resistant Touchscreen
  - -40°C to 70°C Operating Temperature
  - IP56 rated (Power Jets of Water from all directions)
- RoHS Compliant
- UL 916 Listed
- 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

## **Chilled Water Reset**

Control logic and factory installed sensors are provided to reset leaving chilled water temperature. The set point can be reset based on ambient temperature or return evaporator water temperature.

## **Factory Mounted Flow Proving and Flow Control**

The factory installed evaporator water flow switch is provided with the control logic and relays to turn the chilled water flow on and off as the chiller requires for operation and protection. This function is a requirement on the chiller.



# Options

## Application Options

### Ice Making

The ice making option provides special control logic to handle low temperature brine applications (less than 40°F [4.4°C] leaving evaporator temperature) for thermal storage applications.

### Low Temperature Fluid

Low temperature option provides special control logic to handle low temperature brine applications including part load conditions below 40°F (4.4°C) leaving evaporator temperature.

### Low Ambient Option

The low ambient options adds hardware and unit controls to allow start and operation down to ambient temperatures of -20°F (-29°C).

### High Ambient Option

High ambient option permits high ambient (up to 130°F [54°C]) operation. Low side ambient remains 32°F (0°C).

### Wide Ambient Option

The wide ambient option combines the features of low and high ambient options for an ambient range of -20 to 130°F (-29 to 54.4°C).

### Dual High Head Pump Package

Pump package includes: two high head pumps, two VSDs, 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 controller displays both of the evaporator pump starts and run-times. Freeze protection down to an ambient of -4°F (-20°C) is included as standard. The cold parts of the pump package will also be insulated. Designed with one redundant pump and VFD, the chiller controls both pumps through a lead/lag and failure/recovery functionality.

Two variable speed drives are installed to control the pump. The drive is adjusted upon start up to balance the system flow and head requirements.

Chiller will require a field-supplied expansion tank when optional pump package is provided. Expansion tank should be field installed before pump inlet at water piping system outside of pump package, the expansion volume is depended on fluid type, temperature range, pressure and loop volume.

### Single High Head Pump Package

Pump package includes: one high head pump, VSD, 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 controller displays evaporator pump starts and run-times. Freeze protection down to an ambient of -4°F (-20°C) is included as standard. The cold parts of the pump package will also be insulated.

A variable speed drive is installed to control the pump. The drive is adjusted upon start up to balance the system flow and head requirements.

Chiller will require a field-supplied expansion tank when optional pump package is provided. Expansion tank should be field installed before pump inlet at water piping system outside of pump package, the expansion volume is depended on fluid type, temperature range, pressure and loop volume.



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## Electrical Options

### Circuit Breaker

A HACR rated molded case capacity circuit breaker (UL approved) is available. Circuit breaker can also be used to disconnect chiller from main power with a through-the-door handle.

### 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.

## Control Options

### Wireless Connectivity Options

- WiFi module is a wireless interface option to service technician to connect the chiller to the service tool interface.
- LTE modem is a wireless interface option to allow the chiller to pass performance and diagnostic information to Trane Intelligent Services without the need for an internal network.
- Air-Fi module is a wireless interface option to connect the chiller to a Trane Tracer system.

### 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.

### Remote Input Options

Option permits remote chilled liquid setpoint, remote demand limit setpoint, or both by accepting a 4-20 mA or 2-10 Vdc analog signal.

### Remote Output Options

Permits alarm relay outputs, chiller Percent Capacity via a 2–10VDC signal, or both.

### Tracer Communication Interface

Interface permits bi-directional communication to Tracer® SC or ES system via BACnet® interface.

## Sound Options

### Acoustic Package

Each compressor includes a factory installed acoustical treatment.

## Options

### Architectural Louvered Panels

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



## Options

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### **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.

### **Convenience Outlet**

Provides a 20 amp, 115V (60 Hz) convenience outlet on the unit.

### **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.

### **Isolators — Elastomeric**

Elastomeric Isolators provide isolation between chiller and structure to help eliminate vibration transmission.

### **Drain Pan**

Drain pans option is only applied to ACXA which is used to collect the defrost water during heating mode and convey to customer plumbing system. Drain pan can be removed for on site cleaning and re-installed.





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