



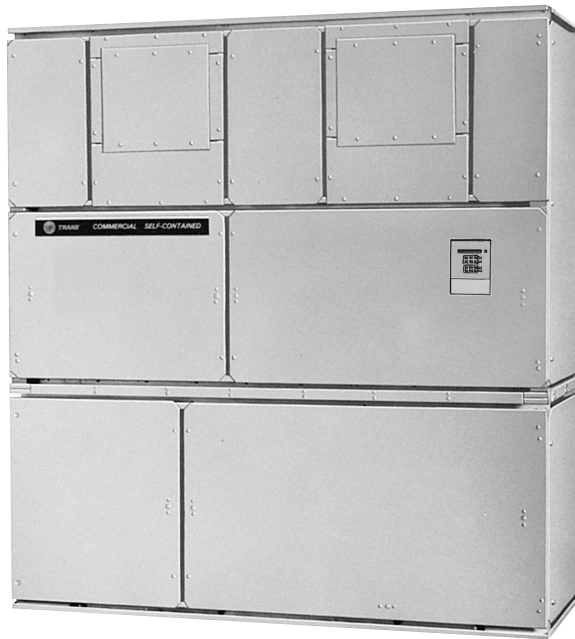
Product Catalog

Commercial Self-Contained Modular Series

Water-Cooled — 20 to 35 Tons

Air-Cooled — 32 Ton

Remote Air-Cooled Condenser





Introduction

Modular Series Self-Contained Units



- **Modular design** allows the fan/coil section to “split-apart” from the compressor section
- **35–inch wide base** that fits through standard door openings
- **Trane 3-D® Scroll compressors** give reliable, efficient, and quiet operation
- **Unit-mounted microprocessor control** with human interface panel
- **Hinged and removable control panel door** for easy access
- **Waterside or airside economizer** for “free cooling”
- **Two-bolt connection** on cleanable condenser for quick, easy maintenance
- **Waterside valve package** option to enhance system efficiency
- **Sight glasses** with ports for viewing unit while running
- **2-inch flat filter box** inside unit casing
- Energy saving with **variable frequency drive (VFD)**
- **Sloped drain pan**

The industry leader in self-contained systems since 1988 is now even better! The modular series unit is easy to install, flexible, and now has the latest control technology. New modular DDC controls with human interface (HI) panel make self-contained units easier to operate.

The modular series design fits the needs of the retrofit/renovation market. The unit easily “splits” apart to fit into freight elevators. In addition, we can ship the compressor section separate from the fan/coil section for field installation. Filter, economizer, and heating coil sections are all

removable for added flexibility. Also, the modular series is small enough to fit through a standard 35-inch door opening.

The unit's DDC controls are designed to work with Trane® equipment for optimum efficiency. The factory installs and commissions each control component to ensure simple and reliable operation. Also, the self-contained unit has a unit mounted human interface panel as standard and a remote option that will monitor up to four units.

Easy to install

- Passes through standard 35-inch door opening.
- Removable fan/coil section from compressor section for those applications that require the unit to be "split apart"
- Ship separate fan/coil section for field installation
- Removable filter, economizer and heating coil sections for added flexibility

Flexible

- Left or right hand condenser connections for field piping\condenser piping factory manifolded and extended to the unit exterior for a single inlet and outlet
- Economizer factory piped for either right or left hand connections and extended to the unit exterior for a single inlet and outlet
- Free cooling with either waterside or airside economizer options
- Hot water, steam, and electric heating coil options
- Control system choices include:
 - Thermostat interface for simple constant volume applications
 - Direct digital controls (DDC) available on the self-contained, offers the most advanced unit control for constant volume or variable air volume applications — available with a Tracer® LCI-I, BCI-I, or generic building automation system interface.

Easy to operate

The self-contained unit's control design allows greater application flexibility. You can order exactly what the job requires as options, instead of one large control package. Unit features are distributed among multiple field replaceable printed circuit boards.

All set-up parameters are preset from the factory, requiring less startup time during installation.

In addition, self-contained units have a human interface panel that displays unit operating parameters and conditions in English, Spanish, or French language, making it easy to adjust setpoints or service. It also requires less time for building maintenance personnel to learn to interact with the unit. Human interface panel displays all of the self-contained unit's control parameters, such as system on/off; demand limiting type; night setback setpoints. All setpoint adjustments are done through human interface key-pad. You can also monitor diagnostic points, such as sensor failures; supply airflow loss; and inoperative refrigerant circuit. Diagnostics are held in memory, even during power loss. This allows operator/servicer to diagnose failure root cause.

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Revision History

- EER/IEER ratings table is updated in the General Data chapter.
- Running edits included.



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Features and Benefits

Features

Standard Features

- 20 through 35 ton industrial and commercial water-cooled self-contained units
- 32 ton industrial/commercial remote air-cooled self-contained units
- DDC controls or thermostat interface
- Improved Trane 3-D™ scroll compressor
- Constant volume (CV) or variable air volume (VAV) operation
- Low ambient compressor lockout adjustable control input
- EISA efficiency open drip proof (ODP) and totally enclosed fan (TEFC) cooled supply fan motor options
- Emergency stop input.
- Refrigeration circuits are completely factory piped and tested on water-cooled units
- Water-cooled condensers are Factory-piped and tested and mechanically cleanable
- Two-bolt removable condenser waterboxes for quick and easy cleaning
- Sloped drain pans to ensure complete condensate removal
- Internally trapped drain connection with cleanout
- Internally isolated centrifugal supply fan
- Sturdy-gauge galvanized steel framework with easily removable painted galvanized steel exterior panels
- UL listing on standard options
- Fan belts and grease lines are easily accessible
- Access panels and clearance provided to clean both evaporator and waterside economizer coil fins
- Condensing pressure control on all variable water flow systems with valves
- Shipped with protective shrink wrap covering of unit and any indoor modules shipped loose

Standard Control Features

- Unit-mounted human interface panel with a two line x 40 character clear language (English, Spanish, or French) display and a 16-function keypad that includes custom, diagnostics, and service test mode menu keys
- Unit is equipped with phase monitor in control box. The phase monitor will protect against phase loss, imbalance and reversal of line voltage
- Compressor lead/lag
- Froststat™ coil frost protection on all units
- Daytime warm-up (occupied mode) on units with heat and morning warm-up operation on all units
- Supply air static over pressurization protection on units with variable frequency drives (VFDs)
- Supply airflow proving
- Supply air tempering control with heating option
- Supply air heating control on VAV with hydronic heating option
- Mappable sensors and setpoint sources
- Occupied/unoccupied switching
- Timed override activation
- Programmable water purge during unoccupied mode
- High entering air temperature limit
- Low entering air temperature limit with waterside economizer or hydronic heat



Features and Benefits

Optional Features

- Trane® LCI-I Communication Interface Module: ICS interface control module
- BACnet® Communication Interface Module
- Generic BAS interface
- Comparative enthalpy control
- Ventilation override from up to five external inputs
- Remote human interface controls up to four units
- Waterside modulating condensing temperature control valves include factory-installed piping and control wiring
- Removable cast iron headers on cleanable waterside economizer
- Refrigerant suction discharge line service (shut-off) valves
- Protective coatings for the evaporator coils
- Double wall construction
- Stainless steel sloped drain pan
- Medium efficiency throwaway filters
- Through-the-door non-fused disconnect switch
- Trane's air quality Traq™ damper in airside economizer mixing box
- High duct temperature thermostat
- Dual electrical power connection
- CO₂ reset input

Factory-Installed or Ship-Separate Options

- Waterside economizer with factory-installed piping and controls
- Flexible horizontal discharge plenum with or without factory cut holes
- Heating options include hot water and steam

Field-Installed Accessories

- Airside economizer control with or without mixing box
- Air-Fi® Wireless Communications Interface (WCI)
- Programmable sensors with or without night set back for CV and VAV systems
- ICS zone sensors used with Tracer® system for zone control
- Field-installed module kits available for field upgrade of controls.
- Low leak dampers for 0-100 percent modulating fresh air economizer
- Electric heating option
- Fully integrated variable frequency drive (VFD) control with or without optional integrated bypass

Benefits

Servicing Advantages

- Factory-installed and tested options reduce field labor and installation risk, while improving system reliability
- Requires less sophisticated maintenance than built-up systems

Tenant Satisfaction

- Complete HVAC system on each floor minimizes tenant inconvenience during routine maintenance
- Tenants can control system after hours to increase productivity and minimize expense

Low First Cost

- Reduce field labor, installation time, and cost with factory-packaged controls and piping
- Reduce installed tonnage up to 20 percent by taking advantage of building diversity and VAV flexibility

- Flexible air discharge arrangement matches most building configurations

Lower Installed Cost

- Single point power connection
- Single point water connection
- Factory-commissioned and tested controls
- Factory-installed options
- Internally trapped drain connection

Economical Operation

- Free cooling with waterside or air side economizer
- Energy savings with floor-by-floor system since only units on floors requiring cooling need to operate
- Significant annual energy consumption reduction due to partial occupancy after hours, when compared to a central chilled water system
- Simple heating alternatives include perimeter radiation and fan-powered VAV
- Energy savings from the integrated water valve control using pump unloading

Assured Acoustical Performance

- Flexible, horizontal discharge plenum provides smooth airflow, reducing static pressure losses for optimum acoustical performance
- Multiple compressor design reduces acoustical levels. Scroll compressor design smooths gas flow for quieter operation

Indoor Air Quality (IAQ) Features

- Stainless steel sloped drain pan option.
- Internally trapped drain connection
- Double-wall construction option
- Matte-faced fiberglass insulation
- High-efficiency throwaway filter option
- Easily cleanable evaporator, condensers, and waterside economizers
- Filter access door allows easy removal to encourage frequent filter changing
- Airside economizer with Traq™ damper allows direct measurement and control of outdoor air

Enhanced Serviceability

- Self-supporting removable panels
- Quick access service panel fasteners
- Easy to adjust setpoints and operating parameters using the human interface panel on units
- Refrigerant line sight glasses in view during operation

Integrated Self-Contained Systems

Integrated Comfort System (ICS)

Trane's Integrated Comfort System® (ICS) increases job control by combining Signature Series self-contained units and a Tracer® building management system. This integrated system provides total building comfort and control. Building owners and managers not only save energy when using ICS. They have the ability to automate their facilities and the convenience of a control system interface.



Features and Benefits

Simplifying the Comfort System

Trane's designers combined new technology and innovation to bring you more system capabilities and flexibility. Our Integrated Comfort System (ICS) with HVAC equipment is easy to use, install, commission, and service.

Everything you need to know about your self-contained VAV system is available using Tracer®, Trane's family of building automation products. Tracer is a software package that minimizes custom programming requirements and allows easy system setup and control using your personal computer.

The self-contained unit, as part of Trane ICS, provides powerful maintenance monitoring, control, and reporting capabilities. Tracer places the self-contained unit in the appropriate operating mode for system on/off, night setback, demand limiting, setpoint adjustment based on outside parameters, and much more. You can monitor unit diagnostic conditions through Tracer such as sensor failures, loss of supply airflow, and an inoperative refrigerant circuit.

Tracer points monitored for Self-Contained

- Compressor on/off status
- Ventilation status
- Condenser water flow status
- Heat status
- Supply air pressure
- Supply air temperature
- Suction temperature of each circuit
- Entering economizer water temperature
- Zone temperature
- Entering condenser water temperature
- Supply air temperature reset signal
- Morning warm-up sensor temperature
- Entering air temperature

Tracer control points available for Self-Contained

- Cooling and heating setpoints
- VAV discharge air temperature setpoints
- Supply air pressure setpoint
- Cooling and heating enable/disable
- Air economizer enable/disable
- Airside economizer minimum position
- Unit priority shutdown

Integrated Comfort with BACnet Communication

The Trane SC BACnet Control Interface (BCI-I) for IntelliPak Self Contained offers a building automation control system with outstanding interoperability benefits. BACnet, which is an industry standard, is an open, secure and reliable network communication protocol for controls, created by American Society of Heating, refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).

Interoperability allows application or project engineers to specify the best products of a given type, rather than one individual supplier's entire system. It reduces product training and installation costs by standardizing communications across products. Interoperable systems allow building managers to monitor and control IntelliPak Self Contained equipment with Tracer SC or a 3rd party building automation system. It enables integration with many different building controls such as access/intrusion monitoring, lighting, fire and smoke devices, energy

management, and a wide variety of sensors (temperature, pressure, light, humidity, occupancy, CO₂ and air velocity).

Trane Air-Fi® Wireless Communication

Trane Air-Fi® Wireless replaces the need for wired building controls, allowing installations to be completed quickly with less disruption to occupants in existing buildings, while also providing greater reliability, simplified installation and more flexibility as building spaces change. Many building owners face challenges connected to maintenance and repair with traditional wired systems, which fail when wires are cut or disconnected or fail intermittently when damaged. Air-Fi Wireless can help optimize any building's performance with less risk, thanks to self-repairing mesh technology that features redundant signal paths to help prevent communication failures.

Trane offers a typical 200-foot indoor signal range, with up to four times the number of paths, extending up to half-mile when unobstructed for even greater levels of signal reliability. With a battery life that's three times what competitors offer, the lifetime battery¹ eliminates the need to replace batteries over the life of the system in most installations and saves time and money. Air-Fi Wireless is a ZigBee® Certified Building Automation solution, and the system is built on a platform that supports BACnet® open standards. This allows customers to integrate devices in the future when the building expands or changes. Wireless sensors are easy to move or replace, as needed, to resolve issues related to sensing accuracy, aesthetics or reconfigured spaces.

Trane Air-Fi Wireless also conforms to the IEEE 802.15.4 standard, so customers get a wireless BAS communication system that reliably coexists with other wireless systems, including Bluetooth® and Wi-Fi® — without interference. There's no security risk with Air-Fi Wireless, which uses a separate, secure network from those used by a building's IT system. Air-Fi Wireless secures building automation networks by the use of AES-128 encryption, keys and device authentication.

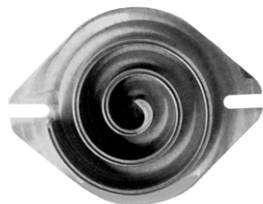
The Trane Air-Fi Wireless interface is available factory-installed and addressed as a design special to expedite installation and reduce labor and upfront costs. It also ensures higher installation quality that results in better building performance for customers because the work is done in a controlled environment, making it more repeatable and consistent. To learn more about Trane Air-Fi Wireless technology, visit www.trane.com.

3-D Scroll Compressors

The Trane 3-D® Scroll provides important reliability and efficiency benefits inherent to its design. The 3-D Scroll allows the orbiting scrolls to touch in all three dimensions forming a completely enclosed compression chamber which leads to increased efficiency.

In addition, the orbiting scrolls only touch with enough force to create a seal, thereby resulting in no wear between the scroll involutes. The fixed and orbiting scrolls are made of high strength cast iron, which results in less thermal distortion and minimal leakage. In addition, better part isolation has resulted in reduced compressor sound levels compared to previous designs.

Figure 1. 3-D® scroll compressor



Features listed below optimize the compressor design and performance:

- Optimized scroll profile
- Heat shield protection to reduce heat transfer between discharge and suction gas
- Suction Gas Cooled Motor

¹ Based on typical indoor operating conditions.

Features and Benefits

- Low Torque Variation
- Improved sealing between condenser side and air handler side

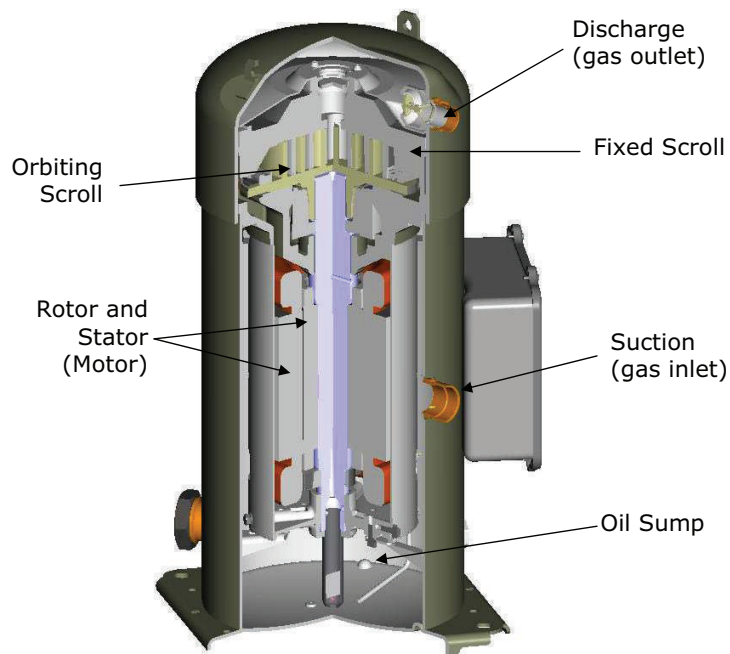
Additional features are incorporated in the compressor design for greater compressor reliability:

- Patented design motor cap for improved motor cooling
- Improved bearing alignment
- Improved resistance to dry start up
- Oil sight glass for evaluating proper oil levels

Low Torque Variation

The 3-D scroll compressor has a very smooth compression cycle. This means that the scroll compressor imposes very little stress on the motor resulting in greater reliability. Low torque variation reduces noise and vibration.

Figure 2. Internal view, 3-D® scroll compressor



Suction Gas Cooled Motor

Compressor motor efficiency and reliability is further optimized with the latest scroll design. The patented motor cap directs suction gas over the motor resulting in cooler motor temperatures for longer life and better efficiency.

Application Considerations

Self-Contained Acoustical Recommendations

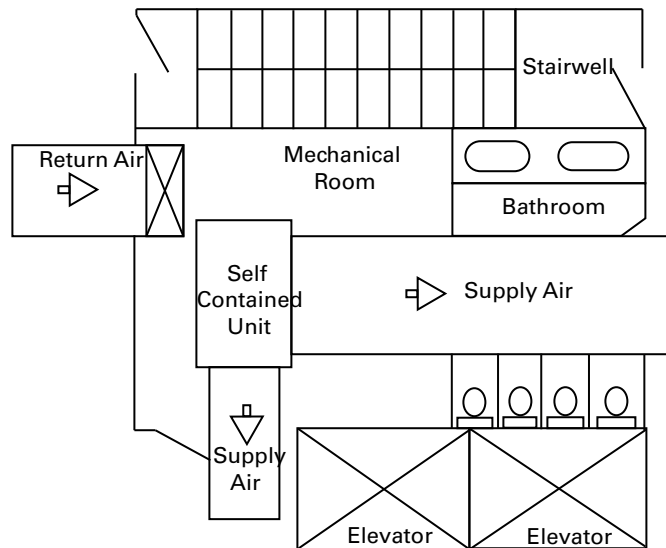
Successful acoustical results are dependent on many system design factors.

Following are general acoustical recommendations. For more information, or if there is concern about a particular installation, contact a professional acoustical consultant.

Location and Orientation of the Mechanical Equipment Room

Locate the equipment room adjacent to stairwells, utility rooms, electrical closets, and rest rooms if possible, to minimize the acoustic effects and risk of workmanship or installation errors. (See figure below) Place the discharge and return air ductwork over these less acoustically sensitive areas, using vertical or horizontal fresh air shafts. Consult code requirements for fresh air and smoke purge constraints.

Figure 3. Equipment room and location and orientation



Return Air Ductwork

Duct the return air into the mechanical equipment room. Connect ductwork to the unit if local code dictates. The return air ductwork must have an elbow inside the equipment room. This elbow will reduce sound transmissions through the return duct. Extend the ductwork from the elbow far enough to block the "line of sight" to the exterior of the equipment room. Use a minimum ductwork length of 15 feet to the equipment room exterior. Line the duct with two-inch, three-pound density insulation. Use multiple, small return ducts for better acoustical performance to the occupied space.

Supply Air Ductwork

Insulate the supply air duct with two-inch, three-pound density insulation. Extend this lining at least 15 feet out from the equipment room wall, keeping the duct aspect ratio as small as possible. Minimize large flat panels since they transmit sound. In addition, small aspect ratios will minimize potential "oil canning" of the duct due to flow turbulence.

The flexible horizontal discharge plenum option helps avoid complicated ductwork transitions. Ductwork turning vanes typically improve pressure drop but degrade acoustical performance.

Recommended Maximum Air Velocities

The maximum recommended velocity for the discharge air duct is 2,000 fpm. The maximum recommended velocity for the return air duct is 1,000 fpm. Limit air velocities below these operating points to minimize the risk of flow turbulence that causes regenerated noise. Using

Application Considerations

round supply duct and static regain allows maximum discharge air velocities up to 3,000 fpm. Lining round supply duct also substantially lowers frequency noise attenuation. However, flow regenerated noise potential increases dramatically at air velocities over 3000 fpm.

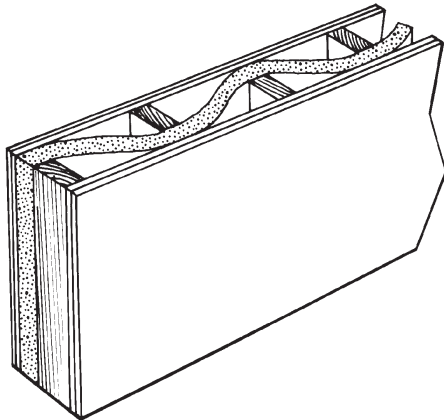
Equipment Room Construction Options

The preferred equipment room wall construction is concrete block. If this is not feasible then a double stud offset wall is suggested (See figure below). This removes physical contact that would transmit sound through the equipment room wall to the occupied space. Interweave fiberglass insulation between the wall studs. Use two layers of drywall on each side of the wall.

Workmanship details are critical to acoustical performance. Seal all wall and floor penetrations by the ductwork, water piping, and equipment room access doors with a flexible material such as caulk and/or gasketing to stop noise and air leaks.

Locate the equipment room door away from acoustically sensitive areas like conference rooms. The door should swing out of the equipment room, if possible, so that the low pressure in the equipment room pulls the door in to help maintain a tight seal.

Figure 4. Double stud offset wall with interwoven insulation



Equipment Options

The flexible horizontal discharge plenum allows multiple tested outlet options. This minimizes the risk of acoustic and/or pressure drop problems by avoiding complex transitions close to the fan discharge.

Static Pressure Versus Acoustics

Design the system to minimize the total static pressure required from the self-contained unit fan. Typically a change in static pressure of only 0.5 inches can reduce NC level by approximately 2 or 3 in the occupied space.

Isolation Recommendations

Unit

The unit fan and compressors are internally isolated. The unit fan and compressors are internally isolated. Therefore, external isolation is not required. Consult a vibration specialist before considering external or double vibration isolation.

Ductwork

Design duct connections to the unit using a flexible material. Consult local codes for approved flexible duct material to prevent fire hazard potential.

Piping Connections

Rubber isolator connectors are recommended for condenser piping to prevent vibration transmission to or from the building plumbing. The self-contained unit is internally isolated and does not require additional isolation. However, ensure that proper system vibration isolation design prevents vibration transmission from the building plumbing to the unit. Also be sure to properly isolate the drain line.

Condenser Water Piping

Piping Location and Arrangement

Provide at least 24 inches of clearance between the piping and the unit for service. Place the risers away from the side of the unit if possible. Be sure to allow sufficient space for valves and unions between the piping and the self-contained unit. Lay out condenser piping in reverse returns to help balance the system. This is accomplished by equalizing the supply and return pipe length. Multi-story buildings can use a direct return system with balancing valves at each floor. Install all heat exchangers and most cooling tower piping below the sump operating water level to prevent overflow during unit and/or system shut down.

Recommended Pump Location

Locate pump downstream of the cooling tower and upstream of the self-contained unit. This provides smoother and more stable unit operation.

When the tower and pump are both roof mounted, be sure to provide the necessary net positive suction head pressure to prevent cavitation. Raise the tower or submerge the pump in a sump to provide positive suction. To prevent an on-line pump failure, use a standby pump to avoid a complete system shutdown.

Several partial capacity pumps or variable speed pumps can be used. Review the economics of these alternate pumping options.

Strainers and Water Treatment

Water strainers are required at the unit inlet to eliminate potential unit damage from dirty water. Specify a water basket-type strainer to avoid an incorrect stream strainer application. Untreated or poorly treated water may result in equipment damage. Consult a water treatment specialist for treatment recommendations.

Isolation Valves

Install isolation valves at each unit before the strainer and after the condenser. This allows periodic servicing of the unit or strainer while allowing other units in the system to remain in operation.

Pressure Gauges

Install pressure gauges on the inlet and outlet of the self-contained unit. Select the gauge's scale so that the unit design operating point is approximately mid-scale.

Thermometers

Install thermometers on the condenser water inlet and outlet lines to each unit for system analysis. Trane® recommends using a thermometer temperature range of 40°F to 140°F, using a 2°F temperature increment.

Drains

The unit condensate drain is internally trapped to offset the pressure differential that exists during fan operation. Install a trapped drain in the low point of the mechanical equipment room floor to collect water from cleaning operations.

Condensing Pressure Control (Water-Cooled Condensers)

Often cold condensing water applications between 35°F and 54°F require a condensing pressure control valve. Any unit with the intermediate piping package can modulate water flow to maintain a user-defined condensing temperature. However, to utilize this feature, the building water system must be capable of operating at reduced water flow rates through the self-

contained units. It is imperative to install variable volume pumps or an external bypass in the water distribution system.

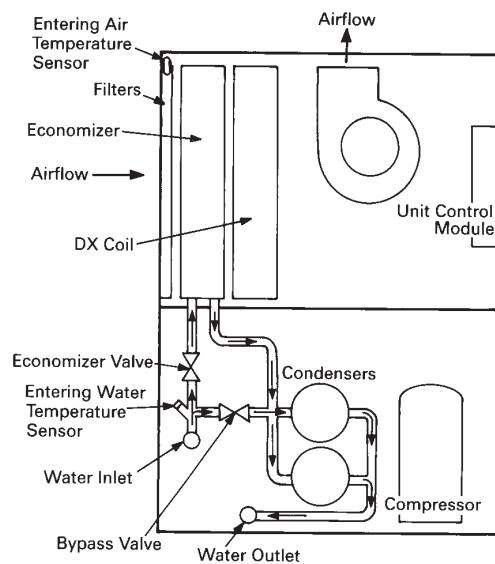
Waterside Economizer Flow Control

Units equipped with waterside economizer and intermediate piping package can be set up for variable or constant water flow.

Use constant water flow setup on water systems that are not capable of unloading water supply to the unit. The economizer and condenser valves will operate in complement to one another to provide continuous water flow.

Use variable water flow setup with water flow systems that can take advantage of pump unloading for energy savings. Since non-cooling operation restricts water flow during part load economizing or condensing temperature control, it is imperative to install variable volume pumps or an external bypass in the water distribution system.

Figure 5. Waterside economizer flow control



Airflow Limitations

The minimum recommended airflow for proper VAV system staging and temperature control is 35% of nominal design airflow. However, using VAV boxes at the appropriate minimum settings will prevent the self-contained unit from operating in a surge condition at airflows below this point. Continuous operation in a surge condition can cause fan failure. See [Table 1, p. 22](#) for minimum airflow conditions.

Modular Series self-contained units use fixed pitch sheaves. Adjust air balancing by obtaining alternate fixed pitch sheave selections from the local Trane sales office.

Waterflow Limitations

Use 3 gpm/ton for optimum unit capacity and efficiency. Use 2.5 or 2 gpm/ton to reduce pump energy, cooling tower and piping costs. However, these reduced waterflows may impact unit capacity and efficiency by one or two percent. Consult the general data section for unit specific waterflow ranges.

Air Cooled Condenser Location

Unobstructed condenser airflow is essential to maintaining capacity and operating efficiency. When determining unit placement, give careful consideration to assure sufficient airflow across the condenser coils. Avoid these two detrimental conditions: warm air recirculation and coil starvation.

Both warm air recirculation and coil starvation cause reductions in unit efficiency and capacity because of the higher head pressure associated with them. In more severe cases, nuisance unit shutdowns will result from excessive head pressures.

Clearances

Ensure vertical condenser air discharge is unobstructed. While it is difficult to predict the degree of warm air recirculation, a unit installed with a ceiling or other obstruction above it will experience a capacity reduction that will reduce the maximum ambient operation. Nuisance high head pressure trip-outs may also occur.

The coil inlet must also be unobstructed. A unit installed closer than the minimum recommended distance to a wall or other vertical riser will experience a combination of coil starvation and warm air recirculation. This may result in capacity and efficiency reductions, as well as possible excessive head pressures. Reference the service clearance section for recommended lateral distances.

Ambient Limitations (Remote Air-Cooled Units)

Standard ambient control allows operation down to 50°F with cycling of condenser fans. Units with the low ambient option are capable of starting and operating in ambient temperatures down to 0°F. Optional low ambient units use a condenser fan damper arrangement that controls condenser capacity by modulating damper airflow in response to saturated condenser temperature.

Maximum cataloged ambient temperature operation of a standard condenser is 115°F. Operation at design ambient above 115°F can result in excessive head pressures.

Free Cooling Opportunities and Alternatives

Free cooling is available with either the airside or waterside economizer options. The advantages and disadvantages of each type are listed as follows:

Waterside Economizer

The waterside economizer substantially reduces the compressor energy requirements because it uses the cooling water before it enters the condensers. Additional equipment room space is not required since the coils are contained within the overall unit dimensions.

Disadvantages include higher airside pressure drop and a higher head on condenser water pumps.

The coils can be mechanically cleaned (optional) for ease in maintenance versus expensive and difficult chemical cleaning methods.

Airside Economizer

The airside economizer substantially reduces compressor, cooling tower, and condenser water pump energy requirements using outside air for free cooling. It also reduces tower make up water needs and related water treatment.

Disadvantages include building requirements that locate the mechanical room and self-contained unit toward an exterior wall to minimize ductwork, building barometric control, or additional air shafts. Also, airside economizers require additional mechanical room space.



Selection Procedure

Following is a sample selection for a standard applied water-cooled self-contained at particular operating conditions. Use Trane® Official Product Selection System, TOPSS™, for making all final selections or contact your local Trane representative.

Selection Example

Design Conditions

- Total gross capacity required = 368.7 MBh = 31 Tons
- Total sensible capacity required = 259 MBh
- Entering air temperature = 80/67°F
- Entering water temperature = 85°F
- Water flow rate = 105 gpm
- Airflow = 14,200 cfm at 2.5-inch duct static pressure

Unit includes:

- Constant volume
- Waterside economizer
- Medium velocity throwaway filters

Unit Capacities

1. Determine entering air temperature dry bulb and wet bulb and entering water temperature.
2. Refer to performance [Table 9, p. 31](#) through [Table 16, p. 38](#) to find gross total and sensible capacity that best meets capacity requirements.
3. Apply the cfm correction factors from the capacity correction factor [Table 7, p. 29](#) to determine gross total and gross sensible capacities at desired cfm.
4. Multiply condenser water deltaT by the total capacity cfm correction factor to determine new condenser water deltaT.
5. Using design cfm, determine static air pressure drops for accessories from the airside pressure drop [Figure 6, p. 25](#) through [Figure 11, p. 27](#). Add accessory static pressure drops to external supply and return static air pressure drops. Use the total air pressure drop to determine rpm and brake horsepower requirements from the appropriate fan curve.

Note: *The fan curves include refrigerant coil and internal cabinet static losses.*

6. Calculate supply fan motor heat by using the following equation: Fan motor heat (MBh) = 2.8 x fan motor brake horsepower
7. Determine net total capacity and net sensible capacity by subtracting fan motor heat from gross total capacity and gross sensible capacity.
8. Refer to Trane psychometric chart to determine leaving air temperatures.

Waterside Economizer Capacity

1. After determining that the unit will meet the required mechanical cooling capacity, determine the waterside economizer capacity by referring to the appropriate two-row (low capacity) or four-row (high capacity) waterside economizer capacity found in one of the following tables: [Table 8, p. 30](#) through [Table 16, p. 38](#).
2. Determine entering air temperature dry bulb and wet bulb, condenser water flow (gpm), and economizer entering water temperature.
3. Refer to the appropriate waterside economizer table to find gross total and sensible capacity and the leaving water temperature.
4. Apply the cfm correction factor for the waterside economizer from the appropriate table to determine the gross total and sensible capacities at the desired cfm.

5. Multiply the condenser water deltaT by the total capacity cfm correction factor to determine the new deltaT.
6. Calculate supply fan motor heat by using the following equation: Fan motor heat (MBh) = 2.8 × fan motor brake horsepower
7. Determine net total and sensible capacity by subtracting fan motor heat from gross total and sensible capacity.
8. Refer to the Trane psychometric chart to determine leaving air temperatures.



Model Number Description

Commercial Self-Contained Modular Series

Digit 1 — Unit Model

S = Self-Contained

Digit 2 — Unit Type

C = Commercial
I = Industrial

Digit 3 — Condenser Medium

W = Water-cooled
R = Remote Air-cooled

Digit 4 — Development Sequence

G = Modular Series

Digit 5— Refrigerant Circuit Configuration

U = Independent, R-410A refrigerant

Digit 6, 7 — Unit Nominal Capacity

20 = 20 Tons (water-cooled only)
25 = 25 Tons (water-cooled only)
30 = 30 Tons (water-cooled only)
32 = 32 Tons (air-cooled only)
35 = 35 Tons (water-cooled only)

Digit 8 — Unit Voltage

6 = 200 volt/60 hz/3 ph
4 = 460 volt/60 hz/3 ph
5 = 575 volt/60 hz/3 ph

Digit 9 — Air Volume/Temp Control

2 = IPak & VFD & supply air temp ctrl
3 = IPak & VFD w/ bypass & supply air temp ctrl
4 = IPak w/o vol. ctrl, w/ zone temp cool
5 = IPak w/o vol. ctrl, w/ zone temp heat/cool
6 = IPak w/o vol. ctrl, w/ supply air temp ctrl
8 = thermostat interface

Digit 10, 11 — Design Sequence

****** = Factory Assigned

Digit 12 — Unit Construction

A = Vertical discharge
B = Vertical discharge with double wall
C = Horizontal discharge
D = Horizontal discharge with double wall
E = Vertical discharge, ship separate
F = Vertical discharge with double wall, ship separate
G = Horizontal discharge, ship separate
H = Horizontal discharge with double wall, ship separate

Digit 13— Flexible Horizontal Discharge Plenum Type

B = STD plenum w/ factory-cut holes
C = Low plenum w/ factory-cut holes
E = Std plenum w/ field-cut holes
F = Low plenum w/ field-cut holes
H = STD plenum double wall (perf) w/ field-cut holes
J = Low plenum double wall (perf) w/ field-cut holes
L = STD plenum w/factory-cut holes, ship separate
M = Low plenum w/factory-cut holes, ship separate
P = STD plenum w/field-cut holes, ship separate
R = Low plenum w/field-cut holes, ship separate
U = STD plenum double-wall perf w/field-cut holes, ship separate
V = Low plenum double-wall perf w/field-cut holes, ship separate
0 = Without Plenum

Digit 14— Motor Type

2 = ODP motor
4 = TEFC motor

Digit 15, 16 — Motor HP

05 = 5 hp
07 = 7.5 hp
10 = 10 hp
15 = 15 hp
20 = 20 hp
25 = 25 hp

Digit 17, 18, 19 — Fan rpm

085 = 850 rpm
090 = 900 rpm
095 = 950 rpm
100 = 1000 rpm
105 = 1050 rpm
110 = 1100 rpm
115 = 1150 rpm
120 = 1200 rpm
125 = 1250 rpm
130 = 1300 rpm
135 = 1350 rpm
140 = 1400 rpm
145 = 1450 rpm
150 = 1500 rpm
155 = 1550 rpm
160 = 1600 rpm
165 = 1650 rpm
170 = 1700 rpm
175 = 1750 rpm
180 = 1800 rpm
185 = 1850 rpm

Digit 20— Heating Type

A = Steam coil, LH
B = Hot water coil, LH
C = Electric heat, 1 stage
F = Hydronic heat ctrl interface
G = Elec. heat ctrl interface (Not UL Approved)
K = Steam coil ship separate, LH
L = Hot water coil ship separate, LH
M = Steam coil, RH
N = Hot water coil, RH
P = Steam coil ship separate, RH
R = Hot water coil ship separate, RH
T = Hi-cap. hot water coil, LH
U = Hi-cap hot water coil, LH, ship separate
V = Hi-cap hot water coil, RH
W = Hi-cap hot water coil, RH, ship separate
0 = None

Digit 21 — Unit Isolators

A = Isopads
B = Spring isolators
0 = None

Digit 22— Unit Finish

1 = Paint - Slate Gray

Digit 23

0 = None

Digit 24— Unit Connection

1 = Disconnect switch
2 = Terminal block
3 = Dual point power

Digit 25— Industrial Options

A = Protective coated evaporator coil
B = Silver solder
C = Stainless steel screws
D = A and B
E = A and C
F = B and C
G = A, B, and C
0 = none

Digit 26 — Drain PanType

A = Galvanized sloped
B = Stainless steel sloped

Digit 27 — Waterside Economizer

A = Mechanical clean full capacity (4-row)
B = Mechanical clean low capacity (2-row)
C = Chemical clean full capacity (4-row)
D = Chemical clean low capacity (2-row)
E = Mechanical clean full capacity(4-row) ship separate
F = Mechanical clean low capacity (2-row) ship separate
G = Chemical clean full capacity (4-row) ship separate
H = Chemical clean low capacity (2-row) ship separate
O = None

Digit 28 — Ventilation Control

B = Airside econ w/Traq™ damper (top O/A inlet)
C = Airside econ w/ std damper, (top O/A inlet)
E = Airside econ w/Traq™ damper and comparative enthalpy (top O/A)
F = Airside econ w/ std dampers and comparative enthalpy (top O/A)
H = None/ventilation for 2-position control interface
J = Airside economizer interface
K = Airside economizer interface w/ comparative enthalpy
O = None

Digit 29 — Water Piping

A = RH condenser connection
B = LH condenser connection
C = RH basic piping
D = LH basic piping
E = RH Intermediate piping
F = LH intermediate piping
J = RH basic w/ flow switch
K = LH basic w/ flow switch
L = RH intermediate w/ flow switch
M = LH intermediate w/ flow switch
O = None

Digit 30 — Condenser Tube Type

A = Standard condenser tubes
B = 90/10 CuNi condenser tubes
O = None

Digit 31 — Compressor Service Valves

1 = With service valves
O = None

Digit 32 — Miscellaneous System Control

1 = Time Clock
2 = Interface For remote HI (IPCB)
3 = Dirty filter switch
4 = 1 and 2
5 = 1 and 3
6 = 2 and 3
7 = 1, 2 and 3
O = None

Digit 33 — Control Interface Options

A = Generic BAS Module; 0-5 Vdc (GBAS)
B = Ventilation Override Module (VOM)
D = Remote Human Interface (RHI)
G = GBAS and VOM
H = GBAS and RHI
J = VOM and RHI
M = GBAS, VOM, and RHI
N = BACnet Communications Interface (BCI)
P = BCI and GBAS
Q = BCI and VOM
R = BCI and RHI
T = BCI and GBAS and VOM
U = BCI and GBAS and RHI
V = BCI and VOM and RHI
W = BCI and GBAS and VOM and RHI
O = None
1 = LonTalk Comm5 Interface (LCI)
2 = LCI and GBAS
3 = LCI and VOM
4 = LCI and RHI
5 = LCI and GBAS and VOM
6 = LCI and GBAS and RHI
7 = LCI and VOM and RHI
8 = LCI and GBAS and VOM and RHI

Digit 34— Agency

U = UL agency listing
O = None

Digit 35— Filter Type

1 = 2-inch construction throwaway
2 = 2-inch med eff. throwaway

Digit 36— Miscellaneous Control Option

A = Low entering air temp. protect device (LEATPD)
B = High duct temp t-stat
C = Plenum high static switch
D = Kit for heat mode output (w/t'stat)
E = A and B
F = A and C
G = B and C
H = A, B, and C
O = None



General Data

Table 1. SCWG/SIWG/SCRG/SIRG general data

	Water-Cooled Units				Air-Cooled Units
Unit Size	20	25	30	35	32
Compressor Data					
Quantity	2	2	1/1	2	2
Nominal Ton/Comp	10	10	10/15	15	15
Circuits	2	2	2	2	2
Evaporator Coil Data					
Rows	4	4	4	4	4
Sq. Ft.	25.0	25.0	25.0	25.0	25.0
FPF	144	144	144	144	144
Condenser Data					
Minimum GPM w/o Econ	36	36	46	54	-
Minimum GPM w/ Econ	41	41	60	65	-
Maximum GPM	80	80	102	119	-
Evaporator Fan Data					
Quantity	2	2	2	2	2
Size (Dia. x width - inches)	12-5/8" x 8"	12-5/8" x 9"	12-5/8" x 11"	12-5/8" x 11"	12-5/8" x 11"
Minimum HP	5	5	5	5	5
Maximum HP	20	25	25	25	25
Minimum Design CFM	6350	7250	7250	7250	7250
Maximum Design CFM	8500	10,625	12,750	14,875	13600
R-410A Refrigerant Data					
Refrigerant Charge - lb (kg)					
Circuit A	26.5 (10.9)	27 (12.3)	24.5 (11.1)	23.0 (10.4)	See Note 2
Circuit B	26.5 (10.9)	27 (12.3)	23.0 (10.4)	23.0 (10.4)	See Note 2
Capacity Steps - %	100/53/0	100/53/0	100/65/42/0	100/53/0	100/53/0
Filter Data					
Quantity	4	4	4	4	4
Size (inches)	16 x 25 x 2	16 x 25 x 2	16 x 25 x 2	16 x 25 x 2	16 x 25 x 2
Quantity	4	4	4	4	4
Size (inches)	20 x 25 x 2	20 x 25 x 2	20 x 25 x 2	20 x 25 x 2	20 x 25 x 2
CCRC/CIRC Condenser Match	N/A	N/A	N/A	N/A	32

Notes:

1. Compressors are Trane 3-D™ scroll.
2. All units operate with R-410A. Water Cooled units that ship together ship with full operating charge. Air-cooled and ship-separate water-cooled units ship with dry nitrogen charge. Field refrigerant system charge required. Refer to Table 3, p. 23 for refrigerant amounts required for remote air-cooled unit and matching CxRC condenser.
3. Maximum cfm limits are set to prevent moisture carryover on the evaporator coil.
4. Minimum cfm limits are set to ensure stable thermal expansion valve operation at low load conditions.
5. Filter sizes are for units with or without hot water or steam heating coils.

Table 2. SCWG/SIWG/SCRG/SIRG self-contained heating coil

Coil Data	Type	Rows	No. - Size (in)	No. - Size (mm)	fpf
Steam Coil	NS	1	2 - 24 x 58	2 - 609.6 x 1473.2	42
Hot Water Coil, std. cap	5W	1	1 - 48 x 62	1 - 1219 x 1575	80
Hot Water Coil, hi-cap.	5W	2	1 - 48 x 62	1 - 1219 x 1575	108

Notes:

- Hot water and steam heating coils have Prima-Flo® fins and do not have turbulators.
- For coil capacities, use TOPSS™ (Trane Official Product Selection Program).

Table 3. SCRG/SIRG self-contained and CCRC/CIRC remote air-cooled condenser, refrigerant data

SCRG/SIRG and CCRC/CIRC Unit Size	32/32
No. of Refrigerant Circuits	2
Operating Charge - lbs R-410A	46/46
Operating Charge - kg R-410A	20.9/20.9
Cond. Storage Cap. - lbs R-410A	51/51
Cond. Storage Cap. - kg R-410A	23.1/23.1

Notes:

- Refrigerant charges are listed as circuit 1/circuit 2 and provide only an estimate. Final charge requires sound field charging practice.
- Operating charge estimate includes the air-cooled self-contained, remote air-cooled condenser, and 25 feet of interconnecting refrigerant piping.
- At conditions of 95°F (35°C), condenser storage capacity is 95% full.
- To determine the correct amount of refrigerant needed for a particular application, reference the Trane Reciprocating Refrigeration Manual.

Table 4. EER/IEER ratings

Series	Model	EER	IEER (CV)	IEER (VAV)	AHRI Net Cooling Capacity (Btu/h)
MODULAR	SCWGU20	13.5/13.3	14.5	17.8	238000
	SCWGU25	13.9/13.7	14.5	17.8	280000
	SCWGU30	13.8/13.9	15.9	17.9	330000
	SCWGU35	13.4/13.2	15.0	17.0	372000
	SCRGU32	10.2/10.0	11.5	13.4	376000

Notes:

- Cooling Only / Electric and Hydronic Heat.
- Performance is rated at 80°F EDB/67°F EWB with 85°F EWT for water-cooled performance and 95°F ambient for air-cooled performance.
- EER, IEER and AHRI Net Cooling Capacity are tested in accordance with AHRI 340/360 (I-P) and certified to 10 CFR Part 431 from the US Department of Energy.

Table 5. Waterside economizer coil physical data

Model	Unit Size	Type	Rows	FPF	height (in.)	length (in.)
SCXG	20, 25, 30 and 35	Chemically Cleanable	2	108	50	72
SCXG	20, 25, 30 and 35	Mechanically Cleanable	2	108	50	72
SCXG	20, 25, 30 and 35	Chemically Cleanable	4	108	50	72
SCXG	20, 25, 30 and 35	Mechanically Cleanable	4	108	50	72



General Data

Table 6. CCRC/CIRC remote air-cooled condenser general data

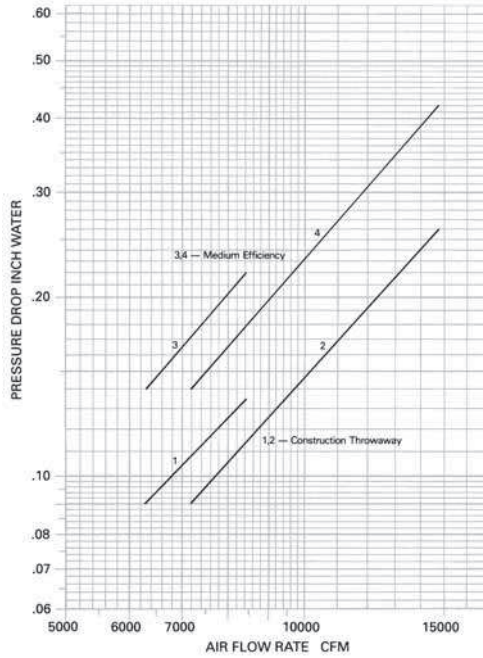
Unit Size	20	29	32
Condenser Fan Data			
Number/Type/Drive	4/Prop/Direct	4/Prop/Direct	4/Prop/Direct
Size (inches)	26	26	26
HP ea.	1	1	1
Nominal Cfm	18,800	21,200	32,000
Condenser Coil Data			
Circuit 1 Size (in.)	1/46 x 71	1/46 x 71	1/64 x 71
Circuit 2 No./Size (in.)	1/46 x 71	1/64 x 71	1/64 x 71
Face Area (sq. ft.)	45.4	54.2	63.1
Rows/fpf	4/144	4/144	4/144
Ambient Temperature Operating Range			
Standard Ambient (°F)	50-115	50-115	50-115
Low Ambient Option (°F)	0-115	0-115	0-115



Performance Data

Airside Pressure Drops

Figure 6. Filter airside pressure drop



Note: Lines 1 and 3 are for the SXWG 20 ton only. Lines 2 and 4 are for all air-cooled units and all SXWG 25-35 tons.

Figure 7. Horizontal discharge plenum airside pressure drop

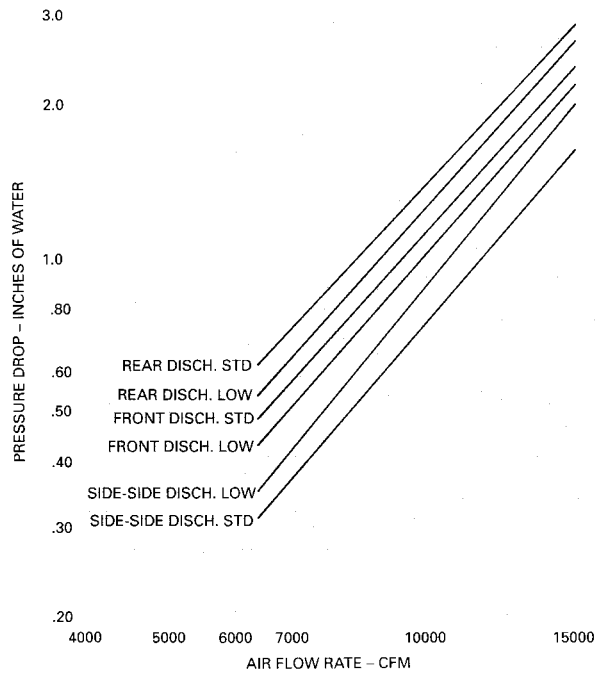


Figure 8. Traq™ damper airside pressure drop

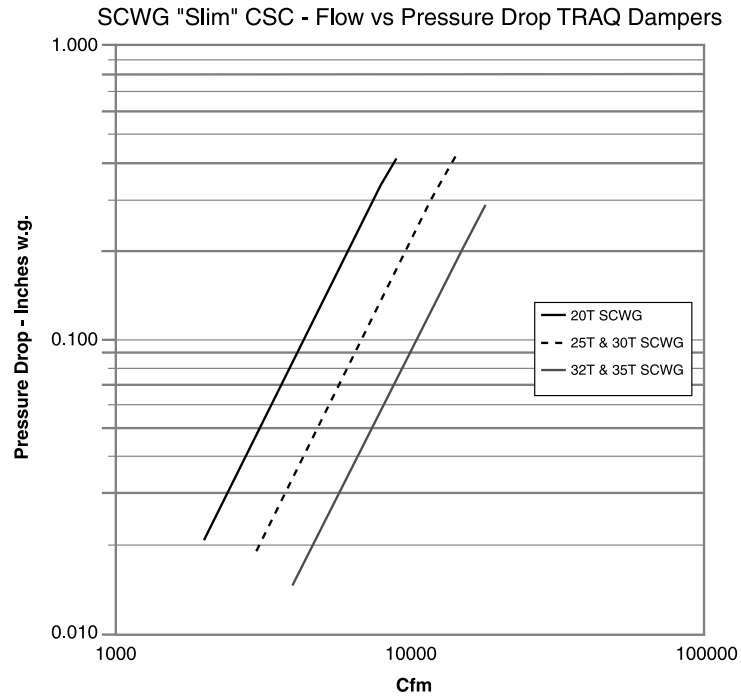


Figure 9. Waterside economizer airside pressure drop

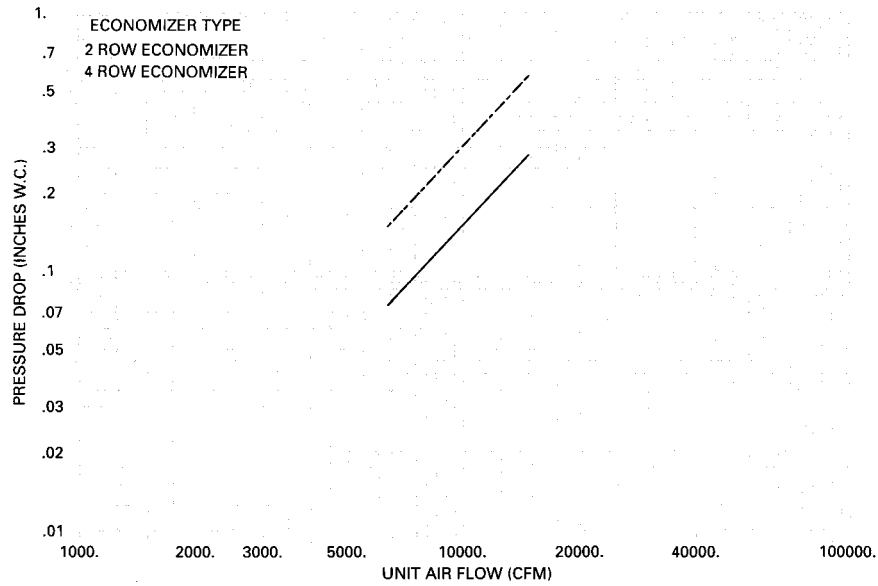


Figure 10. Steam coil airside pressure drop

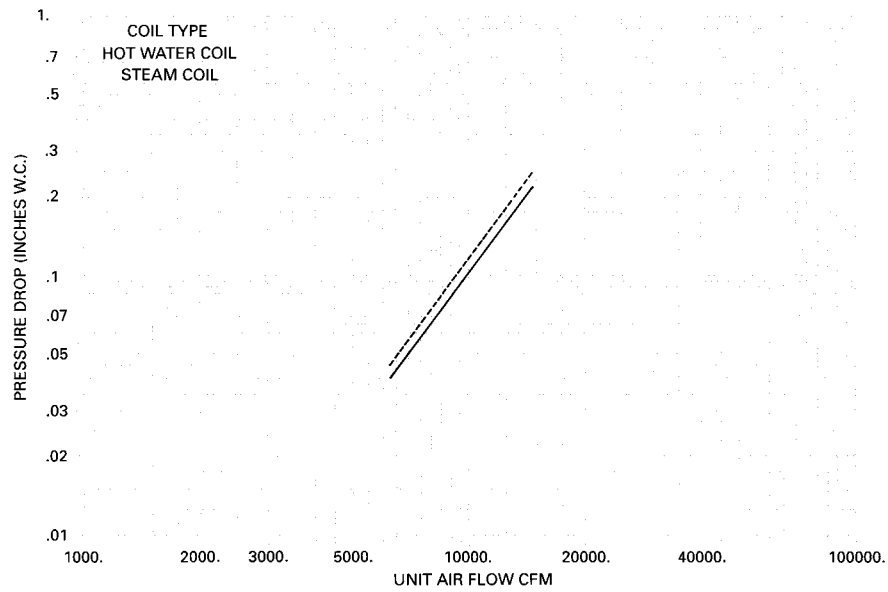
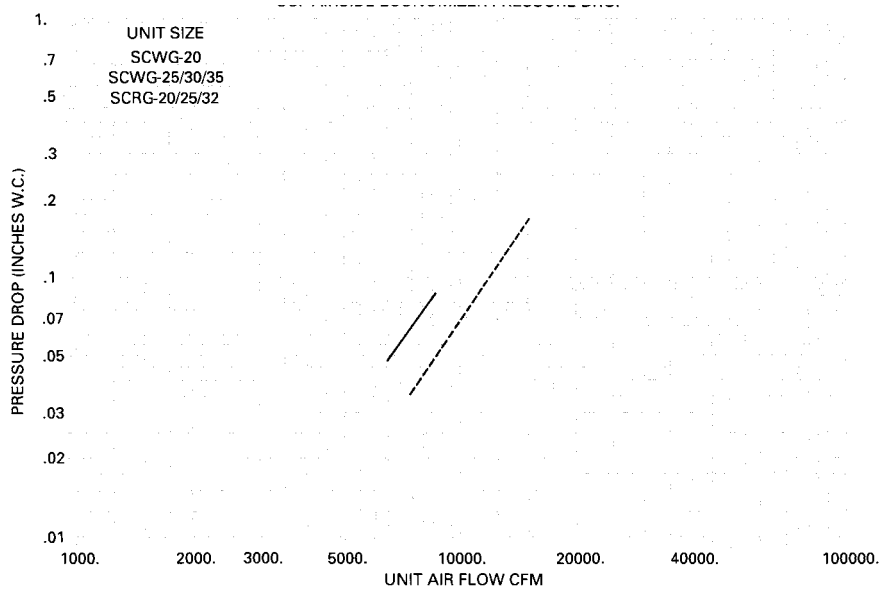


Figure 11. Airside economizer airside pressure drop





Waterside Pressure Drop

Figure 12. Waterside economizer waterside pressure drop

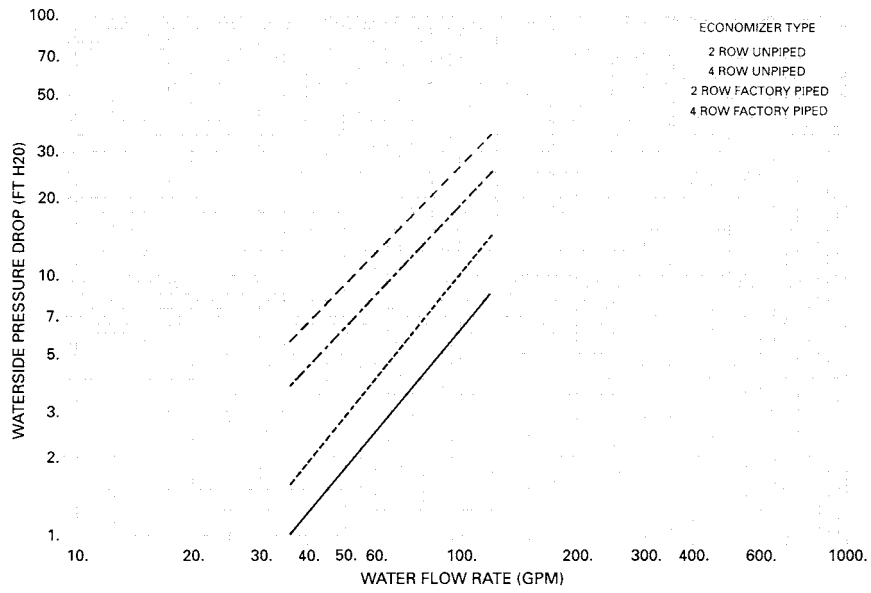


Figure 13. Unit without piping water pressure drop

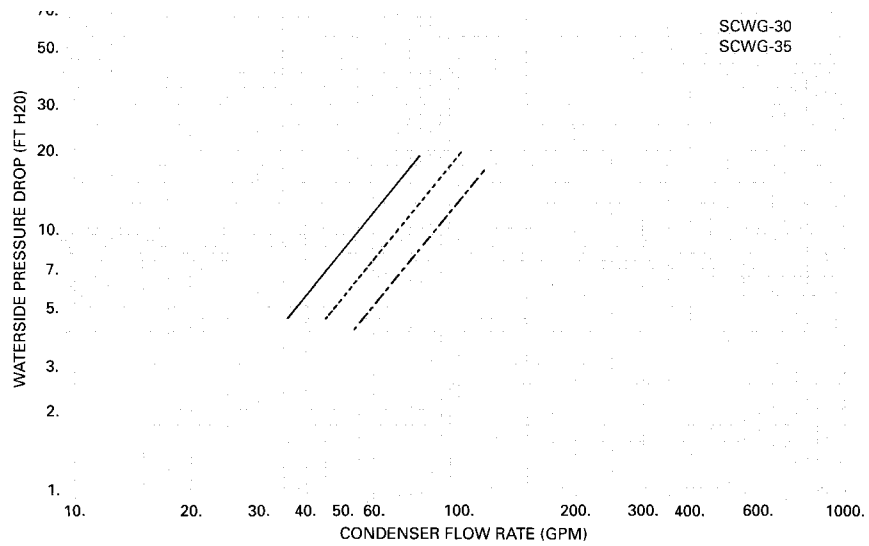
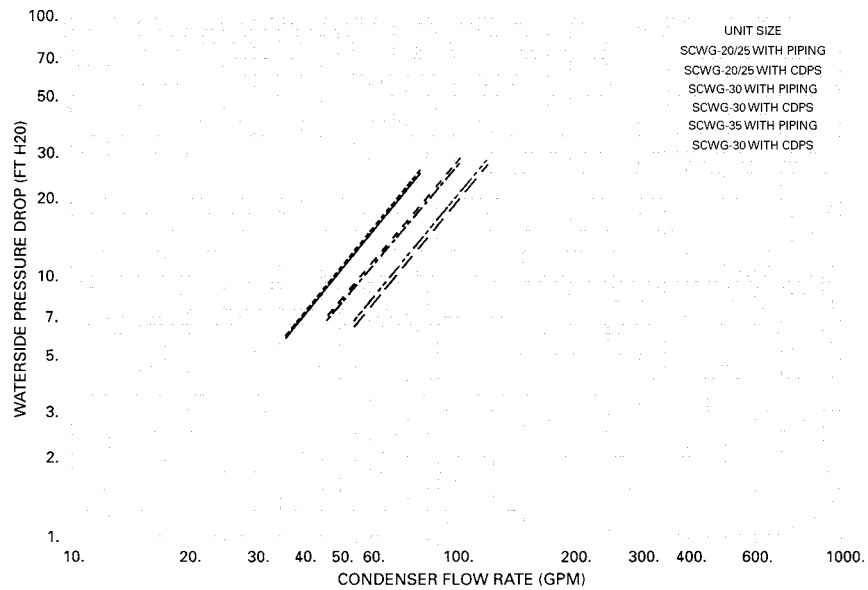


Figure 14. Unit with piping waterside pressure drop


Note: "Primary" refers to the side where the static pressure drop was measured. This value must be added to the unit external static pressure for proper fan horsepower determination.

Table 7. CFM capacity correction table

	CFM compared to rated quantity	cooling capacity multiplier	sensible capacity multiplier
DX cooling	-20%	0.970	0.910
	-10%	0.985	0.955
	Std	1.000	1.000
	+3%	1.005	1.014
	+6%	1.009	1.027
Waterside economizer	-20%	0.970	0.910
	-10%	0.985	0.955
	Std	1.000	1.000
	+3%	1.005	1.014
	+6%	1.009	1.027



Performance Data

Water-Cooled Performance Data

20 Ton Water-Cooled Models

Table 8. SCWG/SIWG 20 economizer full capacity—8,000 cfm

ED-B°F	EW-B°F	Flow gpm	Full Capacity Coil						Low Capacity Coil					
			45°F			55°F			45°F			55°F		
			Total MBh	Sensible MBh	LW-T °F	Total MBh	Sensible MBh	LW-T °F	Total MBh	Sensible MBh	LW-T °F	Total MBh	Sensible MBh	LW-T °F
75	62	50	215.3	192.8	53.6	135.9	135.9	60.4	142.6	142.6	50.7	96.5	96.5	58.9
		60	225.9	197.3	52.5	139.7	139.7	59.6	152.1	149.8	50.1	99.9	99.9	58.3
		70	233.9	200.7	51.7	142.3	142.3	59.1	157.5	152.0	49.5	102.4	102.4	57.9
	67	50	270.4	163.0	55.8	158.5	121.2	61.3	179.3	118.3	52.2	104.8	91.6	59.2
		60	289.4	170.5	54.6	167.9	124.5	60.6	192.5	123.3	51.4	110.9	93.7	58.7
		70	303.9	176.4	53.7	175.4	127.2	60.0	202.3	127.0	50.8	115.8	95.4	58.3
	72	50	344.7	135.8	58.8	224.9	94.1	64.0	229.0	92.7	54.1	149.8	66.3	61.0
		60	370.7	145.4	57.3	242.1	99.9	63.1	246.2	98.7	53.2	160.6	69.8	60.3
		70	390.2	152.8	56.1	255.5	104.4	62.3	259.1	103.3	52.4	169.1	72.5	59.8
80	62	50	235.6	235.6	54.4	169.8	169.8	61.8	166.4	166.4	51.6	120.6	120.6	59.8
		60	242.7	242.7	53.1	174.5	174.5	60.8	172.9	172.9	50.7	124.8	124.8	59.2
		70	251.2	250.5	52.2	177.8	177.8	60.1	177.5	177.5	50.1	127.9	127.9	58.7
	67	50	277.2	208.3	56.1	175.5	169.9	62.0	182.9	155.4	52.3	120.9	120.9	59.8
		60	294.0	215.0	54.8	182.7	172.5	61.1	194.4	159.7	51.5	125.1	125.1	59.2
		70	306.9	220.2	53.7	188.2	174.5	60.4	203.3	163.1	50.8	128.2	128.2	58.7
	72	50	344.0	179.0	58.7	226.2	137.7	64.0	228.6	128.4	54.1	149.5	102.1	61.0
		60	369.8	188.7	57.3	242.2	143.1	63.1	245.6	134.4	53.2	160.1	105.5	60.3
		70	389.2	196.1	56.1	255.0	147.4	62.3	258.5	139.0	52.4	168.5	108.2	59.8

Table 8. SCWG/SIWG 20 economizer full capacity—8,000 cfm (continued)

ED-B°F	EW-B°F	Flow gpm	Full Capacity Coil						Low Capacity Coil					
			45°F			55°F			45°F			55°F		
			Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F
85	62	50	269.3	269.3	55.7	203.7	203.7	63.1	190.3	190.3	52.6	144.8	144.8	60.8
		60	277.2	277.2	54.2	209.2	209.2	62.0	197.6	197.6	51.6	149.8	149.8	60.0
		70	282.7	282.7	53.1	213.2	213.2	61.1	202.8	202.8	50.8	153.5	153.5	59.4
	67	50	290.3	256.0	56.6	204.4	204.4	63.2	190.7	190.7	52.6	145.1	145.1	60.8
		60	304.9	261.8	55.1	210.0	210.0	62.0	204.4	199.1	51.8	150.1	150.1	60.0
		70	316.0	266.3	54.0	214.0	214.0	61.1	211.8	201.9	51.0	153.8	153.8	59.4
	72	50	347.4	223.1	58.9	235.8	183.7	64.4	228.8	164.3	54.1	155.9	140.0	61.2
		60	371.1	232.0	57.3	249.6	188.4	63.3	245.2	170.1	53.1	164.6	142.8	60.5
		70	389.3	238.9	56.1	260.5	192.1	62.4	258.0	174.6	52.3	171.6	145.1	59.9

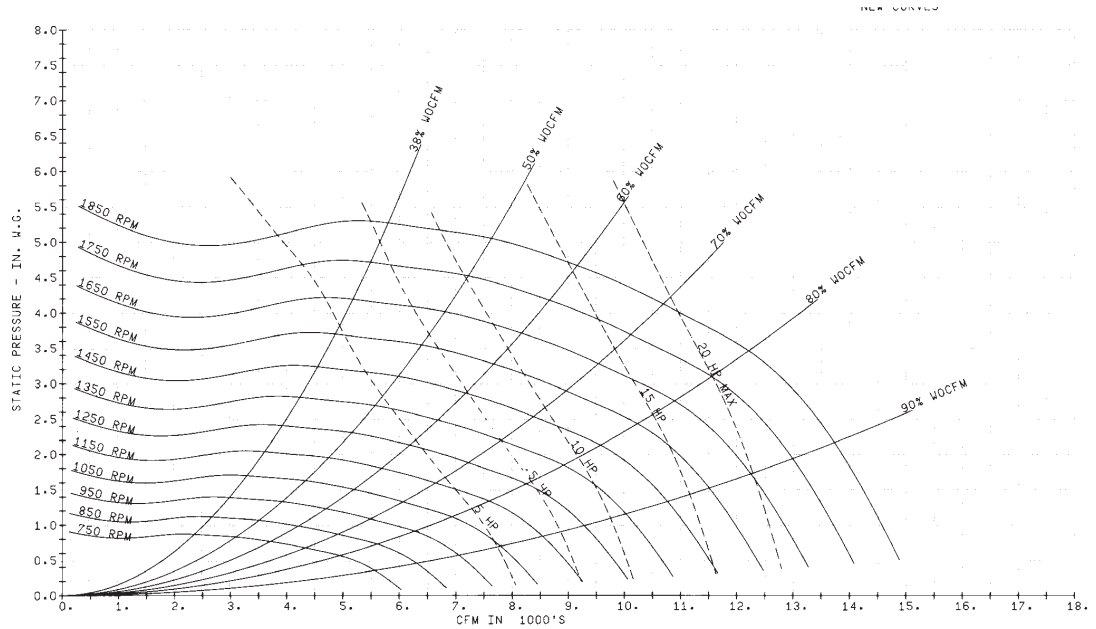
Table 9. SCWG/SIWG 20 gross cooling capacity—8,000 cfm, 60 gpm

Entering air		Entering Water Temp								
		75°F			85°F			95°F		
		Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F
EDB °F	EWB °F	Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F
75	62	245.5	196.5	86.1	235.9	192.3	96.0	224.8	187.5	105.8
	67	268.9	156.8	87.1	258.1	152.6	96.8	245.8	147.7	106.6
	72	294.0	116.1	88.0	281.9	111.8	97.8	268.1	106.9	107.5
80	62	246.2	235.2	86.2	236.9	229.9	96.0	226.2	224.9	105.9
	67	269.3	196.6	87.1	258.5	192.3	96.9	246.3	187.5	106.6
	72	294.0	156.2	88.0	281.9	151.8	97.8	268.2	147.0	107.5
85	62	251.3	251.3	86.4	243.1	243.1	96.3	234.7	234.7	106.2
	67	269.6	236.2	87.1	259.0	232.0	96.9	246.8	226.1	106.7
	72	294.3	196.1	88.0	282.3	191.8	97.8	268.6	186.9	107.5



Performance Data

Figure 15. Fan performance for CV or with VFD



Note: Fan curves include refrigerant coil and internal cabinet static losses. To determine static pressure to use with these curves, add filter; economizer; flexible horizontal discharge plenum; and heat pressure drops to external duct static pressure.

25 Ton Water-Cooled Models

Table 10. SCWG/SIWG 25 economizer (Full capacity) – 10,000 cfm

EDB °F	EWB °F	Flow gpm	Full Capacity Coil					
			45°F			55°F		
			Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F
75	62	63	236.9	225.2	52.5	154.9	154.9	59.9
		75	251.4	231.2	51.7	160.9	160.9	59.3
		80	256.4	233.3	51.4	162.8	162.8	59.1
	67	63	292.6	184.8	54.3	174.1	141.4	60.5
		75	317.7	194.5	53.5	186.1	145.6	60.0
		80	326.5	197.9	53.2	190.4	147.2	60.0
	72	63	372.7	149.0	56.8	245.1	105.5	62.8
		75	406.4	161.0	55.8	267.0	112.7	62.1
		80	418.1	165.2	55.5	274.6	115.2	61.9
80	62	63	266.7	266.7	53.5	193.7	193.7	61.2
		75	277.9	277.9	52.4	201.1	201.1	60.4
		80	281.6	281.6	52.0	203.5	203.5	60.1
	67	63	301.5	240.4	54.6	194.3	194.3	61.2
		75	405.5	213.6	55.8	267.2	165.4	62.1
		80	331.8	252.2	53.3	209.4	206.2	60.2
	72	63	371.9	201.4	56.8	246.6	158.7	62.8
		75	405.5	213.6	55.8	267.2	165.4	62.1
		80	417.2	217.9	55.4	274.4	167.8	61.9

Table 10. SCWG/SIWG 25 economizer (Full capacity) – 10,000 cfm (continued)

			Full Capacity Coil					
			45°F			55°F		
EDB °F	EWB °F	Flow gpm	Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F
85	62	63	305.0	305.0	54.7	232.5	232.5	62.4
		75	223.0	223.0	50.9	168.9	168.9	59.5
		80	321.8	321.8	53.0	244.1	244.1	61.1
	67	63	319.3	299.4	55.1	233.2	233.2	62.4
		75	339.0	307.1	54.0	242.0	242.0	61.5
		80	345.8	309.8	53.7	244.9	244.9	61.1
	72	63	376.5	255.5	57.0	259.0	215.2	63.2
		75	407.4	266.7	55.9	276.8	221.1	62.4
		80	418.3	270.7	55.5	283.1	223.2	62.1



Performance Data

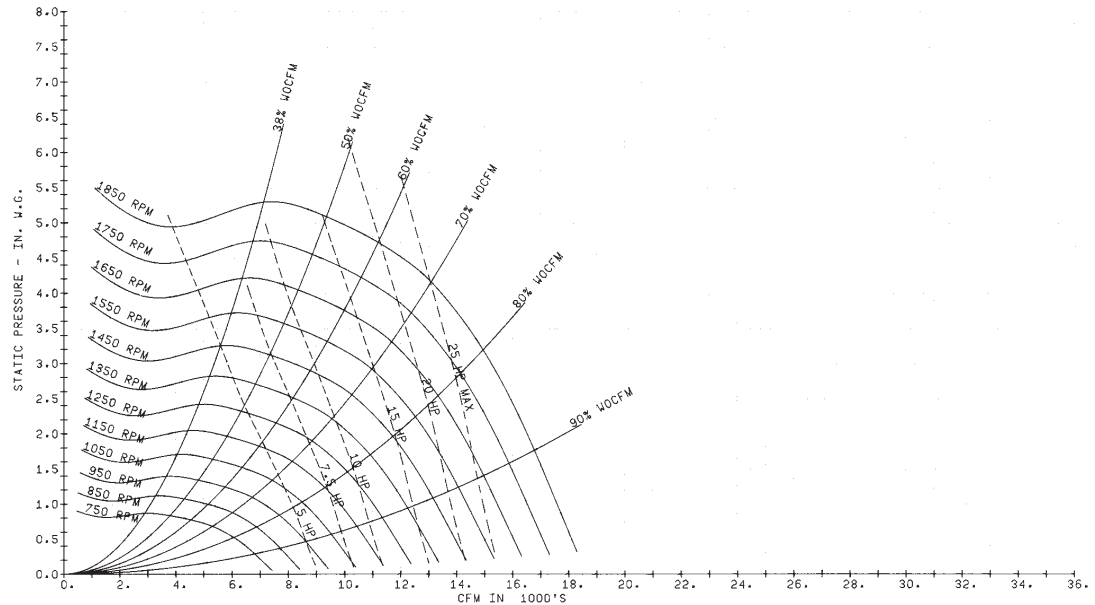
Table 11. SCWG/SIWG 25 economizer (Low capacity) – 10,000 cfm

EDB °F	EWB °F	Flow gpm	Low Capacity Coil					
			45°F			55°F		
			Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F
75	62	63	153.6	153.6	49.9	105.1	105.1	58.3
		75	162.0	162.0	49.3	110.2	110.2	57.9
		80	164.7	164.7	49.1	111.8	111.8	57.8
	67	63	184.6	129.7	50.9	110.6	103.7	58.5
		75	202.1	136.2	50.4	118.3	106.3	58.2
		80	208.2	138.4	50.2	121.1	107.3	58.0
	72	63	235.1	97.5	52.5	155.8	71.6	59.9
		75	257.9	105.2	51.9	169.9	76.1	59.5
		80	265.8	107.9	51.6	174.9	77.7	59.4
80	62	63	179.4	179.4	50.7	131.5	131.5	59.2
		75	189.1	189.1	50.0	137.8	137.8	58.7
		80	192.3	192.3	49.8	139.8	139.8	58.5
	67	63	190.1	173.9	51.0	131.7	131.7	59.2
		75	205.3	179.5	50.5	138.0	138.0	58.7
		80	210.6	181.5	50.3	140.1	140.1	58.5
	72	63	234.7	139.7	52.5	155.6	113.9	59.9
		75	257.4	147.4	51.9	169.4	118.3	59.5
		80	265.3	150.1	51.6	174.3	119.9	59.4
85	62	63	205.3	205.3	51.5	157.9	157.9	60.0
		75	216.3	216.3	50.8	165.4	165.4	59.4
		80	219.9	219.9	50.5	167.9	167.9	59.2
	67	63	205.7	205.7	51.5	158.2	158.2	60.0
		75	216.7	216.7	50.8	165.7	165.7	59.4
		80	220.3	220.3	50.5	168.2	168.2	59.2
	72	63	235.6	182.3	52.5	164.6	159.1	60.2
		75	257.2	189.6	51.9	175.9	162.7	59.7
		80	264.8	192.2	51.6	179.9	164.0	59.5

Table 12. SCWG/SIWG 25 gross cooling capacity— 10,000 cfm, 75 gpm

Entering Air		Entering Water Temp								
EDB °F	EWB °F	75°F			85°F			95°F		
		Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F
75	62	290.5	253.4	84.3	279.0	248.5	94.1	265.9	239.7	104.0
	67	317.5	197.4	85.0	304.6	192.4	94.8	289.9	186.8	104.6
	72	346.1	140.1	85.8	331.6	135.1	95.6	315.2	129.5	105.3
80	62	293.6	293.6	84.4	282.6	282.6	94.2	270.3	270.3	104.1
	67	318.1	253.3	85.1	305.3	248.3	94.9	290.6	242.7	104.7
	72	346.6	196.4	85.8	332.2	191.4	95.6	315.9	185.9	105.4
85	62	308.2	308.2	84.8	298.2	298.2	94.7	286.6	286.6	104.5
	67	319.5	305.4	85.1	307.0	300.2	94.9	292.7	292.7	104.7
	72	347.2	252.5	85.9	332.9	247.6	95.6	316.6	242.0	105.4

Figure 16. Fan performance for CV or with VFD



Note: Fan curves include refrigerant coil and internal cabinet static losses. To determine static pressure to use with these curves, add filter; economizer; flexible horizontal discharge; and heat pressure drops to external duct static pressure.

30 Ton Water-Cooled Models

Table 13. SCWG/SIWG 30 economizer capacity (Full capacity) – 12,000 cfm

EDB °F	EWB °F	Flow gpm	Full Capacity Coil					
			45°F			55°F		
			Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F
75	62	75	274.7	264.2	52.3	179.9	179.9	59.8
		90	290.5	270.7	51.5	186.6	186.6	59.2
		105	302.5	275.7	50.8	191.3	191.3	58.6
	67	75	338.7	215.8	52.3	200.7	165.6	60.4
		90	366.4	226.4	51.5	213.7	170.1	59.8
		105	387.7	234.8	50.8	224.1	173.8	59.3
	72	75	431.4	173.0	54.0	282.5	122.4	62.5
		90	468.5	186.3	53.1	306.4	130.2	61.8
		105	496.8	196.5	52.4	324.8	136.3	61.2
80	62	75	310.4	310.4	56.5	224.9	224.9	61.0
		90	323.0	323.0	55.4	233.2	233.2	60.2
		105	331.8	331.8	54.5	239.1	239.1	59.6
	67	75	348.8	281.5	54.3	225.5	225.5	61.0
		90	373.4	291.0	53.3	233.9	233.9	60.2
		105	392.4	298.4	52.5	245.7	243.4	59.7
	72	75	430.5	235.0	56.5	283.9	185.2	62.6
		90	467.4	248.2	55.4	306.4	192.6	61.8
		105	495.7	258.6	54.4	324.1	198.4	61.2



Performance Data

Table 13. SCWG/SIWG 30 economizer capacity (Full capacity) – 12,000 cfm (continued)

			Full Capacity Coil					
			45°F			55°F		
EDB °F	EWB °F	Flow gpm	Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F
85	62	75	354.9	354.9	54.5	270.0	270.0	62.2
		90	369.1	369.1	53.2	279.8	279.8	61.2
		105	379.1	379.1	52.2	286.8	286.8	60.5
	67	75	369.9	351.3	54.9	270.7	270.7	62.2
		90	391.3	359.6	53.7	280.7	280.7	61.2
		105	407.7	366.1	52.8	287.7	287.7	60.5
	72	75	434.9	298.6	56.6	298.3	252.1	63.0
		90	469.2	311.0	55.4	317.6	258.4	62.1
		105	495.8	320.7	54.4	332.8	263.5	61.3

Table 14. SCWG/SIWG 30 economizer capacity (Low capacity) – 12,000 cfm

EDB °F	EWB °F	Flow gpm	Low Capacity Coil					
			45°F			55°F		
			Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F
75	62	75	176.8	176.8	49.7	120.4	120.4	58.2
		90	185.7	185.7	49.1	125.9	125.9	57.8
		105	192.1	192.1	48.7	129.7	129.7	57.5
	67	75	212.2	149.9	50.7	126.3	119.6	58.4
		90	230.7	156.7	50.1	134.3	122.4	58.0
		105	244.8	161.9	49.7	140.8	124.6	57.7
	72	75	270.2	112.2	52.2	177.9	82.2	59.7
		90	294.3	120.4	51.5	192.8	86.9	59.3
		105	312.6	126.7	51.0	204.3	90.5	58.9
80	62	75	206.5	206.5	50.5	150.7	150.7	59.0
		90	216.7	216.7	49.8	157.4	157.4	58.5
		105	224.1	224.1	49.3	162.2	162.2	58.1
	67	75	218.2	201.0	50.8	150.9	150.9	59.0
		90	234.2	206.9	50.2	157.7	157.7	58.5
		105	246.7	211.5	49.7	162.5	162.5	58.1
	72	75	269.8	161.2	52.2	177.6	131.3	59.7
		90	293.7	169.4	51.5	192.2	135.9	59.3
		105	312.0	175.7	50.9	203.6	139.5	58.9
85	62	75	236.2	236.2	51.3	180.9	180.9	59.8
		90	247.9	247.9	50.5	188.9	188.9	59.2
		105	256.2	256.2	49.9	194.7	194.7	58.7
	67	75	236.6	236.6	51.3	181.2	181.2	59.8
		90	248.3	248.3	50.5	189.3	189.3	59.2
		105	256.7	256.7	49.9	195.0	195.0	58.7
	72	75	270.4	210.5	52.2	187.8	183.6	60.0
		90	293.3	218.3	51.5	199.6	187.3	59.4
		105	311.4	224.5	50.9	208.8	190.3	59.0

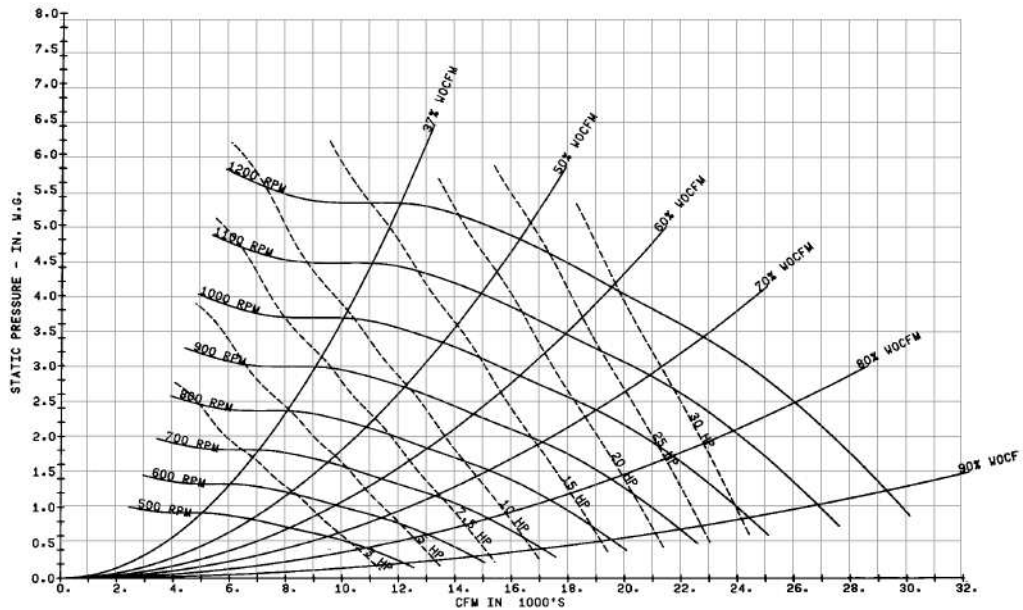
Table 15. SCWG/SIWG 30 gross cooling capacity— 12,000 cfm, 87 gpm

Entering Air		Entering Water Temp								
		75°F			85°F			95°F		
EDB °F	EWB °F	Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F
75	62	352.1	306.3	84.6	338.5	300.5	94.5	322.9	292.2	104.3
	67	384.2	238.7	85.4	369.1	232.9	95.2	351.8	226.3	105.0
	72	418.5	169.6	86.2	401.6	163.8	96.0	382.3	157.2	105.8
80	62	352.9	352.9	84.6	339.4	339.4	94.5	323.8	323.8	104.3
	67	384.9	305.8	85.4	369.9	300.0	95.2	352.6	293.4	105.0
	72	418.9	237.2	86.2	402.1	231.4	96.0	383.0	224.9	105.8
85	62	353.5	353.5	84.7	339.9	339.9	94.5	324.3	324.3	104.4
	67	385.7	368.1	85.4	370.7	362.0	95.3	353.5	351.2	105.1
	72	419.6	304.7	86.2	402.9	298.9	96.0	383.8	292.3	105.8



Performance Data

Figure 17. Fan performance for CV or with VFD



Note: Fan curves include refrigerant coil and internal cabinet static losses. To determine static pressure used with these curves, add filter; economizer, flexible horizontal discharge; and heat pressure drops to external duct static pressure.

35 Ton Water-Cooled Models

Table 16. SCWG/SIWG 35 economizer capacity – 14,000 cfm

			Full Capacity Coil						Low Capacity Coil					
			45°F			55°F			45°F			55°F		
ED-B °F	EW-B °F	Flow gpm	Total MBh	Sensible MBh	LW-T °F	Total MBh	Sensible MBh	LW-T °F	Total MBh	Sensible MBh	LW-T °F	Total MBh	Sensible MBh	LWT °F
75	62	88	310.4	301.6	52.1	203.5	203.5	59.6	198.2	198.2	48.6	134.5	134.5	58.1
		105	325.9	308.0	51.2	210.3	210.3	59.0	206.8	206.8	50.4	139.8	139.8	57.7
		119	335.9	312.2	50.7	214.5	214.5	58.6	212.1	212.1	49.9	143.1	143.1	57.4
	67	88	382.4	245.5	53.7	225.6	188.6	60.1	237.9	168.6	51.9	140.6	134.4	57.8
		105	410.1	256.1	52.8	238.4	193.1	59.5	255.7	175.1	51.2	148.2	137.0	57.6
		119	428.2	263.1	52.2	247.2	196.2	59.2	267.1	179.4	50.7	153.5	138.8	59.5
72	88	487.2	195.8	56.1	317.8	138.5	62.2	302.8	125.9	49.6	198.2	92.0	58.7	
	105	524.2	209.0	55.0	341.7	146.3	61.5	325.9	133.7	49.2	212.6	96.5	58.8	
	119	548.1	217.7	54.2	357.5	151.5	61.0	340.8	138.9	50.6	222.0	99.5	58.3	
80	62	88	351.7	351.7	53.0	254.4	254.4	60.8	231.4	231.4	49.5	254.4	254.4	58.8
		105	364.5	364.5	51.9	262.9	262.9	60.0	241.4	241.4	51.9	262.9	262.9	58.3
		119	372.3	372.3	51.3	268.1	268.1	59.5	247.5	247.5	51.2	268.1	268.1	58.0
	67	88	393.4	320.9	53.9	255.0	255.0	60.8	244.0	226.1	51.0	255.0	255.0	59.0
		105	417.8	330.2	53.0	263.6	263.6	60.0	259.4	231.7	50.3	263.6	263.6	58.7
		119	433.8	336.4	52.3	268.9	268.9	59.5	269.5	235.5	49.8	268.9	268.9	59.6
72	88	486.1	267.1	56.1	319.1	210.6	62.3	302.2	181.3	50.3	319.1	210.6	58.6	
	105	523.0	280.2	55.0	341.5	217.9	61.5	325.3	189.1	49.8	341.5	217.9	59.6	
	119	546.8	288.9	54.2	356.7	222.9	61.0	340.2	194.2	51.9	356.7	222.9	59.0	

Table 16. SCWG/SIWG 35 economizer capacity—14,000 cfm (continued)

ED-B °F	EW-B °F	Flow gpm	Full Capacity Coil						Low Capacity Coil					
			45°F			55°F			45°F			55°F		
			Total MBh	Sensible MBh	LW-T °F	Total MBh	Sensible MBh	LW-T °F	Total MBh	Sensible MBh	LW-T °F	Total MBh	Sensible MBh	LW-T °F
85	62	88	402.1	402.1	54.1	305.3	305.3	61.9	264.7	264.7	50.7	168.3	168.3	59.8
		105	416.6	416.6	52.9	315.4	315.4	61.0	276.0	276.0	58.1	174.8	174.8	59.2
		119	425.3	425.3	52.2	321.6	321.6	60.4	282.9	282.9	57.7	178.9	178.9	58.8
	67	88	417.5	401.0	54.5	306.1	306.1	62.0	265.1	265.1	58.2	168.6	168.6	59.6
		105	438.6	409.2	53.4	316.2	316.2	61.0	276.4	276.4	57.8	175.1	175.1	59.0
		119	452.3	414.6	52.6	322.5	322.5	60.4	283.4	283.4	57.6	179.2	179.2	58.6
72	88	491.0	340.2	56.2	335.2	287.4	62.6	302.6	236.8	59.1	197.8	147.4	59.8	
	105	524.5	352.2	55.0	354.3	293.6	61.8	324.7	244.3	58.7	211.9	151.8	59.2	
	119	547.1	360.4	54.2	367.2	297.9	61.2	339.5	249.3	58.8	221.3	154.8	58.8	

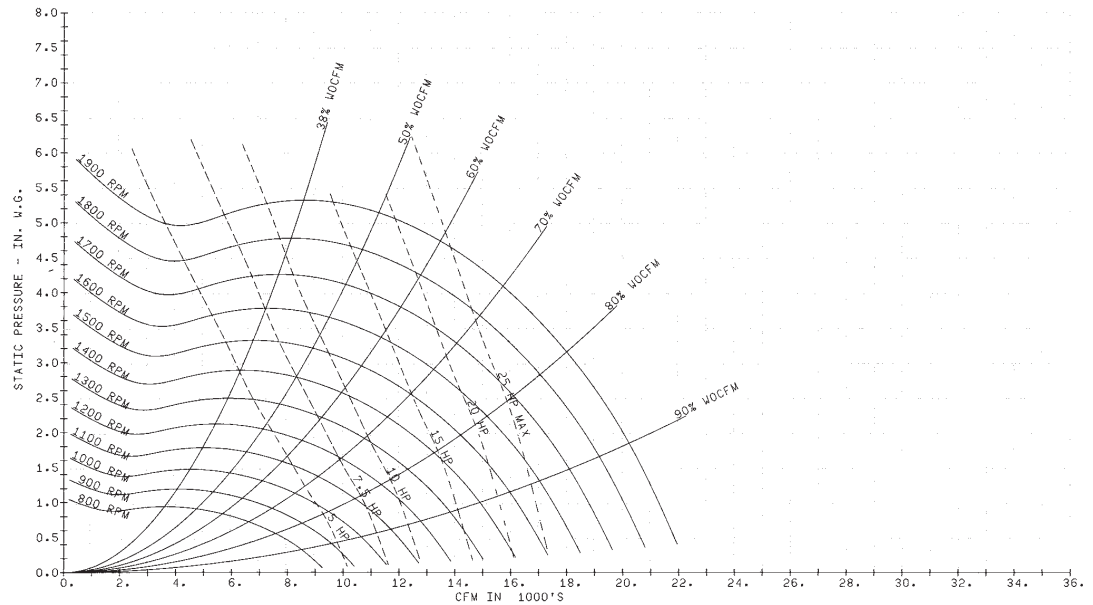
Table 17. SCWG/SIWG 35 gross cooling capacity—14,000 cfm, 105 gpm

Entering air		Entering Water Temp								
		75°F			85°F			95°F		
EDB °F	EWB °F	Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F	Total MBh	Sensible MBh	LWT °F
75	62	414.7	360.2	84.4	399.1	353.6	94.3	381.3	346.0	104.2
	67	452.0	280.8	85.2	434.7	274.2	95.0	415.0	266.6	104.8
	72	491.9	199.7	86.0	472.6	193.0	95.8	450.5	185.5	105.6
80	62	417.9	417.9	84.5	403.0	403.0	94.4	386.0	386.0	104.3
	67	452.8	359.4	85.2	435.6	352.8	95.0	415.9	345.2	104.9
	72	492.1	278.8	86.0	472.9	272.1	95.8	451.0	264.6	105.6
85	62	434.8	434.8	84.8	421.6	421.6	94.8	406.1	406.1	104.7
	67	454.1	432.4	85.2	437.3	425.4	95.1	418.0	417.4	104.9
	72	492.9	357.7	86.0	473.7	351.0	95.8	451.9	343.5	105.6



Performance Data

Figure 18. Fan performance for CV or with VFD



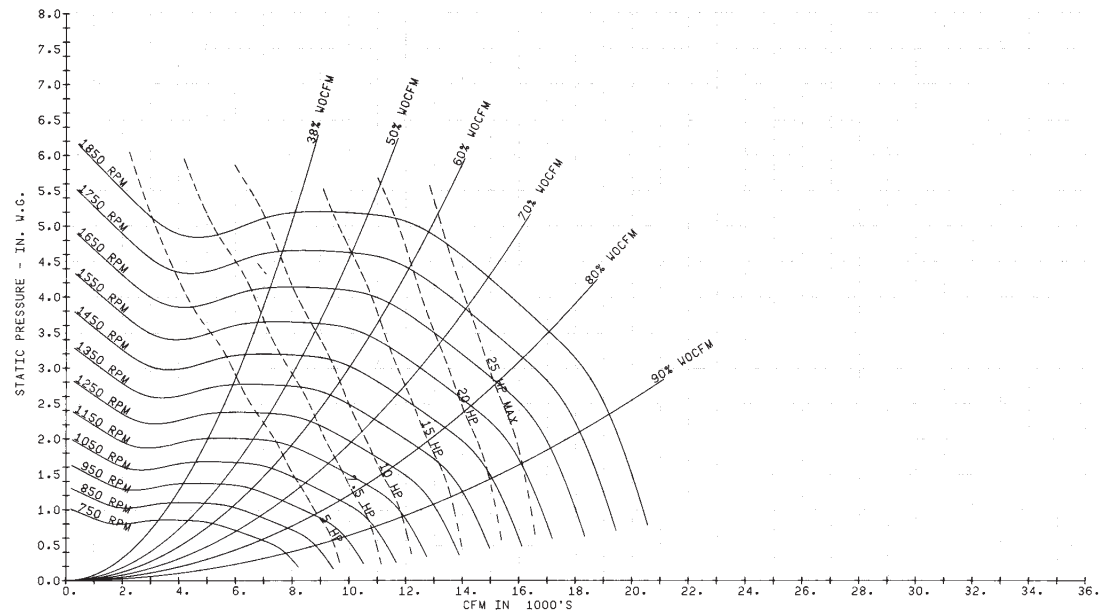
Note: Fan curves include refrigerant coil and internal cabinet static losses. To determine static pressure used with these curves, add filter; economizer; flexible horizontal discharge; and heat pressure drops to external duct static pressure.

Air-Cooled Unit Performance

32-ton Air-Cooled

Table 18. SCRG/SIRG 32 gross cooling capacity—12,800 CFM

Entering air		Outdoor Ambient									
		75°F		85°F		95°F		105°F		115°F	
EDB	EWB	Total MBH	Sensible MBH	Total MBH	Sensible MBH	Total MBH	Sensible MBH	Total MBH	Sensible MBH	Total MBH	Sensible MBH
70	62	416.2	273.0	400.8	266.2	382.9	258.5	362.6	249.9	340.6	240.6
	67	456.9	201.5	439.5	194.6	419.5	186.8	397.0	178.1	372.6	168.8
75	62	417.0	343.9	401.6	337.2	383.7	329.5	363.6	320.9	341.6	311.6
	67	456.9	272.8	439.6	265.9	419.7	258.1	397.3	249.5	373.1	240.2
	72	500.0	199.9	480.5	192.9	458.1	185.1	433.3	176.4	406.7	167.3
80	62	418.8	410.9	403.8	403.5	386.5	386.5	367.2	367.2	346.4	346.4
	67	457.5	343.9	440.3	337.1	420.4	329.3	398.1	320.7	374.1	311.5
	72	500.0	271.5	480.4	264.5	458.2	256.7	433.4	248.1	407.0	239.0
85	62	428.8	428.8	417.2	417.2	402.3	402.3	385.3	385.3	366.5	366.5
	67	458.4	414.9	441.1	408.1	421.6	400.4	399.8	386.9	376.3	376.3
	72	500.4	342.9	481.0	336.0	458.8	328.2	434.2	319.6	407.9	310.5

Figure 19. Fan performance for CV or with VFD


Note: Fan curves include refrigerant coil and internal cabinet static losses. To determine unit's total static pressure add filter, economizer, flexible horizontal discharge, and heat pressure drops to external duct static pressure.

Heating Performance

Table 19. Steam heating capacity

Unit Size	Airflow cfm	2 psi		5 psi		10 psi	
		Capacity MBh	LAT °F	Capacity MBh	LAT °F	Capacity MBh	LAT °F
20 tons	8000	278.6	92.1	293.9	93.9	315.5	96.4
25 tons	10000	318.2	89.3	335.7	91.0	360.5	93.2
30 tons	12000	353.3	87.2	372.7	88.6	400.3	90.8
32 tons	12800	366.2	86.4	386.4	87.8	414.9	89.9
35 tons	14000	384.6	85.3	405.8	86.7	435.8	88.7

Note: Based on 60°F EAT.

Table 20. Electric heating capacity

Unit Size SCWG	Unit Size SCRG	Heat kW	Air Flow cfm	Capacity MBH	LAT
20	N/A	16	8000	54.64	66.32
25	N/A	20	10000	68.30	66.32
30	N/A	24	12000	81.96	66.32
N/A	32	26	12800	88.79	66.42
35	N/A	28	14000	95.62	66.32

Notes:

1. Based on 60°F EAT.
2. For unit capacities at different conditions than those listed, use TOPSS (Trane Official Product Selection Program).
3. Air temperature rise = kW x 3413 / (CFM x 1.085).



Controls

Modular Series Self-Contained Units

Modular DDC controls with human interface (HI) panel make self-contained units more flexible and easier to operate.

Controls are designed to work with Trane® equipment for optimum efficiency. The factory installs and commissions each control component to ensure simple and reliable operation.

Furthermore, the DDC control's modular design allows greater application flexibility using up to twelve different modules, dependent upon unit options. A customer can order exactly what the job requires as options, instead of one large control package. And since unit features are distributed among multiple printed circuit boards, field replacement is easy.

Depending upon unit options, units can operate as follows:

- Stand-alone
- Interface with Trane Tracer® building management system
- Interface with a generic (non-Trane) building management system.

Available Inputs and Outputs for the RTM Module (on all units with controls)

Binary Inputs

- Emergency stop
- External auto/stop
- Unoccupied/occupied
- Dirty filter
- VAV changeover with hydronic heat

Binary Outputs

- VAV box drive max (VAV units only)
- CV unoccupied mode indicator (CV units only)
- Alarm
- Fan run request
- Water pump request (water-cooled only)

Analog Input

- Airside economizer damper minimum position

Analog Output

- Outside air damper actuator

Heat Module Option

- Analog output

Generic BAS Option (GBAS)

Binary Inputs

- Demand limit contacts

Binary Outputs

- Dirty filter relay
- Refrigeration fail relay
- Heat fail relay
- Supply fan fail relay
- Active diagnostics

Analog Inputs

- Occupied zone cooling setpoint
- Occupied zone heating setpoint
- Unoccupied zone cooling setpoint
- Unoccupied zone heating setpoint or minimum outside air flow setpoint
- Supply air cooling setpoint
- Supply air heating setpoint
- Supply air static pressure setpoint

Comparative Enthalpy Module (ECEM) Option

Analog Inputs

- Return air temperature
- Return air humidity

Ventilation Override Module (VOM) Option

Binary Inputs

- VOM mode A, unit off
- VOM mode B, pressurize
- VOM mode C, exhaust
- VOM mode D, purge
- VOM mode E, purge w/duct pressure control

Binary Outputs

- V.O. relay

LonTalk/Building Automation System

The LonTalk® Communication Interface for self-contained (LCI-I) controller expands communications from the unit UCM network to a Trane Tracer® Summit or a third party building automation system, utilizing LonTalk, and allows external setpoint and configuration adjustment and monitoring of status and diagnostics. The LCI-I utilizes an FTT-10A Free Topology transceiver, which supports non-polarity sensitive, free topology wiring, which allows the system installer to use 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 Trane Tracer Summit and SC or a third party building automation system that supports LonTalk.

BACnet/Building Automation System

The BACnet Communication Interface for self-contained (BCI-I) controller expands communications from the unit UCM network to Tracer SC or a third party building automation system, utilizing BACnet, and allows external setpoint and configuration adjustment and monitoring of status and diagnostics. The BCI-I utilizes the BACnet defined MS/TP protocol as defined in ASHRAE standard 135-2004. This controller works in standalone mode, with Tracer SC or when connected to a third party building automation system that supports BACnet.

Standard Unit Control Features

Note: All set-up parameters are preset from the factory, requiring less start-up time during installation.

The human interface panel is easy to read and requires less time for building maintenance personnel to learn to interact with the unit. It features a clear language display (in English, Spanish, or French) that shows all of the self-contained unit control parameters, such as system on/off, demand limiting type, night setback setpoints, and many other setpoints. All adjustments are done through the human interface keypad. Also, the human interface panel allows you to monitor diagnostic points such as; sensor failures, supply airflow loss, and inoperative refrigerant circuit. No special tools are required for servicing the unit. Diagnostics are held in

memory, even during power loss. This allows the operator/servicer to diagnose the failure root cause.

Unit Features

- Unit-mounted human interface panel with a two line x 40 character language (English, Spanish, or French) display and a 16-function keypad that includes CUSTOM, DIAGNOSTICS, and SERVICE TEST MODE menu keys on units.
- Compressor lead/lag
- Frostat™ coil frost protection on all units
- Daytime warmup (occupied mode) on units with heating options and morning warmup operation on all units
- Supply air static over-pressurization protection on units with variable frequency drives (VFDs)
- Supply airflow proving
- Supply air tempering control with heating option
- Supply air heating control on VAV with hydronic heating option
- Mappable sensors and setpoint sources
- Occupied/unoccupied switching
- Timed override activation
- Programmable water purge during unoccupied mode

Human Interface Panel (HI)

The human interface panel provides a 16-button keypad for monitoring, setting, editing and controlling. The HI panel is mounted in the unit's main control panel, accessible through the unit's control panel door.

The optional remote-mount version of the human interface (RHI) panel has all the functions of the unit-mounted version, except for the service mode. To use a RHI, the unit must be equipped with the remote HI interface option (model number digit 32 = 2), which includes an interprocessor communications bridge (IPCB). The RHI can be located up to 1,000 feet (304.8 m) from the unit. A single RHI can be used to monitor and control up to four self-contained units, each containing an IPCB.

Figure 20.



The main menus of the human interface panels are:

- STATUS is used to monitor all temperatures, pressures, humidities, setpoints, input and output status.
- CUSTOM key allows the user to customize a status report, consisting of up to four screens of the data available in the main STATUS menu.
- SETPOINT is used to edit all factory preset default setpoints.
- DIAGNOSTICS allows the user to review active and historical lists of diagnostic conditions. A total of 49 different diagnostics can be read at the human interface (HI) panel and the last 20 diagnostics can be held in an active history buffer log at the HI panel.
- SETUP allows the user to edit control parameters, sensor selections, setpoint source selections, output definitions, and numerous other points in this menu. All points have factory-preset values to keep unnecessary editing to a minimum.

- **CONFIGURATION** allows changing of factory-preset unit configuration information. This information can be edited only if certain options are field installed or deleted from the unit. For example, if a Tracer LCI-I communication interface module or ventilation override module (VOM) were field installed, the unit configuration will require editing to reflect those options for proper unit operation.
- **SERVICE** allows servicing or troubleshooting the unit by selecting component control outputs such as compressors, fans, damper position, etc. This menu is accessible only at the unit-mounted human interface panel.

Thermostat Interface

A two-heat/two-cool thermostat must be ordered separately and shipped separate for field installation in a remote-mounted configuration. The thermostat is to provide control over the compressor staging, fan start/stop (CV only) and electric heat only (if ordered).

Control Sequences of Operation

Morning Warmup

This feature is available on all types of factory-installed heat units and on units with no heat. This function may still be selected to support systems with heat sources not provided by the self-contained unit. At the conclusion of unoccupied mode, the selected zone is heated to the user-defined morning warmup setpoint. The unit then is released to occupied mode. There are two types of morning warmup: full capacity or cycling capacity.

- **Full Capacity Morning Warmup (MWU)**

Full capacity morning warmup uses full heating capacity to heat the zone as quickly as possible. Full heating capacity is provided until the morning warmup setpoint is met. At this point, the unit is released to daytime mode.

- **Cycling Capacity Morning Warmup (MWU)**

Cycling capacity morning warmup provides gradual heating to overcome “building sink” as the zone is heated. Normal zone temperature control with varying capacity is used to raise the zone temperature to the MWU zone temperature setpoint. Cycling capacity MWU will operate until MWU setpoint is reached or for 60 minutes. Then the unit switches to occupied mode. Cooling will suspend until building load conditions exceed the MWU setpoint of 3 F (1.7 C), which is field adjustable.

Note: *When using the morning warmup option in a heating/cooling self-contained unit in a VAV system, it is important to maintain airflow through the unit. This can be accomplished by electrically tying the VAV boxes to the VAV drive max output relay contacts on the unit’s RTM module board or by using changeover thermostats. Either of these methods will assure adequate airflow through the unit and satisfactory heating.*

Ventilation Override (VOM)

The user can customize up to five different override sequences (A-E) for purposes of ventilation override control. If more than one VOM sequence is being requested, the sequence with the highest priority is initiated first. Priority schedule is that sequence “A” (unit off) is first, with sequence “E” (purge with duct pressure control) last.

- **UNIT OFF sequence “A”** — When complete system shut down is required, use the following sequence:
 - Supply fan – Off
 - Supply fan VFD – Off (0 Hz) (if equipped)
 - Outside air dampers – Closed
 - Heat – all stages – Off, Modulating heat output at 0 Vdc
 - Occupied/Unoccupied output – Deenergized
 - VO relay – Energized
 - Exhaust fan (field-installed) - Off
 - Exhaust damper (field-installed) - Closed

- **PRESSURIZE sequence “B”** – Use the following override sequence if a positively pressurized space is desired instead of a negatively pressurized space:
 - Supply fan – On
 - Supply fan VFD – On (60 Hz)\VAV boxes – Open (if equipped)
 - Outside air dampers – Open
 - Heat – all stages – Off, Modulating heat output at 0 Vdc
 - Occupied/Unoccupied output – Energized
 - VO relay – Energized
 - Exhaust fan (field-provided/installed) – Off
 - Exhaust damper (field-provided/installed) – Closed
- **EXHAUST sequence “C”** – With the building’s exhaust fans running and the unit’s supply fan off, the conditioned space becomes negatively pressurized. This is desirable for clearing the area of smoke when necessary (e.g., from an extinguished fire, to keep smoke out of areas that were not damaged).
 - Supply fan – Off
 - Supply fan VFD – Off (0 Hz) (if equipped)
 - Outside air dampers – Closed
 - Heat – all stages – Off, Modulating heat output at 0 Vdc
 - Occupied/Unoccupied output – De-energized
 - VO relay – Energized
 - Exhaust fan (field-provided/installed) – On
 - Exhaust damper (field-provided/installed) – Open
- **PURGE sequence “D”** – Use the following sequence for purging the air out of a building before coming out of unoccupied mode of operation on VAV units. Also, it can be used to purge smoke or stale air.
 - Supply fan – On
 - Supply fan VFD – On (60 Hz)\VAV boxes – Open (if equipped)
 - Outside air damper – Open
 - Heat – all stages – Off, Modulating heat output at 0 Vdc
 - Occupied/Unoccupied output – Energized
 - VO relay – Energized
 - Exhaust fan (field-provided/installed) – On
 - Exhaust damper (field-provided/installed) – Open
- **PURGE WITH DUCT PRESSURE CONTROL “E”** – Use the following sequence when supply air control is required for smoke control:
 - Supply fan – On
 - Supply fan VFD – On (if equipped)
 - Outside air dampers – Open
 - Heat – all stages – Off, Modulating heat output at 0 Vdc
 - Occupied/Unoccupied output – Energized
 - VO relay – Energized
 - Exhaust fan (field-provided/installed) – On
 - Exhaust damper (field-provided/installed) – Open

Note: Each system (cooling, supply air, etc.) within the unit can be redefined in the field for each of the five sequences, if required. Also the definitions of any or all of the five sequences may be locked into the software by simple key strokes at the human interface panel.

Generic Building Automation System Module (GBAS) Option

The generic building automation system module (GBAS) provides broad control capabilities for building automation systems other than Trane Tracer® systems. A field-provided potentiometer or a 0-5 Vdc signal can be applied to any of the inputs of the GBAS to provide the following inputs and outputs:

- **GBAS Analog Inputs** — Four analog inputs that can be configured to be any of the following:
 - Occupied zone cooling
 - Unoccupied zone cooling
 - Occupied zone heating
 - Unoccupied zone heating
 - SA cooling setpoint
 - SA heating setpoint
 - SA static pressure setpoint
- **GBAS Binary Outputs** — Each of the five relay outputs can be mapped to any/all of the available diagnostics.
- **Demand Limiting Binary Input** — This function is operational on units with a GBAS and is used to reduce electrical consumption at peak load times. There are two types of demand limiting, 50% and 100%. When demand limiting is needed, mechanical cooling and heating operation are either partially (50%), or completely disabled (100%) to save energy. The demand limit definition is user definable at the human interface panel. Demand limit binary input accepts a field supplied switch or contact closure. When the need for demand limiting has been discontinued, the unit's cooling/heating functions will again become fully enabled.

Evaporator Coil Frost Protection Frostat™

The Frostat™ system uses a temperature sensor on the evaporator to determine if the coil is getting close to a freezing condition. If so, mechanical cooling capacity is shed as necessary to prevent icing.

Also, the Frostat™ system eliminates the need for hot gas bypass. It uses a suction line surface temperature sensor mounted near the TXV bulb location to shut off cooling when coil frosting conditions occur. The supply fan does not shut off and will de-ice the coil. Timers prevent the compressors from rapid cycling.

Occupied/Unoccupied Switching

There are four ways to switch occupied/unoccupied:

1. Programmable night setback sensor
2. Field-supplied contact closure (hardwired binary input to RTM) — This input accepts a field supplied switch or contacts closure such as a time clock.
3. Tracer® — The Trane Tracer® system can control the occupied/unoccupied status of the self-contained unit.
4. Factory-mounted time clock — A time clock can control the occupied/unoccupied status of the self-contained unit.

Timed Override Activation—ICS

This function is operational whenever the unit's RTM module board is used as the zone temperature sensor source, which can be set at the human interface panel. When this function is initiated by the push of the override button on the zone sensor, the unit will switch to the occupied mode. Unit operation (occupied mode) during timed override is terminated by a signal from Tracer.

Timed Override Activation—Non-ICS

This function is active whenever the unit's RTM module board is selected as the zone temperature source, which can be set at the human interface panel. When this function is initiated by the push of the override button on the zone sensor, the unit will switch to the

occupied mode. Automatic cancellation of the timed override mode occurs after three hours of operation.

Low Ambient Compressor Lockout

This function will lock out the compressor if the outdoor air temperature is below the low ambient compressor lock-out temperature setpoint when using a field-installed outside air sensor. This setpoint is adjustable at the human interface panel. Compressors will lock out when outdoor air temperature falls below that selected temperature and will start again when the temperature rises 5° F above the setpoint.

Comparative Enthalpy Control of Airside Economizer Option

An optional comparative enthalpy system is used to control the operation of the economizer and measures the temperature and humidity of both return air and outside air to determine which source has lower enthalpy. This system allows true comparison of outdoor air and return air enthalpy by measurement of outdoor and return air temperatures and humidities.

Note: If comparative enthalpy is not ordered, the standard method compares outdoor air enthalpy with a fixed reference enthalpy, set through the human interface panel.

Compressor Lead/Lag

Compressor lead/lag is a user-selectable feature through the human interface panel available on all units. After each request for compressor operation, the lead refrigeration circuit or compressor switches, thereby causing a more equitable or balanced run time among compressors.

Emergency Stop Input

A binary input is provided on the unit's RTM module board for installation of a field-provided switch or contacts to immediately shutdown all unit functions.

Water Flow Control

With compatible piping configurations, the unit can be configured to provide:

- Constant water flow with basic or intermediate piping for condenser pumping systems that are not capable of unloading the water-pumping system.
- Variable water flow with intermediate piping only, which maximizes energy saving by unloading the water pumping system.

Head Pressure Control

- Water-cooled condensers — Units that are set up for variable water flow will modulate a water valve to maintain a user-defined condensing temperature setpoint. Condensing temperature will be referenced utilizing factory installed sensors located at each condenser.
- Air-cooled condensers — Condenser fans will stage per a user-defined setting. If the condenser is equipped with head pressure control (air modulation on last stage of condenser capacity), the condenser airflow will modulate to maintain condensing temperature setpoint. Condensing temperature is determined by sensors located at each condenser coil.

Water Purge

This user-definable feature allows the user to select a purge schedule to automatically circulate water through the economizer and condensers periodically during non-operational times. This allows fresh chemicals to circulate in waterside heat exchangers.

Airside Options

Variable Frequency Drive (VFD) Control

Variable frequency drives are driven by a modulating 0-10 Vdc signal from the RTM module. A pressure transducer measures duct static pressure, and the VFD adjusts the fan speed to maintain the supply air static pressure within an adjustable user-defined range. The range is determined by the supply air pressure setpoint and supply air pressure deadband, which are set through the human interface panel.

Variable frequency drives provide supply fan motor speed modulation. The drives will accelerate or decelerate as required to maintain the supply static pressure setpoint.

Bypass control is offered as an option to provide full nominal airflow in the event of drive failure. Manual bypass is initiated at the human interface panel. When in the bypass mode, VAV boxes will need to be fully opened. The self-contained unit will control heating and cooling functions to maintain setpoint from a user defined zone sensor. Supply air static pressure limit will be active in this mode.

Supply Air Static Pressure Limit

The opening of the VAV boxes are coordinated during unit start up and transition to/from occupied/unoccupied modes to prevent over-pressurization of the supply air duct-work. However, if for any reason the supply air pressure exceeds the user-defined supply air static pressure limit that was set at the human interface panel, the supply fan/VFD is shut down. Then unit is then allowed to restart up to three times. If the over-pressurization condition still occurs on the third restart, the unit shuts down and a manual reset diagnostic sets and displays at the human interface panel.

Zone Temperature Control Unit Sequence of Operation

1 – Occupied Zone Temperature Control

Cooling/Waterside Economizer

During occupied cooling mode, the waterside economizer option and mechanical cooling function to control zone temperature. If the entering condenser water temperature is appropriate to use “free cooling,” the economizer initiates to attempt to satisfy the cooling zone temperature setpoint with the compressors staging on as necessary. Minimum on/off timing of compressors prevents rapid cycling.

Waterside economizing enables when the unit’s entering water temperature is below the unit’s entering mixed air temperature by 4°F plus the user adjustable economizer approach temperature. The approach temperature default is 4°F and is adjustable from 0-9°F at the human interface (HI) panel. Waterside economizing disables when the unit’s entering water temperature is not below the unit’s entering mixed air temperature by at least the water economizer approach temperature. The approach temperature defaults to 4°F and is adjustable from 0-9°F at the HI. The economizer acts as the first stage of cooling. If the economizer is unable to maintain the zone temperature setpoint, the compressor module will bring on compressors as required to meet the setpoint.

If the unit does not include an economizer, only mechanical cooling will operate to satisfy cooling requirements.

Cooling/Airside Economizer

During occupied cooling mode, the economizer option and mechanical cooling operate to control zone temperature. If the outside air enthalpy is appropriate for airside economizing or “free cooling,” the economizer initiates to satisfy the cooling zone temperature setpoint with the compressors staging on as necessary. Minimum on/off timing of compressors will prevent rapid cycling.

On units with an airside economizer, a call for cooling will modulate the fresh air dampers open. The rate of economizer modulation is based on deviation of the zone temperature from setpoint; i.e., the further away from setpoint, the faster the fresh air damper will open. First stage of cooling will start after the economizer reaches full open.

Note that the airside economizer will only function freely if ambient conditions are below the enthalpy control settings or below the return air enthalpy if unit has comparative enthalpy installed. If outside air is not suitable for “economizing,” the fresh air dampers drive to the minimum open position. A field adjustable, factory default setting in the human interface panel or Tracer can provide the input to establish the minimum damper position.

At outdoor air conditions above the enthalpy control setting, only mechanical cooling is used and the fresh air dampers remain at minimum position.

If the unit does not include an airside economizer, only mechanical cooling will operate to satisfy cooling requirements.

Heating: Electric

On units with electric heating, the zone temperature can be controlled to a heating setpoint during the occupied mode by cycling a single stage electric heater. Interface is provided for field supplied electric heat (up to three stages). The zone temperature heating setpoint and deadband are user defined at the human interface panel.

Heating: Hot Water or Steam

On units with hot water or steam heating, the zone temperature can be controlled to a heating setpoint during the occupied mode. The zone temperature heating setpoint and deadband are user defined at the human interface panel.

Supply Air Tempering

For hot water, steam, or electric heat units in the heat mode but not actively heating, if the supply air temperature drops to 10°F below the occupied zone heating temperature setpoint, one stage of heat will be brought on to maintain a minimum supply air temperature. The unit transitions out of heat mode if the supply air temperature rises to 10°F above the occupied zone heating temperature setpoint.

Auto Changeover

When the system mode is auto, the mode will change to cooling or heating as necessary to satisfy the zone cooling and heating setpoints. The zone cooling and heating setpoints can be as close as 2°F apart.

2 – Unoccupied Zone Temperature Control

Cooling and Heating

Both cooling and heating modes can be selected to maintain unoccupied zone temperature deadbands. For unoccupied periods, heating, economizer operation, or compressor operation can be selectively locked out at the human interface panel.

Supply Air Temperature Control Unit Sequence of Operation

1 – Occupied Supply Air Temperature Control

Cooling/Waterside Economizer

During occupied cooling mode, the waterside economizer option and mechanical cooling are used to control the supply air temperature. The supply air temperature setpoint and deadband are user defined at the human interface panel. Waterside economizing enables when the units entering water temperature is below the units entering mixed air temperature by 4°F plus the user adjustable economizer approach temperature. The approach temperature default is 4°F and is adjustable from 0-9°F at the HI. Waterside economizing disables when the units entering water temperature is not below the units entering mixed air temperature by at least the water economizer approach temperature.

The economizer acts as the first stage of cooling. If the economizer is unable to maintain the supply air setpoint, the compressor module will bring on compressors as required to meet the setpoint. If the unit does not include an economizer, only mechanical cooling will satisfy cooling requirements.

Cooling/Airside Economizer

During occupied cooling mode of operation, the airside economizer option and mechanical cooling are used to control the supply air temperature. The supply air temperature setpoint and deadband are user-defined at the human interface panel. If the temperature of the mixed air is appropriate to use "free cooling," the economizer initiates to satisfy the supply air setpoint. Then if required, the mechanical cooling stages on to maintain supply air temperature setpoint. Minimum on/off timing of the mechanical cooling prevents rapid cycling.

On units with an airside economizer, a call for cooling will modulate the fresh air dampers open. The rate of economizer modulation is based on deviation of the discharge temperature from setpoint, i.e., the further away from setpoint, the faster the fresh air damper will open. First stage of cooling initiates after the economizer reaches full open.

Note that the airside economizer is only allowed to function freely if ambient conditions are below the setpoint control settings or below the return air enthalpy, if unit has the comparative enthalpy option. If outside air is not suitable for “economizing,” the fresh air dampers drive to the minimum open position. A field adjustable, factory default setting in the human interface panel or Tracer can provide the input to establish the minimum damper position.

At outdoor air conditions above the setpoint or comparative enthalpy control setting, only mechanical cooling is used and the fresh air dampers remain at minimum position.

If the unit does not include an economizer, only mechanical cooling operates to satisfy cooling requirements.

Heating: Hot Water or Steam

On units with hot water or steam heating, the supply air temperature can be controlled to a heating setpoint during the occupied mode. The supply air temperature heating setpoint and deadband are user defined at the human interface panel. VAV occupied heating on hot water and steam heat units is initiated by closing a field-supplied switch or contacts connected to a changeover input on the unit’s RTM module board .

Supply Air Setpoint Reset

Supply air reset can be used to adjust the supply air temperature setpoint on the basis of a zone temperature or outdoor air temperature. Supply air reset adjustment is available from the human interface panel for supply air heating and supply air cooling control.

Reset based on outdoor air temperature

Outdoor air cooling reset is sometimes used in applications where the outdoor temperature has a large effect on building load. When the outside air temperature is low and the building cooling load is low, the supply air setpoint can be raised, thereby preventing subcooling of critical zones. This reset can lower usage of mechanical cooling, thus savings in compressor kW, but an increase in supply fan kW may occur.

Outdoor air heating reset is the inverse of cooling, with the same principles applied.

For both outdoor air cooling reset and heating reset, there are three user defined parameters that are adjustable through the human interface panel:

- Beginning reset temperature
- Ending reset temperature
- Maximum amount of temperature reset

Reset based on zone temperature

Zone reset is applied to the zone(s) in a building that tends to overcool or overheat. The supply air temperature setpoint is adjusted based on the temperature of the critical zone(s). This can have the effect of improving comfort and/or lowering energy usage. The user-defined parameters are the same as for outdoor air reset.

Supply Air Tempering (Hot Water and Steam Units Only)

When supply air temperature falls below the supply air temperature deadband low end, the heating valve modulates open to maintain the minimum supply air temperature setpoint.

2 — Unoccupied Supply Air Temperature Control — Unoccupied Zone Heating and Cooling

During unoccupied mode, the unit operates to maintain zone temperature with fan cycling as needed for building load. VAV boxes drive full open. However, unit airflow modulation control operates to maintain duct static setpoint. The unit controls zone temperature within the unoccupied zone cooling and heating (heating units only) deadbands.

Daytime Warmup

During occupied mode, if the zone temperature falls to a preset, user-defined zone low limit temperature setpoint, the unit is put into daytime warmup. The system changes over to CV heating, the VAV boxes drive full open. However, unit airflow modulation control operates to maintain duct static setpoint, and full heating capacity is provided until the daytime warmup setpoint is reached. The unit is then returned to normal occupied mode.

Zone Sensor Options

Zone Temperature Sensor, BAYSENS077 (standard on all units)



This wall-mounted zone sensor ships with every Signature Series unit, CV or VAV. Additional sensors are also available for order using the accessory model number. It includes an internal thermistor and should be mounted in the zone. This sensor is available for use with all zone sensor options to provide remote sensing capabilities.

Additional sensors shown can be ordered through Unitary Accessories (ACC)/UPG Rooftop, Packaged Heat Pump, Split System Accessories (ACC) in Job Center.

CV/VAV Programmable Zone Sensor, BAYSENS119



The BAYSENS119 programmable night set back sensor provides multi functional flexibility for both Constant Volume and Variable Air Volume control. This electronic programmable sensor includes auto or manual cooling and heating changeover with 7 day programming. Five tactile feel buttons located on the sensor front panel provide interface for all programming, including

initial setup for CV or VAV control. Sensor functionality includes up to four daily programmable periods for Occupied/Unoccupied operation, and Override.

The dynamic LCD display indicates status for System On/Off, Heat, Cool, Fan Status, Time of Day, Occupied/Unoccupied mode, Space Temperature, Space or Discharge Air Heating and Cooling Setpoints. Additional features include Service Indication for Heat Failure, Cool Failure, Fan Failure, and Test Mode if system is operating in test mode.

A Check Filter Timer function is included. Filter service countdown time can be set in one-day increments. Activation of the Test/Configuration button located on the bottom of the sensor performs a sensor self-diagnostic routine and indicates hours in service.

When the BAYSENS119 is programmed for CV or VAV control, Night Setback is initiated through the scheduled Unoccupied time setting. When the sensor switches to Night Setback, the outdoor dampers close and heating/cooling functions are enabled/disabled based on set up parameters. As building load changes, if heating/cooling functions are enabled, the Sensor energizes self-contained unit and evaporator fan operation. The unit will cycle heating/cooling operation throughout the Unoccupied period as required to maintain Unoccupied space temperature setpoints. When the Unoccupied time period has expired, all heating/cooling functions return to normal operation.

When Night Setback options are used with VAV heating/cooling, maintain airflow through the self-contained unit by electronically tying the VAV terminals to the unoccupied output relay contacts on the self-contained units low voltage terminal board, or by using changeover thermostats. Either of these methods will assure adequate airflow through the unit and satisfactory temperature control of the space.

Refer to BAS-SVX17*-EN for complete installation, operation, and maintenance instructions.

Note: Additional sensors shown can be ordered through Unitary Accessories (ACC)/UPG Rooftop, Packaged Heat Pump, Split System Accessories (ACC) in Job Center.

CV—Dual Setpoint, Manual/Automatic Changeover Sensor, BAYSENS108



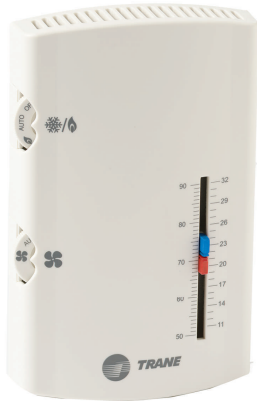
This zone sensor module is for use with cooling/heating CV applications. It provides the following features and system control functions:

- System control switch (Heat/Auto/Off/Cool): Allows you to select heating mode, cooling mode, automatic selection of heating or cooling as required, or turn the system off.
- Fan control switch (Auto/On): Allows you to select automatic fan operation while actively heating or cooling or continuous fan operation.
- Dual temperature setpoint levers allow you to set different cooling (blue lever) and heating setpoints (red lever).
- Thermometer to indicate temperature in the zone.

Note: Additional sensors shown can be ordered through Unitary Accessories (ACC)/UPG Rooftop, Packaged Heat Pump, Split System Accessories (ACC) in Job Center.



CV—Dual Setpoint, Manual/Automatic Changeover Sensor with System Function Lights, BAYSENS110



This zone sensor is for use with cooling/heating CV applications. It provides the following features and system control functions:

- System control switch to select heating mode (HEAT), cooling mode (COOL), AUTO for automatic selection of heating or cooling as required, or OFF to turn the system off.
- Fan control switch to select automatic fan operation while actively heating or cooling (AUTO), or continuous fan operation (ON).
- Dual temperature setpoint levers for setting cooling (blue lever) or heating (red lever).
- Thermometer to indicate temperature in the zone.
- Function status indicator lights:
 - SYS ON glows continuously during normal operation, or blinks if system is in test mode.
 - COOL glows continuously during cooling cycles or blinks to indicate a cooling system failure.
 - HEAT glows continuously during heating cycles or blinks to indicate a heating system failure.
 - SERVICE blinks or glows to indicate a problem. These signals vary depending on the particular equipment used.

Note: Additional sensors shown can be ordered through Unitary Accessories (ACC)/UPG Rooftop, Packaged Heat Pump, Split System Accessories (ACC) in Job Center.

Integrated Comfort™ Systems Sensors for CV and VAV Applications

Zone Temperature Sensor with Timed Override Buttons and Local Setpoint Adjustment, BAYSENS074



This zone sensor is for use with cooling/heating ICS™. It provides the following features and system control functions:

- Remote temperature sensing in the zone
- A timed override button to move an Integrated Comfort™ System or a building management system from unoccupied to occupied mode.
- Setpoint thumbwheel for local setpoint adjustment.
- Cancel button to cancel the unoccupied override command.

Note: Additional sensors shown can be ordered through Unitary Accessories (ACC)/UPG Rooftop, Packaged Heat Pump, Split System Accessories (ACC) in Job Center.

Zone Temperature Sensor with Timed Override Buttons, BAYSENS073



Zone temperature sensor with timed override buttons, Accessory Model Number Digit 6=B, BAYSENS073

This zone sensor is for use with cooling/heating Integrated Comfort™ Systems (ICS). It provides the following features and system control functions:

- Remote temperature sensing in the zone.
- A timed override button to move an ICS or building management system from it unoccupied to occupied mode.
- Cancel button to cancel the unoccupied override command.

Note: Additional sensors shown can be ordered through Unitary Accessories (ACC)/UPG Rooftop, Packaged Heat Pump, Split System Accessories (ACC) in Job Center.



Electrical Data

Selection Procedures

- RLA = Rated Load Amps
- Compressor LRA = Locked Rotor Amps
- Fan Motor LRA = Locked Rotor Amps, N.E.C. Table 430 - 150
- FLA = Full Load Amps, N.E.C. Table 430 - 150
- Voltage utilization range is $\pm 10\%$

Determination of Minimum Circuit Ampacity (MCA)

MCA = 1.25 x largest motor amps/VFD amps (FLA or RLA) + the sum of the remaining motor amps.

Determination of Max Fuse (MFS) and Max Circuit Breaker (MCB) Sizes

MFS and MCB = 2.25 x largest motor amps (FLA or RLA) + the sum of the remaining motor amps.

Units with the dual power option require separate MFS and MCB calculations for each electrical circuit: 1) fans and 2) compressors.

If the rating value calculation does not equal a standard over current protective device rating, use the next lower standard rating as the maximum.

Table 21. Number of compressors per unit

SCWG/SIWGSCRG/SIRG	20	25	30	3532
10 HP	2	2	1	-
15 HP	-	-	1	2

Table 22. SXWG and SXRG compressor motor data

HP	200V		460V		575V	
	RLA	LRA	RLA	LRA	RLA	LRA
10	41.4	267	18.6	142	15.8	103
15	56.9	351	25.5	197	23.1	146

Table 23. Fan motor electrical data

HP	TYPE	200V		460V		575V	
		FLA	LRA	FLA	LRA	FLA	LRA
5	OPD	15.3	109.0	6.6	48.0	5.2	40.0
	TEFC	15.2	128.8	6.7	56.0	5.3	44.8
7.5	OPD	23.3	199.0	9.7	84.8	7.8	61.4
	TEFC	22.1	164.0	9.6	70.9	7.7	56.9
10	OPD	29.5	260.0	12.6	118.0	10.1	72.3
	TEFC	29.5	216.0	12.8	103.0	10.3	83.9
15	OPD	43.4	271.0	18.9	118.0	15.1	95.9
	TEFC	42.5	288.0	18.5	125.0	15.0	102.0
20	OPD	57.0	350.0	24.5	156.0	19.6	126.0
	TEFC	55.5	402.0	24.2	175.0	19.4	140.0

Table 23. Fan motor electrical data (continued)

HP	TYPE	200V		460V		575V	
		FLA	LRA	FLA	LRA	FLA	LRA
25	OPD	70.0	432.0	30.5	190.0	24.5	155.0
	TEFC	71.0	523.0	30.5	188.0	24.5	140.0

Table 24. VFD electrical data

HP	VFD L.I.C.					
	Without Bypass			With Bypass		
	200V	460V	575V	200V	460V	575V
7.5	23.8	10.6	8.8	25	11.3	9.3
10	32.2	14	11.1	31.6	14.3	11.3
15	48.3	21	16.6	47.7	21.3	15.6
20	61.9	27.6	21.4	60.9	27.3	22.3
25	78.2	34	26.3	76.5	34.3	27.3

Note: Values are at the maximum VFD input rating and not the reduced motor values.

Table 25. Electric heat—single stage

SCWG/SIWG Size	SCRG/SIRG Size	Heat kW	200V Amps	460V Amps
20	-	16	44.8	19.6
25	-	20	55.6	24.2
30	-	24	66.8	29.0
-	32	26	72.4	31.6
35	-	28	78	34.0

Note: Electric heat amperage should not be considered when determining minimum circuit ampacity. The current of the unit in the heating mode will not exceed the current of the unit in the cooling mode.

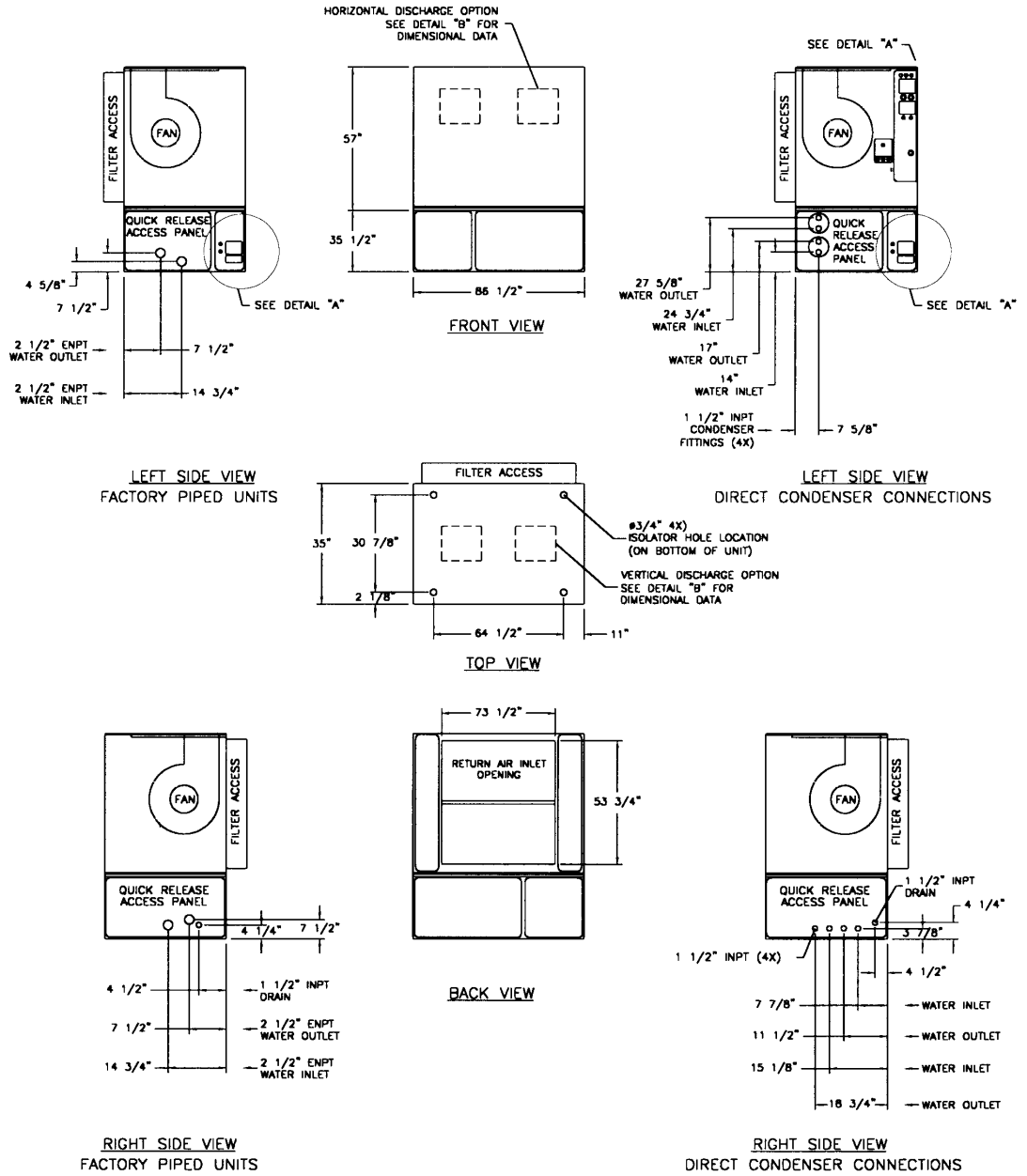
Table 26. CCRC/CIRC condenser electrical data

Unit Size Tons	Rated Voltage	# Fans	FLA (ea.)	LRA (ea.)	MCA	MFS/MCB
20, 29, 32	200	4	4.1	20.7	17.4	20
	230	4	4.1	20.7	17.4	20
	460	4	1.8	9.0	7.7	15
	575	4	1.4	7.2	6.0	15

Note: All motors for CCRC/CIRC units are rated at 1 hp (.7457 kW).

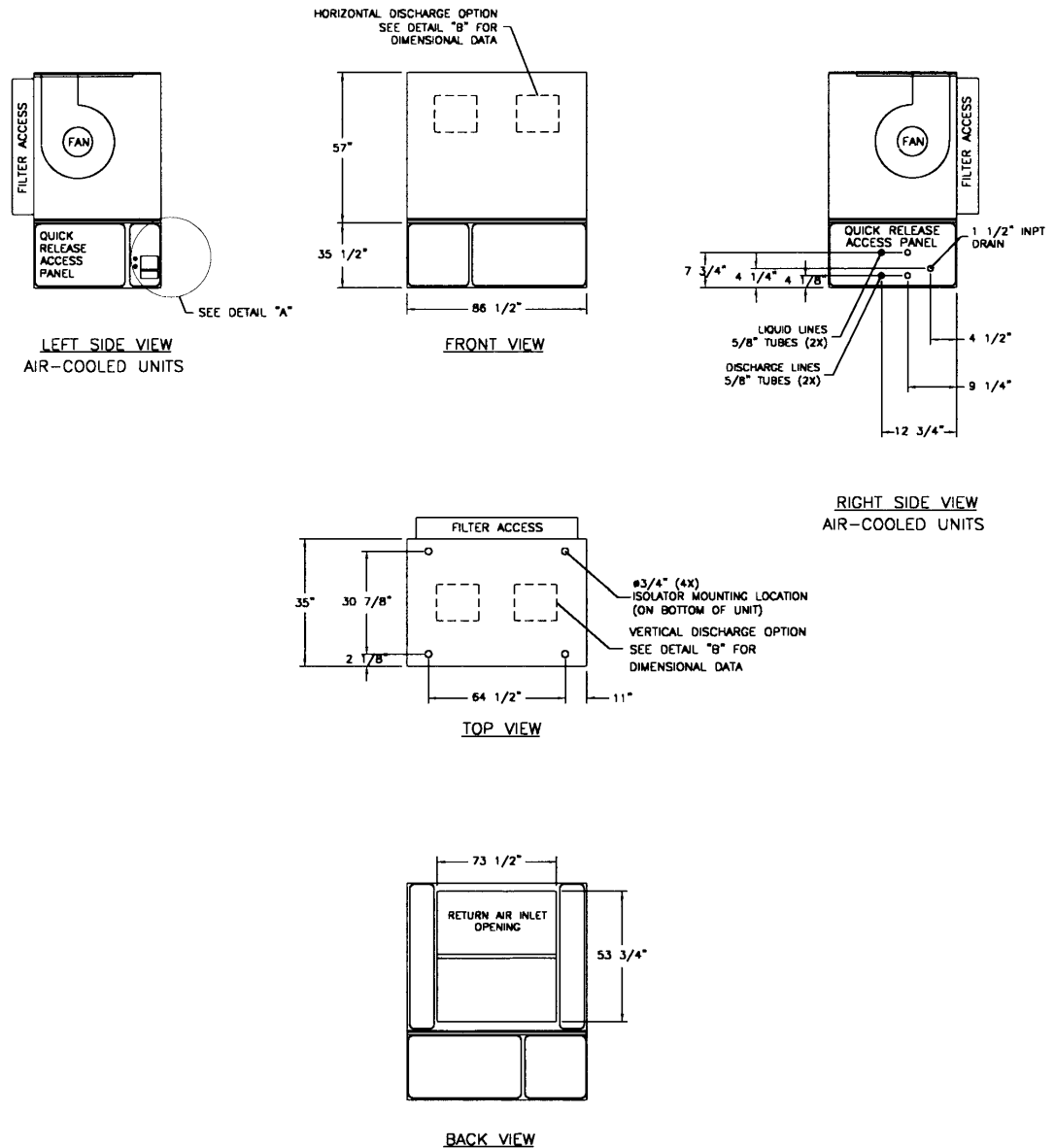
Dimensions and Weights

Figure 21. SCWG/SIWG dimensions, in.



Note: Refer to Table 29, p. 60 for SCRG/SIRG weight, lbs.

Figure 22. SCRG/SIRG dimensions, in.



Notes:

- Refer to [Figure 23, p. 60](#) for Detail A .
- Refer to [Figure 24, p. 61](#) for Detail B.

Table 27. Dimensions, in. (mm)

Model	A	B	C	D	E	F
SCWG 20	20 (508)	10 3/4 (273)	58 1/2 (1486)	5 1/8 (54)	13 1/4 (337)	11 1/2 (292)
SCWG 25	19 1/4 (489)	12 1/4 (311)	57 5/8 (1464)	5 1/8 (54)	13 1/4 (337)	11 1/2 (292)
SCWG 30 - 35/SCRG 32	18 (457)	14 5/8 (371)	56 1/2 (1435)	5 1/8 (54)	13 1/4 (337)	11 1/2 (292)



Dimensions and Weights

Table 28. SCWG/SIWG weight, lbs

Unit Tons	Base Weight - lb (kg)
20	2697 (1223)
25	2697 (1223)
30	2765 (1254)
35	2834 (1286)

Notes:

1. All unit weights include refrigerant, water and controllers, electric heat and valves.
2. Add 150 lbs. to total weight to obtain approximate shipping weight.
3. Split-apart unit weights are approximately: 60% total unit weight = compressor section, 40% total unit weight = fan section.

Table 29. SCRG/SIRG weight, lbs (kg)

Unit Tons	Base Weight - lb (kg)
32	2448 (1110)

Notes:

1. All unit weights include refrigerant, water and controllers, electric heat and valves.
2. Add 150 lbs. to total weight to obtain approximate shipping weight.
3. Split-apart unit weights are approximately: 60% total unit weight = compressor section, 40% total unit weight = fan section.

Figure 23. SCRG/SIRG/SCWG/SIWG detail "A" electrical connections, in.

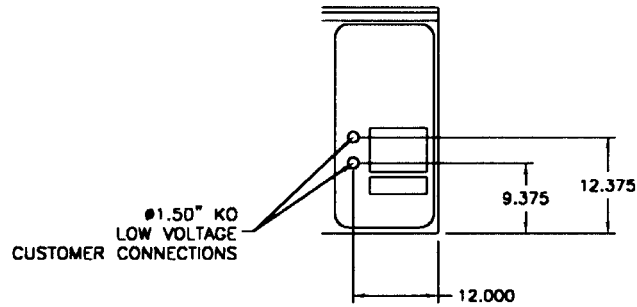
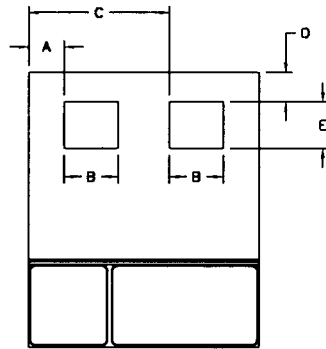
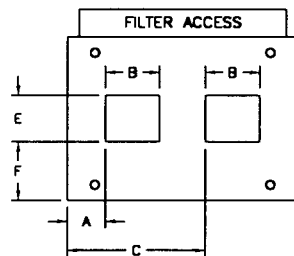


Figure 24. Detail "B" discharge options, in.: front view shown with horizontal discharge option



FRONT VIEW
(SHOWN WITH HORIZONTAL DISCHARGE OPTION)



TOP VIEW
(SHOWN WITH VERTICAL DISCHARGE OPTION)

DETAIL "B"
DISCHARGE OPTIONS

Note: When unit is ordered with horizontal supply, ensure that all applicable codes are considered when installing equipment. Special attention should be made to overhead clearances of unit/ducting to meet code requirements.

Table 30. Detail dimensions, in. (mm)

Model	A	B	C	D	E	F
SCWG 20	20 (508)	10 3/4 (273)	58 1/2 (1486)	5 1/8 (130)	13 1/4 (337)	11 1/2 (292)
SCWG 25	19 1/4 (489)	12 1/4 (311)	57 5/8 (1464)	5 1/8 (130)	13 1/4 (337)	11 1/2 (292)
SCWG 30 - 35/SCRG 32	18 (457)	14 5/8 (371)	56 1/2 (1435)	5 1/8 (130)	13 1/4 (337)	11 1/2 (292)

Figure 25. CCRC/CIRC - Air-Cooled Condenser

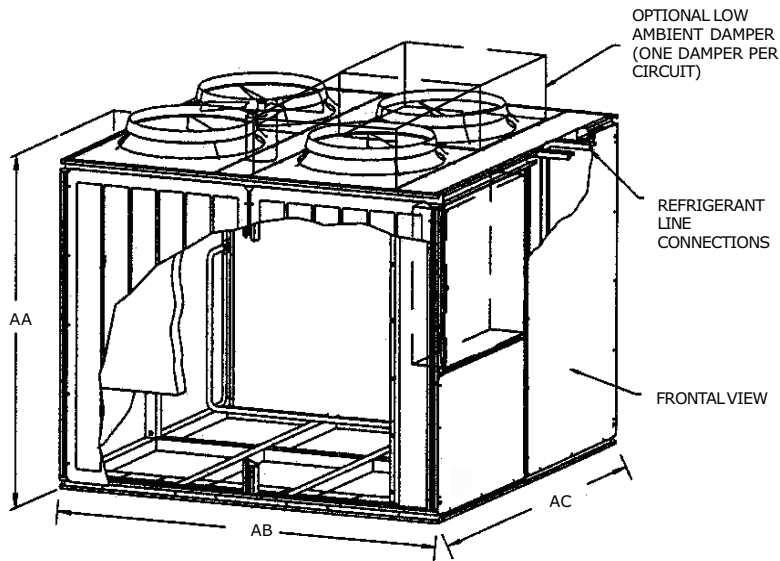


Table 31. CCRC/CIRC air-cooled condenser dimensions and weight, in. (mm), lb (kg)

Model	AA - in. (mm)	AB - in. (mm)	AC - in. (mm)	Shipping Weight - lb (kg)	Operating Weight - lb (kg)
CCRC/CIRC 20	70 1/8 (1781)	88 (2235)	88 (2235)	2030 (921)	1906 (865)
CCRC/CIRC 29	70 1/8 (1781)	88 (2235)	88 (2235)	2084 (945)	1960 (889)
CCRC/CIRC 32	70 1/8 (1781)	88 (2235)	88 (2235)	2138 (970)	2014 (914)

Figure 26. CCRC side view

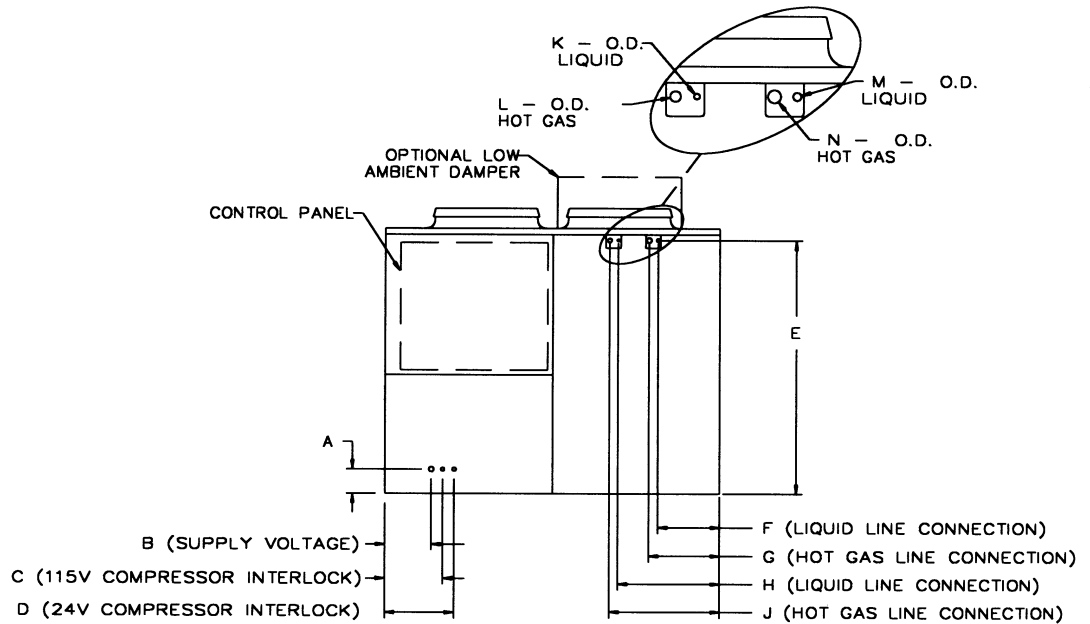
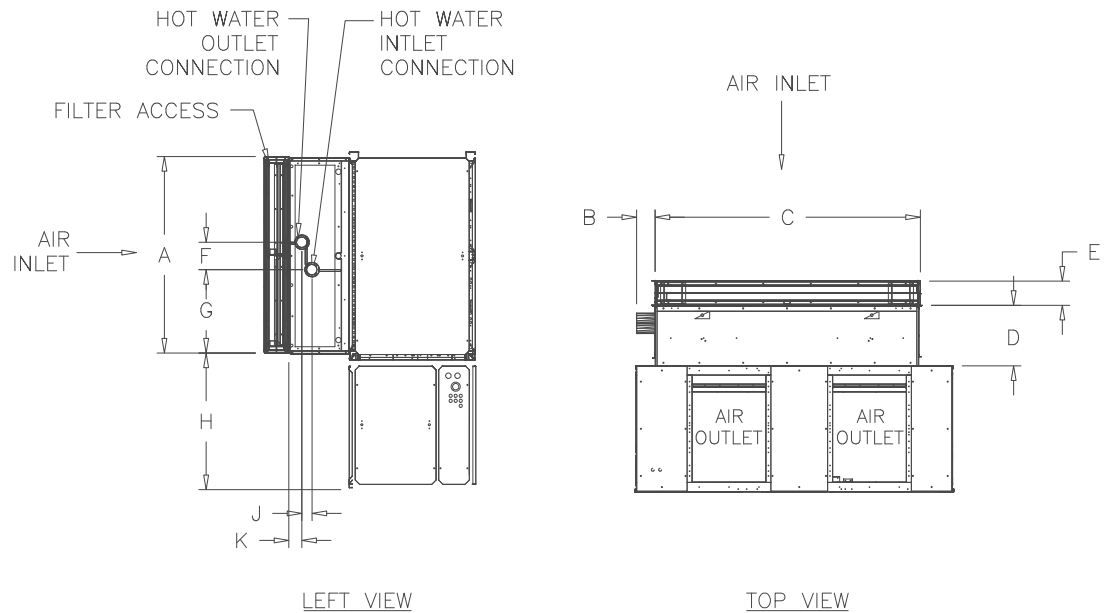


Table 32. CCRC/CIRC electrical connections, in. (mm)

Model	A	B	C
CCRC/CIRC 20-32	4 1/2 (114)	10 1/2 (267)	17 1/2 (445)

Table 33. CCRC/CIRC refrigerant connections, in. (mm)

Model	E	F	G	H	J	K	L	M	N
CCRC/CIRC 20-32	66 7/8 (1699)	14 3/8 (365)	18 1/2 (470)	24 3/4 (629)	29 (737)	5/8 (16)	7/8 (22)	5/8 (16)	7/8 (22)

Figure 27. Hot water coil: Left-hand connections

Table 34. Hot water coil dimensions and weight, in-lbs

	A	B	C	D	E	F	G	H	J	K	Weight
One-row coil	53 3/4	4 7/8	73 1/2	16 5/8	6 3/4	7 1/2	23 1/8	37 1/4	1 3/4	2 1/2	415
Two-row coil	53 3/4	5 1/8	73 1/2	16 5/8	6 3/4	7 1/2	22 3/8	37 1/4	2 3/4	3 5/8	510

Figure 28. Hot water coil: Right-hand connections

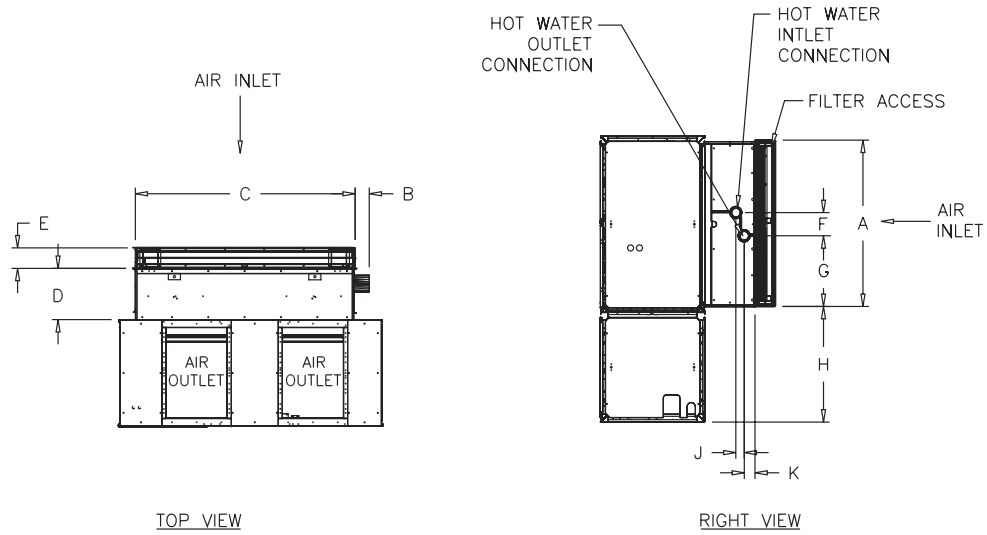


Figure 29. Steam coil: Left connections

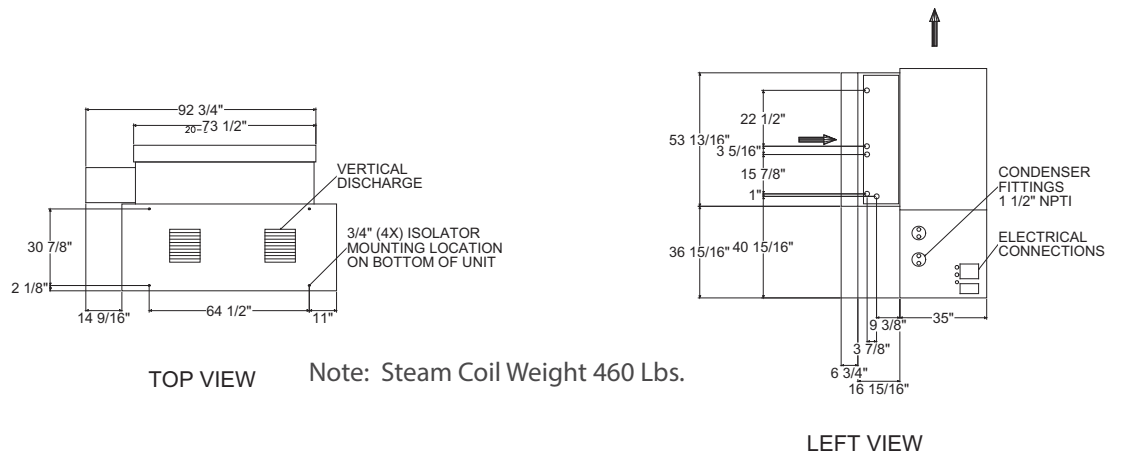


Figure 30. Steam coil: Right connections

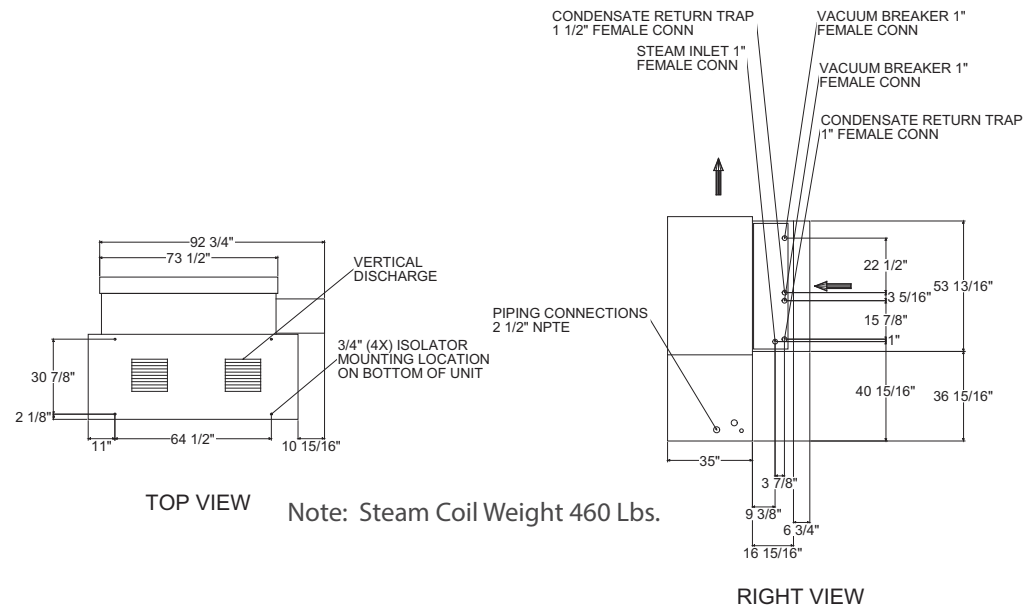
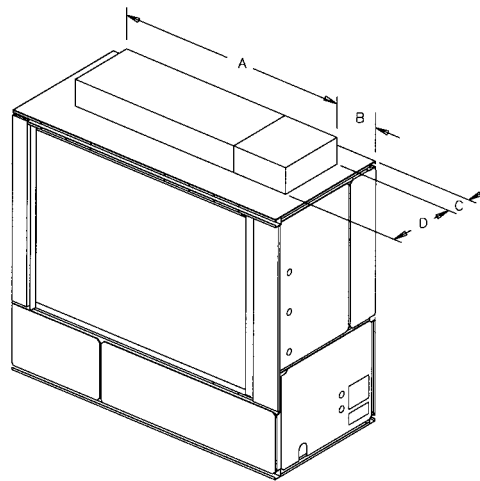


Figure 31. Electric heat coil



Note: Cannot be ordered with plenum.

Table 35. Electric heat coil dimensions and weight, in-lbs

Unit size	A	B	C	D	Weight
20 tons	70 1/4	4 7/8	11 1/2	19	460
25 tons	70 1/4	4 1/8	11 1/2	19	460
30 - 35 tons	70 1/4	2 7/8	11 1/2	19	460

Note: Coil box height is 8 in.

Figure 32. Flexible horizontal discharge plenum

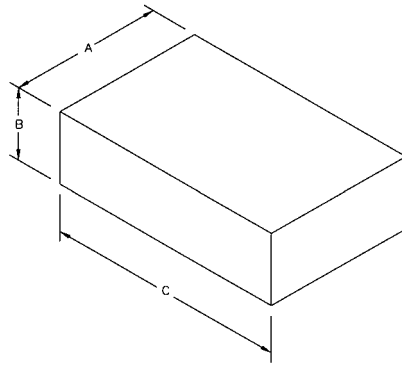


Table 36. Flexible horizontal discharge plenum dimensions and weights, in-lbs

20-35 tons	A	B	C	Weight
Low height	35	17 1/4	86 1/2	262
Standard height	35	25 1/4	86 1/2	352

Figure 33. Waterside economizer

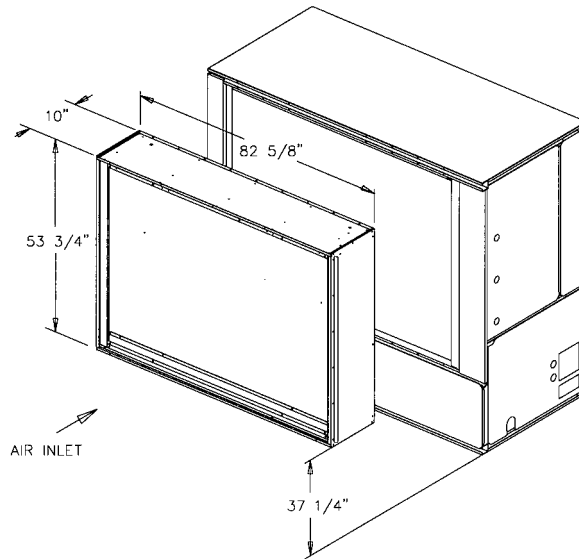
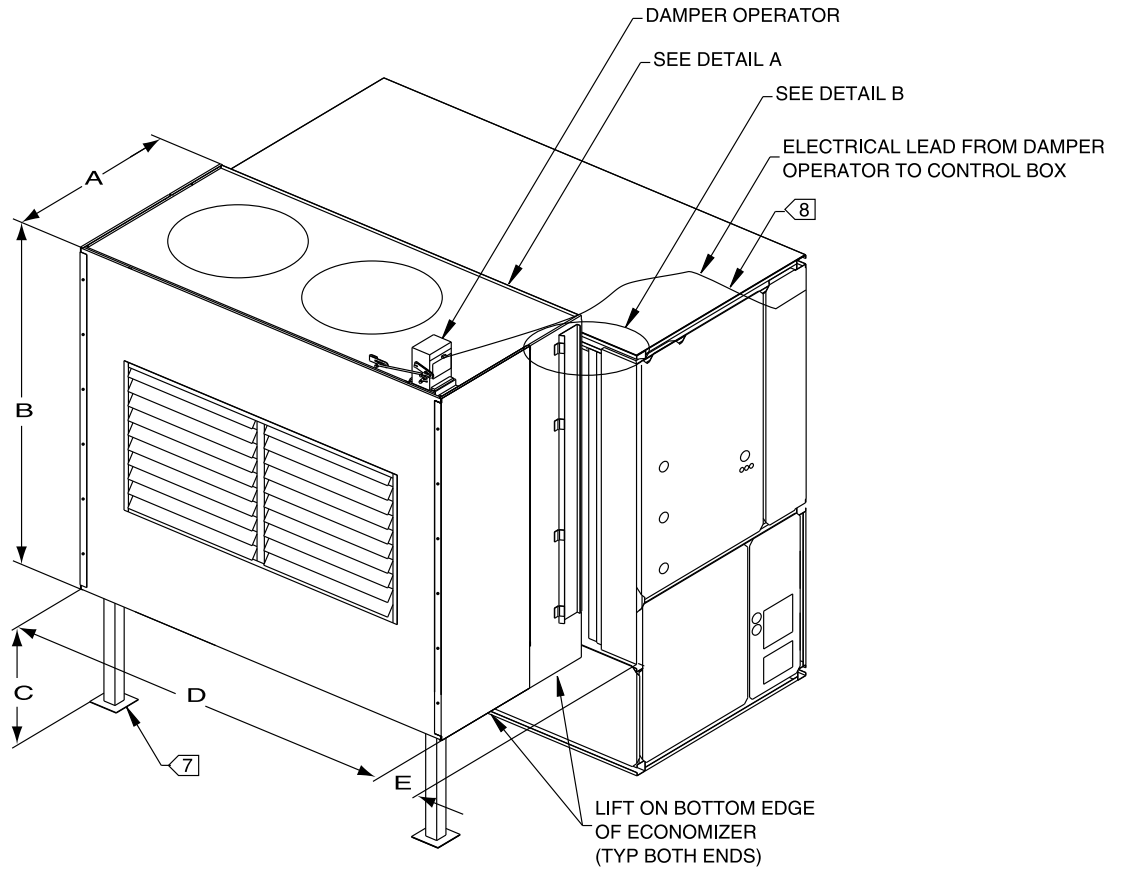


Table 37. Waterside economizer dimensions and weight, in-lbs

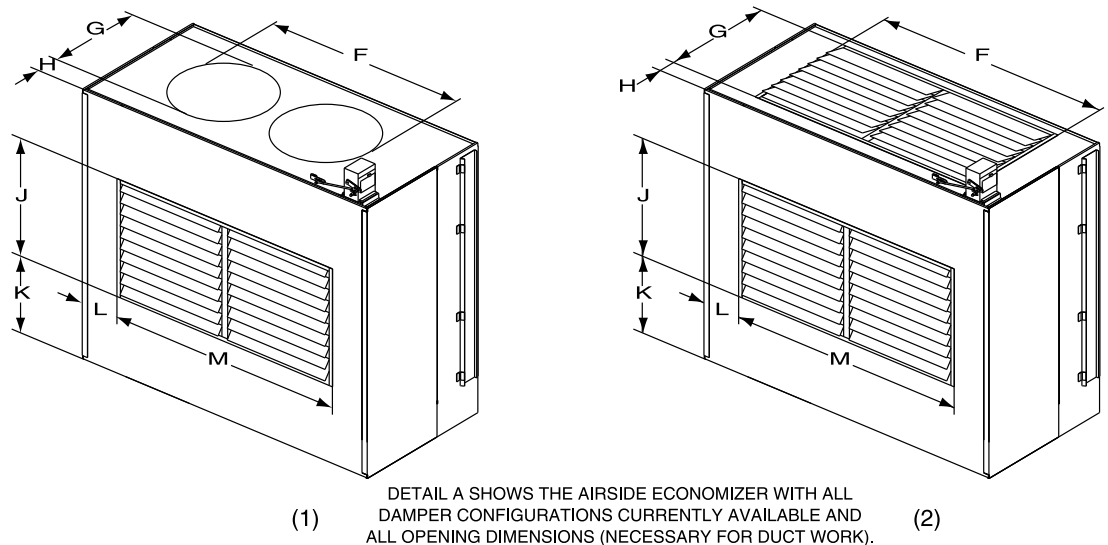
Unit size	Weight				2-row	4-row
	A	B	C	D		
20 - 35 tons	53 3/4	10	82 5/8	37 1/4	488	584

Figure 34. Airside economizer



Note: Refer to Figure 36, p. 68 for Detail B.

Figure 35. Airside economizer: detail A



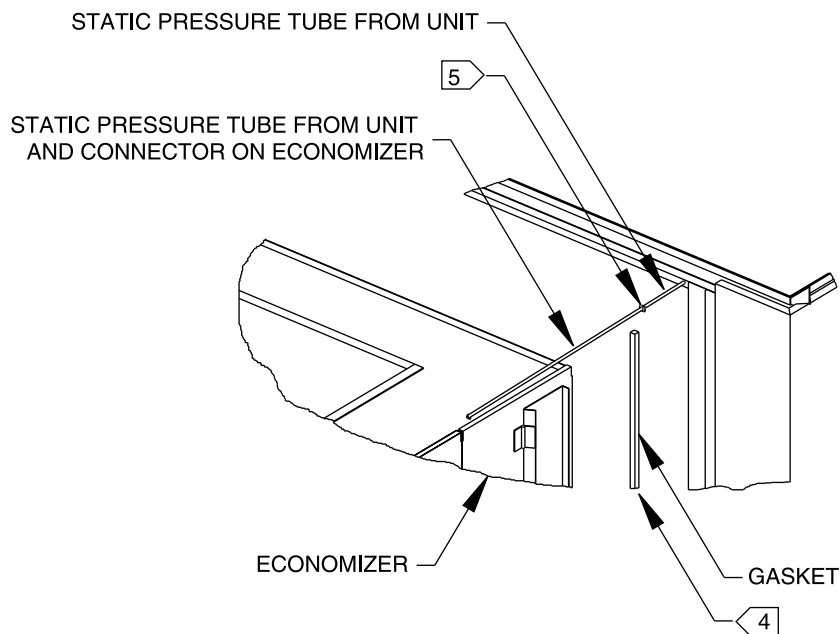
Dimensions and Weights

Table 38. Airside economizer dimensions and weight, in-lbs

Unit size	A	B	C	D	E	F (1)	F (2)	Weight
SCWG/SIWG 20, 25	36	65 5/8	37	74 1/4	6 1/8	56 1/2	49 3/4	273
SCWG/SIWG 30, 35SCRG/ SIRG 32	36	65 5/8	37	74 1/4	6 1/8	61 3/8	62 3/4	273

Unit size	G (2)	H (1)	H (2)	J	K	L	M	Weight
SCWG/SIWG 20, 25	20 1/2	5 5/8	7	20 1/2	17 1/8	12	49 3/4	273
SCWG/SIWG 30, 35SCRG/ SIRG 32	20 1/2	3 1/4	7	20 1/2	17 1/8	5 1/2	62 3/4	273

Figure 36. Airside economizer: detail B



Variable Frequency Drive Without Bypass

Table 39. Without bypass VFD frame sizes

X	200V	460V	575V
HP	Frame	Frame	Frame
7.5	B1	A3	A3
10	B1	A3	B1
15	B1	B1	B1
20	B2	B1	B1
25	C1	B1	B1

Notes:

1. The table above refers to [Figure 37](#), p. 69 through [Figure 40](#), p. 72.
2. VFD wall-mounted by others.

Figure 37. Frame A3: without bypass

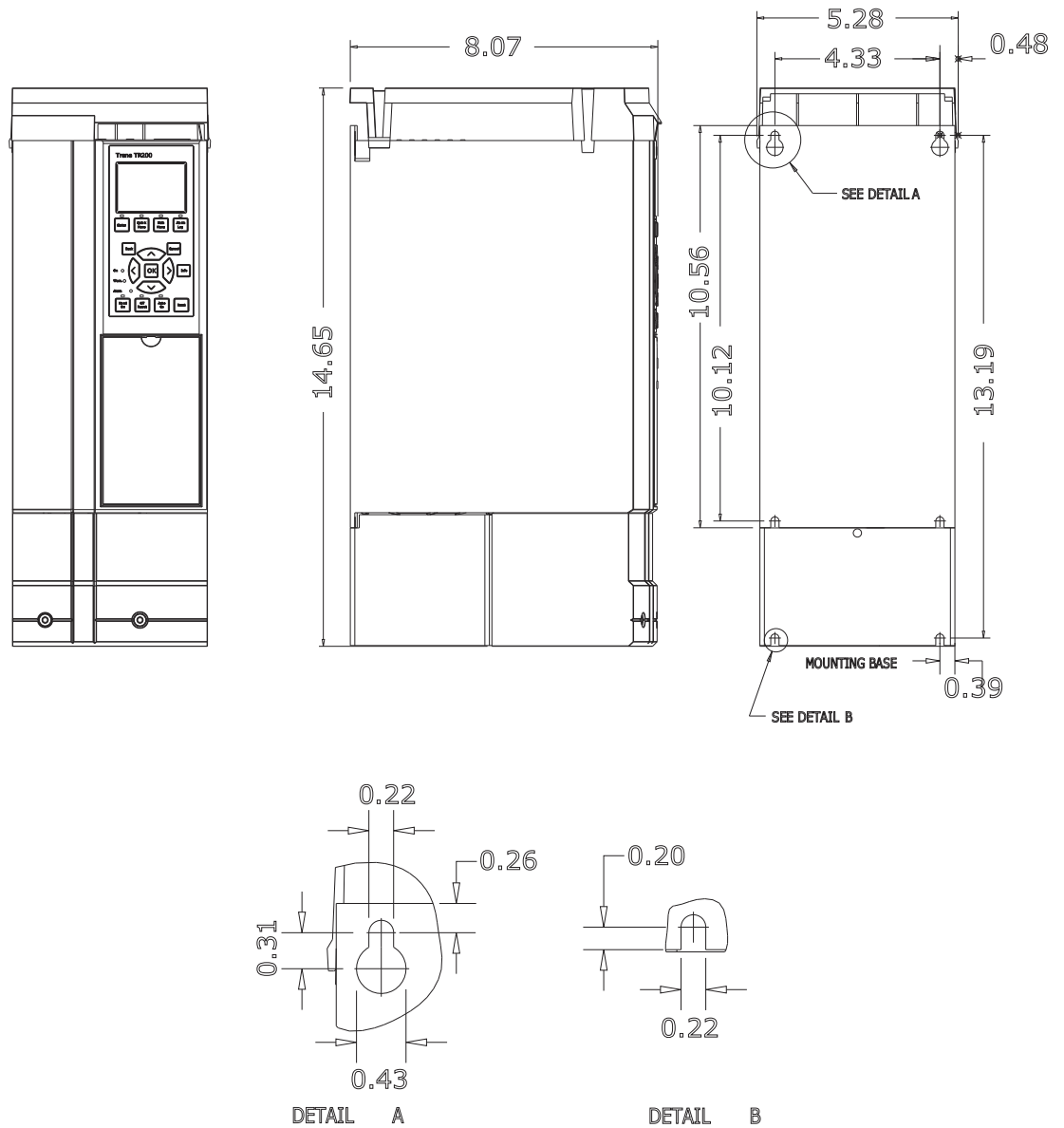


Figure 38. Frame B1: without bypass

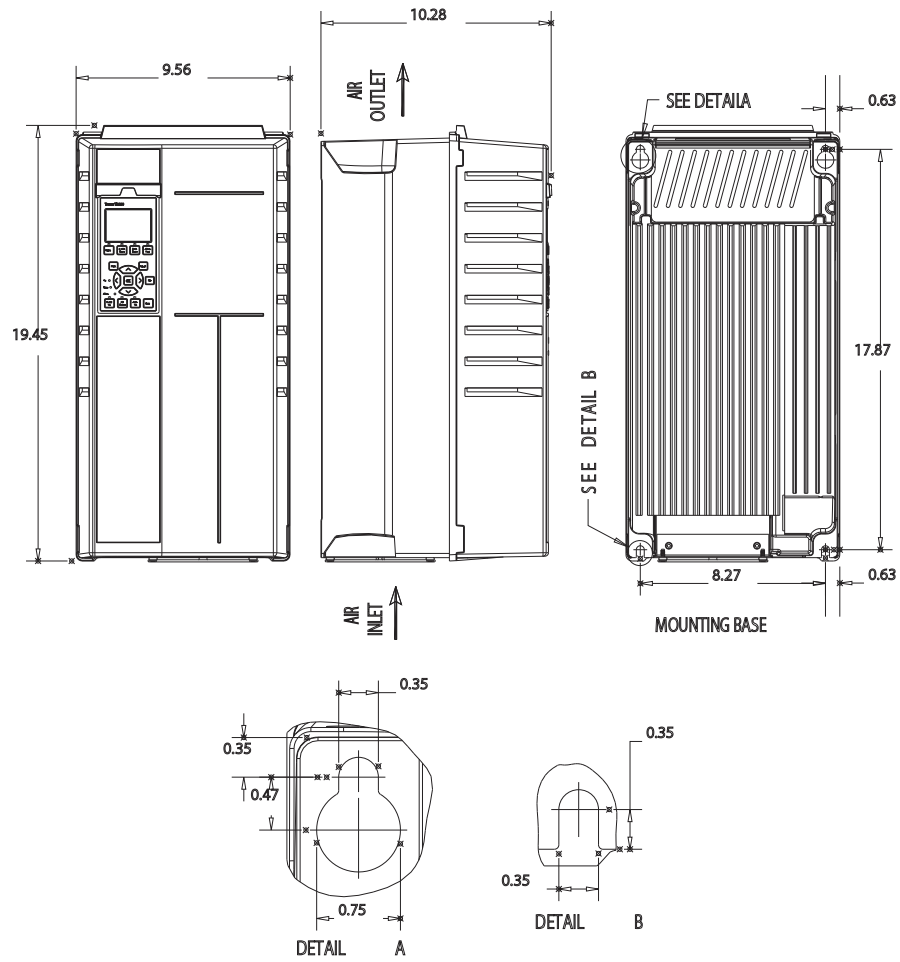


Figure 39. Frame B2: without bypass

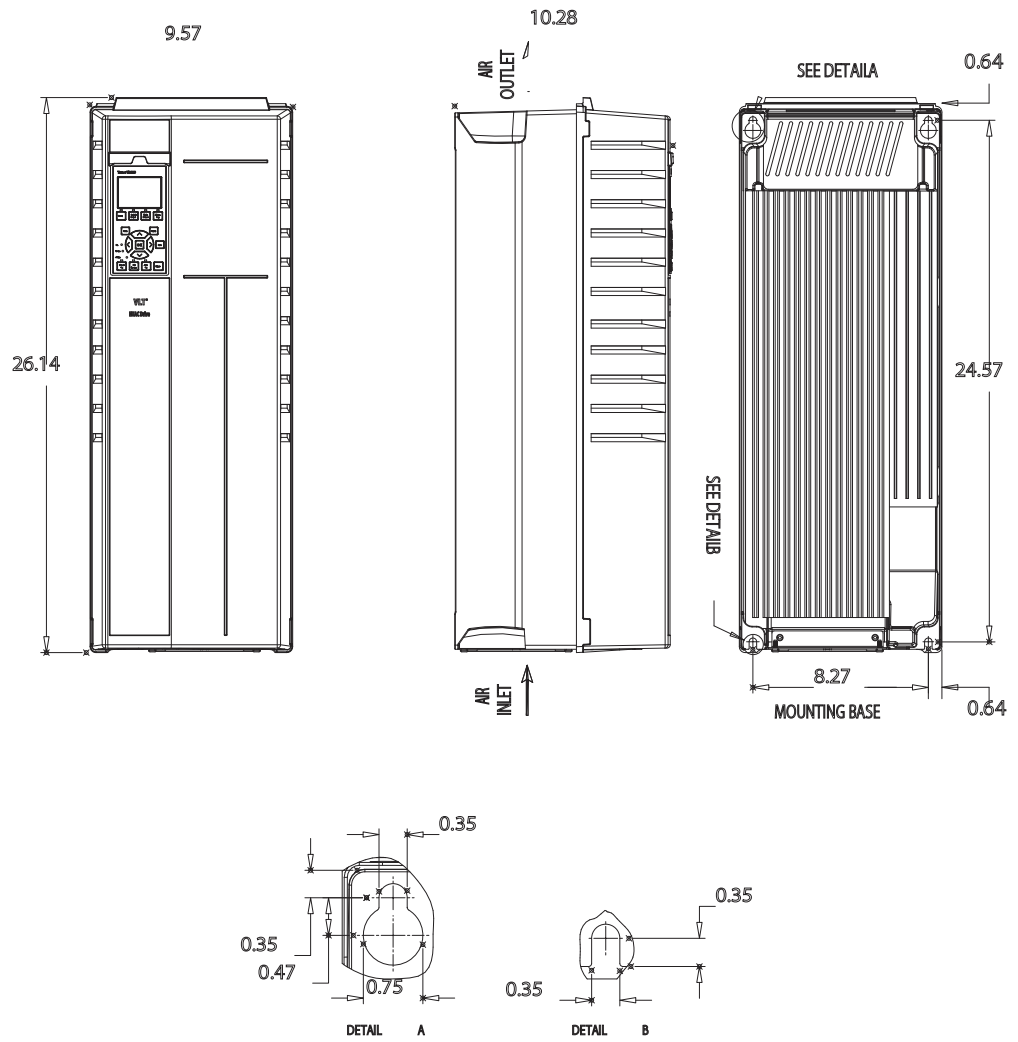
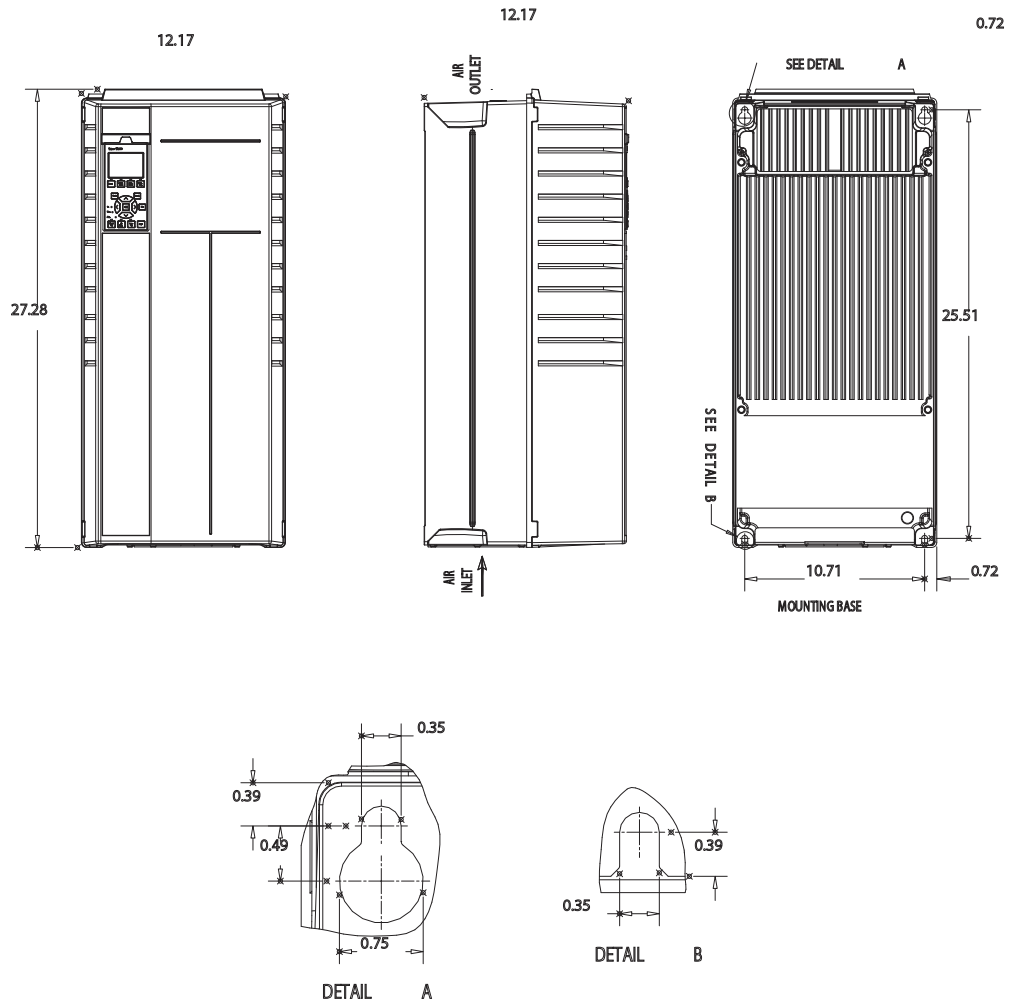


Figure 40. Frame C1: without bypass



Variable Frequency Drive With Bypass

Table 40. With bypass VFD frame sizes

	200V	460V	575V
HP	Frame	Frame	Frame
7.5	B1	A3	A3
10	B1	B1	B1
15	B2	B1	B1
20	B2	B1	B1
25	C1	B1	B1

Notes:

1. The table above refers to through .
2. VFD wall-mounted by others.

Figure 41. Frame A3 with bypass

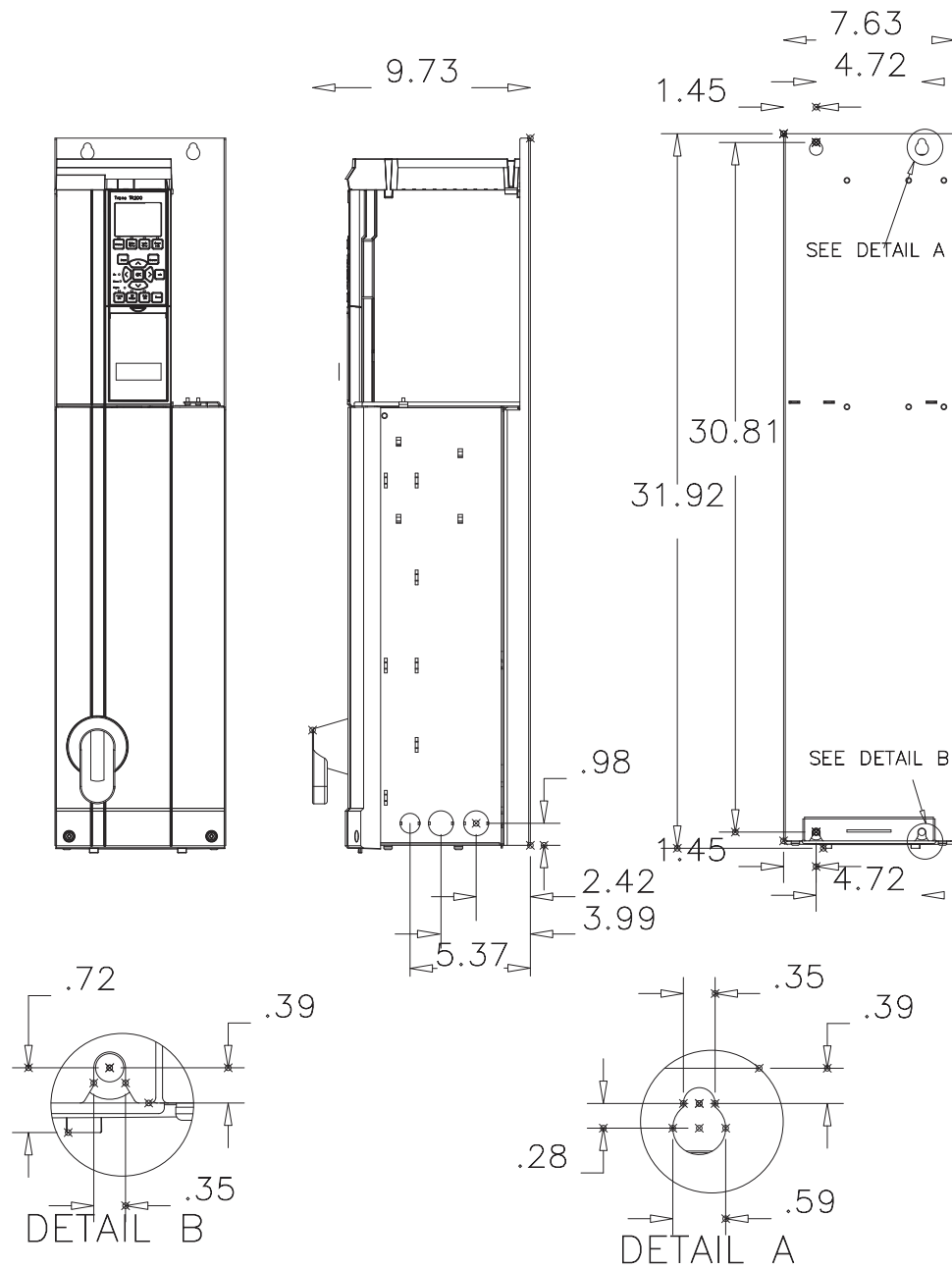


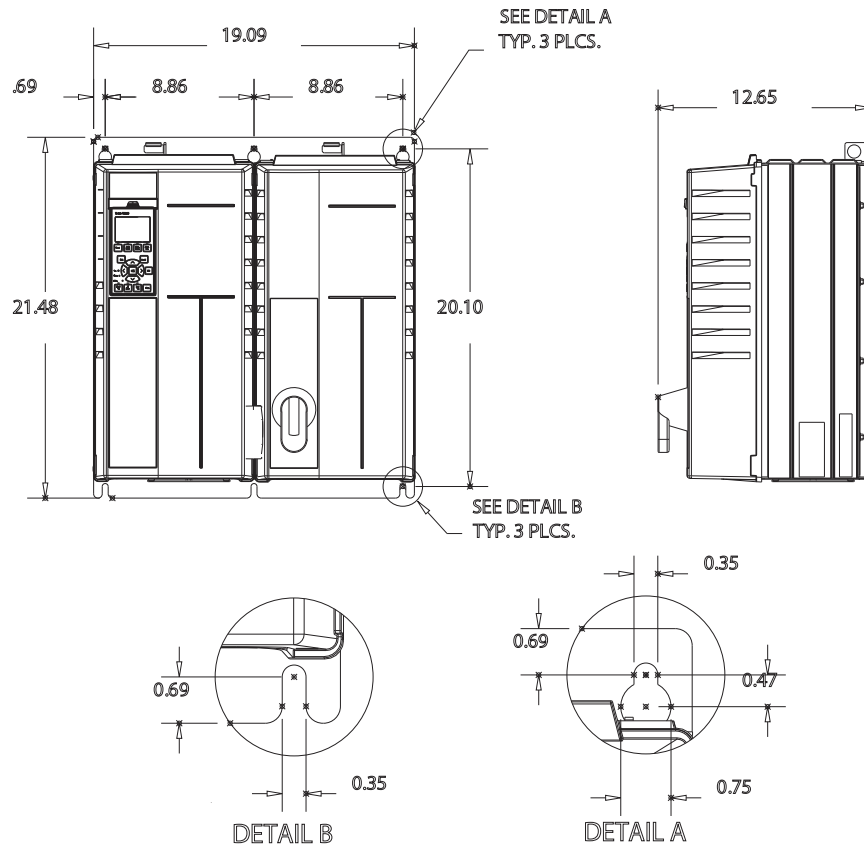
Figure 42. Frame B1 with bypass


Figure 43. Frame B2 with bypass

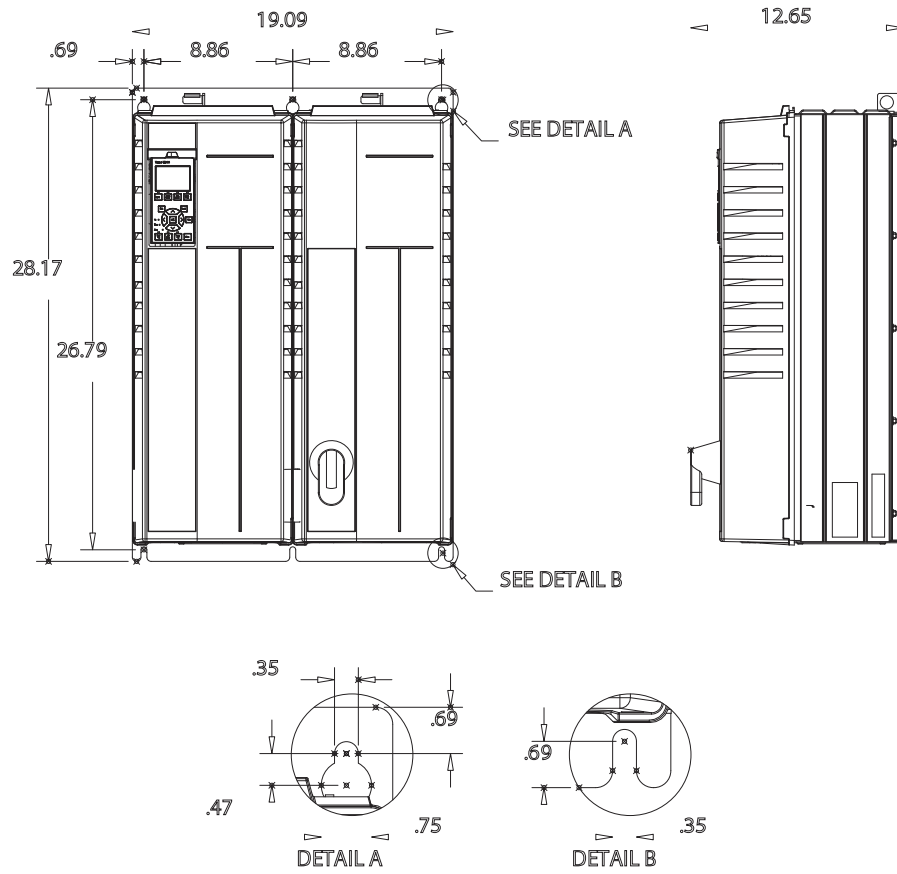
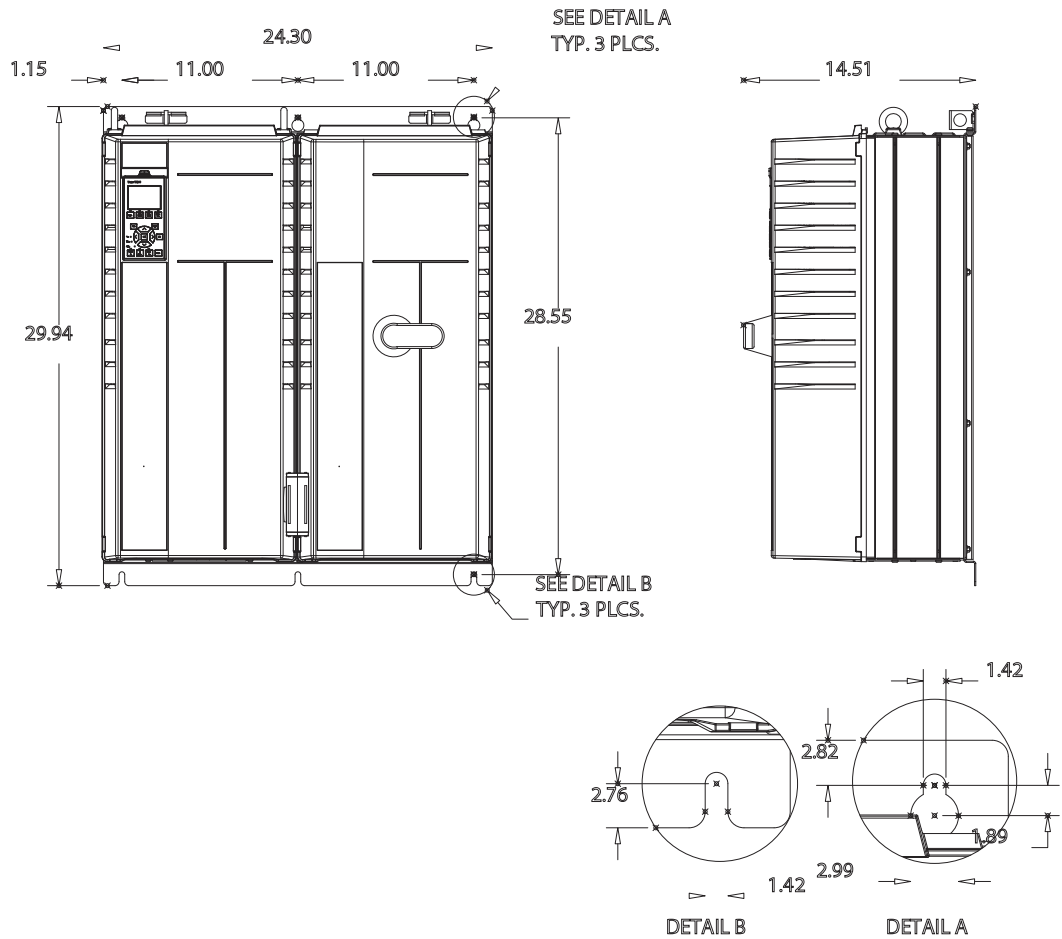


Figure 44. Frame C1 with bypass

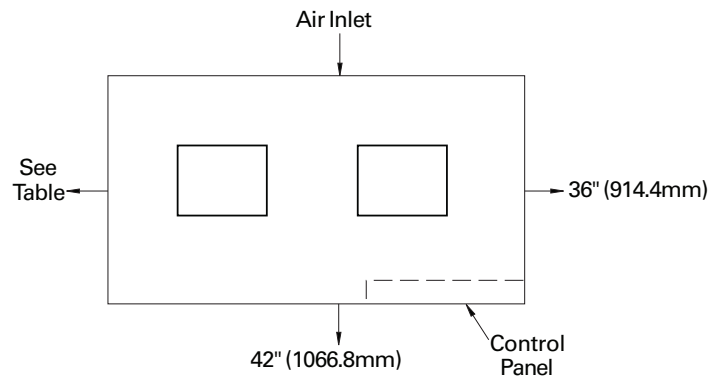


Service Clearances

Table 41. SCWG/SIWG/SCRG/SIRG clearance requirements

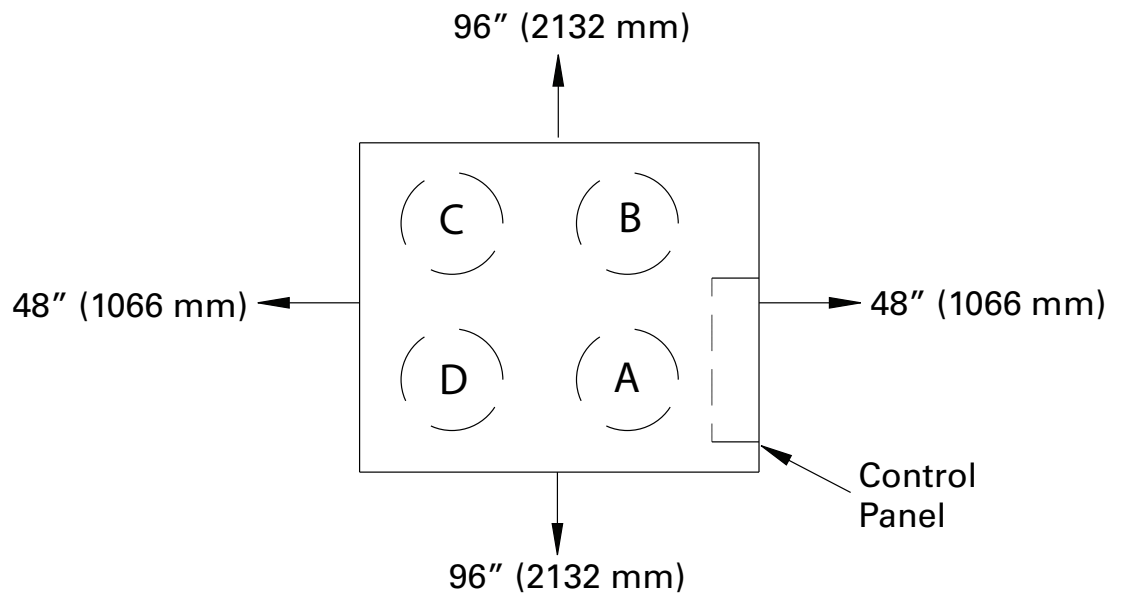
Service/code clearances		
Side	Distance	Purpose
Front	42 in. (1066 mm)	NEC code requirement
Left	18 in. (457 mm) 36 in. (914 mm) 77 in. (1956 mm)	Air-cooled units only Waterside Component service Fan shaft removal
Right	36 in. (914 mm)	Refrigeration Component service Provides uniform airflow
Inlet	18 in. (457 mm)	Provides uniform airflow

Figure 45. Top view: SCWG/SIWG/SCRG/SIRG minimum clearances



Note: When unit is ordered with horizontal supply, ensure that all applicable codes are considered when installing equipment. Special attention should be made to overhead clearances of unit/ducting to meet code requirements.

Figure 46. Top view: CCRC/CIRC 20, 29, 32 minimum clearances





Mechanical Specifications

Modular Series Self-Contained Units

Notes: Certified DOE Performance:

- Trane Commercial Self-Contained units are tested in accordance with AHRI 340/360 (I-P).
- The net cooling capacity and EER performance are certified to 10 CFR Part 431 from the US Department of Energy.

Cabinet

- The unit framework are formed structural members of sturdy-gauge galvanized steel. Exterior panels are fabricated from industrial-gauge galvanized steel. The fan and compressor sections are insulated with ¾-inch (19 mm) of 1.75 lb./cu. ft. (28 kg./cu. ft.) density fiberglass insulation.
- The unit is provided with removable panels to allow service access to compressors, condensers, fan motor, fan bearings, coils, and valves. Removable panels are secured with quick-acting fasteners. The refrigerant sight glasses are accessible during operation. The control panel door has lift-off hinges.

Compressors

- Units have multiple compressors with independent circuits for water-cooled units and manifolded circuits for air-cooled units.
- Compressors are manufactured by the unit manufacturer.
- Scroll compressors are heavy duty suction cooled type with suction screen, centrifugal oil pump with dirt separator, oil charging valve, and oil sight glass.
- Protective devices for low pressure, high pressure, and motor temperature are provided.
- The compressors are mounted on isolators for vibration isolation.

Phase and Voltage Monitor

- Protects 3-phase equipment from phase loss, phase reversal and low voltage.
- Any fault condition will produce a Failure Indicator LED and send the unit into an auto stop condition.
- cULus approved.

Condenser Water-cooled unit only

- One condenser is provided for each compressor.
- The condensers are shell-and-tube design with removable heads and mechanically cleanable tubes. Tubes are ¾-inch (19 mm) OD and constructed of copper.
- Condenser waterside working pressure is 400 psig.
- All condenser water piping including, cleanouts, are factory installed to provide single connections for water inlet and outlet.

Evaporator

- The evaporator coil is seamless copper tubes expanded into aluminum fins. Tubes are ½-inch (13 mm) OD with internally enhanced surfaces.
- Coil has staggered tube arrangement with intertwined circuitry and no more than 12 fins per inch.
- The drain pan is positively sloped in all directions to ensure proper condensate removal. The drain pan is fabricated of galvanized steel and insulated with ¾-inch (19 mm) of 1-lb. (0.5 kg) density fiberglass.

- Drain piping, including a trap with clean-out, is provided with a single-point connection to the unit's exterior.

Refrigerant Circuit Water-cooled unit only

- Refrigerant circuits are independent and completely piped including filter driers, sight glasses, distributors, thermal expansion valves with adjustable superheat and external equalizer, and high pressure relief valves with 1/2-inch (13 mm) flare connection.
- Unit is provided with adequate means of frost control.
- The circuits are factory dehydrated, charged with oil and R-410A refrigerant.
- Compressors are mounted on rubber-in-shear isolators for vibration isolation.

Refrigerant Circuit Air-cooled unit only

- Two refrigerant circuits are piped to the unit's exterior.
- The refrigerant piping includes filter driers sight glasses, distributors, thermal expansion valves with adjustable superheat and external equalizer.
- Unit is provided with adequate means of frost control.
- The circuits are factory tested, dehydrated and then charged with dry nitrogen.

Supply Fan

- The supply fan is a dual forward curved medium pressure fan secured to a solid steel shaft with grease lubricated bearings designed for 200,000 hours. Both fan bearings have grease lines extended to a common location. The drive components include fixed pitch sheaves and multiple V-belt sized for 130% nominal motor horsepower. All drive components are accessible without using scaffolds or ladders.
- Supply fan motors are either open drip-proof or totally enclosed fan cooled. The motors have a standard NEMAT-frame and a service factor of 1.15. All 60 Hz motors meet the Energy Independence and Security Act of 2007 (EISA).
- The entire fan assembly, including drive components, is mounted on a common base. The fan base is isolated inside the unit. The entire assembly is statically and dynamically balanced at the factory.

Filters

Two-inch (51 mm) throwaway fiberglass filters are provided for installation during construction. Optional two-inch and four-inch filter racks may also be provided.

Unit Controls — DDC

- Microprocessor controls are provided to control all unit functions. The control system is suitable to control CV or VAV applications. The controls are factory-installed and mounted in the main control panel. All factory-installed controls are fully commissioned (run tested) at the factory. The unit has a human interface panel with 16-key keypad, a two line, 40 character clear language (English, French, or Spanish) display as standard to provide the operator with full adjustment and display of control data functions. The unit controls are used as a stand-alone controller or as part of a building management system involving multiple units.
- The unit is equipped with a complete microprocessor control system. This system consists of temperature and pressure (thermistor and static pressure transducer) sensors, printed circuit boards (modules) and a unit mounted human interface panel. Modules (boards) are individually replaceable for service ease. All microprocessors, boards, and sensors are factory mounted, wired, and tested.
- The microprocessor boards are stand-alone DDC controls not dependent on communications with an on-site PC or building management network. The microprocessors are equipped with on-board diagnostics, indicating that all hardware, software, and interconnecting wiring are in proper operating condition.



Mechanical Specifications

- The modules (boards) are protected to prevent RFI and voltage transients from affecting the board's circuits. All field wiring is terminated at a separate, clearly marked terminal strip. Direct field wiring to the I/O boards is not acceptable.
- The microprocessor's memory is nonvolatile EEPROM type requiring no battery or capacitive backup, while maintaining all data.
- Zone sensors are available in several combinations with selectable features depending on sensor.
- The human interface panel's keypad display character format is 40 characters x two lines. The character font is 5x7 dot matrix plus cursor. The display is supertwist liquid crystal display (LCD) with blue characters on a gray/green background which provides high visibility and interface ease. The display format is in clear language: English, French, or Spanish.
- The keypad is equipped with 16 individual touch sensitive membrane key switches. The switches are divided into four separate sections and password protected to prevent tampering by unauthorized personnel. The six main menus shall be STATUS, SETPOINTS, DIAGNOSTICS, SETUP, CONFIGURATION, and SERVICE MODE.

Agency Listing

The unit has the US/Canada Underwriter's Laboratory agency listing. A Unit Interrupt Rating (Standard Short Circuit Current Rating - SCCR) of 5,000 Amp rating (up to 480V) and 25,000 Amp rating (600V) is applied to the unit.

Remote Air-Cooled Condenser

Cabinet

- The unit framework shall be formed structural steel members of sturdy-gauge galvanized steel.
- Panels and access doors shall be sturdy-gauge galvanized steel.
- The unit exterior shall be phosphatized and finished with air-dried enamel paint.

Refrigerant Circuits and Controls

- All sizes shall have dual refrigerant circuits and shall include an integral subcooling circuit for each circuit.
- All necessary controls to run unit fans shall be factory installed.
- The control panel shall include fan motor contactors, terminal block connection for compressor interlock, and 115-volt control power transformer.

Condenser Coils

- The condenser coil arrangement shall be slab type.
- Coils shall be seamless 3/8-inch (10 mm) OD copper tubes expanded into aluminum fins.
- Each circuit shall include an integral subcooler.
- The coil shall be leak tested at 650 psig air pressure.

Condenser Fans and Motor

- Vertical discharge direct drive fans shall be statically and dynamically balanced at the factory.
- Motors shall be three-phase with permanently lubricated ball bearings, built-in current and thermal overload protection and weathertight rain slinger over the fan shaft.

Protective Coating for Condenser Coils (Option)

The condenser coil shall have a 4 to 6 mil coat of protective coating applied by a multiple dip-and-bake process.

Low Ambient Operation Option

Standard ambient control allows operation down to 50° F by cycling the condenser fans. Low ambient control damper shall allow the unit to operate down to 0°F by utilizing additional fan cycling and an external damper assembly. The low ambient control damper shall include an industrial-gauge damper assembly. Low ambient dampers used with air-cooled units with a thermostat interface use a 2–10 Vdc modulating damper actuator controlled from the unit control panel. The damper is controlled by the air-cooled unit's DDC controller.

Louvered Coil Guards Option

The unit coils shall be covered with a factory installed decorative louvered grill type panel for protection.

Agency Listing

The unit shall have the US/Canada Underwriter's Laboratory agency listing.

Self-Contained Options

Air Volume/Temperature Control

Zone Temperature Control

This option includes a zone sensor, microprocessor unit control module, a microprocessor compressor controller, and a unit-mounted human interface panel. The unit operates at a design airflow based on the fan and motor drive selections.

Supply Air Temperature Control With Variable Frequency Drive

This option controls the VAV self-contained unit from the discharge air temperature using a factory mounted variable frequency drive (VFD). The VFD safely varies the fan motor speed to allow the motor to meet the dynamic requirements at the motor shaft and meet the system static. Other control components include a discharge air microprocessor controller and discharge air sensor. The microprocessor controller coordinates the economizer control and the stages of cooling with discharge air temperature reset capabilities. Includes factory installed and tested variable frequency drive (VFD) to provide supply fan motor speed modulation. The VFD receives 0-10 Vdc signal from the unit microprocessor based upon supply static pressure and causes the drive to accelerate or decelerate as required to maintain the supply static pressure setpoint.

Supply Air Temperature Control With Variable Frequency Drive with Bypass

Manual bypass control provides full nominal airflow and zone temperature control in the event of a drive failure. The VFD with bypass is factory mounted A motor overload relay and fuses are provided to properly size motor protection during both drive and bypass modes.

Waterside Economizer

The waterside economizer takes advantage of cooling tower water to either pre-cool the entering air to aid the mechanical cooling process or, provides total system cooling if the water temperature is low enough. Waterside economizing enables when the unit's entering water temperature is below the unit's entering mixed air temperature by a minimum of 4°F plus the economizer's approach temperature. The approach temperature default is 4°F and is adjustable from 0 to 9°F. Waterside economizing disables when the unit's entering water temperature is not below the unit's entering mixed air temperature by at least the water economizer approach temperature. The economizer acts as the first stage of cooling. If the economizer is unable to maintain the supply air setpoint, the unit control module brings on compressors as required to meet the setpoint.

The waterside economizer includes a coil, modulating valves, controls, and piping with cleanouts. The coil construction is ½-inch (13 mm) OD seamless copper tubes expanded into aluminum fins. The evaporator and economizer coils share a common sloped drain pan. Drain pan options are either galvanized or stainless steel and insulated and internally trapped.



Mechanical Specifications

The waterside economizer coil options have either two or four rows with no more than 12 fins per inch. The tubes are arranged in a staggered pattern to copper supply and return headers with removable cleanout and vent plugs. The optional mechanically cleanable economizer has removable cast iron headers to allow easy mechanical cleaning of the tubes. The waterside working pressure is rated for 400 psig (2758 kPa).

Airside Economizer

Units with the airside economizer option are equipped with the necessary control sequences to use outside air for the first stage of cooling, in occupied or unoccupied mode and when ambient conditions are favorable for economizing. Inherent in the unit controller is the ability to suppress the setpoint below the normal unit setpoint. This allows the building to improve comfort levels when possible, and at the same time, optimize building mechanical cooling operation for peak operating efficiency. An outside air temperature and relative humidity sensor are provided to allow monitoring of reference enthalpy and are field installed. Economizer operation enables when the outside air enthalpy is less than 25 BTU's/lb. default (adjustable 19-28 BTU's/lb.). During occupied mode, the outside air damper opens to 15% (adjustable 0-100%) for ventilation purposes. Also, the ability to alter the outside air damper position to compensate for VAV supply air modulation is inherent in the unit controls, and can be enabled by the operator.

The mixing box fabrication is sturdy-gauge galvanized steel. Opposed low leak damper blades are fabricated from sturdy-gauge galvanized steel and rotate on rustproof nylon bushings. A factory installed 24V modulating spring return actuator controls both damper positions.

Comparative Enthalpy Control

Units with comparative enthalpy control are equipped with the necessary control sequences to allow using outside air for the first stage of cooling, in occupied or unoccupied mode and when ambient conditions are favorable for economizing. Inherent in the unit controller is the ability to suppress the setpoint below the normal unit setpoint. This allows the building to improve comfort levels when possible, and at the same time, optimize building mechanical cooling operation for peak operating efficiency. A factory-installed control board, with field-installed outside and return air temperature and relative humidity sensors, allows monitoring of outside and return air. Economizer operation enables when the outside air enthalpy is 3 BTU's/lb. less than the return air enthalpy. During occupied mode, the outside air damper opens to 15% (adjustable 0-100%) for ventilation purposes. Also, the ability to alter the outside air damper position to compensate for VAV supply air modulation is inherent in the unit controls, and can be enabled by the operator.

The mixing box fabrication is sturdy-gauge galvanized steel. Opposed low leak damper blades are fabricated from sturdy-gauge galvanized steel and rotate on rustproof nylon bushings. A factory installed 24V modulating spring return actuator controls both damper positions.

Standard Two-Position Damper Interface

Units with the two-position damper interface are provided with a 0-10 Vdc control output suitable for controlling a field-provided modulating actuator. In occupied mode, the output drives to the maximum position.

Airside Economizer Interface

Units with airside economizer interface are equipped with the necessary control sequences to allow using outside air for the first stage of cooling, in occupied or unoccupied mode and when ambient conditions are favorable for economizing. Inherent in the unit controller is the ability to suppress the setpoint below the normal unit setpoint. This allows the building to improve comfort levels when possible, and at the same time, optimize building mechanical cooling operation for peak operating efficiency. An outside air temperature and relative humidity sensor are provided for field installation to monitor reference enthalpy. Economizer operation enables when the outside air enthalpy is less than 25 BTU's/lb. (adjustable 19-28 BTU's/lb.). During occupied mode, the outside air damper opens to 15% (adjustable 0-100%) for ventilation purposes. Also, the ability to alter the outside air damper position to compensate for VAV supply air modulation is inherent in the unit controls, and can be enabled by the operator. An analog 2-10 Vdc output (adjustable (0-10 Vdc) is provided to modulate the field-provided 30 second damper actuators (adjustable 1-255 seconds).

Airside Economizer Interface with Comparative Enthalpy

Units with airside economizer interface and comparative enthalpy are equipped with the necessary control sequences to allow using outside air for the first stage of cooling, in occupied or unoccupied mode and when ambient conditions are favorable for economizing. Inherent in the unit controller is the ability to suppress the setpoint below the normal unit setpoint. This allows the building to improve comfort levels when possible, and at the same time, optimize building mechanical cooling operation for peak operating efficiency. A factory-installed control board, with outside and return air temperature and relative humidity sensors, are provided for monitoring outside and return air. The sensors are field installed. Economizer operation enables when the outside air enthalpy is 3 BTU's/lb. less than the return air enthalpy. During occupied mode, the outside air damper opens to 15% (adjustable 0-100%) for ventilation purposes. Also, the ability to alter the outside air damper position to compensate for VAV supply air modulation is inherent in the unit controls, and can be enabled by the operator. An analog 2-10 Vdc output (adjustable (0-10 Vdc) is provided to modulate the field-provided 30-second damper actuators (adjustable 1-255 seconds).

Basic Water Piping

This option is available on units without a waterside economizer and with condenser water applications above 54°F that do not require condensing pressure control. Left hand water connections and piping are extended to the unit exterior. Manifold piping is factory installed.

Intermediate Water Piping

This option provides condensing temperature control when the unit is configured (user defined at the HI) for variable water flow with or without a waterside economizer. A two-way modulating control valve is wired and installed in the unit to maintain a specific range of water temperature rise through the condenser when entering fluid temperature is less than 58°F. This option allows the compressor to operate with entering fluid temperature down to 35°F. The minimum valve position to maintain minimum condenser flow rates is user-defined at the human interface. This valve drives closed if the unit shuts down or if a power failure occurs.

Waterside Economizer Flow Control

Units equipped with a waterside economizer can be set from the human interface panel for variable or constant water flow.

Constant Water Flow

Two-way modulating control shutoff valves are wired, controlled, and installed in the unit. One valve is located in the economizer's water inlet, and the other is in the condenser bypass water inlet. When the waterside economizer enables, the two-way valve modulates to maintain the discharge air temperature setpoint. As the economizer valve opens, the condenser bypass valve closes, and vice versa. Full water flow is always maintained through the condensers. Both valves will close in the event of a power failure.

Variable Water Flow

Two-way modulating control shutoff valves are wired, controlled, and installed in the unit. One valve is located in the economizer's water inlet, and the other is in the condenser bypass water inlet. When the economizer valve is active, the condenser bypass valve closes. The economizer valve modulates, thus water flow through the unit modulates. If the water is cool enough for economizing, but mechanical cooling is also required, the economizer valve fully opens to establish full water flow through the condensers. Whenever the water is too warm for economizing and there is a call for cooling, the economizer valve fully closes and the bypass valve fully opens, establishing full water flow through the condensers. Full water flow is always maintained through the condensers when mechanical cooling is required. Both valves close whenever cooling is not required and in the event of a power failure.

Water Flow Switch

A water flow switch is factory installed in the condenser water pipe within the unit. Whenever the flow switch detects a water flow loss prior to or during mechanical cooling, compressor



Mechanical Specifications

operation locks out and a diagnostic code displays. If water flow is restored, the compressor operation automatically restores.

Service Valves

Service valves are factory installed on each circuit before and after the compressor to allow compressor isolation for servicing.

Electric Heat

Single stage electric heating coils with controls are field installed exterior to unit (see [Figure 33, p. 66](#) for details) casing at both fan discharges. An open construction type coil is provided. Power to the electric heater is factory wired to the unit's single-point power connection.

Hot Water

The hot water heating assembly includes the coil and filter section and is factory installed on the unit's inlet. A three-way modulating valve and actuator (shipped separate for field installation), and an automatic air vent is factory installed. The coil is a Trane type 5W, constructed of 5/8-inch (16 mm) OD copper tubes arranged in a parallel pattern. The copper tubes are expanded into aluminum fins positioned continuously across the entire coil width, not exceeding 80 fpf for a standard capacity coil (one-row) and 108 fpf for a high-capacity (two-row) coil. The coil casing is 16-gauge steel. Coil performance is rated at a maximum working pressure of 200 psig in accordance with ARI Standard 410. Supply and return water header connections are female tapered NPT.

Steam Heating Coil

The steam heating assembly includes the coil and filter section and is available as a ship-separate option or factory installed on the unit's inlet. A two-way modulating valve, actuator, manifold piping are factory installed. Also, connections are provided for field installing a vacuum breaker. The coil is a Trane type NS, constructed of one inch OD copper tubes arranged in a parallel pattern. The copper tubes are expanded into aluminum fins positioned continuously across the entire coil width, not exceeding 42 fins per foot. The coil casing is steel. Coil performance is rated at a maximum working pressure of 100 psig in accordance with ARI Standard 410. Supply and return steam header connections are female tapered NPT. Factory provided controls limit the leaving air temperature from the heating coils to no more than 105°F at all operating conditions.

Staged Electric Heat Interface

A heat control module will be factory installed and wired for customer supplied and powered electric heat. This module will allow the unit to stage the customer-provided electric heat. Up to three stages of electric heat control will be accomplished with three dry binary output rated at one amp for 115 Vac.

Hydronic Heating Control Interface

A heat control module will be factory installed and wired for customer supplied hydronic heating. This control will be accomplished with a dry binary output, 0-10 Vdc analog control signal.

Time Clock

A factory-installed programmable time clock is wired to the unoccupied mode binary input to provide on/off control. The timer is accessible without opening the control panel door, and is a seven-day type with a maximum of four operations per day. A permanent built-in rechargeable battery pack is provided.

Low Entering Air Temperature—Protection Device

A thermostat limit switch is factory mounted on the unit's entering air side with a capillary tube serpentine across the coil face. If the temperature falls below 35°F, the fan shuts down and the waterside economizer and/or hydronic heat valve option opens to allow full water flow. The heat output also energizes. A manual reset is required.

Note: This option is standard on units with a waterside economizer or hydronic heat.

Non-fused Disconnect Switch

The unit has a factory mounted non-fused disconnect switch accessible without opening the control panel door.

Dual Point Power Terminal Blocks

Two separate power terminal blocks are available to bring power to the unit; one terminal block provides power to the compressors and the other provides power to the fan motor and controls.

Note: A single point power terminal block is standard.

Flexible Horizontal Discharge Plenum

Low and Standard Height

Units are provided with a ship-separate or factory installed horizontal discharge plenum that permits multi-directional duct connections. The plenum is insulated with two inches (51 mm) of 1.75 lb. (0.79 kg) density fiberglass for sound attenuation. Discharge openings can either be field cut or factory cut based on duct dimensions supplied by the customer. A two-inch duct collar is provided for field duct connections.

High Duct Temperature Thermostat

A factory-supplied temperature limit switch with reset element detects the supply air duct temperature. This sensor should be field-installed downstream from the unit's discharge in the supply air duct. If the supply air duct temperature exceeds 240°F, the unit shuts down and displays a diagnostic. A manual reset is required at the unit. The high duct temperature can be adjusted at the thermostat.

Plenum High Static Switch

A factory supplied sensor provides additional protection from ductwork over-pressurization. This sensor should be field-installed downstream of the unit's discharge in the supply air duct.

Cupro-Nickel Condenser

One condenser is provided for each compressor. The condensers are a shell-and-tube design with removable heads to allow mechanical tube cleaning. Tubes are 3/4-inch (19 mm) OD and constructed of copper cupro-nickel (90/10).

Stainless Steel Drain Pan

The drain pan is positively sloped, fabricated from 304L stainless steel, and insulated with 3/4-inch (19 mm) of 1-lb. (0.5 kg) density fiberglass. The drain pan contains a factory piped trap with cleanout.

Dirty Filter Sensor

A factory installed pressure switch senses the pressure differential across the filters. When the differential pressure exceeds 0.9-inches (23 mm) WG, contact closure occurs.

A field installed indicator device may be wired to relay terminals that indicate when filter service is required. Contacts are rated at 115 Vac and are powered by a field supplied transformer.

Filters

Two-inch (51 mm) medium efficiency throwaway fiberglass filters are installed in the unit filter section.

Remote Human Interface Panel

The remote human interface panel (RHI) can perform all the same functions as the unit mounted human interface panel, except the service mode function. A single RHI can monitor and control up to four units. The panel includes a 2x40 character clear language (English, Spanish, or French)



Mechanical Specifications

display, a red LED light to indicate an alarm condition, a simple 16-key keypad for making unit setpoint and configuration changes, and hinged access door. The panel can be mounted up to 5,000 feet (1524 m) from the unit and is wired to the inter-processor communications bridge (IPCB) mounted in the unit with twisted wire pair communication wiring and 24V wiring.

Generic Building Automation System Module (GBAS)

The GBAS module is for use with a non-Trane building management system. The module provides a binary input for demand limiting, four analog inputs for setpoint adjustment, and five relay outputs for diagnostic reporting. Inputs can use a potentiometer or 0-5 Vdc signal.

Ventilation Override Module (VOM)

The VOM allows you to program the unit with up to five ventilation sequences: smoke purge, evacuation, pressurization, purge, and purge with duct control. Typically, a hard-wire short from a smoke detector or fire control panel will cause a binary input on the VOM to close, thus causing the programmed sequence to occur.

LonTalk Communication Protocol/LCI-I

The LCI-I option (COMM5) provides interface to a Trane Integrated Comfort™ system (ICS). It allows remote control and monitoring of the self-contained unit using a personal computer with Tracer® building management software.

BACnet Building Automation System

The BACnet® Communication Interface for self-contained (BCI-I) controller expands communications from the unit UCM network to Tracer SC or a 3rd party building automation system, utilizing BACnet, and allows external setpoint and configuration adjustment and monitoring of status and diagnostics.

Air Fi Wireless Communications Interface (WCI)—Field Installed

Air Fi™ Wireless Communications Interface—Provides wireless communication between the Tracer™ SC, Tracer Unit Controllers and BACnet Communication Interface (BCI) modules.

Thermostat Interface

A two-heat/2-cool thermostat must be ordered separately and shipped separate for field installation in a remote-mounted configuration. The thermostat is to provide control over the compressor staging, fan start/stop (CV only), and electric heat only (if ordered).

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