Product Catalog

Commercial Self-Contained Modular Series

20-35 Ton Water-Cooled Air Conditioners
20-32 Ton Air-Cooled Air Conditioners
Remote Air Cooled Condensers

June 2014

PKG-PRC003U-EN

Introduction

Figure 1. Affordable self-contained value from Trane

- **Modular design** allows the fan/coil section to "split-apart" from the compressor section
- **35" 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** for indoor air quality

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Trademarks

Revision History

PKG-PRC003U-EN (09 Jun 2014)

Updated to correct 460V, 7.5HP, ODP Fan motor FLA value, and input line current for 575V, 15HP, with bypass.

PKG-PRC003-EN (04 Apr 2013)

Add wireless comm interface (WCI).

PKG-PRC003-EN (15 Oct 2012)

Corrected fan motor information. Updated fan FLA and LRA values in Electrical Data tables

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Features and Benefits

The industry leader in self-contained systems since 1988 is now even better! Trane's 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 IntelliPak™ unit's DDC controls are Trane-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 IntelliPak® 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 IntelliPak 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 Intellipak 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, IntelliPak 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.

Why consider Modular Series self-contained floor-by-floor systems?

Improved Cash Management

- 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% 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 year-round with waterside or airside economizer
- Energy savings with floor-by-floor system since only units on floors requiring cooling need to operate
- Significant annual energy consumption reduction compared to a central chilled water system due to partial occupancy after-hours
- 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

- Sloped drain pan
- Stainless steel sloped drain pan option
- Internally trapped drain connection
- Double wall construction option
- Matt-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 option with Traq™ damper allows direct measurement and control of outdoor air

Enhanced Serviceability

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

Standard Features

- 20 through 35 ton industrial and commercial water-cooled self-contained units
- 20 through 32 ton industrial/commercial remote air-cooled self-contained units
- IntelliPak™ 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 supply fan open drip proof (ODP) or totally enclosed fan cooled (TEFC) 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, mechanically cleanable
- Two-bolt removable condenser waterboxes for quick and easy cleaning
- Sloped drain pans to ensure complete condensate removal for IAQ
- Internally trapped drain connection with cleanout
- Internally isolated centrifugal supply fan
- Sturdy galvanized steel framework with easily removable painted exterior galvanized steel panels
- UL listing on standard options
- Fan belts and grease lines are easily accessible
- Access panels and clearance provided to clean evaporator and waterside economizer coil fins
- Condensing pressure control on all variable water flow systems with valves
- Complete factory run–in test with power and water

Standard Control 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
- Compressor lead/lag
- FROSTAT™ coil frost protection on all units
- Daytime warmup (occupied mode) and morning warmup operation
- 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

Optional Features

- Trane LCI-I communication interface module: ICS interface control module
- BACnet Communications Interface Module
- Generic BAS interface
- Comparative enthalpy control
- Ventilation override with 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 coating on unit and/or evaporator coils
- Double wall construction
- Stainless steel sloped drain pan
- Medium efficiency throwaway filters
- Through-the-door non-fused disconnect switch
- High duct temperature thermostat
- Dual electrical power connection
- CO2 reset input
- Trane's air quality Traq™ damper in mixing box

Factory Installed or Ship Separate Options

- Waterside economizer with factory installed piping and controls
- Flexible horizontal discharge plenum with or without factory cut holes, double wall perf
- Heating options include hot water, steam, and electric (field installed only)

Field Installed Accessories

- Airside economizer control with or without mixing box
- Wireless comm interface (WCI)
- Programmable sensors with or without night set back - CV and VAV
- ICS zone sensors used with Tracer™ system for zone control
- Field installed module kits available to upgrade controls
- Ultra low leak dampers for 0-100% & modulating fresh air economizer
- Fully integrated variable frequency drive (VFD) control with or without optional integrated bypass

Integrated Self-Contained Systems

Integrated Comfort™ System (ICS)

Figure 2. You can control, monitor, and service your facility using Trane's ICS and your PC

Trane's Integrated Comfort™ system (ICS) increases job control by combining IntelliPak™ Modular 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.

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 building automation products. Tracer is a software package that minimizes custom programming requirements and allows easy system setup and control using your personal computer. Operating data from all system components is readily available for evaluation. You can control, monitor, and service your facility — all from your personal computer.

The IntelliPak 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.

IntelliPak Modular Series Self-Contained Monitoring Points Available Using Tracer

- 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 warmup sensor temperature
- Entering air temperature

Tracer Control Points for IntelliPak Modular Series Self-Contained Units

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

Interoperability with BACnet

The Trane Tracer SC BACnet Control Interface (BCI) 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 equipment with Tracer SC controls 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, humidity, occupancy, CO2 and air velocity).

Commissioning, control, efficiency, and information…it simply all adds up to one reliable source…Trane.

Trane Wireless Comm Interface (WCI)

The Trane® Wireless Comm Interface (WCI) is the perfect alternative to Trane's BACnet™ wired communication links (for example, Comm links between a Tracer™ SC and a Tracer™ UC400). Minimizing communication wire used between terminal products, zone sensors, and system controllers has substantial benefits. Installation time and associated risks are reduced. Projects are completed with fewer disruptions. Future re-configurations, expansions, and upgrades are easier and more cost effective.

Trane R-410A 3-D™ Scroll Compressor

The R-410A Trane 3-D™ Scroll provides important reliability and efficiency benefits inherent in 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, eliminating 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, improved part isolation provides reduced compressor sound levels compared to previous designs.

Features listed below optimize the compressor design and performance:

- Optimized scroll profile
- Heat shield protection to reduce heat transfer between discharge and suction gas
- Improved sealing between high side and low side

Additional features are incorporated in the compressor design for greater 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 has a very smooth compression cycle, imposing very little stress on the motor and resulting in greater reliability. Low torque variation reduces noise and vibration.

Suction Gas Cooled Motor

Compessor 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.

Proven Design through Testing and Research

The new R-410A 3-D™ Scroll compressor is the next generation of reliable Trane 3-D™ Scroll compressors provided by Trane, the leader in scroll compressor technology
.

Figure 3. One of two matched scroll plates - the distiguishing feature of the scroll compressor

Application Considerations

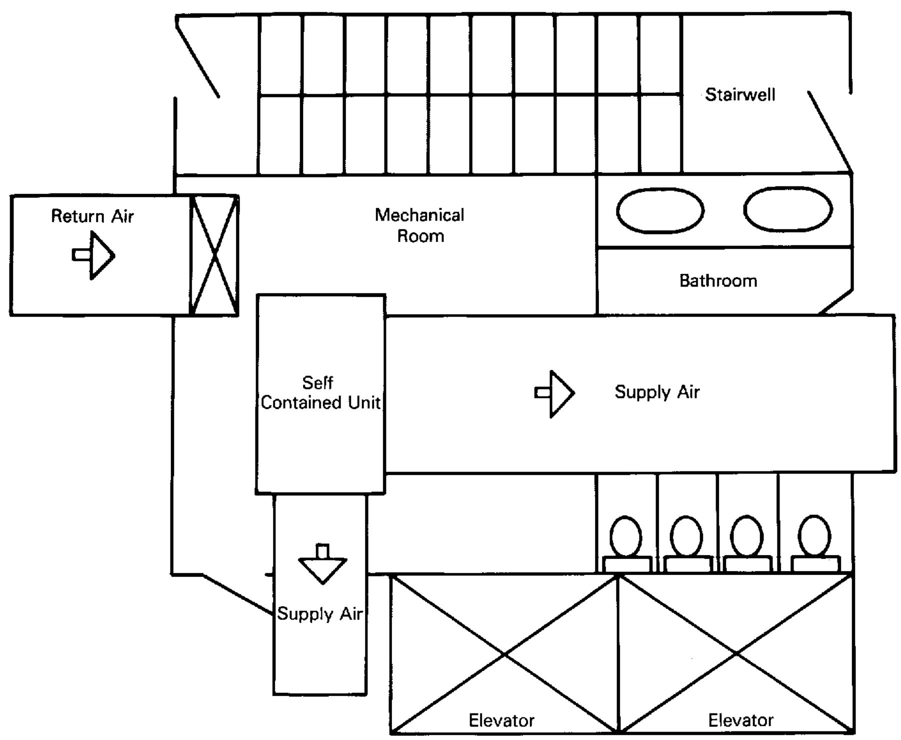
Self-Contained Acoustical Recommendations

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. See Figure 4, p. 12.This minimizes the acoustic effects and risk of workmanship or installation errors. 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 4. Equipment room 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. 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 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.

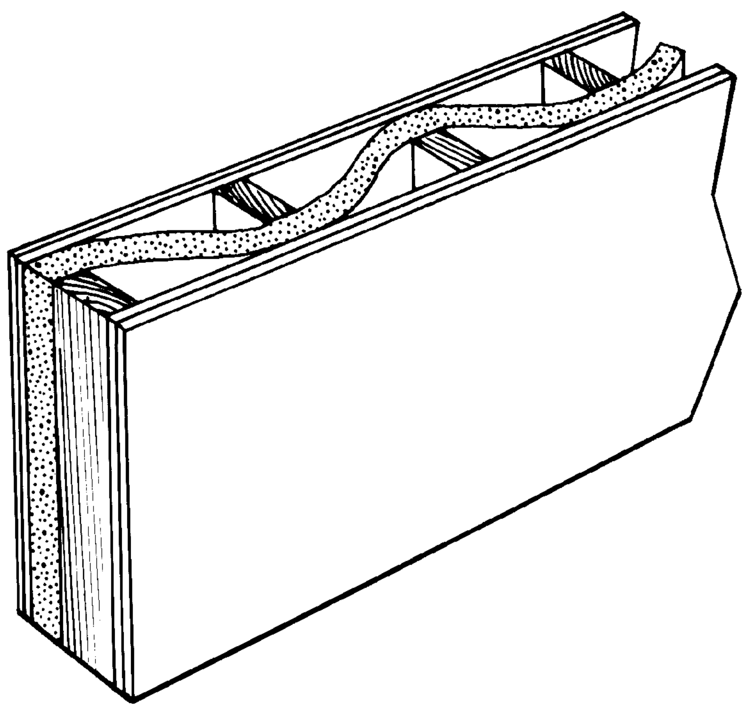
Equipment Room Construction Options

The preferred equipment room wall construction is concrete block. If this is not feasible then a double stud offset wall is suggested. See Figure 5, p. 13. 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 sheetrock 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 5. 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.

Free Cooling Opportunities and Alternatives

Free cooling is available with either airside or waterside economizers. 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 may be mechanically cleanable (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.

Isolation Recommendations

Unit

The Modular Series unit is internally isolated so that external isolation is not required. Consult a vibration specialist before using external isolation. The Trane Company does not recommend double isolation. If isolation external to the unit is preferred, remove internal isolators.

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 Modular Series self-contained unit is internally isolated and does not require additional isolation. However, do not forget to design proper system vibration isolation to prevent vibration transmission from the building plumbing to the unit. Also be sure that the drain line is properly isolated.

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. Layout condenser piping in reverse returns to help balance the system. This is accomplished by equalizing the supply and return pipe length. Multi-story buildings may 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

Pump location is preferred 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. Use several partial capacity pumps or variable speed pumps. 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 strainer to avoid an incorrect application of a stream strainer. 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 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 54°F and 35°F require a condensing pressure control valve. Any unit with variable-flow waterside valves 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 control valves 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.

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 tripouts 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

Standard ambient control allows operation down to 45°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.

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 sales office.

Unit Capacities

1. Determine entering air temperature dry bulb and wet bulb and entering water temperature.
2. Refer to performance Table 7, p. 30 through Table 19, p. 41 to find gross total and sensible capacity that best meets capacity requirements.
3. Apply the cfm correction factors from the capacity correction factor Table 6, p. 29 to determine gross total and gross sensible capacities at desired cfm.
4. Multiply condenser water delta T by the total capacity cfm correction factor to determine new condenser water delta T.
5. Using design cfm, determine static air pressure drops for accessories from the air 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 loses.
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 the 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 tables for the unit size.
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 delta T by the total capacity cfm correction factor to determine the new delta T.
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 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.

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
gpm = 105

Selection Procedure

Airflow = 14200 cfm at 2.5-inch duct static pressure
Unit to include:
Constant Volume
Waterside economizer
Medium velocity throwaway filters

Unit Selection

Tentatively select a 35 ton unit. Refer to Table 13, p. 36 to obtain gross total and sensible unit capacities, and gpm at the design conditions:

Total capacity = 370 MBh
Sensible capacity = 282 MBh
LWT = 95.4°F

Since the design cfm is greater than the nominal cfm, adjust the capacities and condenser water delta T to reflect the higher cfm:

design cfm/nominal cfm 14,240/14,000 + 3% from nom. Cfm

Refer to Table 6, p. 29 to obtain the capacity correction factors for +3% of nominal cfm:

Cooling capacity multiplier = 1.005
Sensible capacity multiplier = 1.014

Multiply the capacities by the correction factors:

370 MBh x 1.005 = 371.85 MBh
282 MBh x 1.014 = 285.95 MBh

The SCWG 35 meets the total and sensible design requirements.

Multiply the delta T of 10.4°F, by the cooling capacity correction factor of 1.005 to obtain new delta T of 10.45 and add this to the entering water temperature to obtain the actual leaving water temperature, 95.45°F.

Determine static air pressure drops through the accessories at the design cfm by referring to Figure 6, p. 25 through Figure 11, p. 27.

4-row waterside economizer = 0.55 in. Medium velocity filters = 0.41 in. Add this to the 2.5-inch duct static pressure for a total external static pressure of 3.46 inches. Refer to the fan curve with Constant Volume, Figure 18, p. 37 to determine approximate brake horsepower and fan rpm:

Fan brake horsepower = 25 bhp
Fan rpm = 1850 rpm

Determine net capacities by subtracting fan motor heat from gross capacities:
2.8 x 25 bhp = 70.0 MBh
Net total capacity = 371.85 MBh - 70.0 MBh = 301.85 MBh
Net sensible capacity = 285.95 MBh - 70.0 MBh = 215.95 MBh

Determine waterside economizer (full coil) capacity by referring to Table 13, p. 36. Use entering air of 80/67°F and entering water temperature of 55°F at 105 gpm. The table provides a gross total capacity of 263.6 MBh and gross sensible capacity of 263.6 MBh and 60.0°F leaving water temperature at nominal cfm.

Determine gross capacities at design cfm by applying the cfm correction factors from waterside economizer from Table 6, p. 29. Use the following correction factors:

263.6 MBh x 1.005 = 264.92 MBh
263.6 MBh x 1.014 = 267.29 MBh

Apply the cooling correction factor to water delta T to determine new delta T of 5.03°F.

Determine net capacities by subtracting fan motor heat for net total capacity of 194.92 MBh and net sensible capacities of 197.29 MBh.

Model Number Descriptions

Modular Series Self-Contained

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

Digits 6, 7 - Unit Nominal Capacity

20 = 20 Tons (water or air cooled)
25 = 25 Tons (water or air cooled)
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 = I-Pak & VFD & supply air temp ctrl
3 = I-Pak & VFD w/ bypass & supply air temp ctrl
4 = I-Pak w/o vol. ctrl, w/ zone temp cool
5 = I-Pak w/o vol. ctrl, w/ zone temp heat/cool
6 = I-Pak w/o vol. ctrl, w/ supply air temp ctrl
8 = thermostat interface

Digits 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 w/ double wall
E = vertical discharge, ship separate
F = vert. dis. w/ double wall, ship sep.
G = horizontal discharge, ship separate
H = horiz. dis. w/ double wall, ship sep.

Digit 13 - 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
3 = TEFC motor

Digits 15, 16 - Motor HP

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

Digits 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,1 stage
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 sep
V = hi-cap hot water coil, RH
W = hi-cap hot water coil, RH, ship sep
0 = none

Digit 21 - Unit Isolators

A = isopads
B = spring isolators
0 = none

Digit 22 - Unit Finish

1 = paint - slate gray
2 = protective coating
3 = protective coating w/ finish coat

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 Pan Type

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
0 = none

Digit 28 - Ventilation Control

B = airside econ w/Traq™ damper (top O/A inlet)
C = airside econ w/ standard dampers (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
0 = 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
0 = none

Digit 30 - Condenser Tube Type

A = standard condenser tubes
B = 90/10 CuNi condenser tubes
0 = none

Digit 31 - Compressor Service Valves

1 = with service valves
0 = none

Digit 32 - Miscellaneous System Control

1 = timeclock
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
0 = 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 & VOM
H = GBAS & RHI
J = VOM & RHI
M = GBAS & VOM & 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
0 = 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

T = UL agency listing
0 = 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
0 = None

Self-Contained Ship-With Accessory Model Number

Digit 1 - Parts/Accessories
P = parts/accessories

Digit 2 - Unit Model
S = self-contained

Digit 3 - Shipment
W = with unit

Digit 4 - Development Sequence
F = signature series
G = modular series

Digit 5 - Sensors and Other Accessories
S = sensors

Digit 6 - Sensors and Thermostats (Field Installed)
A = BAYSENS077 - zone temp only (CV and VAV)
B = BAYSENS073- zone temp with timed override button (CV and VAV)
C = BAYSENS074 - zone temp with timed override button, setpoint dial (CV and VAV)
E = BAYSENS108 - CV zone sensor -dual setpoint, man/auto changeover
F = BAYSENS110 - CV zone sensor-dual setpoint, man/auto changeover w, indicastor lights
G = BAYSENS119 - CV/VAV programmable night setback Sensor
H = BAYSENS021 - VAV zone sensor with indicator lights
K = BAYSTAT150 2H/2C Prog Tstat w/ BAYSTAT077 Remote Sensor
L = outside air temperature sensor kit
M = outside air humidity sensor kit
N = BAYSTAT155 3H/2C Tstat
P = BAYSTAT150 2H/2C Programmable Tstat
0 = none

Digit 7 - Mixed Air Temperature Protection Kit (Field Installed)
1 = mixed air temperature protection kit
0 = none

Digit 8 - Carbon Dioxide Sensor (Field Installed)
1 = carbon dioxide sensor kit
0 = none

Digit 9 - Future Option
0 = none

Digits 10, 11 - Design Sequence
** = Factory Assigned

Remote Air-Cooled Condenser

Digit 1 - Unit Model
C = Condenser

Digit 2 - Unit Type
C = Commercial
I = Industrial

Digit 3 - Condenser Medium
R = Remote

Digit 4 - Development Sequence
C = C

Digits 5, 6, 7 - Nominal Capacity
020 = 20 Tons
029 = 29 Tons
032 = 32 Tons

Digit 8 - Unit Voltage
4 = 460 Volt/60 Hz/3 ph
5 = 575 Volt/60 Hz/3 ph
6 = 200 Volt/60 Hz/3 ph

Digit 9 - Control Option
0 = No Low Ambient, I-Pak
A = No Low Ambient, T-stat
B = Low Ambient, I-Pak
C = Low Ambient, T-stat

Digits 10, 11 - Design Sequence
** = Factory Assigned

Digit 12 - Unit Finish
1 = Paint - Slate Gray
2 = Protective Coating
3 = Protective Coating with Finish Coat
4 = Unpainted Unit

Digit 13 - Coil Options
A = Non-Coated Aluminum
C = Protective Coated Aluminum

Digit 14 - Unit Isolators
0 = None
A = Spring Isolators
B = Isopads

Digit 15 - Panels
0 = None
1 = Louvered Panels

Digit 16 - Agency
0 = None
T = UL Listing

General Data

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

	Water-Cooled Units				Air-Cooled Units		
Unit Size	**20**	**25**	**30**	**35**	**20**	**25**	**32**
Compressor Data							
Quantity	2	2	1/1	2	2	1/1	2
Nominal Ton/Comp	10	10	10/15	15	10	10/15	15
Circuits	2	2	2	2	2	2	2
Evaporator Coil Data							
Rows	2	4	4	4	3	4	4
Sq. Ft.	22.5	25.0	25.0	25.0	25.0	25.0	25.0
FPF	144	144	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	2	2
Size (Dia. x width - inches)	12 5/8"x8"	12 5/8"x9"	12 5/8"x11"	12 5/8 x11"	12 5/8"x8"	12 5/8"x9"	12 5/8"x11"
Minimum HP	5	5	5	5	5	5	5
Maximum HP	20	25	25	25	20	25	25
Minimum Design CFM	6350	7250	7250	7250	7250	7250	7250
Maximum Design CFM	8500	10,625	12,750	14,875	8500	10,625	13600
R-410A Refrigerant Data							
EER	14.0	14.3	14.1	14.0	10.0	10.1	10.4
IEER (CV)	14.1	14.8	15.4	15.6	10.8	11.8	11.9
IEER (VFD)	17.1	18.1	18.2	17.7	13.4	13.3	13.8
Refrigerant Charge - lb (kg)							
Circuit A	19.0 (8.6)	24.0 (10.9)	24.5 (11.1)	23.0 (10.4)	See Note 3	See Note 3	See Note 3
Circuit B	19.0 (8.6)	24.0 (10.4)	23.0 (10.4)	23.0 (10.4)	See Note 3	See Note 3	See Note 3
Capacity Steps - %	100/53/0	100/53/0	100/65/42/6	100/53/0			
Filter Data							
Quantity	4	4	4	4	4	4	4
Size (inches)	16x25x2	16x25x2	16x25x2	16x25x2	16x25x2	16x25x2	16x25x2
Quantity	4	4	4	4	4	4	4
Size (inches)	20x25x2	20x25x2	20x25x2	20x25x2	20x25x2	20x25x2	20x25x2
CCRC/CIRC Condenser Match	-	-	-	-	20	29	32

Notes:

1. Compressors are Trane 3D™scroll.
2. EER and IEER are rated in accordance to the AHRI Standard 340/360-2010. Based on 80/67°F (26.7/19.4°C) to the evaporator coil, nominal airflow and 85-95°F (29.4-35°C) condenser water or 95° F (35° C) ambient.
3. All units operate with R-410A. Water Cooled units ship with full operating charge. Air-cooled Units ship with dry nitrogen charge. Field refrigerant system charge required. Refer to Table 3, p. 23 for amounts required.
4. Maximum cfm limits are set to prevent moisture carryover on the evaporator coil.
5. Minimum cfm limits are set to ensure stable thermal expansion valve operation at low load conditions.
6. Filter sizes are for units without hot water or steam heating coils

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

Filter Data for Heating Coil					
Quantity	4				
Size (inches)	20x18x2				
Size (mm)	(508x457x51)				
Quantity	8				
Size (inches)	20x20x2				
Size (mm)	(508x508x51)				
Coil Data	Type	Rows	No. - Size (in)	No. - Size (mm)	fpf
Steam Coil	NS	1	2 - 24 x 58	2 - 609.6x1473.2	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:
1. Hot water and steam heating coils have Prima-Flo® fins and do not have turbulators.
2. 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 & CCRC/CIRC Unit Size	20/20	25/29	32/32
No. of Refrigerant Circuits	2	2	2
Operating Charge - lbs R-410A	36.5/36.5	48.5/36	46/46
Operating Charge - kg R-410A	16.6/16.6	22/16.3	20.9/20.9
Cond. Storage Cap. - lbs R-410A	37/37	51/37	51/51
Cond. Storage Cap. - kg R-410A	16.8/16.8	23.1/16.8	23.1/23.1

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

Table 4. Waterside economizer coil physical data

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

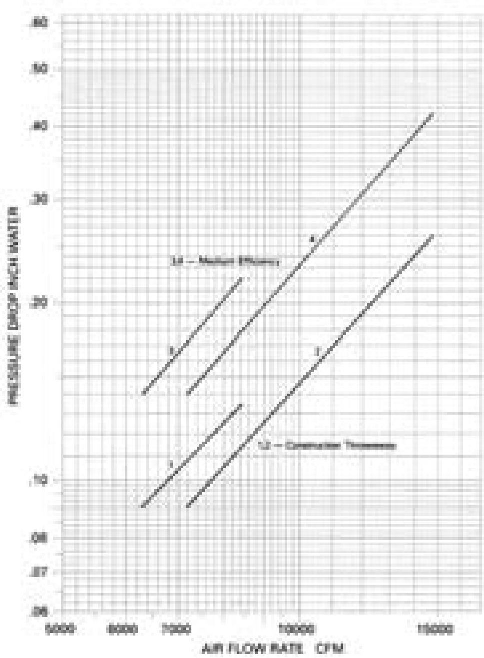
Table 5. CCRC/CIRC remote air-cooled condenser general data

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.)	1/46x71	1/46x71	1/64x71
Circuit 2 No./Size (in.)	1/46x71	1/64x71	1/64x71
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 Drop

Figure 6. Filter airside pressure drop



Note: In Figure 6, p. 25, 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

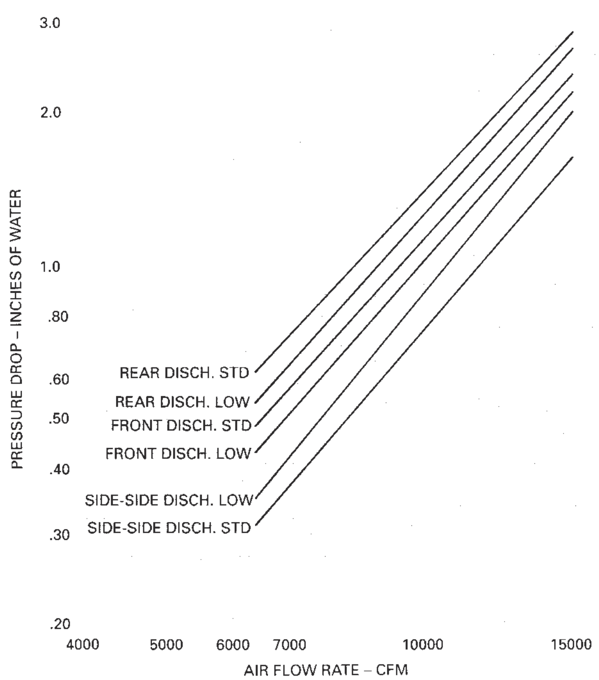


Figure 8. Traq™ damper airside pressure drop

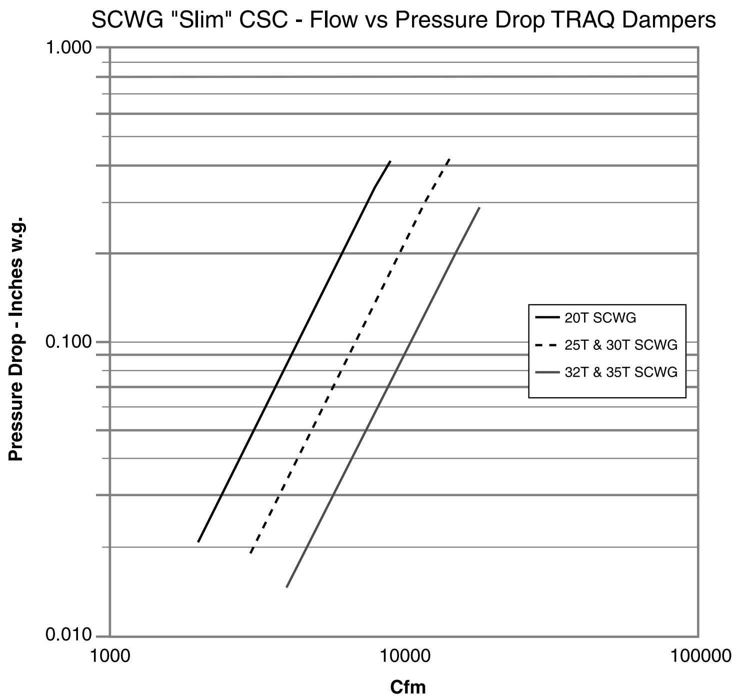


Figure 9. Waterside economizer airside pressure drop

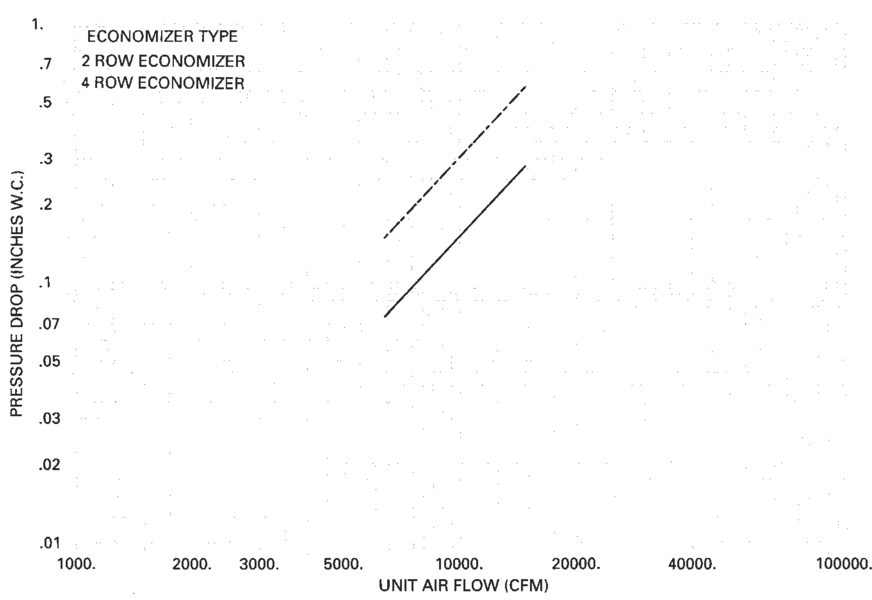


Figure 10. Steam coil airside pressure drop

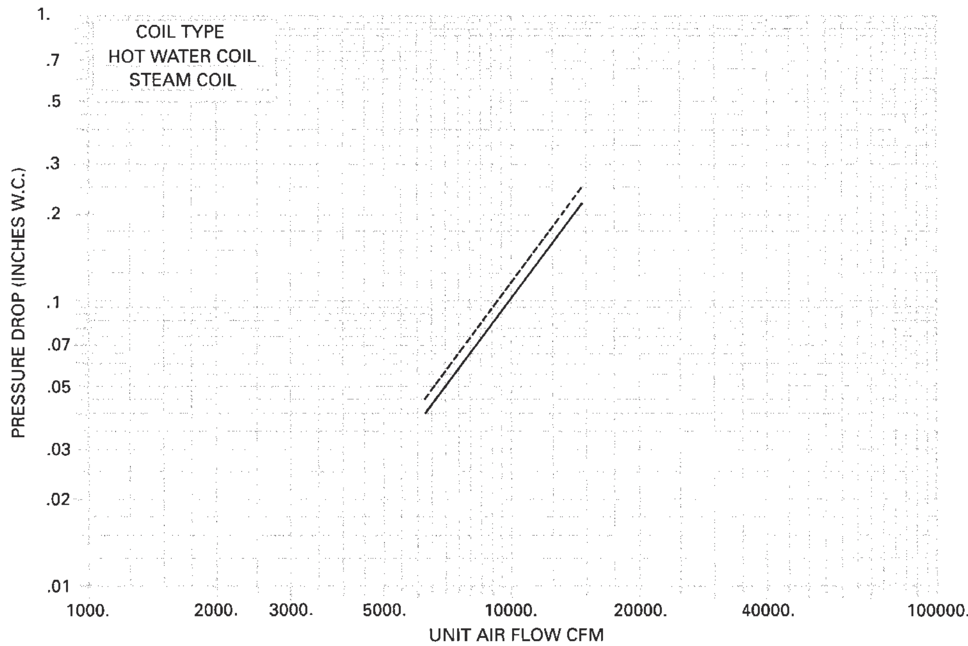
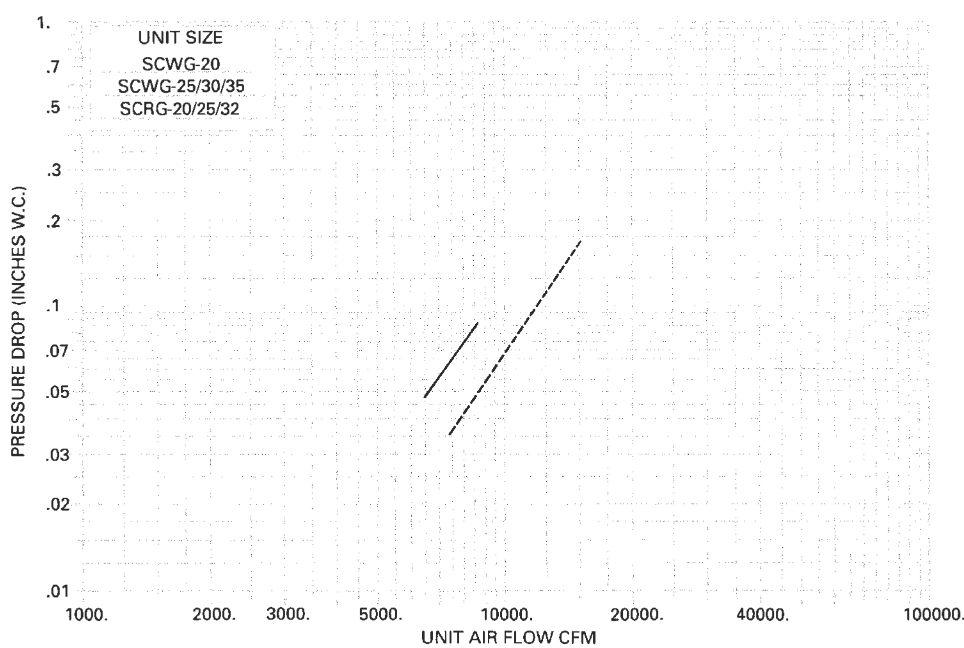


Figure 11. Airside economizer airside pressure drop



Waterside Pressure Drop

Figure 12. Waterside economizer waterside pressure drop

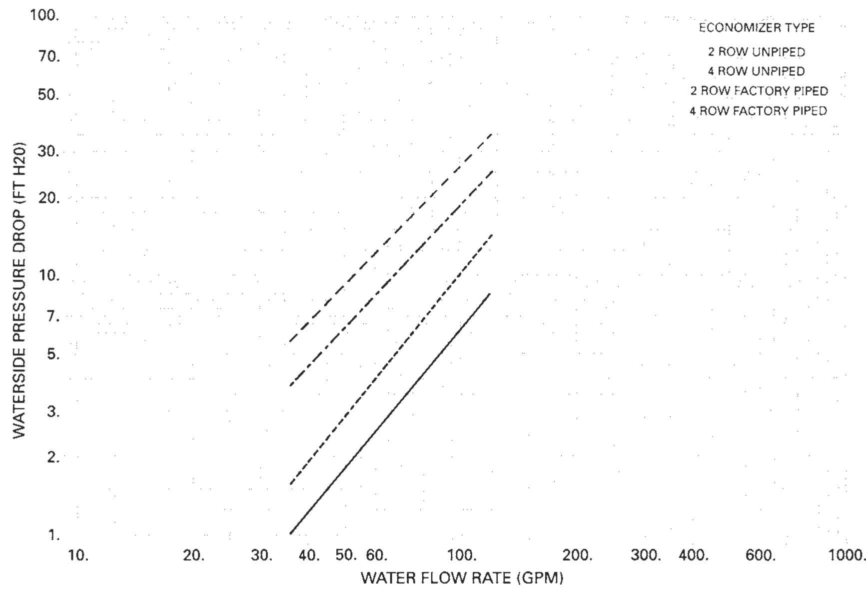


Figure 13. Unit without piping water pressure drop

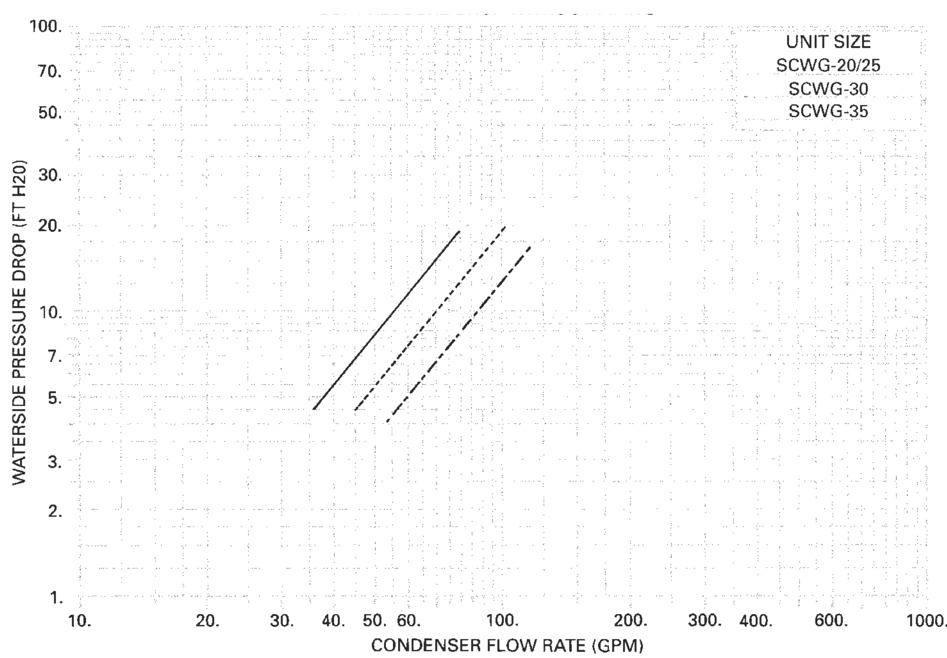
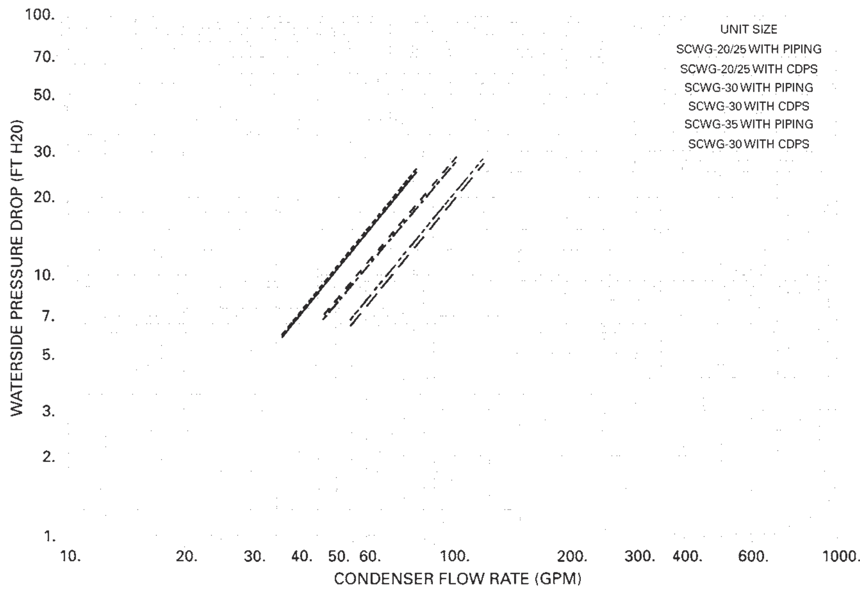


Figure 14. Unit with piping waterside pressure drop



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 6. 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

Water-Cooled Unit Performance

20-ton Water-Cooled

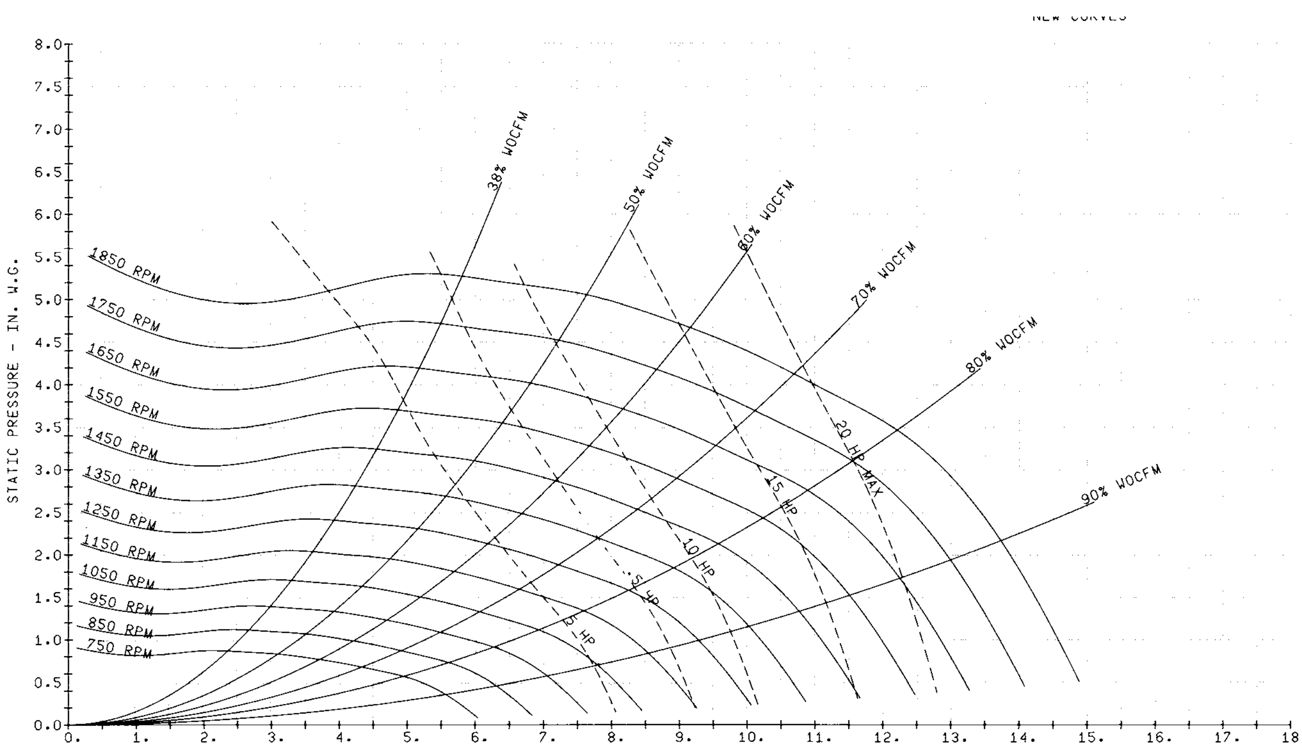
Table 7. SCWG/SIWG 20 economizer full capacity - 8,000 cfm

			full capacity coil						low capacity coil					
			45°F			55°F			45°F			55°F		
EDB °F	EWB °F	flow gpm	total MBh	sensible MBh	LWT °F	total MBh	sensible MBh	LWT °F	total MBh	sensible MBh	LWT °F	total MBh	sensible MBh	LWT °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
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 8. SCWG/SIWG 20 gross cooling capacity - 8,000 cfm, 60 gpm

entering air		entering water temp 75°F			85°F			95°F		
EDB °F	EWB °F	total MBh	sensible MBh	LWT	total MBh	sensible MBh	LWT	total MBh	sensible MBh	LWT
75	62	269	197	84.8	259	192	94.7	249	187	104.6
	67	294	162	85.6	283	158	95.5	271	153	105.3
	72	321	127	86.5	309	122	96.3	296	117	106.1
80	62	270	230	84.8	261	226	94.7	250	220	104.6
	67	294	197	85.6	284	192	95.5	272	187	105.4
	72	321	161	86.5	309	157	96.3	296	151	106.1
85	62	270	270	84.8	262	262	94.8	253	253	104.7
	67	295	230	85.6	285	225	95.5	273	219	105.4
	72	322	195	86.5	310	191	96.3	297	186	106.1

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

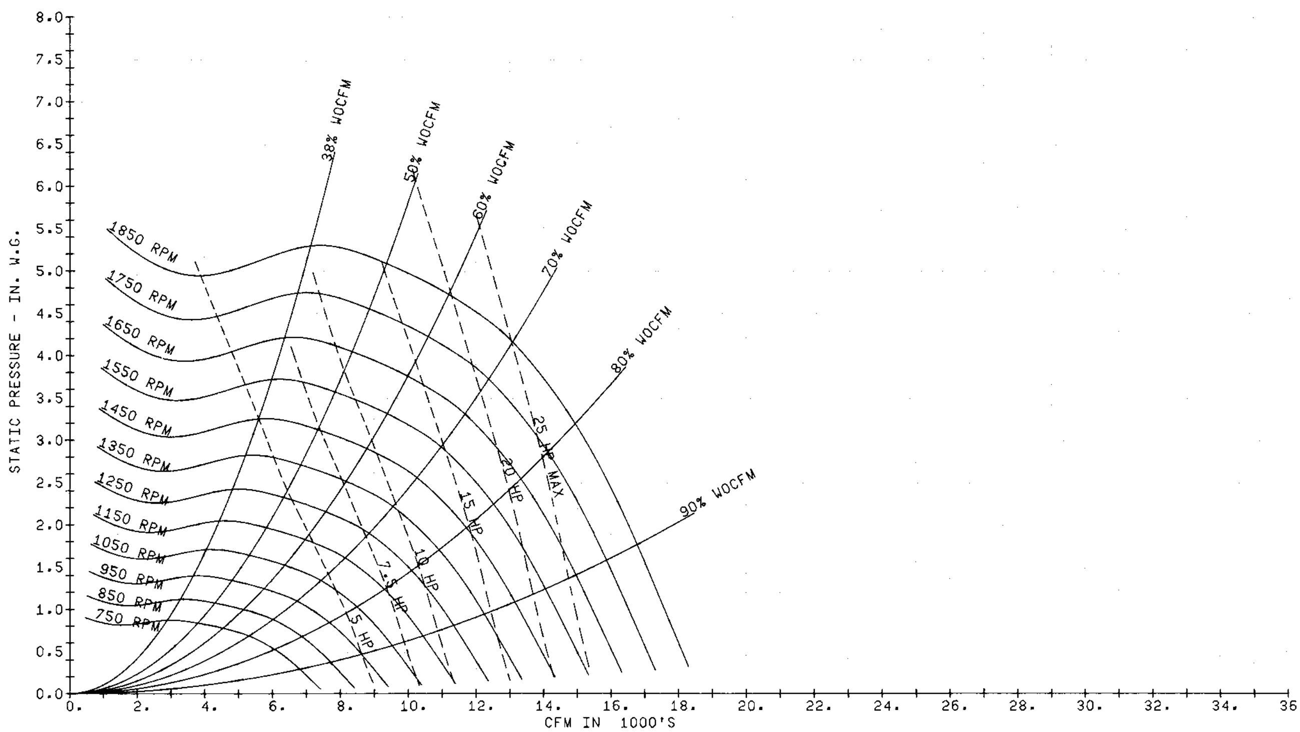
Table 9. SCWG/SIWG 25 economizer - 10,000 cfm

			full capacity coil						low capacity coil					
			45°F			55°F			45°F			55°F		
EDB	EWB	flow	total	sensible	LWT	total	sensible	LWT	total	sensible	LWT	total	sensible	LWT
°F	°F	gpm	MBh	MBh	°F	MBh	MBh	°F	MBh	MBh	°F	MBh	MBh	°F
75	62	63	236.9	225.2	52.5	154.9	154.9	59.9	153.6	153.6	49.9	105.1	105.1	58.3
		75	251.4	231.2	51.7	160.9	160.9	59.3	162.0	162.0	49.3	110.2	110.2	57.9
		80	256.4	233.3	51.4	162.8	162.8	59.1	164.7	164.7	49.1	111.8	111.8	57.8
	67	63	292.6	184.8	54.3	174.1	141.4	60.5	184.6	129.7	50.9	110.6	103.7	58.5
		75	317.7	194.5	53.5	186.1	145.6	60.0	202.1	136.2	50.4	118.3	106.3	58.2
		80	326.5	197.9	53.2	90.4	147.2	60.0	208.2	138.4	50.2	121.1	107.3	58.0
	72	63	372.7	149.0	56.8	245.1	105.5	62.8	235.1	97.5	52.5	155.8	71.6	59.9
		75	406.4	161.0	55.8	267.0	112.7	62.1	257.9	105.2	51.9	169.9	76.1	59.5
		80	418.1	165.2	55.5	274.6	115.2	61.9	265.8	107.9	51.6	174.9	77.7	59.4
80	62	63	266.7	266.7	53.5	193.7	193.7	61.2	179.4	179.4	50.7	131.5	131.5	59.2
		75	277.9	277.9	52.4	201.1	201.1	60.4	189.1	189.1	50.0	137.8	137.8	58.7
		80	281.6	281.6	52.0	203.5	203.5	60.1	192.3	192.3	49.8	139.8	139.8	58.5
	67	63	301.5	240.4	54.6	194.3	194.3	61.2	190.1	173.9	51.0	131.7	131.7	59.2
		75	405.5	213.6	55.8	267.2	165.4	62.1	205.3	179.5	50.5	138.0	138.0	58.7
		80	331.8	252.2	53.3	209.4	206.2	60.2	210.6	181.5	50.3	140.1	140.1	58.5
	72	63	371.9	201.4	56.8	246.6	158.7	62.8	234.7	139.7	52.5	155.6	113.9	59.9
		75	405.5	213.6	55.8	267.2	165.4	62.1	257.4	147.4	51.9	169.4	118.3	59.5
		80	417.2	217.9	55.4	274.4	167.8	61.9	265.3	150.1	51.6	174.3	119.9	59.4
85	62	63	305.0	305.0	54.7	232.5	232.5	62.4	205.3	205.3	51.5	157.9	157.9	60.0
		75	223.0	223.0	50.9	168.9	168.9	59.5	216.3	216.3	50.8	165.4	165.4	59.4
		80	321.8	321.8	53.0	244.1	244.1	61.1	219.9	219.9	50.5	167.9	167.9	59.2
	67	63	319.3	299.4	55.1	233.2	233.2	62.4	205.7	205.7	51.5	158.2	158.2	60.0
		75	339.0	307.1	54.0	242.0	242.0	61.5	216.7	216.7	50.8	165.7	165.7	59.4
		80	345.8	309.8	53.7	244.9	244.9	61.1	220.3	220.3	50.5	168.2	168.2	59.2
	72	63	376.5	255.5	57.0	259.0	215.2	63.2	235.6	182.3	52.5	164.6	159.1	60.2
		75	407.4	266.7	55.9	276.8	221.1	62.4	257.2	189.6	51.9	175.9	162.7	59.7
		80	418.3	270.7	55.5	283.1	223.2	62.1	264.8	192.2	51.6	179.9	164.0	59.5

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

		entering water temp								
entering air		75°F			85°F			95°F		
EDB	EWB	total	sensible		total	sensible		total	sensible	
°F	°F	MBh	MBh	LWT	MBh	MBh	LWT	MBh	MBh	LWT
75	62	297	245	84.1	286	240	94.0	272	233	103.8
	67	324	195	84.9	311	190	94.7	296	184	104.4
	72	352	142	85.6	337	136	95.4	320	130	105.1
80	62	298	295	84.2	287	287	94.0	273	273	103.8
	67	325	244	84.9	312	239	94.7	297	232	104.5
	72	353	193	85.6	338	187	95.4	322	181	105.2
85	62	317	317	84.7	307	307	94.6	295	295	104.4
	67	326	294	84.9	313	288	94.7	298	281	104.5
	72	354	243	85.7	339	238	95.4	323	232	105.2

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

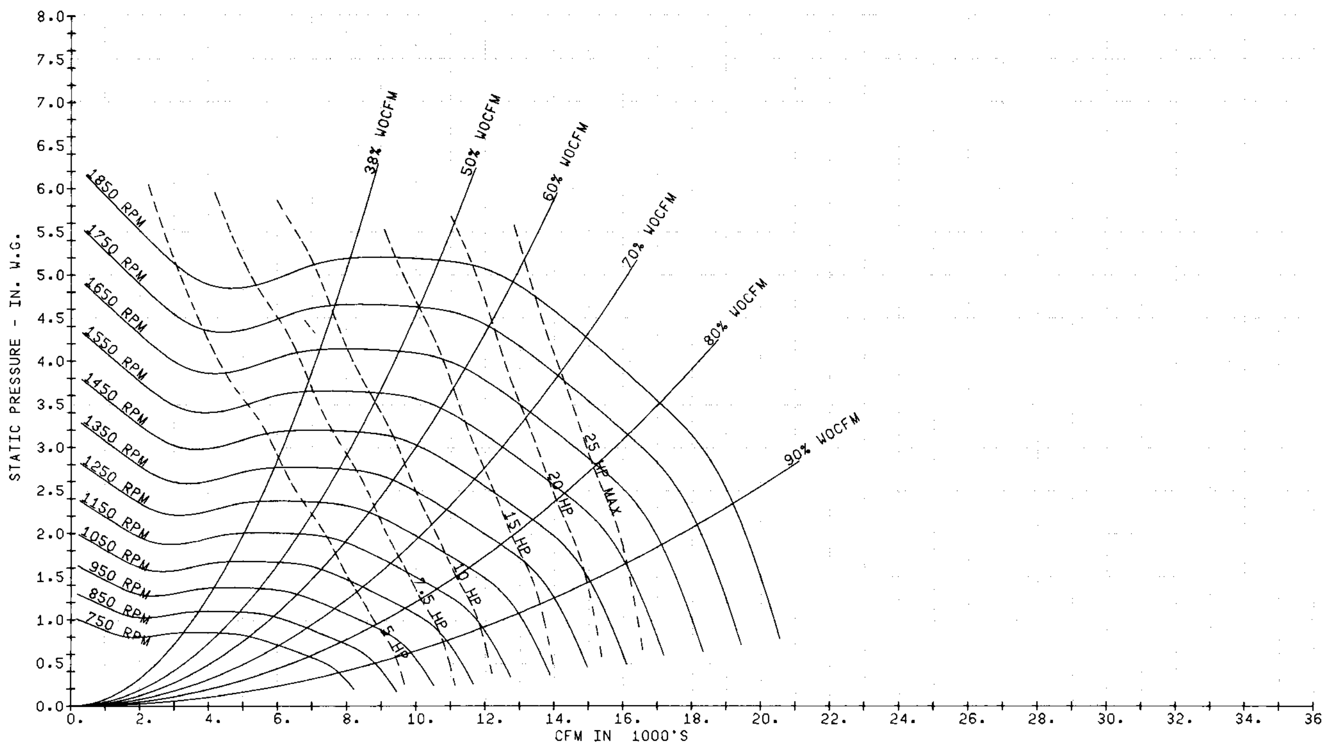
Table 11. SCWG/SIWG 30 economizer capacity - 12,000 cfm

			full capacity coil						low capacity coil					
			45°F			55°F			45°F			55°F		
EDB °F	EWB °F	flow gpm	total MBh	sensible MBh	LWT °F	total MBh	sensible MBh	LWT °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	176.8	176.8	49.7	120.4	120.4	58.2
		90	290.5	270.7	51.5	186.6	186.6	59.2	185.7	185.7	49.1	125.9	125.9	57.8
		105	302.5	275.7	50.8	191.3	191.3	58.6	192.1	192.1	48.7	129.7	129.7	57.5
	67	75	338.7	215.8	52.3	200.7	165.6	60.4	212.2	149.9	50.7	126.3	119.6	58.4
		90	366.4	226.4	51.5	213.7	170.1	59.8	230.7	156.7	50.1	134.3	122.4	58.0
		105	387.7	234.8	50.8	224.1	173.8	59.3	244.8	161.9	49.7	140.8	124.6	57.7
	72	75	431.4	173.0	54.0	282.5	122.4	62.5	270.2	112.2	52.2	177.9	82.2	59.7
		90	468.5	186.3	53.1	306.4	130.2	61.8	294.3	120.4	51.5	192.8	86.9	59.3
		105	496.8	196.5	52.4	324.8	136.3	61.2	312.6	126.7	51.0	204.3	90.5	58.9
80	62	75	310.4	310.4	56.5	224.9	224.9	61.0	206.5	206.5	50.5	150.7	150.7	59.0
		90	323.0	323.0	55.4	233.2	233.2	60.2	216.7	216.7	49.8	157.4	157.4	58.5
		105	331.8	331.8	54.5	239.1	239.1	59.6	224.1	224.1	49.3	162.2	162.2	58.1
	67	75	348.8	281.5	54.3	225.5	225.5	61.0	218.2	201.0	50.8	150.9	150.9	59.0
		90	373.4	291.0	53.3	233.9	233.9	60.2	234.2	206.9	50.2	157.7	157.7	58.5
		105	392.4	298.4	52.5	245.7	243.4	59.7	246.7	211.5	49.7	162.5	162.5	58.1
	72	75	430.5	235.0	56.5	283.9	185.2	62.6	269.8	161.2	52.2	177.6	131.3	59.7
		90	467.4	248.2	55.4	306.4	192.6	61.8	293.7	169.4	51.5	192.2	135.9	59.3
		105	495.7	258.6	54.4	324.1	198.4	61.2	312.0	175.7	50.9	203.6	139.5	58.9
85	62	75	354.9	354.9	54.5	270.0	270.0	62.2	236.2	236.2	51.3	180.9	180.9	59.8
		90	369.1	369.1	53.2	279.8	279.8	61.2	247.9	247.9	50.5	188.9	188.9	59.2
		105	379.1	379.1	52.2	286.8	286.8	60.5	256.2	256.2	49.9	194.7	194.7	58.7
	67	75	369.9	351.3	54.9	270.7	270.7	62.2	236.6	236.6	51.3	181.2	181.2	59.8
		90	391.3	359.6	53.7	280.7	280.7	61.2	248.3	248.3	50.5	189.3	189.3	59.2
		105	407.7	366.1	52.8	287.7	287.7	60.5	256.7	256.7	49.9	195.0	195.0	58.7
	72	75	434.9	298.6	56.6	298.3	252.1	63.0	270.4	210.5	52.2	187.8	183.6	60.0
		90	469.2	311.0	55.4	317.6	258.4	62.1	293.3	218.3	51.5	199.6	187.3	59.4
		105	495.8	320.7	54.4	332.8	263.5	61.3	311.4	224.5	50.9	208.8	190.3	59.0

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

		Entering Water Temp								
Entering Air		75°F			85°F			95°F		
EDB	EWB	Total	Sensible		Total	Sensible		Total	Sensible	
°F	°F	MBh	MBh	LWT	MBh	MBh	LWT	MBh	MBh	LWT
75	62	360	294	84.6	347	288	94.4	330	280	104.3
	67	392	234	85.3	376	228	95.2	359	221	104.9
	72	425	171	86.1	408	165	95.9	388	158	105.6
80	62	362	353	84.6	348	344	94.5	332	332	104.3
	67	393	293	85.4	377	286	95.2	360	278	105.0
	72	426	231	86.1	409	225	95.9	390	218	105.7
85	62	382	382	85.1	370	370	95.0	356	356	104.9
	67	394	351	85.4	379	344	95.2	361	336	105.0
	72	428	291	86.2	410	285	96.0	391	278	105.7

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

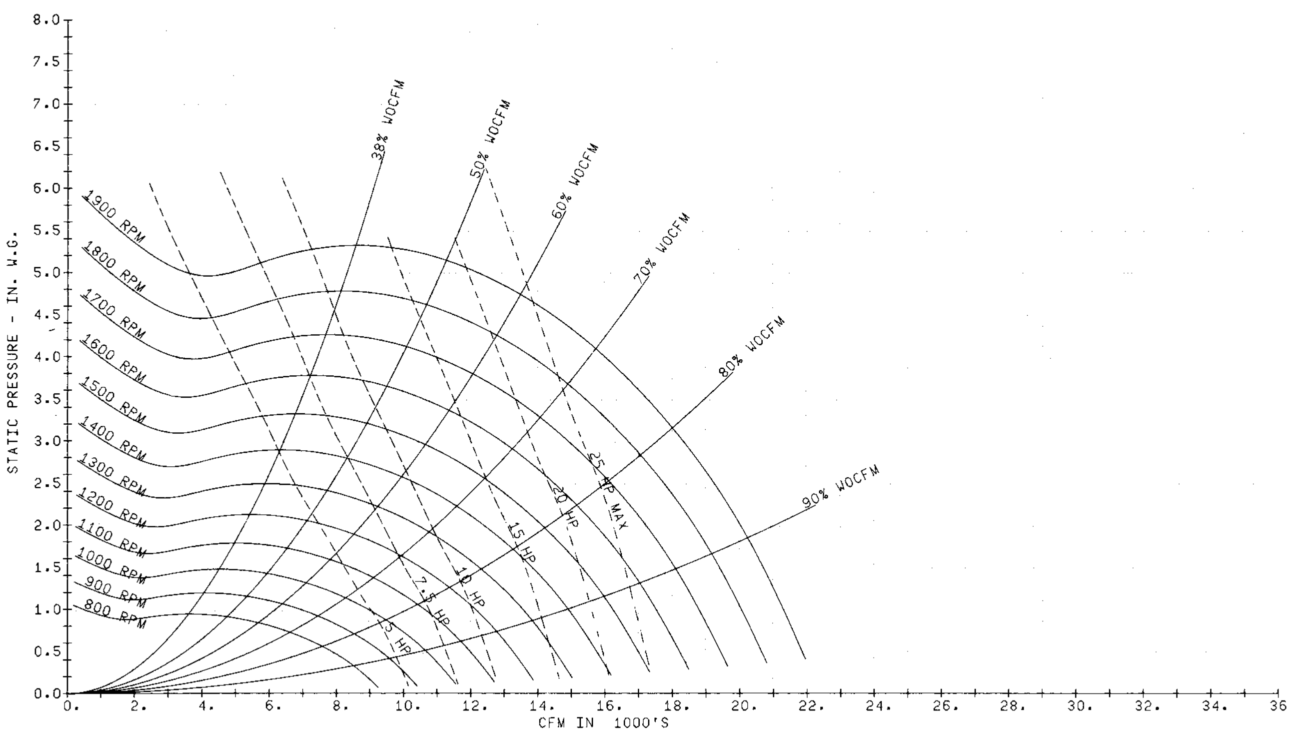
Table 13. SCWG/SIWG 35 economizer capacity - 14,000 cfm

			full capacity coil						low capacity coil					
			45°F			55°F			45°F			55°F		
EDB	EWB	flow	total	sensible	LWT	total	sensible	LWT	total	sensible	LWT	total	sensible	LWT
°F	°F	gpm	MBh	MBh	°F	MBh	MBh	°F	MBh	MBh	°F	MBh	MBh	°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
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 14. SCWG/SIWG 35 gross cooling capacity - 14,000 cfm, 105 gpm

entering air		entering water temp								
		75°F			85°F			95°F		
EDB	EWB	total	sensible		total	sensible		total	sensible	
°F	°F	MBh	MBh	LWT	MBh	MBh	LWT	MBh	MBh	LWT
75	62	430	348	84.4	413	340	94.2	395	331	104.1
	67	467	277	85.1	449	270	94.9	428	262	104.7
	72	506	204	85.8	486	196	95.6	463	188	105.4
80	62	431	416	84.4	415	408	94.2	396	396	104.1
	67	468	345	85.1	450	338	94.9	429	329	104.7
	72	507	273	85.8	487	266	95.6	464	258	105.4
85	62	454	454	84.8	439	439	94.7	423	423	104.6
	67	469	413	85.1	451	405	95.0	431	396	104.8
	72	508	343	85.9	488	336	95.7	466	327	105.4

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.

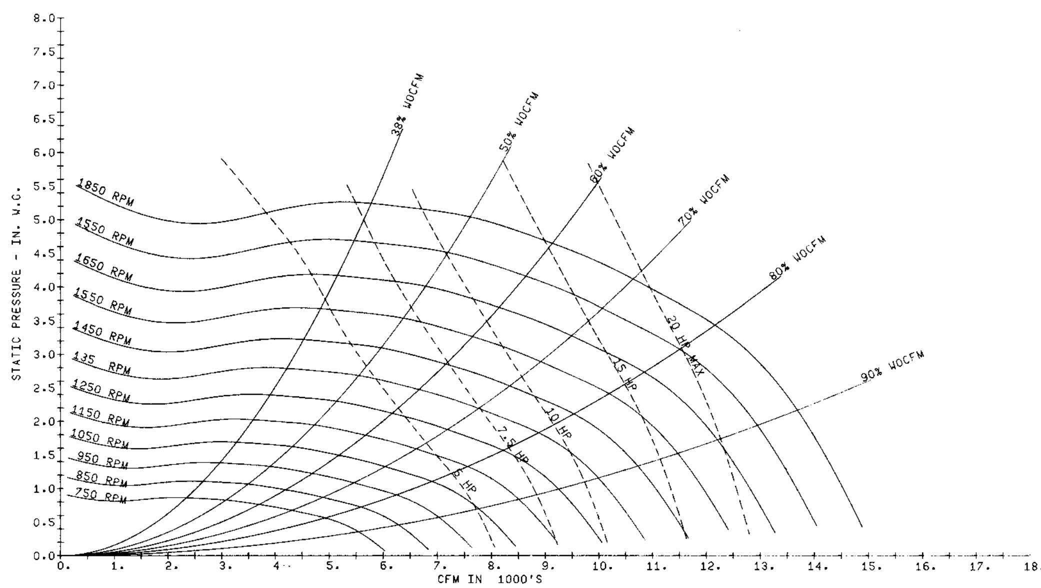
Air-Cooled Unit Performance

20-ton Air-Cooled

Table 15. SCRG/SIRG 20 gross cooling capacity, - 8,000 CFM

	Ambient	75		85		95		105		115	
EDB	EWB	total MBH	sensible MBH	total MBH	sensible MBH	total MBH	sensible MBH	total MBH	sensible MBH	total MBH	sensible MBH
70	62	295.2	182.5	284.0	177.3	271.1	171.4	256.5	164.8	240.7	157.8
	67	324.1	141.0	311.4	135.9	296.8	129.7	280.5	123.0	263.0	116.0
75	62	295.7	223.2	284.6	217.8	271.8	211.5	257.3	204.5	241.7	197.0
	67	324.5	182.2	312.0	176.9	297.6	170.9	281.4	164.2	264.2	157.2
	72	355.3	140.1	341.1	134.9	324.9	128.7	306.9	122.1	287.7	115.2
80	62	296.8	263.1	285.7	257.6	272.9	251.3	258.4	244.2	242.8	236.6
	67	324.7	223.2	312.3	217.7	298.0	211.3	282.0	204.2	265.0	196.7
	72	355.6	181.0	341.5	175.6	325.4	169.5	307.6	162.9	288.7	155.9
85	62	301.8	301.8	292.7	292.7	282.1	282.1	269.9	269.9	256.7	256.6
	67	326.0	262.7	313.6	257.0	299.3	250.6	283.3	243.5	266.2	235.9
	72	356.4	221.8	342.3	216.4	326.3	210.2	308.6	203.5	289.8	196.5

Figure 19. Fan performance for CV or with VFD



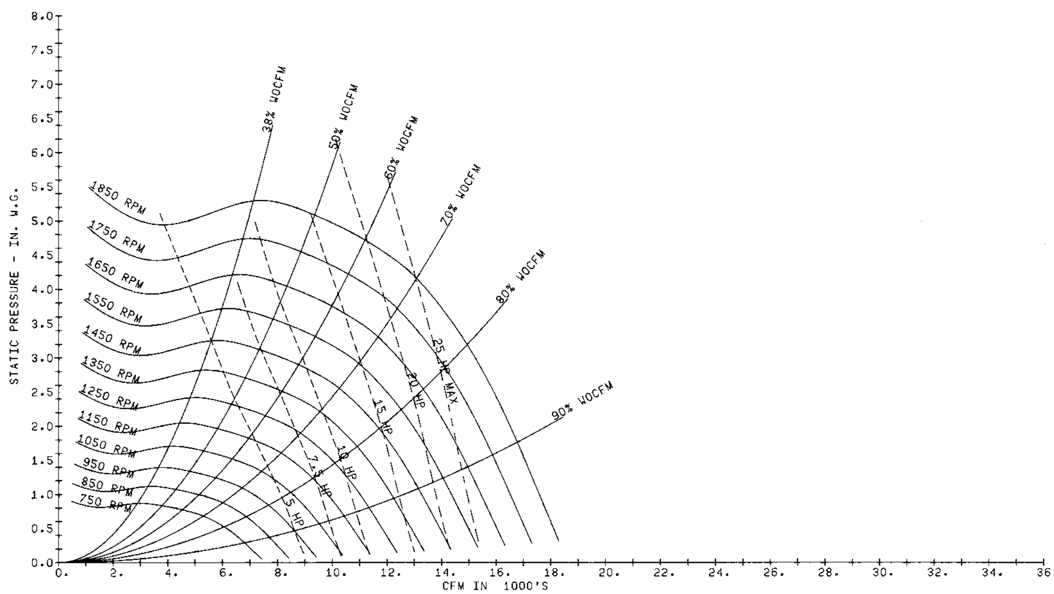
Note: Fan curves include refrigerant coil and internal cabinet static losses. To determine unit's total static pressure add filter, economizer, flexible horizontal discharge, and heat pressure drops to external duct static pressure.

25-ton Air-Cooled

Table 16. SCRG/SIRG 25 gross cooling capacity, - 10,000 CFM

	Ambient	75		85		95		105		115	
EDB	EWB	total MBH	sensible MBH	total MBH	sensible MBH	total MBH	sensible MBH	total MBH	sensible MBH	total MBH	sensible MBH
70	62	352.4	222.1	338.2	215.7	321.9	208.1	304.3	199.5	285.0	190.6
	67	386.7	169.1	370.7	162.7	352.5	155.5	332.4	147.4	311.0	139.0
75	62	354.2	272.1	340.3	265.2	324.3	257.4	306.5	248.8	287.5	239.6
	67	386.6	220.9	370.6	214.2	352.4	206.8	332.3	198.6	310.9	190.2
	72	422.5	167.4	404.6	160.9	384.3	153.7	362.2	145.6	339.0	137.5
80	62	355.6	322.1	341.6	315.2	325.6	307.3	307.8	298.6	288.8	285.4
	67	387.6	271.2	371.9	264.2	354.2	256.3	334.6	247.6	313.9	238.4
	72	422.4	218.8	404.5	212.1	384.3	204.6	362.1	196.5	339.0	188.1
85	62	365.3	365.3	353.6	353.6	339.9	339.9	324.6	324.6	308.0	308.0
	67	389.1	320.7	373.5	313.6	355.7	305.6	336.1	296.8	315.4	287.6
	72	422.3	269.6	405.0	262.4	385.0	254.5	363.8	245.5	341.4	236.5

Figure 20. Fan performance for CV or with VFD



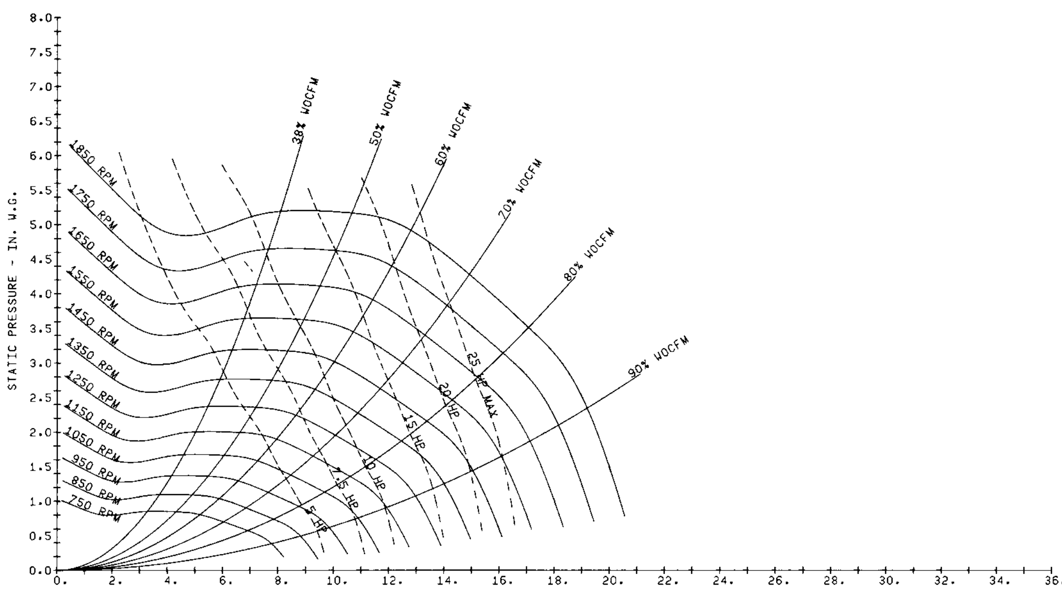
Note: Fan curves include refrigerant coil and internal cabinet static losses. To determine unit's total static pressure add filter, economizer, flexible horizontal discharge, and heat pressure drops to external duct static pressure.

32-ton Air-Cooled

Table 17. SCRG/SIRG 32 gross cooling capacity, - 12,800 CFM

	Ambient	75		85		95		105		115	
EDB	EWB	total MBH	sensible MBH	total MBH	sensible MBH	total MBH	sensible MBH	total MBH	sensible MBH	total MBH	sensible MBH
70	62	423.1	270.4	407.2	262.8	388.6	254.2	368.2	244.3	345.8	233.6
	67	464.0	204.4	445.9	197.0	425.2	188.7	402.0	179.4	376.9	169.6
75	62	425.5	332.1	409.6	324.4	391.3	315.5	370.7	305.6	348.4	294.8
	67	463.8	268.4	445.8	261.0	425.1	252.5	401.9	243.2	376.8	233.3
	72	506.5	202.2	486.4	194.7	463.4	186.3	437.9	177.1	410.6	167.4
80	62	427.1	394.3	411.2	386.5	392.9	377.5	372.3	367.5	349.9	349.9
	67	465.2	330.8	447.5	323.0	427.2	314.0	404.6	304.0	380.2	293.3
	72	506.4	265.6	486.2	258.1	463.3	249.6	437.8	240.4	410.5	230.6
85	62	442.3	442.3	428.8	428.8	413.0	413.0	395.1	395.1	375.4	375.4
	67	467.0	392.4	449.3	384.4	429.0	375.3	406.4	365.2	382.0	354.4
	72	506.6	328.6	487.1	320.4	464.6	311.4	439.7	301.4	410.4	293.5

Figure 21. 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 18. Steam heating capacity

		2 psi		5 psi		10 psi	
unit size	airflow cfm	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 19. Electric heating capacity

Unit Size SCWG	Unit Size SCRG	Heat kW	Air Flow CFM	Capacity MBH	LAT
20	20	16	8000	54.64	66.32
25	25	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 DDC controls with human interface (HI) panel make self-contained units more flexible and easier to operate.

Controls are Trane-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. You 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, IntelliPak units can operate as:

1. stand-alone
2. interface with Trane's Tracer™ building management system
3. interface with a generic (non-Trane) building management system.

Available input and outputs are listed below by module.

RTM Module (on all units)

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 Option (ECEM)

Analog inputs

- Return air temperature
- Return air humidity Ventilation Override Module Option (VOM)

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 output

- V.O. relay

LonTalk™ Building Automation System

The LonTalk Communication Interface for IntelliPak self-contained (LCI-I) controller expands communications from the unit UCM network to a Trane Tracer Summit or a 3rd 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 nonpolarity sensitive, free topology wiring, which allows the system installer to utilize star, bus, and loop architectures. This controller works in standalone mode, peer-to-peer with one or more other units, or when connected to a Trane Tracer Summit or a 3rd party building automation system that supports LonTalk.

BACnet™ Building Automation System

The BACnet Communication Interface for IntelliPak 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. The BCI-I utilizes the BACnet defined MS/TP protocol as defined in ASHRAE standard135-2004. This controller works in standalone mode, with Tracer SC or when connected to a 3rdparty building automation system that supports BACnet

Standard Control Features on IntelliPak™ Units

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 (English, Spanish, or French) display that shows all of the self-contained unit's control parameters, such as system on/off; demand limiting type; night setback setpoints; and many other setpoints. All setpoint adjustments are done through the human interface key-pad. Also, the human interface panel allows you to monitor unit diagnostic points, such as sensor failures; supply airflow loss; and inoperative refrigerant circuit. Diagnostics are held in memory, even during power loss. This allows the operator/servicer to diagnose the failure root cause.

IntelliPak unit features include:

- Unit mounted human interface panel with a two line x 40 character clear language display and a 16-function keypad that includes CUSTOM, DIAGNOSTICS, and SERVICE TEST MODE menu keys on IntelliPak® units
- Compressor lead/lag
- FROSTAT™ coil frost protection on all units
- Daytime warmup (occupied mode) and morning warmup operation
- 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)

Figure 22. HI panel is available as unit or remote mounted.

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

The main menus of the human interface panels are:

- STATUS is used to monitor all temperatures, pressures, humidities, setpoints, input and output status.
- CUSTOM allows the user to customize a status report, which can consist of up to four screens of 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.

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 is then 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 a more 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. This method of warmup is used to overcome the “building sink” effect. 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 VAV heating/cooling self-contained unit, airflow must be maintained through the self-contained unit. This can be accomplished by electrically tying the VAV boxes to the unoccupied output relay contacts on the unit’s RTM module 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, the following sequence can be used:

- 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".

This override sequence can be used if a positively pressured 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-installed) - off
- Exhaust damper (field-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, i.e. 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 – deenergized
- VO relay – energized
- Exhaust fan (field-installed) - on
- Exhaust damper (field-installed) - open

Purge sequence "D".

This sequence could be used 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-installed) - on
- Exhaust damper (field-installed) - open

Purge with duct pressure control "E".

This sequence can be used 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-installed) - on
- Exhaust damper (field-installed) - open

Note: *Each system (cooling, exhaust, 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)

The generic building automation system module (GBAS) provides broad control capabilities for building automation systems other than Trane's Tracer system. 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.Four analog inputs that can be configured to be any of the following:

1. Occupied zone cooling
2. Unoccupied zone cooling
3. Occupied zone heating
4. Unoccupied zone heating
5. SA cooling setpoint
6. SA heating setpoint
7. Space static pressure setpoint
8. SA static pressure setpoint

Each of the five (5) 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 reduces 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 status:

1. Programmable night setback sensor
2. Field-supplied contact closure hardwired binary input to the RTM. This input accepts a field supplied switch or contacts closure such as a time clock.
3. Tracer Summit
4. Factory-mounted time clock

Timed Override Activation - ICS

This function is operational whenever the unit's RTM module is used as the zone temperature sensor source. This 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 Summit.

Timed Override Activation - Non-ICS

This function is active whenever the unit's RTM module is selected as the zone temperature source. This 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. 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

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. The reference enthalpy is set through the human interface panel.*

Compressor Lead/Lag

Compressor lead/lag is a user-selectable feature through the human interface panel and is 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 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

- Variable water flow with intermediate piping only

Constant water flow is for condenser pumping systems that are not capable of unloading the water-pumping system. Variable water flow maximizes energy saving by unloading the water pumping system.

With 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 sensors located at each condenser.

Head Pressure Control 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.

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

The opening VAV boxes are coordinated during unit start up and transition to/from occupied/unoccupied modes to prevent over pressurization of the supply air ductwork. 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 shuts down. The unit is then allowed to restart up to three times. If the over pressurization condition occurs on the third restart, the unit shuts down and a manual reset diagnostic displays at the human interface panel.

IntelliPak™ Units - Zone Temp Control (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 a minimum of 4°F plus the economizer's approach temperature. The approach temperature default is 4°F and is adjustable from 0-9°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 approach temperature defaults to 4°F and is adjustable from 0 to 9°F. 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 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 is only allowed to 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 Summit 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 is used 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 single stage electric heat. 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.

IntelliPak™ Units - Supply Air Temp Control (Sequence Of Operation)

1

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 unit's entering water temperature is below the units entering mixed air temperature by a minimum of 4°F plus the economizer's approach temperature. The approach temperature defaults to 4°F and is adjustable from 0-9°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 approach temperature default is 4°F and is adjustable from 0-9°F. 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 is used to 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 attempt 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 starts 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 the 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 Summit 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 initiates by closing a field-supplied switch or contacts connected to a changeover input on the unit's RTM module.

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, and reduce compressor kW. However, 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

Zone Temperature Control

Unoccupied Zone Heating and Cooling

During unoccupied mode, the unit operates as a CV unit 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 are 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

Standard on all units: BAYSENS077

Figure 23. Standard with all units Zone temperature sensor, Accessory Model Number Digit 6 = A, BAYSENS077

This wall-mounted zone sensor ships with all IntelliPak® Modular Series units. Additional sensors are available for order using the accessory model number. The zone sensor 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.

CV/VAV: BAYSENS119

Figure 24. Programmable zone sensor, Accessory Model Number Digit 6 = G, 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.

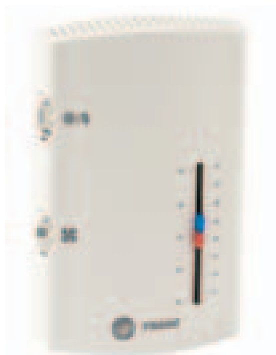
When the BAYSENS119 is programmed for Constant Volume or VAV control, Night Setback is initiated through the scheduled Unoccupied time setting. When the sensor switches to Night Setback, the outdoor dampers close and heating/cooling functions are enabled/disabled based on set up parameters. As building 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.

CV: BAYSENS108

Figure 25. Dual setpoint, manual/automatic changeover sensor, Accessory Model Number Digit 6 = E, 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.

CV: BAYSENS110

Figure 26. Dual setpoint, manual/automatic changeover sensor with system function lights, Accessory Model Number Digit 6 = F, 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.

BAYSENS074

Figure 27. Zone temperature sensor w/timed override buttons and local setpoint adjustment, Accessory Model Number Digit 6 = C, BAYSENS074

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 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.

BAYSENS073

Figure 28. Zone temperature sensor w/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.

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 ±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 20. Number of compressors per unit

SCWG/SIWG SCRG/SIRG	20 20	25	30 25	35 32
10 HP	2	2	1	-
15 HP	-	-	1	2

Table 21. SxWG & SxRG compressor motor data

	200V		460V		575V	
HP	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 22. Fan motor electrical data

HP	TYPE	200V FLA	200V LRA	460V FLA	460V LRA	575V FLA	575V LRA
5	ODP	15.7	107	6.7	48	5.4	40
	TEFC	15	124	6.7	52	5.3	41
7.5	ODP	22.3	199	9.7	84.8	7.8	61.4
	TEFC	23.2	148	9.4	74	7.6	58.5
10	ODP	29.5	260	12.6	118	10.1	72.3
	TEFC	27.4	207	11.9	103	9.6	83.9
15	ODP	43.4	271	18.9	118	15.1	94
	TEFC	42.5	282	18.5	122.9	14.8	99
20	ODP	57.0	373	24.5	160.8	19.6	130
	TEFC	56.4	402	24.5	175	19.6	140
25	ODP	69.0	438	30.4	190	24.3	152

Table 23. VFD electrical data

	VFD L.I.C.					
	Without Bypass			With Bypass		
HP	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 24. Electric heat - single stage

SCWG/SIWG Size	SCRG/SIRG Size	Heat Kw	200V Amps	460V Amps
20	20	16	44.8	19.6
25	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.

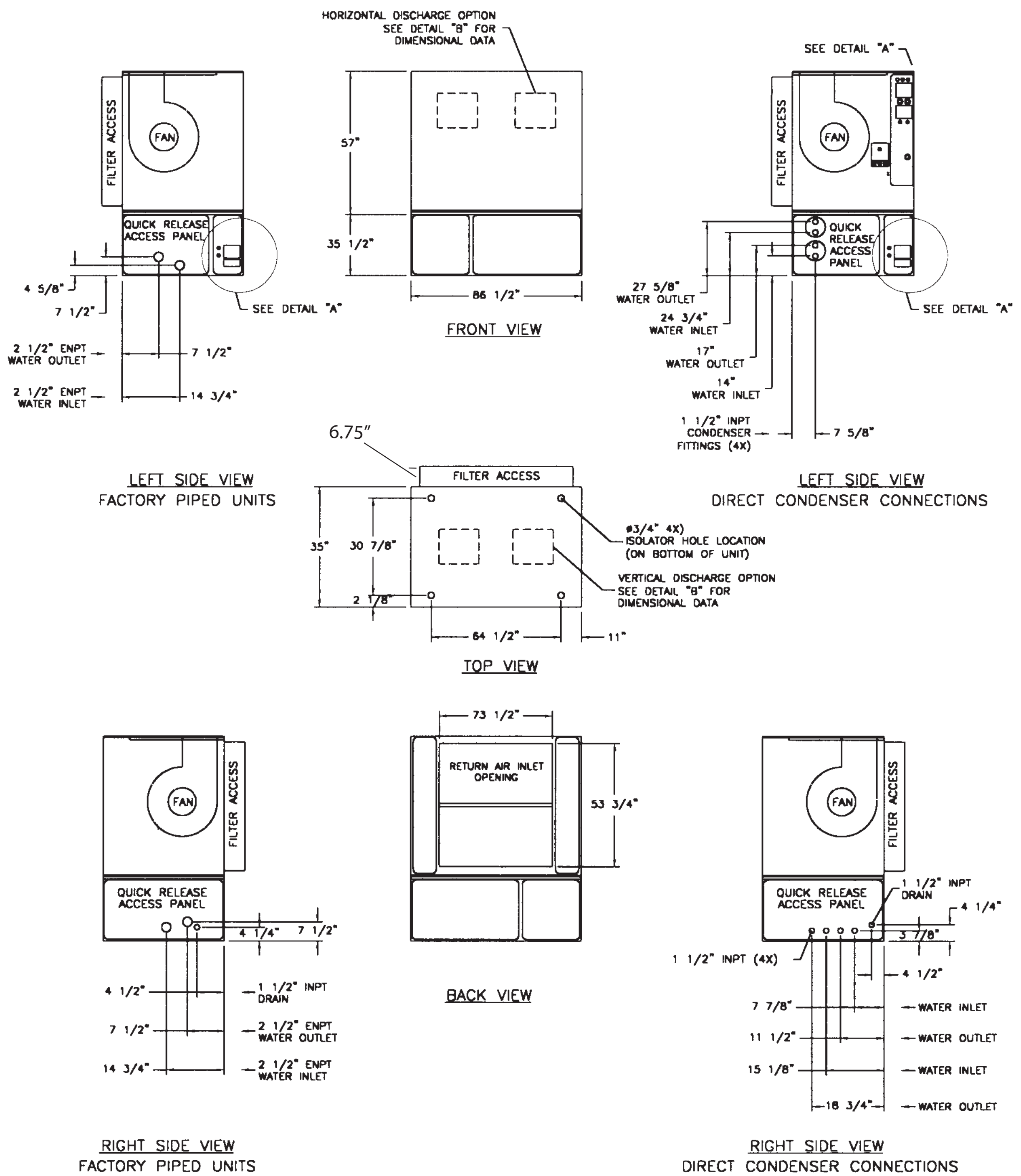
Table 25. CCRC/CIRC condenser electrical data

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 29. SCWG/SIWG dimensions, in.



Note: *Refer to Table 28, p. 61 for SCRG/SIRG weight, lbs.*

Dimensions and Weights

Figure 30. SCRG/SIRG dimensions, in.

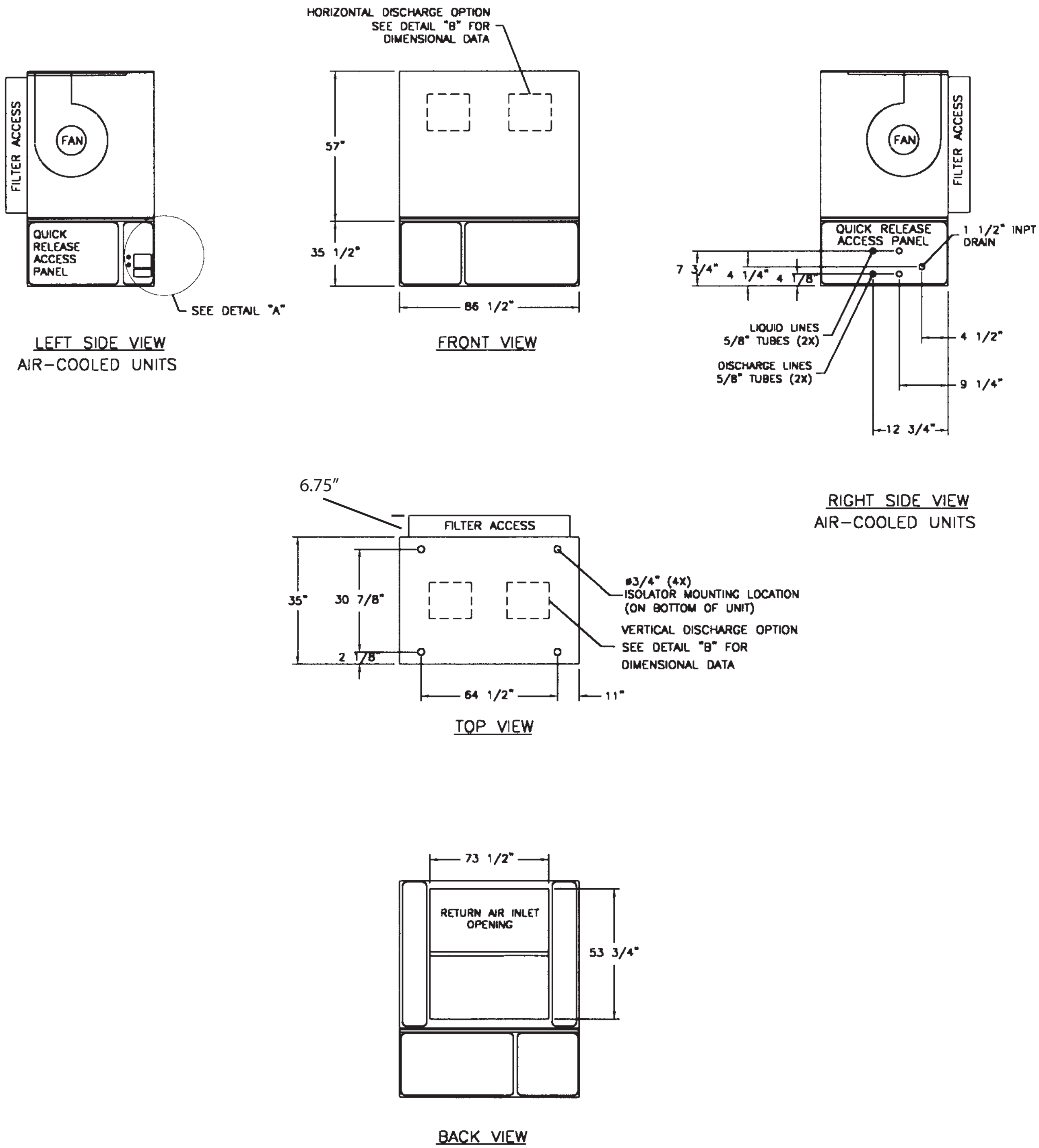


Table 26. Dimensions, in (mm)

Model	A	B	C	D	E	F
SCWG/SCRG 20	20 (508)	10 3/4 (273)	58 1/2 (1486)	5 1/8 (54)	13 1/4 (337)	11 1/2 (292)
SCWG/SCRG 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)

Table 27. SCWG/SIWG weight, lbs.

Unit Tons	Base Weight - lb (kg)
20	2227 (1010)
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 28. SCRG/SIRG weight, lbs (kg)

unit tons	base weight
20	2311 (1048)
25	2380 (1079)
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 31. SCRG/SIRG/SCWG/SIWG detail "A" electrical connections, in.

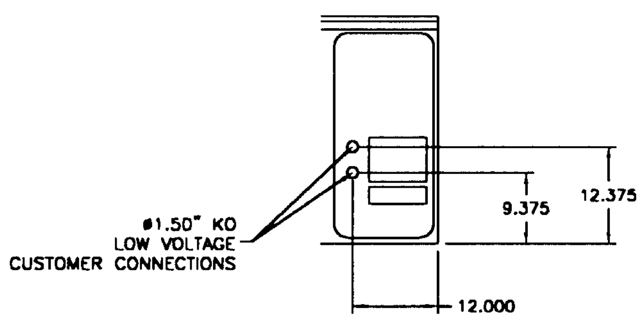
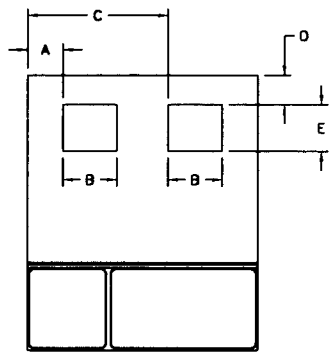


Figure 32. Detail "B" discharge options, in.: front view shown with horizontal discharge option



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 33. Detail "B" discharge options, in.: top view shown with vertical discharge option

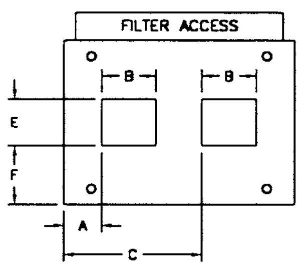


Table 29. Detail dimensions, in (mm)

model	A	B	C	D	E	F
SCWG/SCRG 20	20 (508)	10 3/4 (273)	58 1/2 (1486)	5 1/8 (130)	13 1/4 (337)	11 1/2 (292)
SCWG/SCRG 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 34. CCRC/CIRC - Air-Cooled Condenser

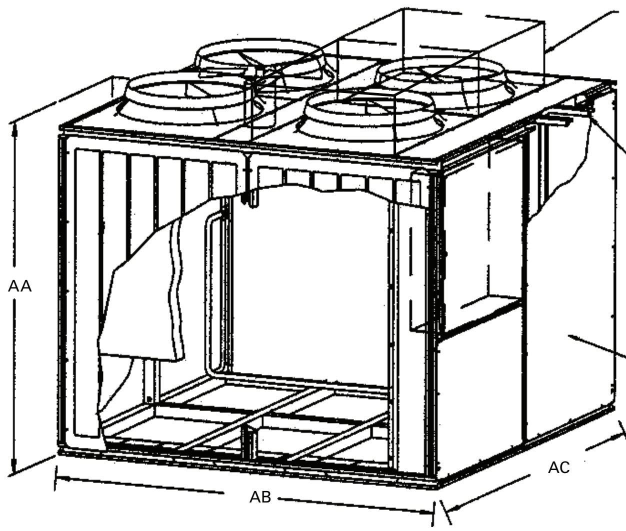


Table 30. CCRC/CIRC air-cooled condenser dimensions & weight, in (mm), lb (kg)

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 35. CCRC side view

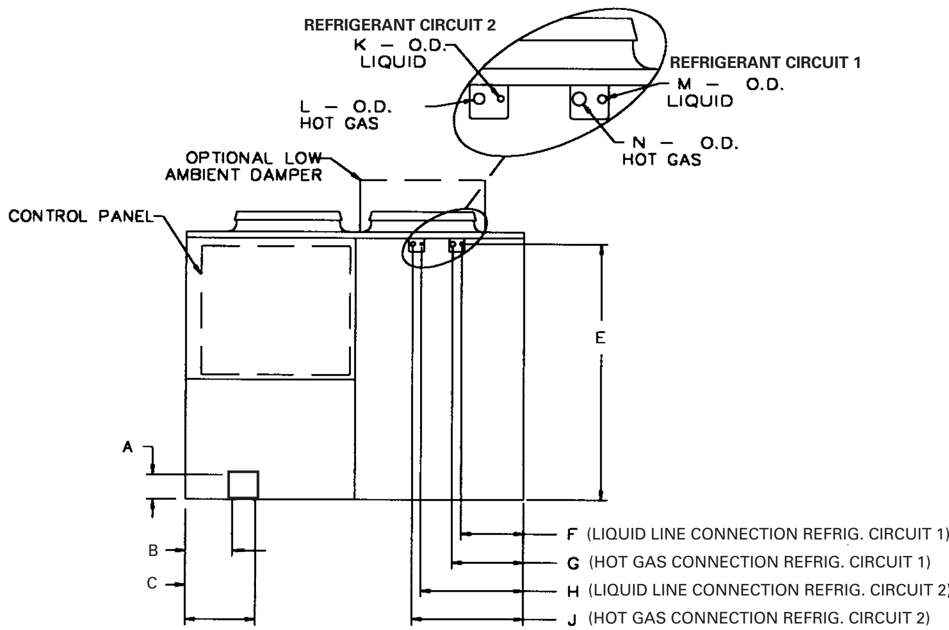


Table 31. CCRC/CIRC electrical connections, in. (mm)

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

Table 32. 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 36. Hot water coil: left-hand connections

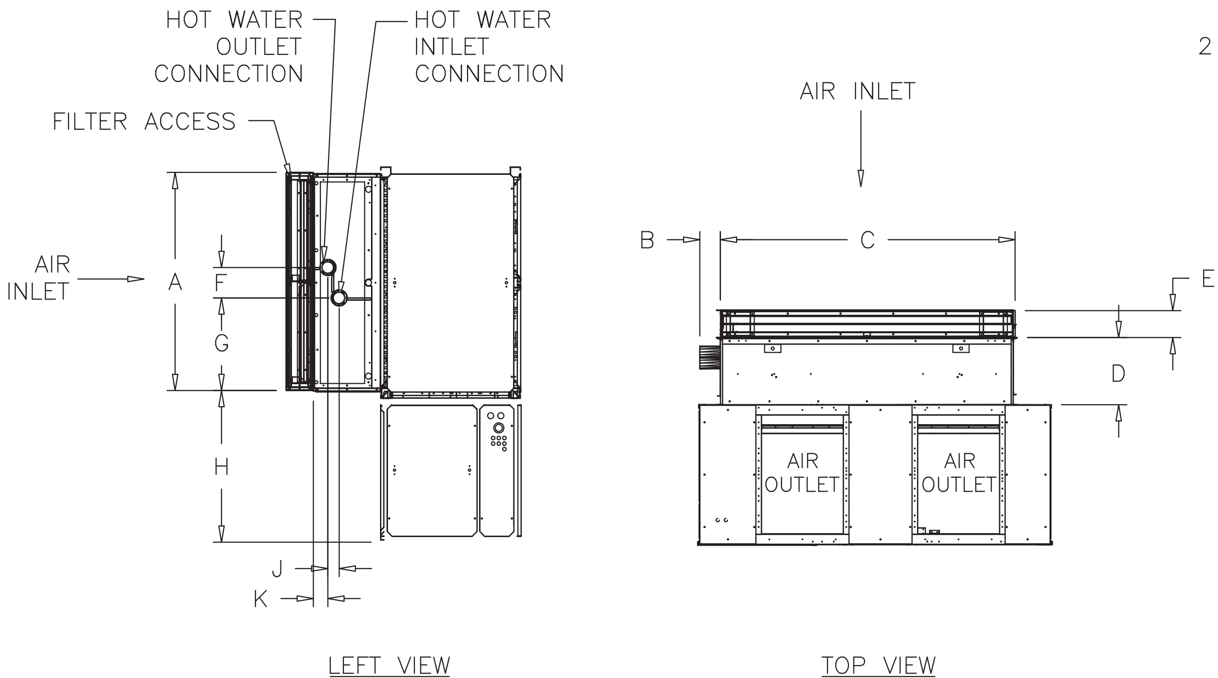


Table 33. Hot water coil dimensions & weight, in-lbs

	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 37. Hot water coil: right-hand connections

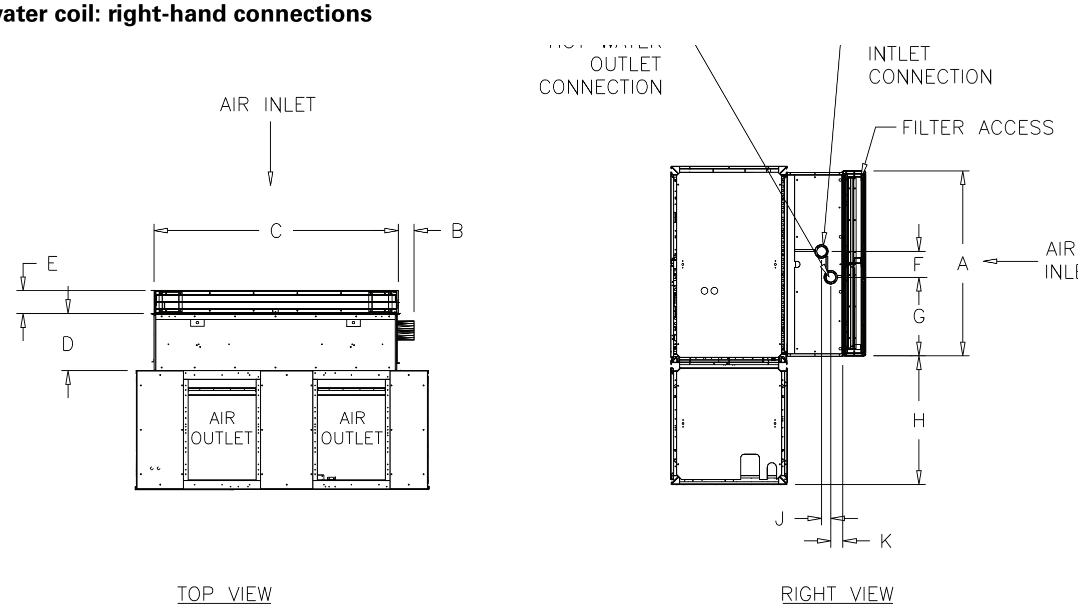


Figure 38. Steam coil: left connections

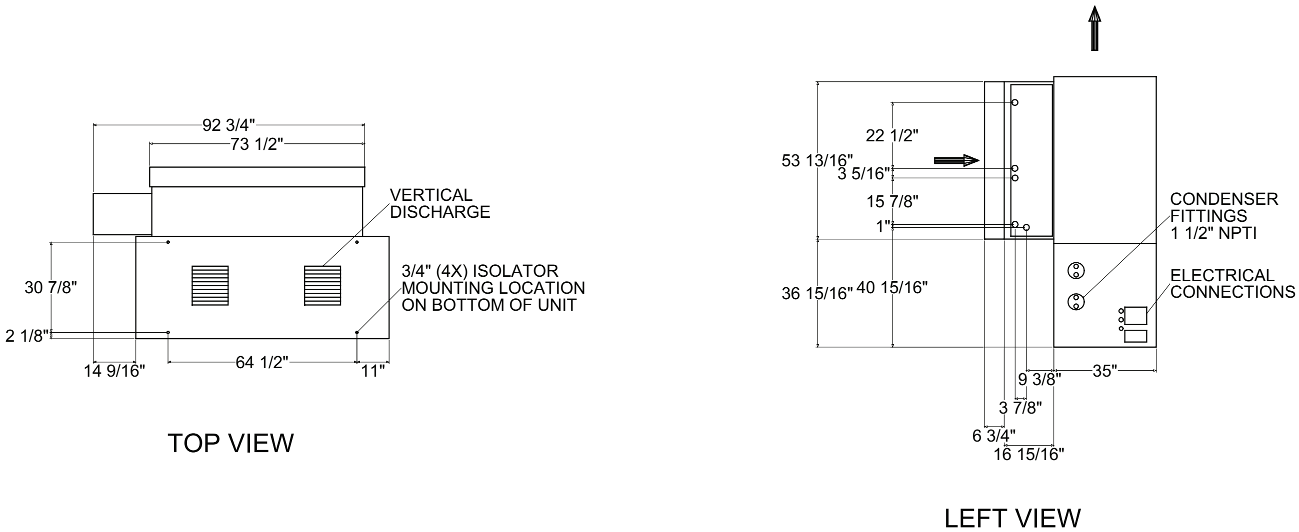


Figure 39. Steam coil: right connections

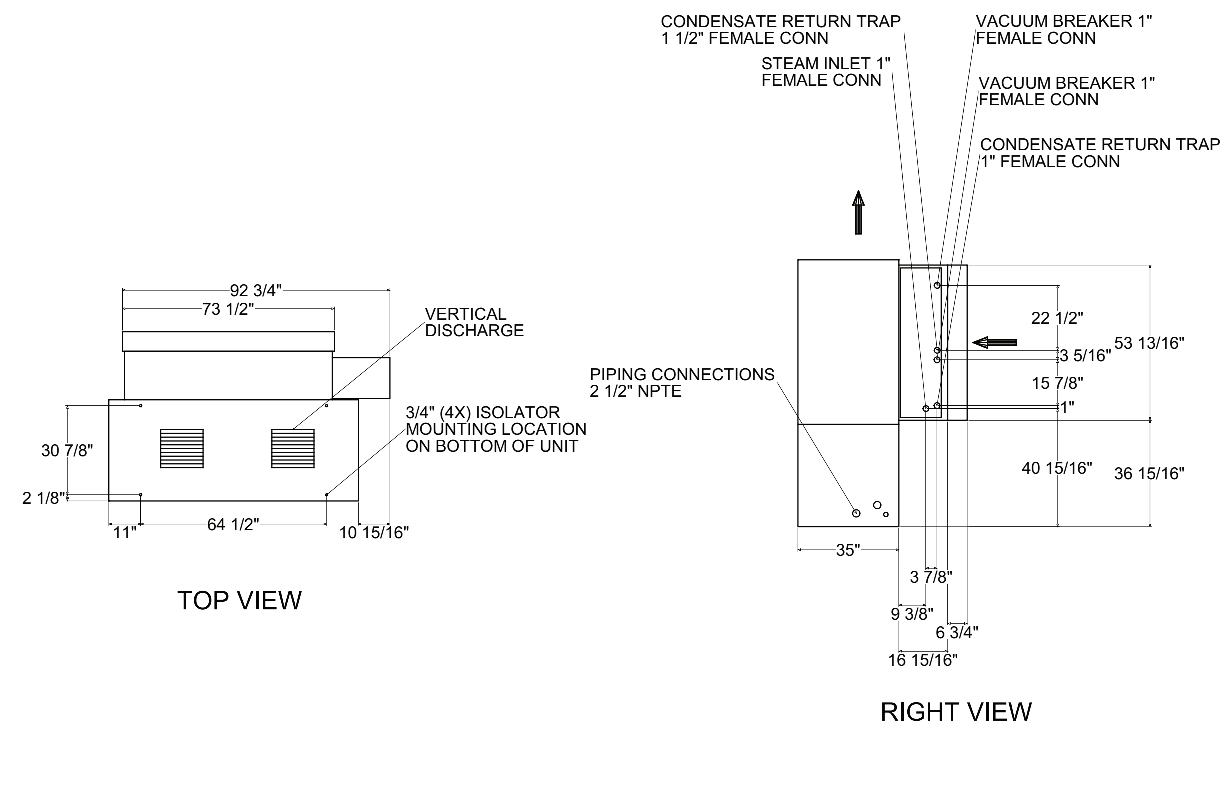


Figure 40. Electric heat coil

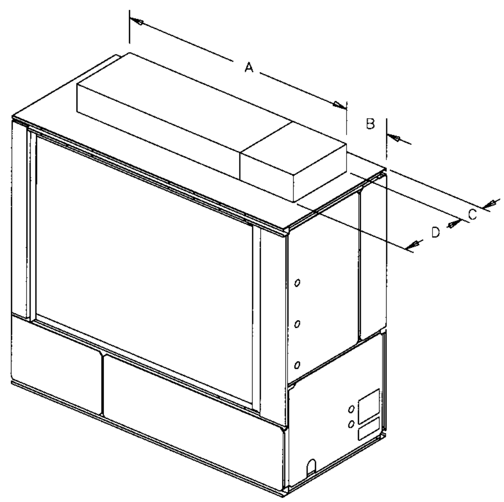


Table 34. Electric heat coil dimensions & weight, in-lbs

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 41. Flexible horizontal discharge plenum

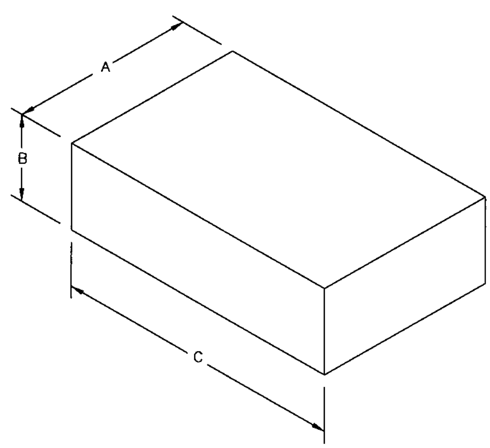


Table 35. Flexible horizontal discharge plenum dimensions & weights, in-lbs.

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 42. Waterside economizer

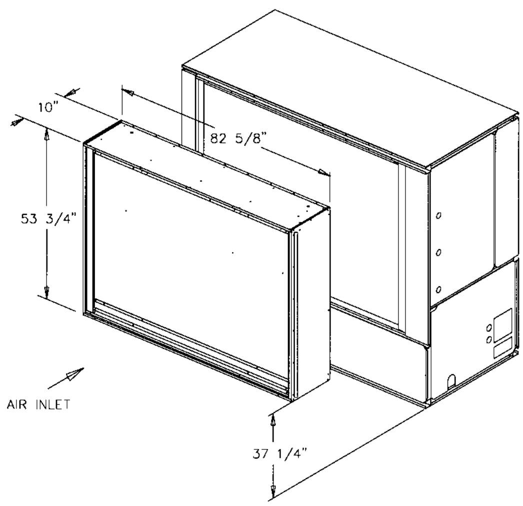


Table 36. Waterside economizer dimensions & weight, in-lbs.

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

Figure 43. Airside economizer

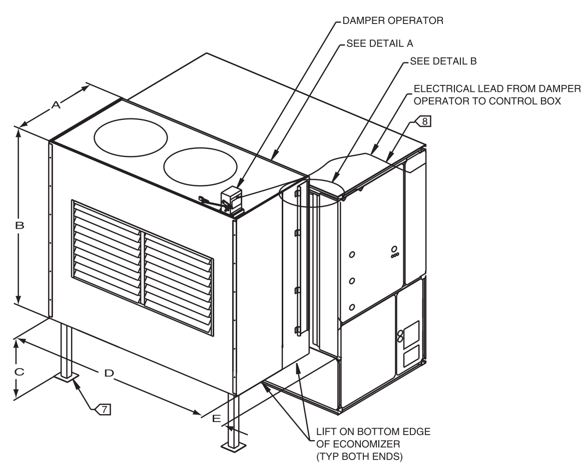


Table 37. Airside economizer dimensions & weight, in-lbs

unit size	A	B	C	D	E	F (1)	F (2)	G (1)	G (2)	H (1)	H (2)	J	K	L	M	weight
SCWG/SIWG 20, 25 SCRG/SIRG 20	36	65 5/8	37	74 1/4	6 1/8	56 1/2	49 3/4	23 1/4	20 1/2	5 5/8	7	20 1/2	17 1/8	12	49 3/4	273
SCWG/SIWG 30, 35 SCRG/SIRG 25, 32	36	65 5/8	37	74 1/4	6 1/8	61 3/8	62 3/4	28 1/8	20 1/2	3 1/4	7	20 1/2	17 1/8	5 1/2	62 3/4	273

Figure 44. Airside economizer: detail A

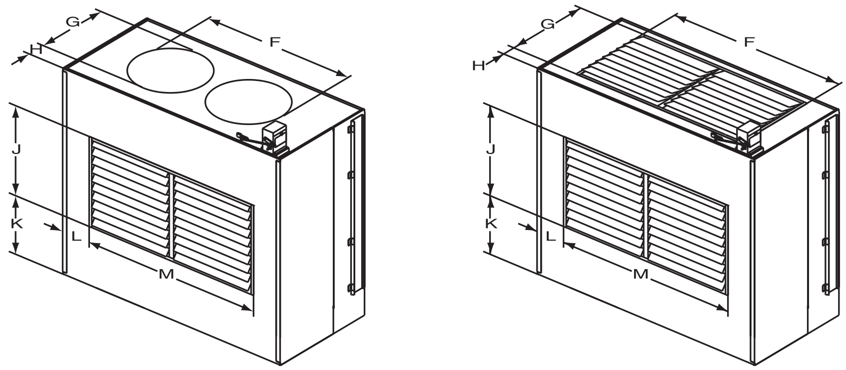
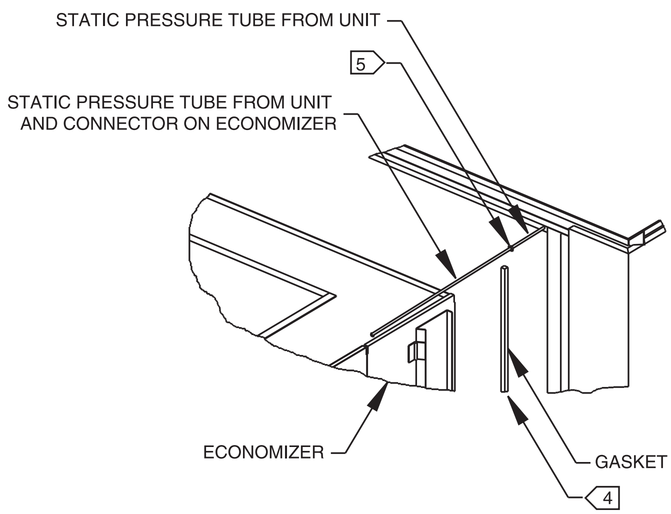


Figure 45. Airside economizer: detail B



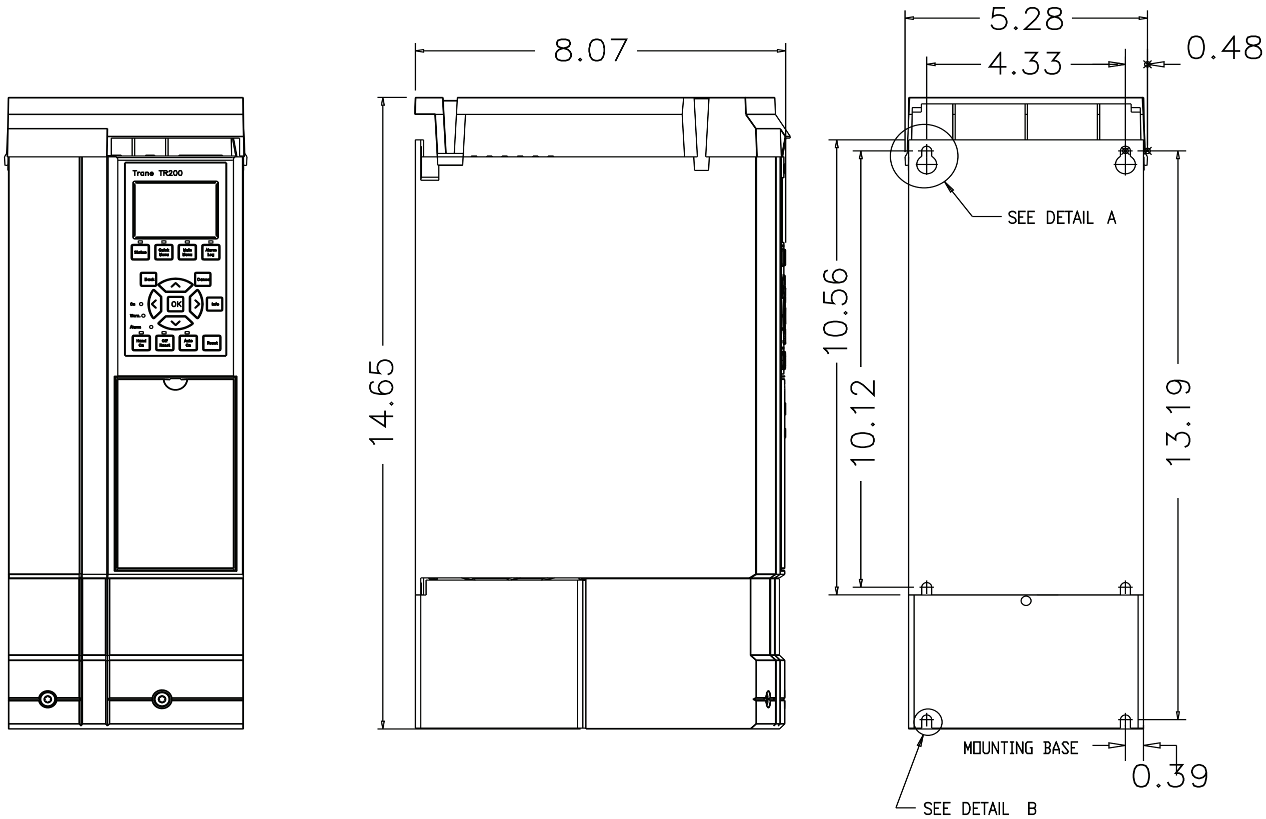
Variable Frequency Drive Without ByPass

Table 38. W/O 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. Table 38, p. 69 refers to Figure 46, p. 70 through Figure 49, p. 73.
2. VFD wall-mounted by others

Figure 46. Frame A3: without bypass



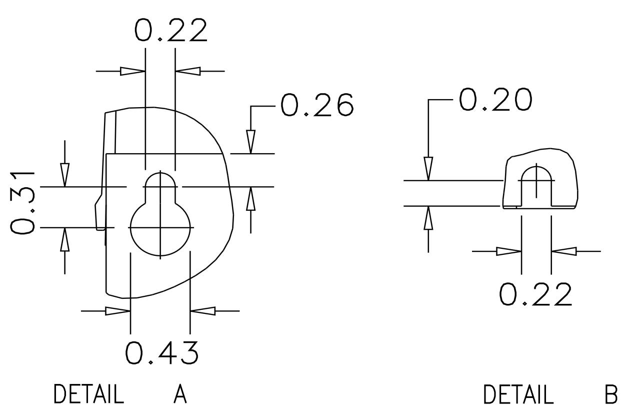


Figure 47. Frame B1: without bypass

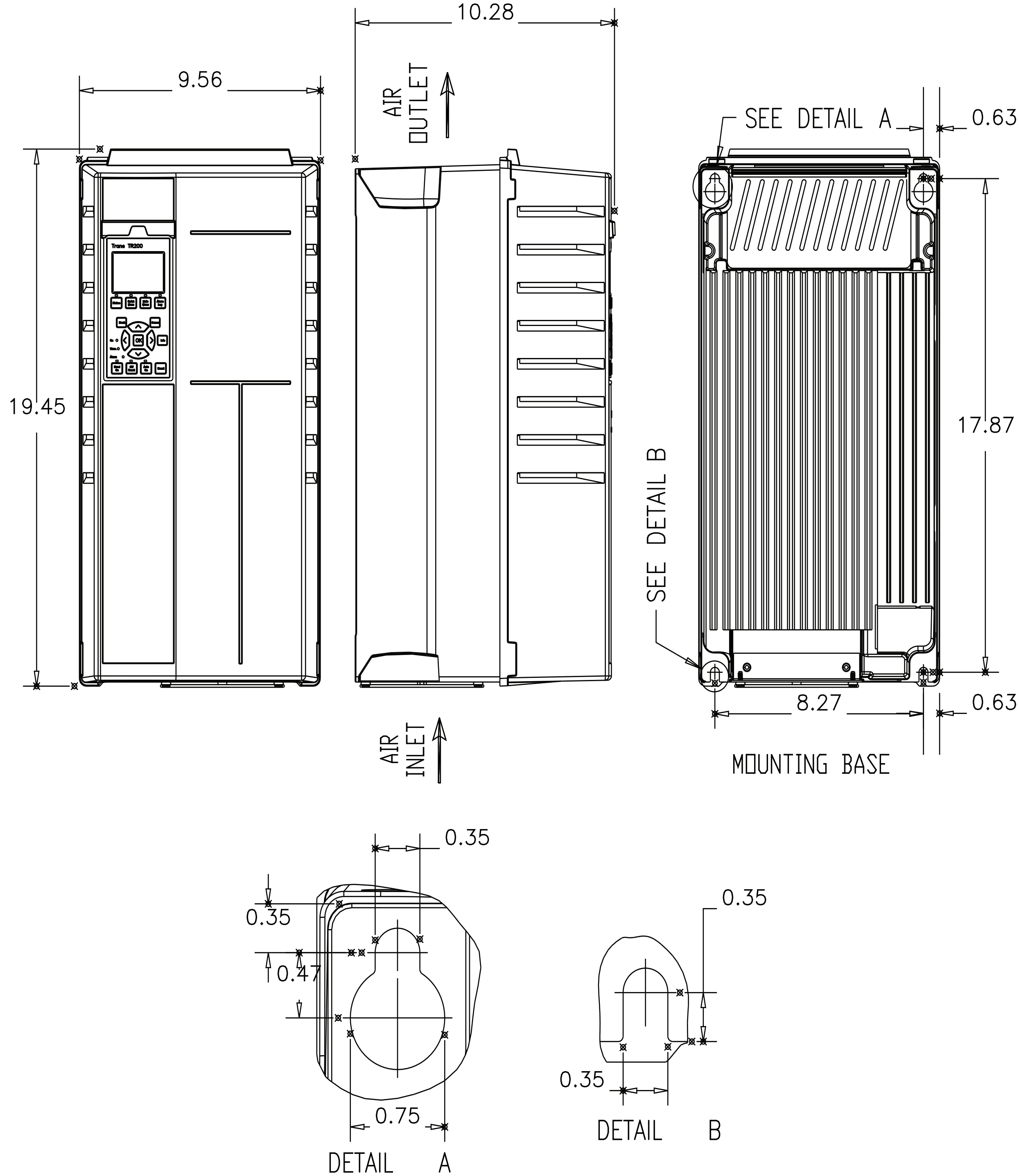


Figure 48. Frame B2: without bypass

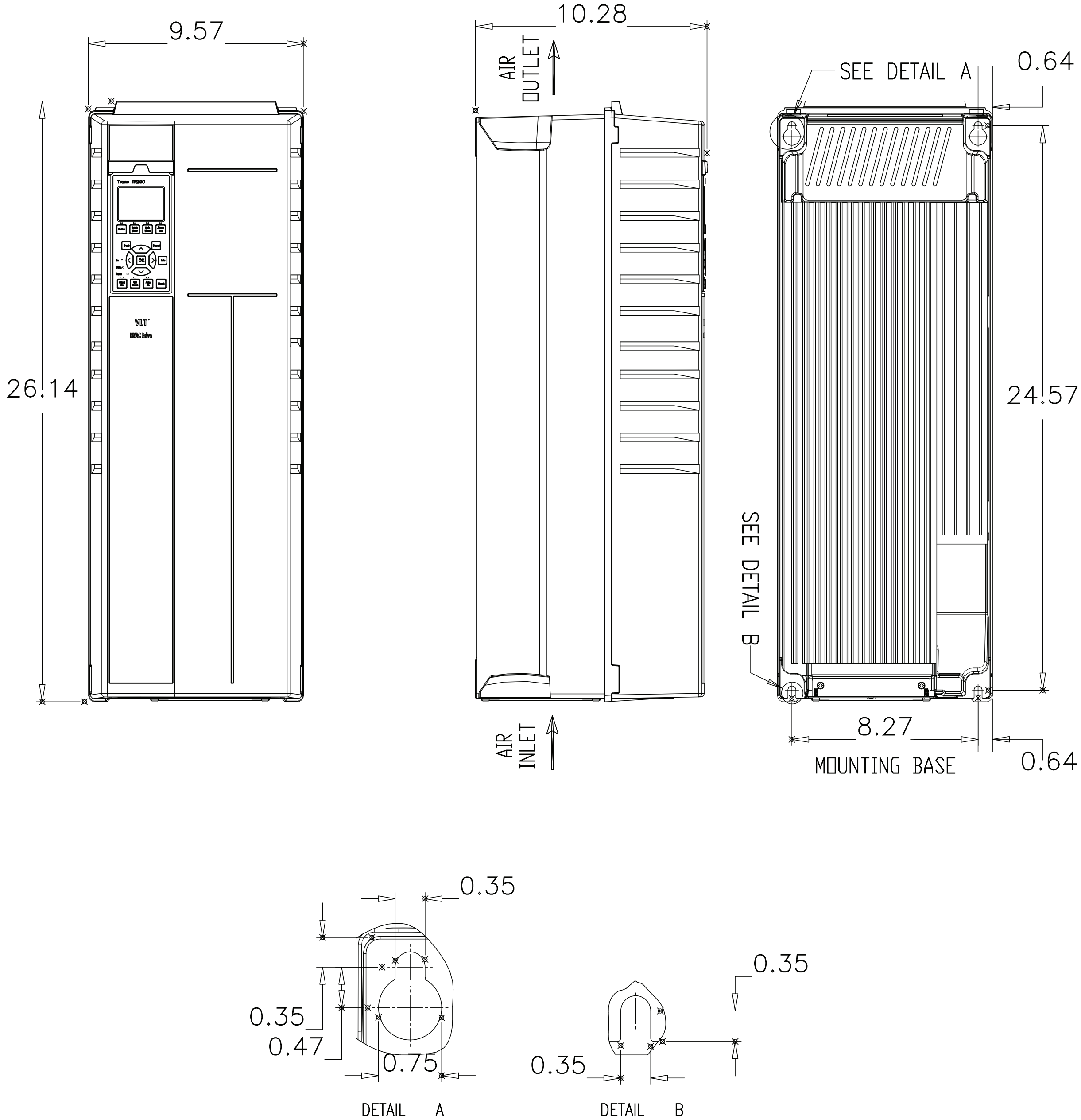
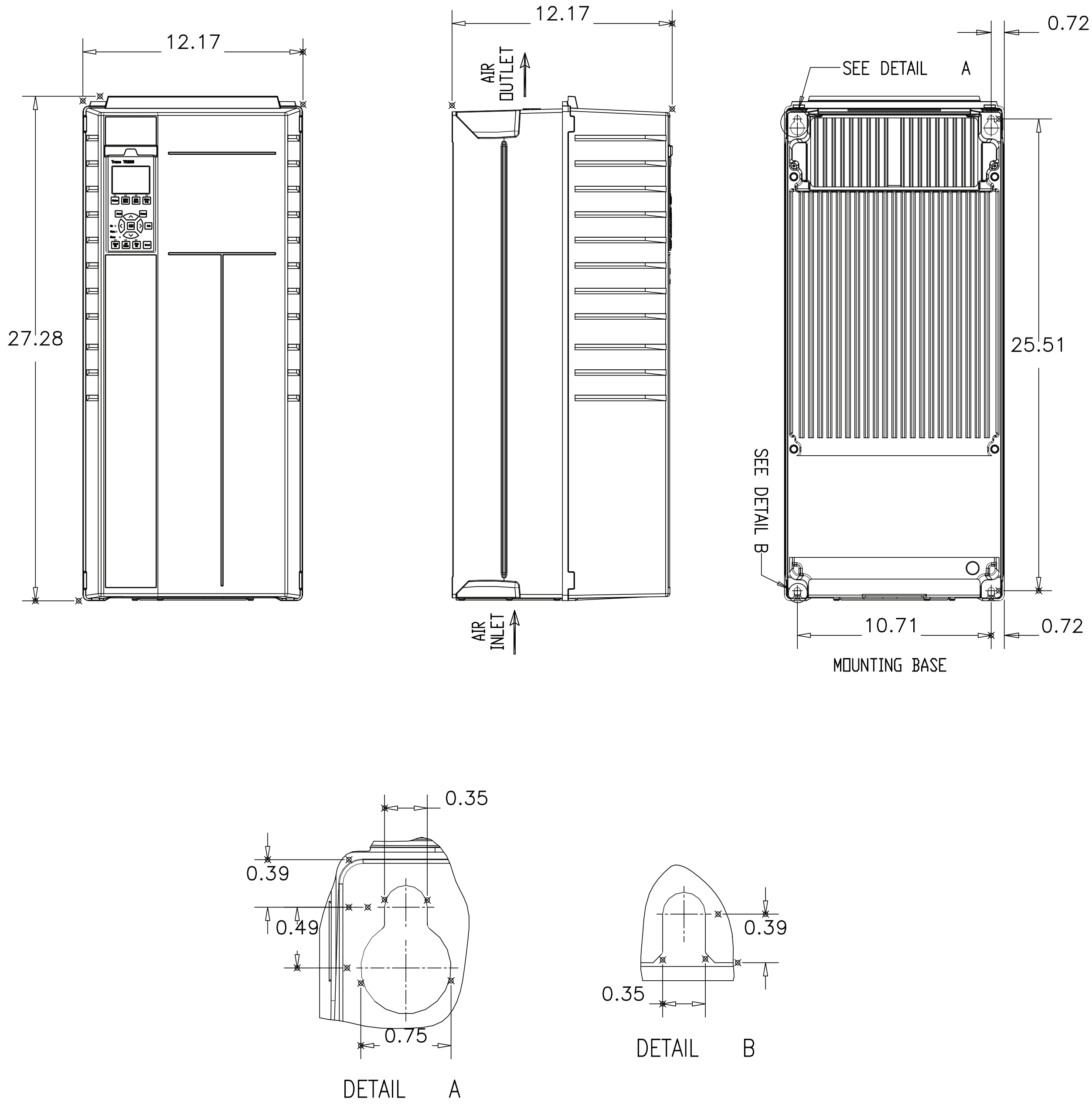


Figure 49. Frame C1: without bypass



Variable Frequency Drive With ByPass

Table 39. 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. Table 39, p. 74 refers to Figure 50, p. 74 through Figure 53, p. 77.
2. VFD wall-mounted by others

Figure 50. Frame A3 with bypass

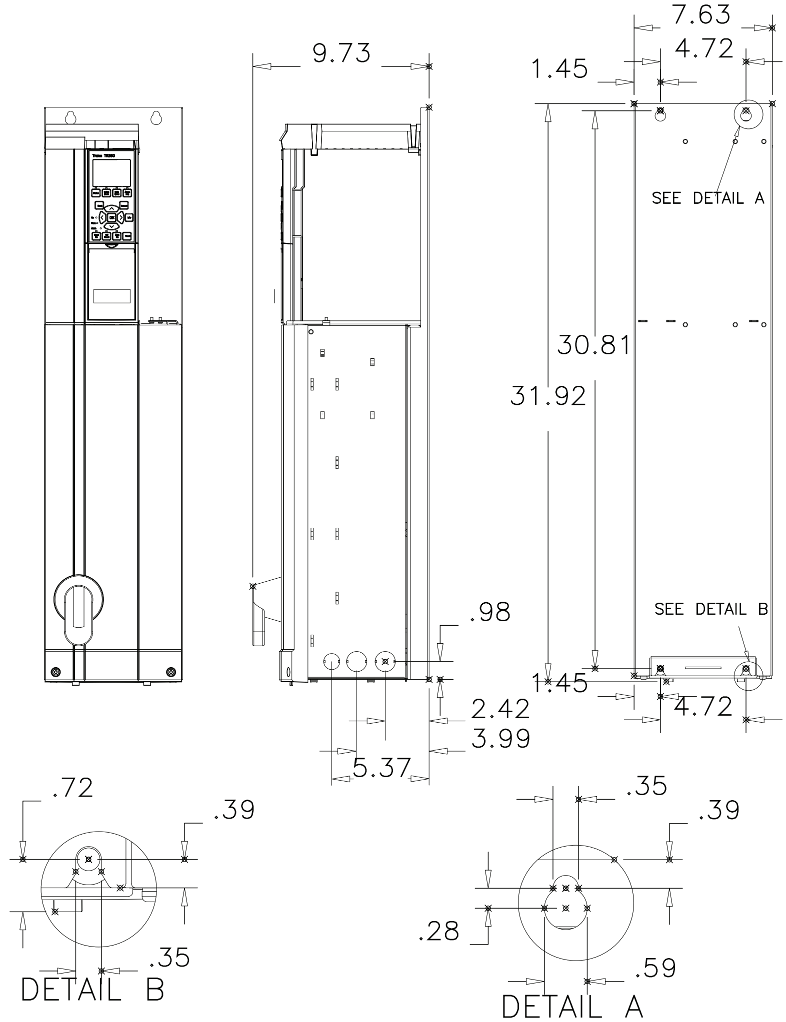


Figure 51. Frame B1 with bypass

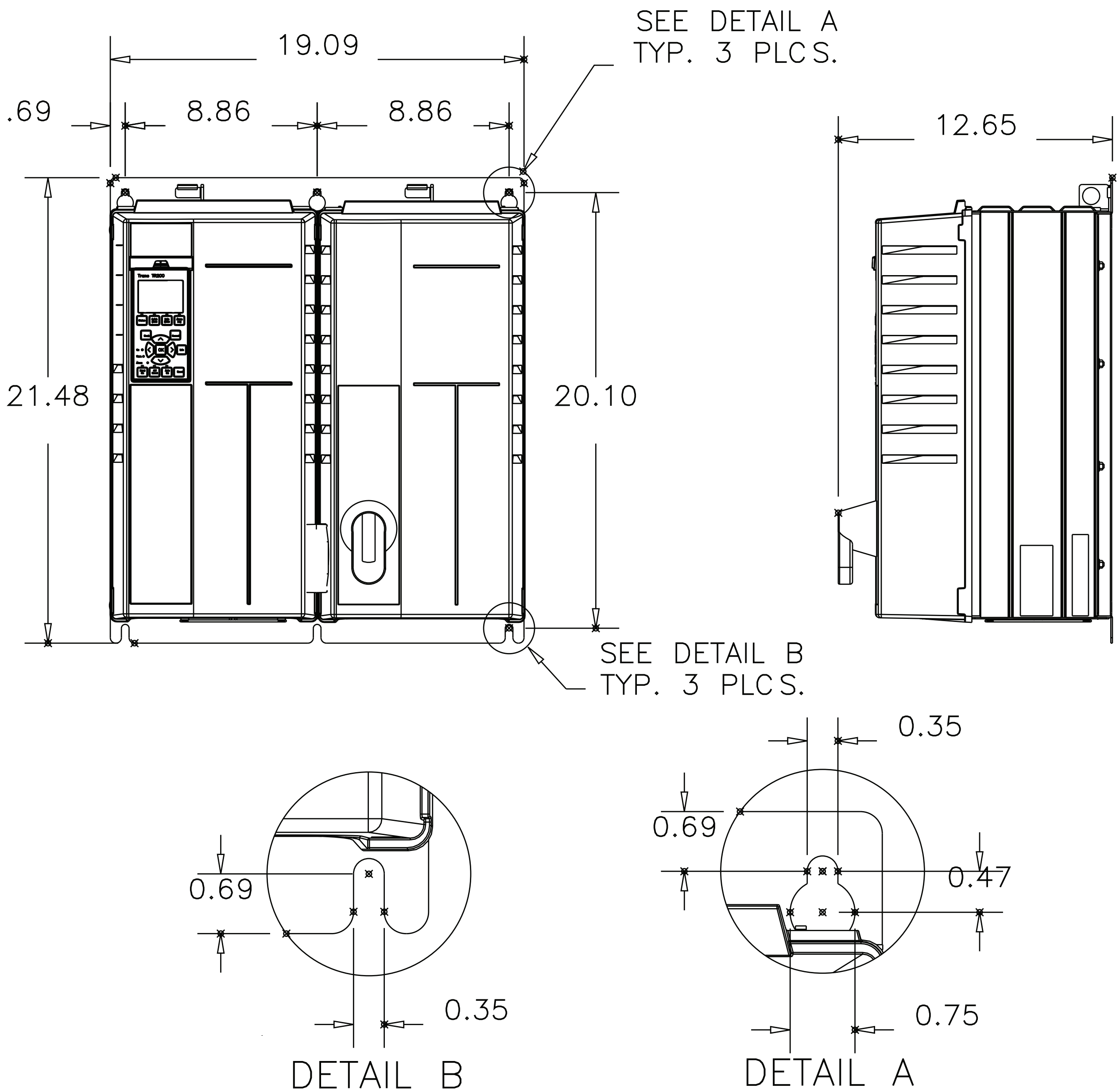


Figure 52. Frame B2 with bypass

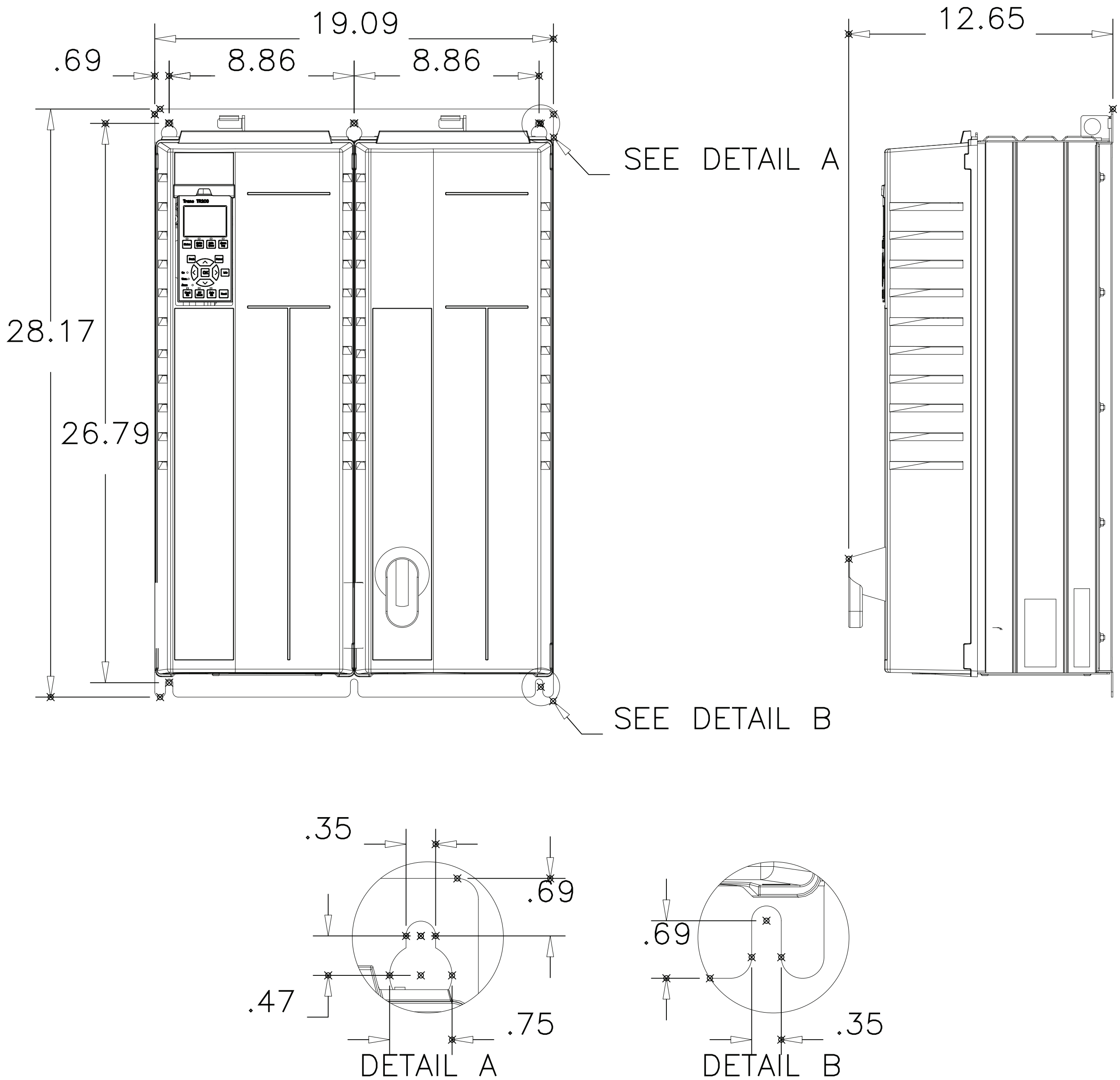
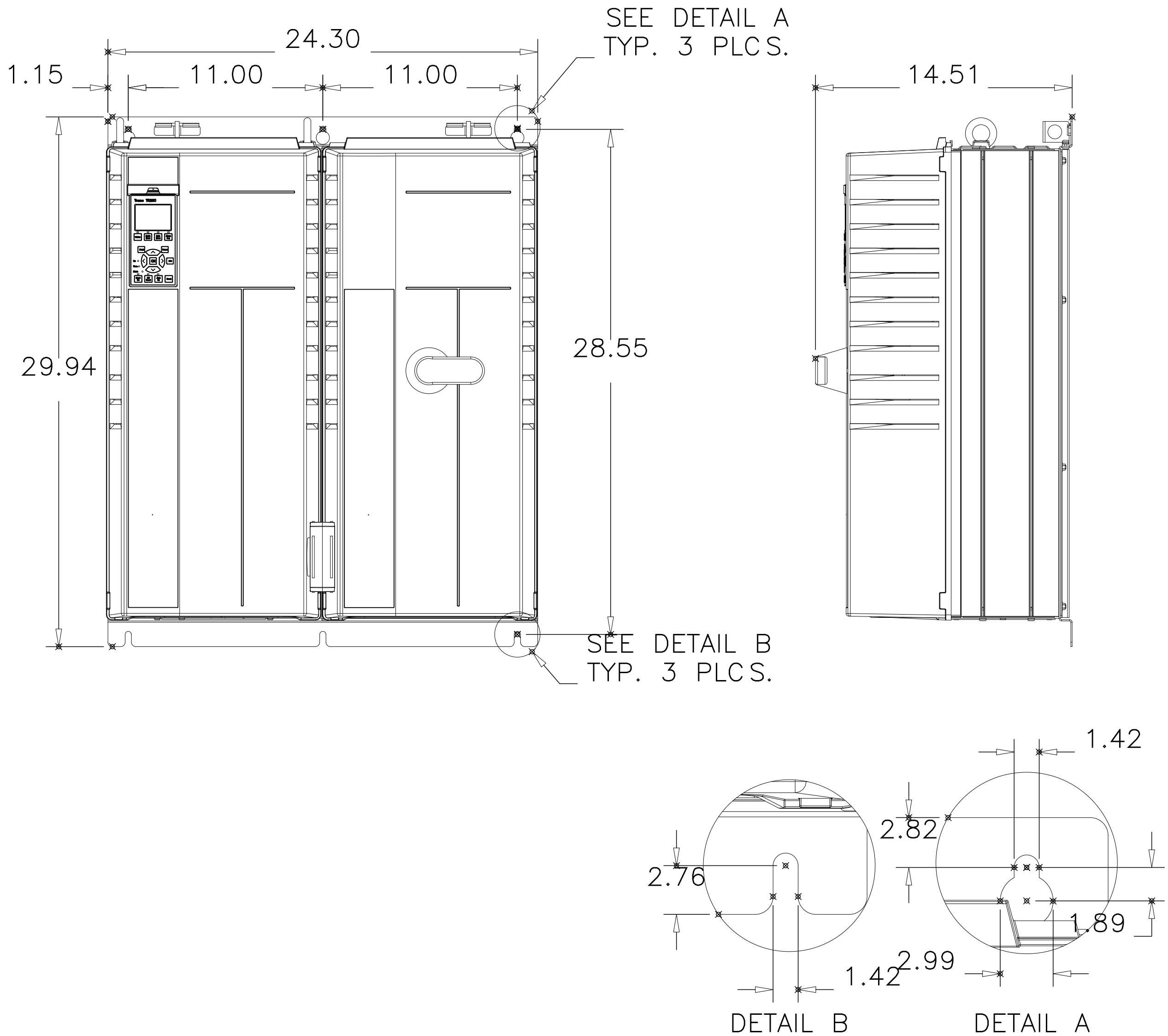


Figure 53. Frame C1 with bypass

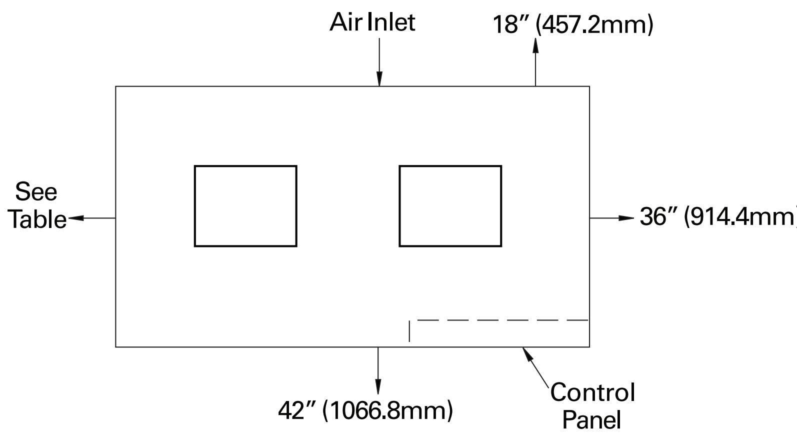


Service Clearances

Table 40. SCWG/SIWG/SCRG/SIRG clearance requirements

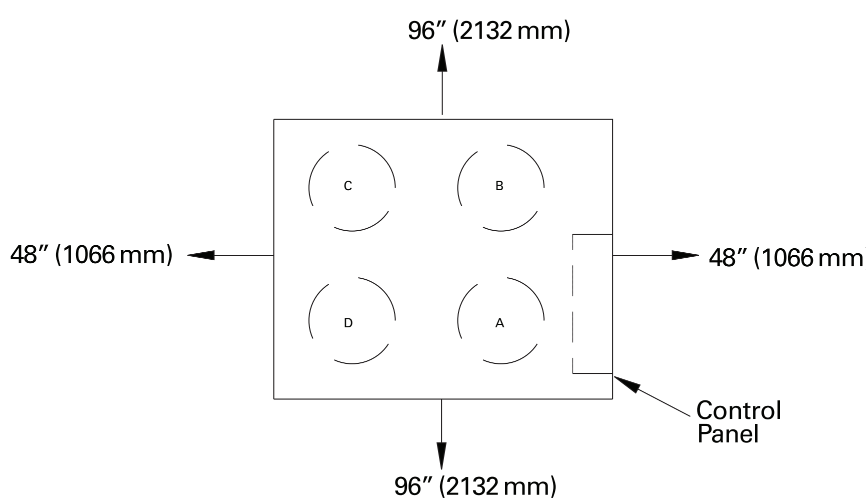
Service / code clearances:		
Side	**Distance**	**Purpose**
Front	42 in. (1066 mm)	NEC code requirement
Left	18 in. (457 mm) 36 in. (914 mm) 77 in. (1956 mm)	Air-cooled units only Refrigeration and waterside Component service Fan shaft removal
Right	36 in. (914 mm)	Provides uniform airflow
Inlet	18 in.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

Figure 54. 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 55. Top view: CCRC/CIRC 20, 29, 32 minimum clearances



Mechanical Specifications

Modular Series Self-Contained

Cabinet

The unit framework shall be formed structural steel members of galvanized steel. Exterior panels shall be fabricated from galvanized steel. The fan and compressor sections shall be insulated with ¾-inch of 1.75 lb./cu. ft. density fiberglass insulation.

The unit shall be provided with removable panels to allow service access to compressors, condensers, fan motor, fan bearings, coils and valves. Removable panels shall be secured with quick-acting fasteners. The refrigerant sight glasses shall be accessible during operation. The control panel door shall have lift-off hinges.

Compressors

Units shall have multiple compressors with independent circuits for water-cooled units and manifolded for air-cooled units. Compressors shall be manufactured by the unit manufacturer. Scroll compressors shall be 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 shall be provided. The compressors shall be mounted on rubber-in-shear isolators for vibration isolation.

Condenser (Water-cooled unit only)

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

Evaporator

The evaporator coil shall be seamless copper tubes expanded into aluminum fins. Tubes shall be ½-inch OD with internally enhanced surfaces. Coil shall have staggered tube arrangement with intertwined circuiting and no more than 12 fins per inch.

The drain pan shall be positively sloped in all directions to ensure proper condensate removal. The drain pan shall be fabricated of galvanized steel and insulated with ¾-inch of 1-lb. density fiberglass. Drain piping, including a trap with cleanout, shall be provided with a single-point connection to the unit's exterior.

Refrigerant Circuit (Water-cooled unit only)

Refrigerant circuits shall be 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 ½-inch flare connection. Unit shall be provided with adequate means of frost control. The circuits shall be tested, factory dehydrated, and charged with oil and refrigerant. Units ordered as "ship separate" shall be factory dehydrated, charged with oil and shipped with a dry nitrogen charge. Refrigerant is to be added in the field.

Refrigerant Circuit (Air-cooled unit only)

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

Supply Fan

Supply fan shall be dual forward curved medium pressure fans secured to a solid steel shaft with grease lubricated bearings designed for 200,000 hours. Fan bearings shall have grease lines extended to a common location. The drive components shall include fixed pitch sheaves and multiple V-belt sized for 130% of nominal motor horsepower. All drive components shall be accessible without using scaffolds or ladders.

Supply fan motors are either open drip-proof or totally enclosed fan cooled. The motors shall have a standard NEMA T-frame and a service factor of 1.15. All 60Hz motors meet the Energy Independence and Security Act of 2007 (EISA).

The entire fan assembly including drive components shall be mounted on a common base. The fan base shall be isolated inside the unit on rubber-in-shear isolators. The entire assembly shall be statically and dynamically balanced at the factory.

Filters

Two-inch throwaway fiberglass filters shall be provided for installation during construction.

IntelliPak Unit Controls - DDC

Microprocessor controls shall be provided to control all unit functions. The control system shall be suitable to control CV or VAV applications. The controls shall be factory-installed and mounted in the main control panel. All factory-installed controls shall be fully commissioned (run tested) at the factory. The unit shall have a human interface panel with 16-key keypad, a two line, 40 character clear language (English, French, Spanish) display as standard to provide the operator with full adjustment and display of control data functions. The unit controls shall be used as a stand-alone controller or as part of a building management system involving multiple units.

1

The unit shall be equipped with a complete microprocessor control system. This system shall consist of temperature and pressure (thermistor and static pressure transducer) sensors, printed circuit boards (modules) and a unit mounted human interface panel. Modules (boards) shall be individually replaceable for service ease. All microprocessors, boards, and sensors shall be factory mounted, wired and tested.

The microprocessor boards shall be stand-alone DDC controls not dependent on communications with an on-site PC or building management network. The microprocessors shall be equipped with on-board diagnostics, indicating that all hardware, software and interconnecting wiring are in proper operating condition. The modules (boards) shall be protected to prevent RFI and voltage transients from affecting the board's circuits. All field wiring shall be terminated at separate, clearly marked terminal strip. Direct field wiring to the I/O boards is not acceptable.

The microprocessor's memory shall be non-volatile EEPROM type requiring no battery or capacitive backup, while maintaining all data.

2

Zone sensors shall be available in several combinations with selectable features depending on sensor.

3

The human interface panel's keypad display character format shall be 40 characters x two lines. The character font shall be 5 x 7 dot matrix plus cursor. The display shall be Supertwist Liquid Crystal Display (LCD) with blue characters on a gray/green background that provides high visibility and interface ease. The display format shall be in clear language (English, French, Spanish).

4

The keypad shall be equipped with 16 individual touch sensitive membrane key switches. The switches shall be 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 shall have the US/Canada Underwriter's agency listing.

IntelliPak™ Control 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 self-contained unit from the discharge air temperature using a field-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 cooling stages with discharge air temperature reset capabilities. The VFD receives a 0-10vdc 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 field 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 option takes advantage of cooling tower water to either pre-cool the entering air to aid the mechanical cooling process or, if the water temperature is low enough, provide total system cooling. 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 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 approach temperature defaults to 4°F and is adjustable from 0 to 9°F. 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 OD seamless copper tubes expanded into aluminum fins. The evaporator and economizer coils share a common sloped (IAQ) drain pan. Drain pan options are either galvanized or stainless steel, and are insulated and internally trapped.

The waterside economizer coil is available with either a two or four row coil, with no more than 12 fins per inch. The tubes are arranged in a staggered pattern to maximize heat transfer. The coil has round copper supply and return headers with removable cleanout and vent plugs. The optional mechanical 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 BTUs/lb. default (adjustable 19-28 BTUs/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 galvanized steel. Opposed low leak damper blades are 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 BTUs/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 galvanized steel. Opposed low leak damper blades are fabricated from 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 BTUs/lb. (adjustable 19-28 BTUs/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

BTUs/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 maintains 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 valves modulate 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 is 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 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 inside the unit 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-gage 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.

Single Stage 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. Single stage electric heat control will be accomplished with one 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.

Entering Air Temperature Protection

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 opens to allow full water flow. The heat output also energizes. A manual reset is required. Note: this option is standard on all units with a waterside economizer or hydronic heat.

Non-Fused Disconnect Switch

The unit has a factory mounted non-fused disconnect switch, which is 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 controls and fan motor.

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 of 1.75 lb. density fiberglass for sound attenuation. Discharge openings can either be field cut or factory cut (a two-inch duct collar is provided with factory cut holes). Plenums are also available with double wall perf.

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.

Protective Coating

The unit exterior and exposed interior surfaces have a four to six mil coat of protective coating.

A three to five mil coat of protective coating is applied to the coil using a multiple dip-and-bake process.

Cupro-Nickel Condenser

One condenser is provided for each compressor. The condensers are a shell-and-tube design with removable heads to allow tubes easy mechanical cleaning. Tubes are ¾-inch 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 ¾-inch of 1-lb. 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 WG, contact closure occurs.

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

Medium Efficiency Filters

Two-inch 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 2 x 40 character clear English 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 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.

Tracer LCI-I Communication Interface

The LCI-I provides interface to a Trane Integrated Comfort™ system (ICS) or third party building management network supporting Lon-Talk communication. 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 IntelliPak 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.

Wireless Comm Interface - Field Installed

Trane Wireless Comm interface – Provides wireless communication between the Tracer™ SC, Tracer Unit Controllers and BACnet Communication Interface (BCI) modules.

Remote Air-Cooled Condenser CCRC/CIRC

Cabinet

The unit framework shall be formed structural steel members of galvanized steel. Panels and access doors shall be 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 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 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 weather tight rain slinger over the fan's shaft.

Protective Coating Option

The unit's interior and exterior shall have a 4 to 6 mil coat of protective coating applied with an air-dry process.

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

Low Ambient Damper Option

Standard ambient control allows operation down to 45°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 a 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. Low ambient dampers used with IntelliPak air-cooled units are 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 agency listing.

Trane optimizes the performance of homes and buildings around the world. A business of Ingersoll Rand, the leader in creating and sustaining safe, comfortable and energy efficient environments, Trane offers a broad portfolio of advanced controls and HVAC systems, comprehensive building services, and parts. For more information, visit www.Trane.com.

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