Product Catalog

Packaged Rooftop Air Conditioners IntelliPak™ 1 with Symbio™ 800

Including eFlex™/eDrive™

Air-Cooled Condensers — 60 Hz

20 to 75 Tons, S*HM and 90 to 130 Tons, S*HL

September 2023

RT-PRC102E-EN

Introduction

Designed for Today and Beyond

Innovative technology and an impressive lineup of features make the Trane® IntelliPak™ rooftop line the number one choice for today and the future.

- 20–130 ton industrial commercial rooftop available in different efficiency tiers.
- Utilizes R-410A refrigerant.
- All units are ASHRAE 90.1 2019 compliant.
- Symbio™ 800 controller now powers the actions of the IntelliPak rooftop for reliable and efficient operation.
- The Symbio™ 800 controller supports multiple communication protocols:
  - Air-Fi®
  - BACnet® MSTP
  - BACnet® IP
  - ModBus® MSTP
  - ModBus® IP
  - LonTalk®
- Symbio 800 user interface provides a high degree of control, superior monitoring capability, and unmatched diagnostic information.
- IntelliPak has the technology and features to bring total comfort to every building space.

  Key technologies include:
  - Statitrac™ space pressure control to manage space pressure control.
  - eFlex™ variable speed compressors to optimize efficiency.
  - Traq™ for accurate outdoor air measurement.
  - Air-Fi® communication platform that minimizes installation time, material, and risk.
  - eDrive™ DDP supply fans for ease of maintenance.

  Highlighted features include:
  - Electronic expansion valves.
  - Expansion module for custom programmability.
  - Optimized economizer controls.
  - AMCA-rated ultra low leak dampers.
  - Double-wall insulation.
  - Stainless steel drain pan.
  - Modulating relief/return fans.
  - Airflow configuration for more flexibility.
  - Refrigeration monitoring via communicating transducers.
  - Filtration options to meet indoor air quality requirements.

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Trademarks

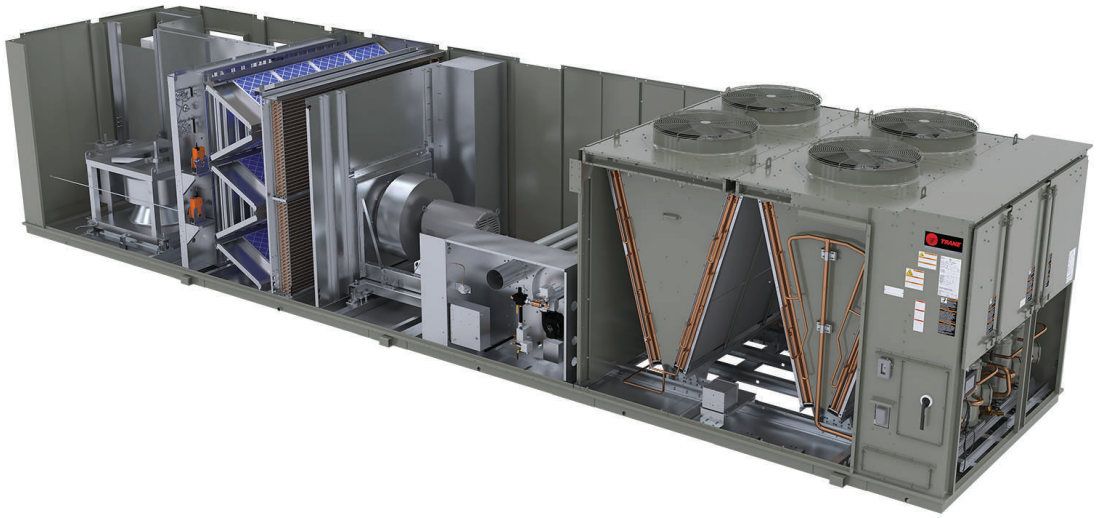
Revision History

- Updated Natural gas heating capacities, 90 to 130 tons table in Performance Data chapter.
- Updated Gas-Fired Heating Option in Mechanical Specifications chapter.
- Remove Staged Gas Heat topic in Mechanical Specifications chapter.

Table of Contents

Features and Benefits

Cabinet



Features		Benefits
Standard	Salt spray testing IAC w ASTM B117 standard	Withstands corrosive environments
	Pitched roof over air handler section	Prevents water leakage in cabinet, pooling water on top of cabinet, as well as paint wear
	Static pressure up to 4 wg	Unit cabinet can operate at static pressure 4 wg on the fan outlet
Optional	Airflow configuration	Downflow and horizontal airflow configurations available for application flexibility
	Hinged access doors	Provide easy and fast access to critical sections of the unit
	Extended casing	Versatility for heating and cooling applications
	Double wall construction	Quality construction enables ease of maintenance
	Stainless steel drain pan	Prevents standing water under the evaporator coil
	IntelliPak Replacement Unit (IRU)	Support for full perimeter curb replacement applications

Refrigeration

Features		Benefits
Standard	R-410A Refrigerant	HFC Refrigerant
	Microchannel condenser coil	Reduced refrigerant quantity enabling LEED EA Credit 4, decreased weight, and minimized galvanic corrosion
	Electronic expansion valve	• More accurate superheat reading and control • Provides consistent super heat setting that improves efficiency and compressor reliability
	Refrigeration pressures constantly monitored by transducers	• Provides faster, more accurate readings that maximize efficiency of the refrigeration system • Monitors compressors in real time to ensure performance within reliable limits • Allows service technician to read system pressures at either the user interface or remotely through optional building automation system (BAS) • Provides loss of charge protection
	Frostat™ coil frost protection	Temperature and pressure sensors on each refrigeration circuit used to determine if the coil is approaching a freezing condition
	Refrigeration systems meet ASHRAE 90.1	Allows customers to meet both U.S. Department of Energy and local/state regulatory requirements
Optional	High efficiency tiers	Allows customers the flexibility to balance budgets and efficiency requirements
	eFlex™ variable speed compressors	Capacity control delivers improved efficiency as well as more precise leaving air temperature control (+/- 1°F)
	Variable speed condenser fans	Minimizes fan cycling and maximizes part load efficiency by closer control to minimum head pressure
	Low ambient control	Provides refrigeration cooling in lower ambient temperatures to 0°F, improving the unit's operating range
	Suction Service Valve	Reduces service time if repairs are needed
	Replaceable core filter driers	Allows for quicker replacement

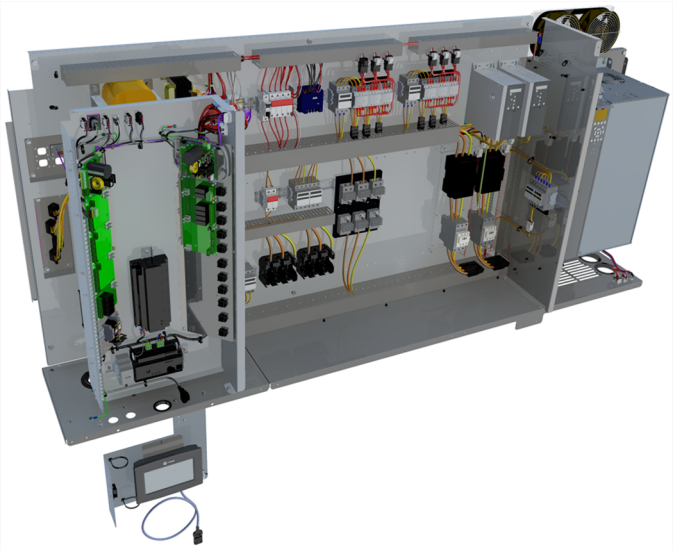
Airflow

Features		Benefits
Standard	Variable speed supply fan with forward curved, airfoil-shaped blades	• Variable speed technology enables precision adjustments to output and/or capacity according to the building space requirements • Flexibility to achieve specific cfm requirements for the application
Optional	eDrive™ variable speed direct drive supply fans[a]	• Variable speed technology enables precision adjustments to output and/or capacity according to the building space requirements • No belts or sheaves reduces maintenance requirements • More efficient, higher static capability, and improved acoustics relative to forward curved fans • Precision fan speed adjustments ensure energy-efficient, indoor comfort without the need for belt/sheave replacements
	Trane Air Quality (Traq™) outside air measurement system	Traq controls the amount of outdoor air intake to accurately meet minimum fresh air requirements and energy-efficiency goals
	Statitrac™ direct space building pressurization control	Highly accurate and efficient method of maintaining building pressure control
	Ventilation override mode	Flexibility to temporarily override airflow management during non-standard situations
	Economizer operations	Enables use of outside air as an initial stage of cooling, reducing compressor run-time, resulting in lower energy consumption and longer unit lifespan
	Pre-evaporator and final filter rating up to MERV 14	• Variety of options available to meet indoor air/filtration requirements • Filter status available at the user interface and/or building automation system
	Relief Fans	The Trane 100% modulating relief fan is an excellent choice for controlling building pressure
	Return Fans	Trane's 100% modulating return fan is an excellent choice for systems with high return static pressure losses

[a] Available on 20–75 ton units only.

Electrical

Figure 1. Control panel 20 to 75 tons



Features and Benefits

Features		Benefits
Standard	Wired and tested at the factory	Reliable unit startup
	Separated high and low voltage components and wiring	Improved safety during servicing; reduced potential for signal interference to controls
	Variable frequency drives communicate via Modbus	Real time information as the drives are connected directly to the building automation system
	Separate access for user interface and USB connection	Ability to access controller functions without opening the control panel
	Dual power connection for 20-75 ton 200, 230V units	Limits size and cost of power supply to unit
	Modular electrical component architecture	Standardized design simplifies service needs
Optional	Optional high SCCR	Meets needs of building systems with high available fault currents

Gas Heat

Features		Benefits
Standard	Drum and tube heat exchangers with forced draft burners tested under UL 795	Meets product safety regulations
	81% steady state efficiency	All gas heaters meet the 2023 Department of Energy efficiency code
	Flue to relief above the unit	Removes hot air away from the unit and prevents recirculation with the combustion intake
Optional	• Staged offering for each MBH • Modulating and Ultra Modulating offerings for 500, 850, and 1000 MBH • Low and high heat offering	• Air rise capability up to 60°F to meet discharge air temperature requirement • Assortment of option combinations provides the best solution for a variety of applications, along with the ability to achieve turndown up to 20:1

Electric Heat

Features		Benefits
Standard	Full-faced element coil	Creates a more consistent heat profile
	• High grade element wire • Low watt density heater coils	Allows for increased reliability
	30 to 190 kW range	Provides best solution for the application
	Air rise capability up to 50°F	Range of capacity meets discharge air temperature requirements

Options

Table 1. Comprehensive listing of available options and accessories

Option or Accessory[a]	Option	Standard Field-Installed Accessory
Coils		
Corrosion Protected evaporator coils	X	
Corrosion protected condenser coil	X	
Controls		
LonTalk® Communication Interface (LCI)	X	X
BACnet® Communication Interface (MSTP or IP)	X	X
Trane® Air-Fi® Wireless Communications Interface	X	
ModBus Communication (MSTP or IP) (add as option)	X	
Expansion Module (XM-70)	X	X
Wi-Fi Module	X	
Power Meter	X	
Fault detection and diagnostics with ultra low leak economizer option	X	
Isolation damper control module[b]	X	
Single Zone VAV	X	
Rapid Restart	X	
Outside Air Measurement (Traq™)	X	
Demand Control Ventilation (DCV)	X	
Space Pressure Management (Statitrac™)	X	
Ventilation override module (five ventilation override sequences)	X	
100 percent modulating exhaust with or without Statitrac™ space pressure control	X	
100 percent modulating return with or without Statitrac™ space pressure control	X	
Outside Air		
0-25 percent manual dampers	X	
Standard dampers (0-100 percent modulating)	X	
Low leak dampers (0-100 percent modulating)	X	
Ultra low leak dampers (0-100 percent modulating)	X	
Relief or Return		
Barometric relief dampers (20-75 tons)	X	
Drain Pans		
Positively sloping evaporator coil drain pan	X	
Stainless steel positively sloping evaporator coil drain pan	X	
Economizer		
0-100 percent modulating outside air economizer	X	
Economizer control options: comparative enthalpy, reference enthalpy, dry bulb	X	
Low or ultra low modulating outside air economizer option	X	

Table 1. Comprehensive listing of available options and accessories (continued)

Option or Accessory[a]	Option	Standard Field-Installed Accessory
Electrical		
Convenience outlet (factory-powered 15A GFI)	X	
Dual power source	X	
Unit mounted disconnect switch with through the door external handle	X	
Phase monitors (200/230/460/575V) (S_HL 20 to 75 tons)	X	
Phase monitors (460/575; S_HK 90 to 130 tons)	X	
High fault SCCR (short circuit current rating)	X	
Fans		
100 percent modulating exhaust with or without Statitrac™ space pressure control	X	
100 percent modulating return with or without Statitrac™ space pressure control	X	
eDrive™ direct drive plenum supply fans (20 to 75 tons)	X	
Supply Fan Piezometer	X	
Horizontal Return fans	X (20–75 Ton)	
Filters, Filter Racks and Related Tools		
90-95 percent bag filters	X	
90-95 percent cartridge filters	X	
90-95 percent bag or cartridge final filters and rack	X	
Filter rack only (no filters)	X	
Final filters, cartridge (SX only)	X	
Filter rack - 4" deep panel rack placed in standard rack location	X	
High efficiency throwaway filters	X	
Filter Monitoring for Pre-Evap and Final Filters	X	
Heat		
Heating options: natural gas, electric, hot water or steam	X	
Modulating Gas Heat	X	
Propane (LP) conversion / Modulating LP heat		X
Ultra Modulating Gas Heat	X	
Two Stage Gas Heat	X	
Insulation		
Double wall	X	
Motors		
Motors with internal shaft grounding ring for VFD applications	X	
Other		
eFlex™ Variable Speed Compressors (20 to 75 ton)	X	
Extended grease lines	X	
Modulating hot gas reheat (20 to 75 tons)	X	
Hinged access doors	X	

Table 1. Comprehensive listing of available options and accessories (continued)

Option or Accessory[a]	Option	Standard Field-Installed Accessory
Horizontal supply and return openings (SX, SL, SS, SL, SF[c] models)	X	
Hot gas bypass to the evaporator inlet	X	
IntelliPak™ Replacement Unit (IRU)	X	
Outside air CFM compensation on VAV units with VFD and economizer	X	
Roof curbs		X
Suction service valves		
Vertical discharge, S_HL 20 to 75 tons (SX,SL,SS,SL models only)	X	
Sensors and Thermostats		
Humidity sensor		X
ICS zone sensors used with Tracer® system for zone control		X
Programmable zone sensors		X
Remote zone sensors — used for remote sensing with remote panels		X

[a] Options are provided for informational purposes only. For specifics, contact your local Trane® sales office.
[b] Module is factory-installed only, damper is field-supplied.
[c] Limited tonnage availability.

Note: *For design specials, contact product support.*

Symbio™ 800 Controls

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

Symbio 800 Advantages	
Connected	Convenient, on-the-go access to advanced monitoring, troubleshooting, and energy management
Flexible	Minimized installation hardware and labor costs – able to use existing devices for maximum convenience, lower controls upgrades and relocation
Reliable	Maximum equipment uptime and life, minimized maintenance and troubleshooting cost

Features and Benefits

Symbio™ 800 Feature	**Benefits**
Multiple, open standard protocol support • Air-Fi® Wireless (BACnet®/AirFi, optional) • BACnet MS/TP • BACnet/IP • LON (Optional) • Modbus	Simplified, lower cost, and more flexible integration with all common open standard protocols using Trane or competitive BAS systems and controllers
Remote connection to building or equipment	Trane Connect™ provides an easy, secure option to connect remotely to a Tracer SC+ or directly to your Trane equipment
Common integration strategies and equipment specific points lists	Simplified, lower cost, and uncompromised integration
Application specific and configurable	Reduced project costs with superior reliability, comfort, performance - applications specific and configurable system ensures machine continues to run within operating envelope. Ability to upgrade firmware with a simple file transfer.
Smart Analytics	Smart analytics provide superior reliability through the life of the equipment with minimum downtime
Data logging	Standard, local or remote Intuitive review and analysis of equipment, zone, and building performance
Local scheduling	Capable of operating in stand-alone operation without a building automation system as a temporary back-up schedule for ongoing comfort and energy savings
Rugged, 7-inch color touch screen user interface	Easy, touch navigation for viewing data and making operational changes
Display preferences	Choose how to view dates, times, units (SI, IP), screen brightness, data format, and backlight timeout. 3 built-in languages are supported and selectable for all TD7 screens.
Intuitive navigation	Helps operators access data and alarms for quick and accurate response and resolution
At-a-glance status	Easily readable color display showing key operating parameters of major equipment components
Reports	Quickly summarizes data for clear understanding and interpretation to enable local monitoring of expected performance and operating efficiency
Graphs	Easily visualize trend data for local troubleshooting and fine-tuning
Multiple language support	Suitable for operation in multiple geographies
Adaptive Control™ Algorithms	Pre-empts potential equipment disruptions during rapidly changing conditions – providing consistent equipment performance and building comfort

Symbio™ 800 Feature	Benefits
SD card backup/restore	Faster, lower cost repairs with reduced downtime
Modbus device support	Capable of integrating optional Modbus devices for local or remote diagnostics — provides faster, lower cost troubleshooting and increased equipment performance

Options

Symbio™ 800 Feature	Benefits
Remote connection to building or equipment	Trane Connect™ provides an easy, secure option to connect remotely to a Tracer SC+ or directly to your Trane equipment
Programmable	Equipment application flexibility and cost-reduced control of nearby equipment
Expandable I/O	Field or factory installed I/O for programmable feature - Reduced installation costs and increased installation flexibility
User security with audit trail support	Flexible and secure access for multiple users allows monitoring, overriding/releasing points, release of all overrides, custom report editing, and tracking changes by user
Wi-Fi Adapter	Enables the operation of wireless service tools for increased technician productivity and flexibility
LonTalk®	Supports LonTalk for Tracer building automation and other building control systems
Air-Fi® Wireless (BACnet®, optional)	

Specifications

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

Agency Compliance
• UL PAZX, Energy Management Equipment. • UL94-5V, Flammability. • FCC CFR Title 47, Part 15.109: Class A Limit, (30 MHz—4 GHz). • CE EMC Directive 2004/108/EC.

Variable Air Volume (VAV) Operation

Discharge Air Pressure Control

Variable Frequency Drive (VFD) Control

Variable frequency drives are used for supply fan speed control. A pressure transducer measures duct static pressure, and the VFD is modulated to maintain the supply air static pressure within an adjustable user-defined range. The range is determined by the discharge air pressure setpoint and discharge air pressure deadband, which are set through the user interface. or BAS/Network.

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

Discharge Air Static Pressure Limit

The opening of VAV terminals, and the amount of supply air provided by the variable frequency drive are coordinated during startup and transition to/from Occupied/Unoccupied modes to prevent over pressurization of the supply air ductwork. However, if for any reason the discharge air pressure exceeds the user-defined discharge air static pressure limit that was set at the user interface, the supply fan and VFD are shut down. The unit is then allowed to restart three times. If the over pressurization condition occurs on the third restart, the unit is shut down and a manual reset diagnostic is set and displayed at the user interface and BAS/Network.

Space Pressure Control - Statitrac

A pressure transducer is used to measure and report direct space (building) static pressure. The user-defined control parameters used in this control scheme are space static pressure setpoint, space pressure deadband and relief enable point. As the economizer opens, the building pressure rises and once above the relief enable point, enables the reflief fan and dampers or relief VFD. The relief dampers or VFD then modulate to maintain space pressure within the deadband.

Discharge Air Temperature Controls

Cooling/Economizer

During Occupied cooling mode of operation, the economizer (if available) and mechanical cooling are used to control the discharge air temperature. The discharge air temperature setpoint and deadband are user-defined at the user interface. The discharge air temperature setpoint may be user-defined from the BAS/Network. If the conditions of the outside air are appropriate to use “free cooling,” the economizer will be used first in an attempt to satisfy the discharge air setpoint; then, if required, the mechanical cooling will be staged on to maintain discharge air temperature setpoint. Minimum On/Off timing of the mechanical cooling prevents rapid cycling.

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

The economizer is only allowed to function freely if one of the following conditions is met:

- For dry bulb economizer control the ambient temperature must be below the dry bulb temperature control setting.
- For reference enthalpy economizer control, outdoor air enthalpy must be below the enthalpy control setting. At outdoor air conditions above the enthalpy control setting, mechanical cooling only is used and the outside air dampers remain at minimum position.

- For comparative enthalpy economizer control, outdoor air enthalpy must be below the enthalpy of the return air.
- For differential dry bulb economizer control, the ambient dry bulb temperature must be below the dry bulb temperature of the return air.

If the unit does not include an economizer, mechanical cooling only is used to satisfy cooling requirements. The outdoor air dampers may be set for a maximum of 25% outdoor air, through the unit mounted user interface or a signal from the BAS/network, if the rooftop is equipped with 0 to 25% motorized outside air dampers.

Heating

Gas Heating: Staged Heat

Up to two stages of gas heat will be sequenced based on zone demand. Status messages and diagnostics are communicated to the user interface. To prevent cycling, a three-minute delay shall be provided between first- and second- stage, gas valve operation on two-stage heaters.

Modulating Gas

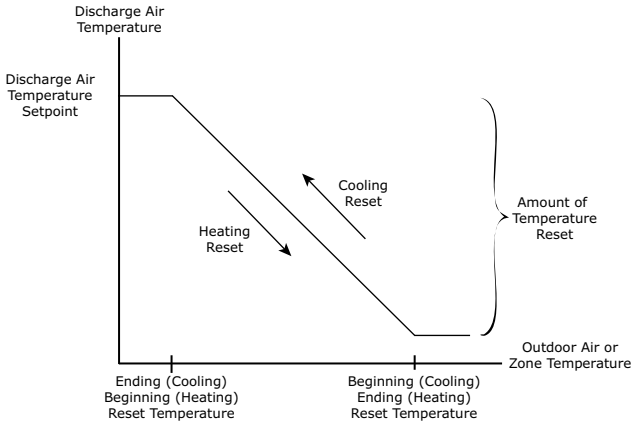
Modulating gas heat will consist of one modulating valve for precise heating control. The output will be modulated to control the discharge air temperature to the heating setpoint. Status messages and diagnostics are communicated to the user interface.

Electric Heating

The individual stages of electric heat will be sequenced on the zone demand. The number of available stages will depend on the unit size and heat capacity selected.

Discharge Air Setpoint Temperature Reset

Figure 2. Discharge air temperature reset



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

Outdoor Air Cooling Reset

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 discharge air setpoint can be raised, thereby preventing sub-cooling of critical zones. This reset can lower usage of mechanical cooling, thus savings in compressor kW, but an increase in supply fan kW may occur.

Outdoor Air Heating Reset

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 user interface:

- Beginning reset temperature

- Ending reset temperature
- Amount of temperature reset

Zone Reset

Zone reset is applied to the zone(s) in a building that tend to be overly cool or overly hot. The discharge 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

A feature that is used with modulating gas, hot water and steam heat option(s). Supply air tempering is enabled when the discharge air temperature falls below the discharge air temperature deadband low end. The heat valve is then modulated open to maintain the set minimum discharge air temperature.

Zone Temperature Control

Unoccupied Zone Heating and Cooling

During Unoccupied mode, the unit is operated as a constant volume unit. Supply fan VFDs operate at 100% and VAV boxes are driven full open. The unit controls zone temperature to the Unoccupied zone cooling and heating (heating units only) setpoints.

Morning Warmup Options

This feature may be enabled on all types of factory installed heat units as well as cooling only units configured as “External Heat” (for example, VAV boxes with reheat). At the conclusion of Unoccupied mode, while the economizer (if supplied) is kept closed, the selected zone is heated to the user-defined Morning Warmup setpoint (see description below). The unit is then released to Occupied mode.

Cycling Capacity Morning Warmup (MWU)

Cycling capacity Morning Warmup provides a more gradual heating of the zone. 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 the MWU setpoint is reached or for 60 minutes, then the unit switches to Occupied mode. A control algorithm is used to increase or decrease the amount of heat in order to achieve the MWU zone temperature setpoint.

Note: *When using the Morning Warmup option in a VAV heating/cooling rooftop, airflow must be maintained through the rooftop unit. This can be accomplished by electrically tying the VAV boxes to the VAV box output relay contacts on the Symbio™ 800 Controls or by using changeover thermostats. Either of these methods will assure adequate airflow through the unit and satisfactory heating of the building.*

Daytime Warmup

This feature is available on all types of heating units. During Occupied mode, if the zone temperature falls to a preset, user-defined zone low limit temperature setpoint, the unit is put into Unoccupied mode and Daytime Warmup is initiated. The system changes over to constant volume heating (full unit airflow), the VAV boxes are fully opened and full heating capacity is provided until the Daytime Warmup setpoint is reached. The unit is then returned to normal Occupied mode.

Single Zone Variable Air Volume (SZVAV) Operation

The IntelliPak® controls platform will support Single Zone VAV as an optional unit control type in order to meet ASHRAE 90.1. The basic control will be a hybrid variable air volume/constant volume configured unit that provides discharge temperature control to a varying discharge air temperature target setpoint based on the space temperature and/or humidity conditions. Concurrently, the unit will control and optimize the supply fan speed to maintain the zone temperature to a zone temperature setpoint.

VFD Control

The VFD will modulate the supply fan motor speed, accelerating or decelerating as required to maintain the zone temperature to the zone temperature setpoint. Bypass control is offered to provide full nominal airflow in the event of drive failure.

Supply Fan Output Control

Units configured for Single Zone VAV control will utilize the same supply fan output control scheme as on traditional VAV units except the VFD signal will be based on zone heating and cooling demand instead of the supply air pressure.

Space Pressure Control – Statitrac™

For units configured with Space Pressure Control , the new schemes implemented for economizer minimum position handling require changes to the existing Space Pressure Control scheme in order to prevent over/under pressurization. The overall scheme will remain very similar to VAV units with Space Pressure Control with the exception of the dynamic Relief Enable Setpoint.

For SZVAV, a Relief Enable Setpoint must be selected during the 100% Fan Speed Command. Once selected, the difference between the Relief Enable Setpoint and Design OA Damper Minimum Position at 100% Fan Speed Command will be calculated. The difference calculated will be used as an offset and added to the Active Building Design OA Minimum Position Target in order to calculate the dynamic Relief Enable Target, which will be used throughout the Supply Fan Speed/OA Damper Position range.

The Relief Enable Target could be above or below the Active Building Design OA Minimum Position Target Setpoint, based on the Active Relief Enable Setpoint being set above or below the Building Design Minimum Position at 100% Fan Speed Command. Note that an Relief Enable Setpoint of 0% will result in the same effect on Relief Fan control as on VAV applications with and without Statitrac.

Occupied Cooling Operation

For normal cooling operation, cooling capacity will be staged or modulated in order to meet the calculated discharge air target setpoint. If the current active cooling capacity is controlling the discharge air within the deadband, no additional cooling capacity change will be requested. As the Discharge Air Temperature rises above the deadband, the algorithm will request additional capacity as required (additional compressors or economizer). As the Discharge Air Temperature falls below the deadband, the algorithm will request a reduction in active capacity.

Default Economizer Operation

By default, the unit will be set up to optimize the minimum supply fan speed capability during Economizer Only operation. If the economizer is able to meet the demand alone, due to desirable ambient conditions, the supply fan speed will be allowed to increase above the minimum prior to utilizing mechanical cooling if discharge air setpoint falls below the discharge air Lower Limit (Cooling) setpoint.

Occupied Heating Operation

Occupied heating operation will utilize two separate control methodologies based on heating configurations. For all “Staged” Heating types, the unit will utilize full airflow during all active heating periods exactly like traditional Constant Volume units. For “Modulating” Heating types the unit will have the ability to utilize SZVAV Heating, much like Active Cooling, in order to maintain the Zone Temperature to the Zone Heating setpoint. Also, on units configured with a Modulating Heat type, the customer will have the ability to select between SZVAV Heating control, or to utilize traditional Constant Volume, full airflow heating based on the associated unit setup.

Unoccupied Mode

In Unoccupied periods the unit will utilize setback setpoints, 0% Minimum OA Damper position, and Auto Fan Mode operation as on normal Constant Volume units. The Supply Fan speed will be forced to 100% to operate in a constant volume mode for all active heating and cooling requests.

Cooling Sequence

If the controller determines that there is a need for compressor stages in order to meet the calculated discharge air target setpoint, once supply fan proving has been made, the unit will begin to stage compressors accordingly.

Note: *The compressor staging order will be based on unit configuration and compressor balanced starts status.*

Once the discharge air target setpoint calculation has reached the user defined Minimum Setpoint and compressors are being utilized to meet the demand, if the cooling demand increases, the discharge air target setpoint value will continue to lower past the minimum setpoint and begin to ramp the supply fan speed upward toward 100%.

Once the discharge air target setpoint calculation has reached the Minimum Setpoint and compressors are being utilized to meet the demand, as the discharge air target setpoint value continues to calculate lower the algorithm will begin to ramp the supply fan speed up toward 100%. Note that the supply fan speed will remain at the compressor stage's associated minimum value (as described below) until the discharge air target setpoint value is calculated below the discharge air temperature Minimum Setpoint (limited discharge air target setpoint).

As the cooling load in the zone decreases the zone cooling algorithm will reduce the speed of the fan down to minimum per compressor stage and control the compressors accordingly. As the compressors begin to de-energize, the supply fan speed will fall back to the Cooling Stage's associated minimum fan speed, but not below. As the load in the zone continues to drop, cooling capacity will be reduced in order to maintain the discharge air within the ±½ discharge air target deadband.

Heating

Gas Heating: Staged Heat

Up to two stages of gas heat will be sequenced based on zone demand. Status messages and diagnostics are communicated to the user interface.

Modulating Gas

Modulating gas heat will consist of one modulating valve for precise heating control. The output will be modulated as the demand in the zone changes. Status messages and diagnostics are communicated to the user interface.

Electric Heating

The individual stages of electric heat will be sequenced on the zone demand. The number of available stages will depend on the unit size and heat capacity selected.

SZVAV and VAV Operation

Outside Air Control

Outside Air Measurement

Trane air quality (Traq™) outside air measurement system utilizes velocity pressure sensing rings. Based on unit design CFM, the Symbio™ 800 monitors and controls the quantity of outside air entering the unit. The outside airflow can be calibrated to compensate for altitude.

An optional CO_2 sensor may be connected to control outside air based on CO_2 Demand Control Ventilation (DCV).

Outside Airflow Compensation

As the supply fan modulates, this function proportionally adjusts the economizer minimum position to compensate for the change in total airflow, in order to maintain a constant percent of outside air. The modified economizer minimum position is computed as a linear function – based on VFD position – given the two endpoints:

- Minimum Position with VFD @ 0%
- Minimum Position with VFD @ 100%

Both are user adjustable at the user interface.

Unit Feedback – Supply and Relief Fan Speed Setpoints

BACnet® network points are available to allow for communication of the Supply and Relief Fan Speed Setpoints to the BAS. These points are only available for multi-zone VAV units. These setpoints will be overridden by equipment protection functionality, when applicable.

Emergency Override

When a LonTalk® communication protocol or BACnet® control network is installed, the user can initiate from the Tracer® Ensemble™ building automation system (BAS) (in the case of LCI), Tracer® SC+ or third party BAS (with either BCI or LCI) one of five predefined, not available to configure, Emergency Override sequences. All compressors, condenser fans and the Humidification output are de-energized for any Emergency Override sequence. Each Emergency Override sequence commands the unit operation as follows:

PRESSURIZE_EMERG: • Supply Fan VFD - Max • Relief Fan - Off; Relief Dampers - Closed (if so equipped) • OA Dampers - Open; Return Damper - Closed • Heat - All heat stages off; Mod Heat output - Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized (if so equipped)	**EMERG_DEPRESSURIZE:** • Supply Fan VFD - Min • Relief Fan - On; Relief Dampers - Open/Max • OA Dampers - Closed; Return Damper - Open • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized
EMERG_PURGE: • Supply Fan VFD - Max • Relief Fan - On; Relief Dampers - Open • OA Dampers - Open; Return Damper - Closed • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized	**EMERG_SHUTDOWN:** • Supply Fan VFD - Min • Relief Fan - Off; Relief Dampers - Closed (if so equipped) • OA Dampers - Closed; Return Damper - Open • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized
EMERG_FIRE - Input from fire pull box/system: • Supply Fan - Off • Supply Fan VFD - Min • Relief Fan - Off; Relief Dampers - Closed (if so equipped) • OA Dampers - Closed; Return Damper - Open • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized	

Ventilation Override Module (VOM)

The user can customize up to five different override sequences for purposes of ventilation override control. If more than one VOM sequence is being requested, the sequence with the highest priority is initiated first. Sequence hierarchy is the sequence “A” (UNIT OFF) is first, with sequence “E” (PURGE with Duct Pressure Control) last. A ventilation override mode can be initiated by closing any of the five corresponding binary inputs on the VOM module. A binary output is provided on the VOM module to provide remote indication of an active VOM mode. All compressors, condenser fans and the Humidification output are de-energized for any VOM sequence. The factory default definitions for each mode are as follows:

UNIT OFF sequence “A” When complete system shutdown is required the following sequence can be used. • Supply Fan VFD - Min • Relief Fan - Off; Relief Dampers - Closed (if so equipped) • OA Dampers - Closed; Return Damper - Open • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Deenergized • VOM Relay - Energized • Return Fan VFD - Off	**PRESSURIZE sequence “B”** Perhaps a positively pressurized space is desired instead of a negatively pressurized space. In this case, the supply fan should be turned on with VFD at 100% speed and relief fan should be turned off. • Supply Fan - On • Supply Fan VFD - Max • Relief Fan - Off; Relief Dampers - Closed (if so equipped) • OA Dampers - Open; Return Damper - Closed • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized • Return Fan VFD - Off
RELIEF sequence “C” With only the fans running (supply fan off), the space that is conditioned by the rooftop would become negatively pressurized. This is desirable for clearing the area of smoke from the now-extinguished fire, possibly keeping smoke out of areas that were not damaged. • Supply Fan VFD - Min • Relief Fan - On; Relief Dampers Open (if so equipped) • OA Dampers - Closed; Return Damper - Open • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Deenergized • VOM Relay - Energized • Return Fan VFD - On/100%	**PURGE sequence “D”** Possibly this sequence could be used for purging the air out of a building before coming out of Unoccupied mode of operation on VAV units or for the purging of smoke or stale air if required after a fire. • Supply Fan VFD - Max • Relief Fan - On; Relief Dampers Open (if so equipped) • OA Dampers - Open; Return Damper - Closed • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized • Return Fan VFD - On/100%
PURGE with duct pressure control sequence “E” This sequence can be used when supply air control is required for smoke control. • Supply Fan VFD - (If so equipped) Controlled by Supply Air Pressure Control function; Supply • Air Pressure High Limit disabled • Relief Fan - On; Relief Dampers Open (if so equipped) • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized • Return Fan VFD - On/In Control	

User Interface (UI)

A 7 inch user interface features a touch-sensitive color screen that provides operating status, performance monitoring, and scheduling changes and operating adjustments.

Demand Limit

This mode is used to reduce electrical consumption at peak load times. When demand limiting is needed, mechanical cooling and/or heating operation are either partially or completely disabled in order to save energy.

Frost/Freeze Avoidance

Evaporator Coil Frost Protection - Frostat™

Temperature and pressure sensors on each refrigeration circuit are used to determine if the coil is approaching a freezing condition. Mechanical cooling capacity is shed as necessary to prevent icing. The Frostat™ system reduces the need for hot gas bypass and utilizes the suction line surface

temperature sensor to shed cooling when coil frosting conditions occur. The supply fans are not shut off and will de-ice the coil. Timers prevent the compressors from rapid cycling.

Steam and Hot Water Coil - Freeze Avoidance

Freeze Avoidance is a feature which helps prevent freezing of steam or hot water heat coils during periods of unit inactivity and low ambient temperatures. Whenever the unit supply fan is off, the outdoor air temperature is monitored. If the temperature falls below a predetermined value, the heating valve is opened to a position selected on the user interface to allow a minimum amount of steam or hot water to flow through the coil and avoid freezing conditions.

Occupied/Unoccupied Switching

There are two ways to switch between Occupied or Unoccupied:

- Field-supplied contact closure (hard wired binary input to Symbio™ 800 Controls). This input accepts a field supplied switch or contacts closure, such as a time-of-day clock
- Tracer (or third party BAS with LCI or BCI module)

Trane Tracer® Ensemble™ or BAS System

The Tracer® Ensemble™ building management system or a third party BAS (with LCI or BCI module) can control the Occupied/Unoccupied status of the rooftop.

Timed Override Activation - ICS

This function is operational when the Zone Temperature Sensor is installed. When this function is initiated by the push of an override button on the ICS sensor, the Tracer Ensemble will switch the unit to the Occupied mode. Unit operation (Occupied mode) during timed override is terminated by a signal from Tracer.

Timed Override Activation - Non-ICS

This function is active whenever the Zone Temperature Sensor is installed. When this function is initiated by the push of an 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.

Economizer Controls

Comparative Enthalpy Control of 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 air and return air temperatures and humidities.

Reference Enthalpy Control of Economizer

The optional reference enthalpy compares outdoor air temperature and humidity to the economizer enthalpy control setpoint. If outdoor air temperature and humidity are below the economizer enthalpy control setpoint, the economizer will operate freely. This system provides more sophisticated control where outdoor air humidity levels may not be acceptable for building comfort and indoor air quality.

Dry Bulb Temperature Control of Economizer

The optional dry bulb system measures outdoor temperature comparing it to the economizer control temperature setpoint. If the outdoor temperature is below the economizer dry bulb temperature control setpoint, the economizer will operate freely. This system is best suited for arid regions where the humidity levels of outside air would not be detrimental to building comfort and indoor air quality.

Differential Dry Bulb

The optional differential dry bulb system measures outdoor air and compares it to the return air dry bulb temperature. If the outdoor air is below the return air and lower than the economizer enable offset, the economizer will operate freely. This system is best suited for arid regions where humidity levels of outside air would not be detrimental to building comfort and indoor air quality.

Refrigeration Balanced Starts

Balanced starts is a user-selectable feature through the user interface available on all units without the eFlex™ variable speed option. After each request for compressor operation, the lead refrigeration circuit switches, thereby causing a more equitable or balanced run time among compressors.

Emergency Stop Input

A binary input is provided for installation of field provided switch or contacts for immediate shutdown of all unit functions.

Anti-Short Cycle Protection

A standard feature provided to prevent excessive cycling and premature wear of the compressors, contactors and related components.

High Duct Temperature Limit

Two temperature sensors, Discharge Air and Return Air (if installed) are used to determine if duct temperatures are excessively high. If the discharge air temperature exceeds 200ºF or if the return air temperature exceeds 135ºF, the unit will be placed into Emergency Stop Mode.

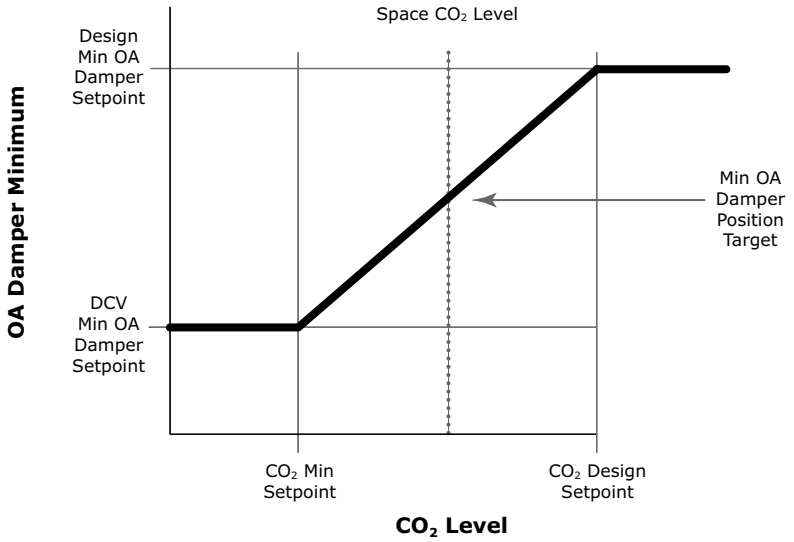
CO_2 Control - Demand Control Ventilation (DCV)

A ventilation reset function that provides the necessary ventilation for occupants and reduces energy consumption by minimizing the outdoor air damper position (or the OA flow setpoint with Traq) below the Building Design Minimum, while still meeting the ASHRAE Std 62.1 ventilation requirements.

- If the space CO_2 level is greater than or equal to the CO_2 Design Setpoint, the outdoor air damper will open to the Design Min Outdoor Air Damper (or OA Flow) Setpoint. If there is a call for economizer cooling, the outdoor air damper may be opened further to satisfy the cooling request.
- If the space CO_2 level is less than or equal to the CO_2 Minimum Setpoint, the outdoor air damper will close to the DCV Minimum Outdoor Air Damper (or OA Flow) Setpoint. If there is a call for economizer cooling, the outdoor air damper may be opened further to satisfy the cooling request.
- If the space CO_2 level is greater than the CO_2 Minimum Setpoint and less than the CO_2 Design Setpoint, the outdoor air damper position is (or OA flow) modulated proportionally to the Space CO_2 level relative to a point between the CO_2 Min Setpoint and the CO_2 Design Setpoint. If there is a call for economizer cooling, the outdoor air damper may be opened further to satisfy the cooling request.

Note: *CO_2 sensor used with Demand Control Ventilation must be powered from an external power source or separate 24 VAC transformer.*

Figure 3. CO_2 control



Low Charge Protection

A refrigerant charge estimate is calculated using a combination of measured temperatures, calculated saturated temperatures, refrigerant mass flow and the expansion valve opening. At the touch screen interface, a warning diagnostic is displayed when a low charge has been detected on the circuit, but is not critical enough to force a circuit shutdown. When a critical low charge has been detected on the circuit, a circuit shut down is triggered, and a shutdown diagnostic is displayed at the touch screen interface. Other diagnostic messages include the following:

- A diagnostic message displayed at the user interface, warning of a low charge situation when the unit is just slightly undercharged. The unit will be allowed to run.
- A diagnostic message displayed at the user interface, , warning of a low charge situation when the unit is undercharged. The undercharged circuit will be locked out to protect the compressors.

Condenser Fan

The Symbio™ 800 controller cycles or modulates condenser fans based on ambient temperature and saturated condensing temperature to ensure the optimum operating conditions for the unit.

LonTalk® Building Automation System

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

BACnet® Building Automation Control Network

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

AirFi® Wireless Communication Interface

Trane AirFi® Wireless Comm replaces the BACnet communication link and sensor wire on Tracer® building automation systems for faster, easier, lower-risk installation and life-cycle savings.

Modulating Hot Gas Reheat

When space conditions allow, the modulating hot gas reheat function activates the reheat mode. The reheat valve and cooling valve are modulated to control the discharge air temperature to the discharge air temperature reheat setpoint (default 70 °F).

In reheat mode, the reheat valve is commanded (15 to 85%) to control to the discharge air reheat setpoint and the cooling valve mirrors the reheat valve position (85 to 15%).

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. The factory setpoint is 50°F on standard units and 0°F on low ambient units. This setpoint is adjustable at the user interface. Compressors will be locked out when outdoor air temperatures fall below the selected temperature and will be allowed to start again when temperatures rise 5°F above the setpoint.

Isolation Damper Control

The Symbio™ 800 supports field installed discharge and/or return isolation dampers including damper parameter setup, damper command, position status and associated alarms.

Application Considerations

Clearance Requirements

The recommended clearances identified in and should be maintained to assure adequate service capability, maximum capacity and peak operating efficiency. A reduction in unit clearance could result in condenser coil starvation or warm condenser air recirculation. If the clearances shown are not possible on a particular job, consider the following:

- Do the clearances available allow for major service work such as changing compressors or coils?
- Do the clearances available allow for proper outside air intake, relief air removal, and condenser airflow?
- If screening around the unit is being used, is there a possibility of air recirculation from the relief to the outside air intake, or from condenser exhaust to condenser intake?
- Do clearances meet all applicable codes?

Actual clearances which appear inadequate should be reviewed with a local Trane sales engineer.

When two or more units are to be placed side by side, the distance between the units should be increased to 150 percent of the recommended single unit clearance. The units should also be staggered for the following reasons:

- To reduce span deflection if more than one unit is placed on a single span. Reducing deflection discourages sound transmission.
- To assure proper diffusion of relief air before contact with the outside air intake of adjacent unit.

Note: *Refer to "Dimensional Data," p. 126 for specific clearance requirements.*

Efficiency Offerings

High Efficiency

Trane offers a high-efficiency option for 20 to 75 ton units. This option is especially helpful in meeting high efficiency requirements legislated by some states, as well as qualifying for local utility rebates. High efficiency units meet CEETier 2 requirements.

eFlex™ Variable Speed

A state of the art Trane eFlex™ variable speed compressor is combined with fixed capacity compressors to provide a superior part load efficiency (IEER) option. Compressor designs are optimized and selected to maximize part load performance. Continuous capacity from 15-100% means that discharge air temperature is controlled within +/-1°F. This eliminates discharge air temperature swings caused by cycling fixed capacity compressors, improves humidity control, and leads to increased comfort in the space.

Note: *Available on 20 to 75 ton units.*

Supply Fan Flexibility

Trane offers two types of supply fans as options for 20 to 75 ton units. These units may be ordered with a traditional belt-driven, forward-curved (FC) fan or with a beltless direct-drive plenum (DDP) fan. The DDP fans offer multiple width options to optimize fan efficiency for the system design point. DDP fans offer increased reliability and require less maintenance than FC fans because there are no belts to tension or replace, no bearings to grease, and no sheaves to align.

Relief/Return Fan Options

The Trane 100% modulating relief system with Statitrac is an excellent choice for controlling building pressure. With a relief fan system, the supply fan motor and drives must be sized to overcome the total system static pressure, including return losses, and pull return air back to the unit during non-economizer operation.

Trane's 100% modulating return fan system with Statitrac is an excellent choice for systems with high return static pressure losses. In a return fan system, the return fan works in series with the supply fan,

and operates continuously whenever the supply fan is operating to maintain return air volume. The return fan motor and drives are sized to pull the return CFM back to the unit based on return duct static. Therefore, with a return fan system, the supply fan ordinarily requires less horsepower than a system with a relief fan.

Either return or relief fan systems with Statitrac may be used on any rooftop application that has an outdoor air economizer.

Relief/Return Fan Systems

Reasons for selecting either return or relief fan systems include economy, building pressure control, code requirements, and generally accepted engineering practices.

- Barometric relief
- 100% modulating relief with Statitrac
- 100% modulating plenum return airfoil fan with Statitrac

Barometric Relief Dampers

This approach uses non-motorized, gravity-operated relief dampers that are located in the return-air section of the rooftop unit. When the building pressure increases, the pressure inside the return-air section also increases, eventually forcing open the relief dampers and allowing air to leave the building.

Barometric relief dampers are typically used in small buildings that use an open ceiling plenum for the return-air path. They are relatively inexpensive and require no sensors or controls, but they may require the building pressure to increase significantly before relieving sufficient airflow.

Modulating Relief Fan with Statitrac™

This approach uses a powered relief fan located inside the return-air section of the rooftop unit. The fan is sized to relieve up to 100 percent of the nominal supply fan airflow, and its capacity is modulated to maintain measured building pressure at a desired setpoint.

The Trane Statitrac™ control system uses a differential pressure transducer to compare indoor (building) static pressure to atmospheric (outdoor) static pressure. The relief fan is turned on whenever needed to relieve air, then modulates the speed of the relief fan (or modulates the position of discharge dampers) to control the building pressure within the adjustable deadband, which can be set at the user interface.

The Trane modulating relief fan with Statitrac provides efficient control of building pressure. The relief fan operates only when needed to lower building pressure, meaning that in some buildings it may only need to operate when the unit is airside economizing. By directly measuring building pressure, the modulating relief fan can respond to pressure changes caused by wind, stack effect, the intermittent operation of local relief fans, and demand-controlled ventilation.

100% Modulating Return Fan Systems with Statitrac Control

A differential pressure control system, Statitrac, uses a differential pressure transducer to compare indoor building pressure to atmospheric pressure.

The return fan relief dampers are modulated, based on space pressure, to control the building pressure to within the adjustable, specified deadband that is set at the user interface. A VFD modulates the return fan speed based on return duct static pressure.

Advantages:

- The return fan operates independently of the supply fan to provide proper balance throughout the airflow envelope.
- Statitrac compensates for pressure variations within the building from remote relief fans and makeup air units.
- The return fan acts as both relief and return fan based on operation requirements.

The Trane 100% modulating return system with Statitrac provides efficient control of building pressure in applications with higher return duct static pressure and applications requiring duct returns. Relief discharge dampers are controlled directly from building pressure, return fan VFD is controlled from

return static pressure, and return/economizer dampers are controlled based on ventilation control and economizer cooling requests.

Horizontal Supply and Return

The typical rooftop installation has both the supply and return air paths routed through the roof curb and building roof. However, many rooftop installations require horizontal supply and/or return from the rooftop because of a building's unique design or for acoustic considerations.

This horizontal supply and return option applies to 20-75 tons SXHM, SFHM, SLHM, and SSHM, and 90-130 tons SXHL, SLHL, and SSHL design units. For this option, the standard downflow discharge and return openings are blocked. Access panels are removed in the field as indicated in Figure 4, p. 30. These openings are used for the discharge and return. No special curb is needed.

When using an IntelliPak™ rooftop for horizontal supply and return, an additional pressure drop must be added to the supply external static to account for the 90 degree turn by the air. This additional pressure drop depends on airflow and rooftop size, but a range of 0.10 inches to 0.30 inches can be expected. The openings on the rooftop all have a one inch lip around the perimeter to facilitate ductwork attachment. If relief/return fans are being used on an IntelliPak™ rooftop unit with horizontal return, provisions should be made for accessing the relief components, since the access door opening is now being used as a return duct opening. The return ductwork attachment to the rooftop can include a section of removable duct. Use the dimensions provided and the supply and relief cfm to calculate the velocity (ft/min) through the openings.

Downflow units can be converted to horizontal supply and/or return in the field with special field-supplied curbs that use the unit's standard discharge and return openings. The supply and return air is routed through the curb to horizontal openings on the sides of the curb.

Note: *90-130 ton horizontal return with a return fan must be handled through design specials. Fan airflow cannot be field converted.*

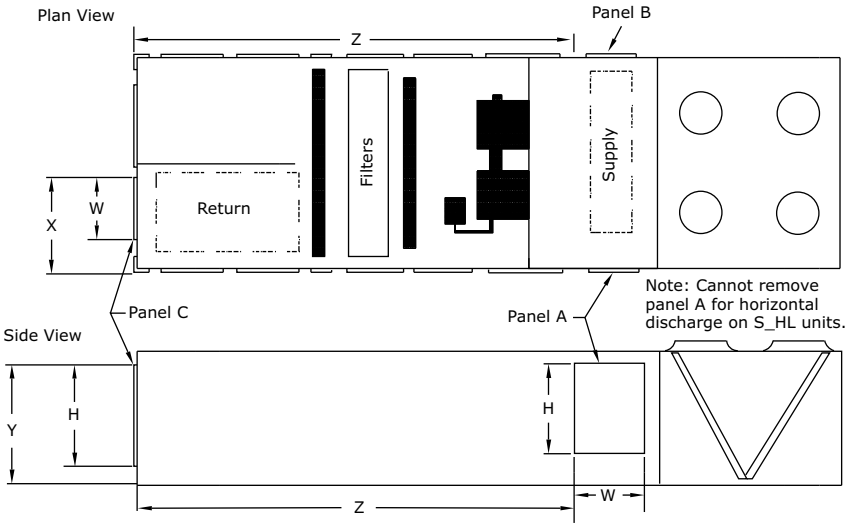
20 to 75 Ton Units

To supply air horizontally, the panels that normally house the heat accessory controls (Panel A) and the gas heat barometric dampers (Panel B) can be removed and either of the openings used as a unit discharge (see note 1). To return air horizontally, the relief fan access door (Panel C) can be removed and used as a return opening. Table 2, p. 30, Table 3, p. 31, and Table 4, p. 31 show dimensions for those panels (see note 4).

Note: *Horizontal discharge cannot be applied to SFHM 20-55 ton units with DDP fan.*

The SXHM (extended casing cooling only), SFHM (gas heat), SSHM (steam heat), and SLHM (hot water heat) rooftops can be factory modified for horizontal supply and return air without the use of a horizontal supply/return curb. To supply air horizontally on SXHM only, the panels that normally house the heat accessory controls (Panel A) and the gas heat barometric dampers (Panel B) can be removed and either of the openings used as a unit discharge. To return air horizontally, the relief fan access door (Panel C) can be removed and used as a return opening (see note 4).

Figure 4. Horizontal discharge panel dimensions – SXHM, SFHM, SLHM, SSHM units (20 to 75 tons)



Notes:

1. *For horizontal discharge on SFHM, SLHM and SSHM units, only the Panel B can be removed. Panel A cannot be used due to the location of the heating piping and components.*
2. *Add an extra 0.20-inches pressure drop to the supply external static to account for the extra turn the air is making.*
3. *The openings all have a 1.25-inch lip around the perimeter to facilitate ductwork attachment.*
4. *If relief fans are being used, provisions should be made for access to the relief components, since the access door is now being used as a return.*
5. *Use the dimensions provided and the supply cfm to calculate the velocity (ft/min) through the openings to be sure they are acceptable coils.*

Table 2. SXHM, SFHM, SSHM, SLHM – Panel A and B dimensions

Model	H (in.)[a]	W (in.)[a]	Total Area (H x W)	
			($in.^2$)	(ft^2)
S*HM *20	40.7	25.5	1038	7.2
S*HM *25	40.7	25.5	1038	7.2
S*HM *30	52.7	25.5	1344	9.3
S*HM *40	64.5	34.5	2225	15.5
S*HM *50	76.7	34.5	2646	18.4
S*HM *55	76.7	34.5	2646	18.4
S*HM *60	64.6	34.5	2229	15.5
S*HM *70	64.6	34.5	2229	15.5
S*HM *75	64.6	34.5	2229	15.5

Note: * = Universal letter/number. See model number for specifics.

[a] Dimensions include a 1.25 inch lip around perimeter. See Horizontal discharge panel dimensions, Note 3.

Table 3. SXHM, SFHM, SSHM, SLHM – Panel C dimensions

Model	H (in.)[a]	W (in.)[a]	Total Area (H x W)	
			($in.^2$)	(ft^2)
S*HM *20	40.7	34.5	1404	9.8
S*HM *25	40.7	34.5	1404	9.8
S*HM *30	52.7	34.5	1818	12.6
S*HM *40	64.5	34.5	2225	15.5
S*HM *50	76.7	34.5	2646	18.4
S*HM *55	76.7	34.5	2646	18.4
S*HM *60	64.6	34.5	2229	15.5
S*HM *70	64.6	34.5	2229	15.5
S*HM 75	64.6	34.5	2229	15.5

Note: * = Universal letter/number. See model number for specifics.

[a] Dimensions include a 1.25 inch lip around perimeter. See Horizontal discharge panel dimensions, Note 3.

Table 4. SXHM, SFHM, SSHM, SLHM – X, Y, and Z dimensions

Model	X (in.)	Y (in.)	Z (in.)
S*HM *20	43.5	44.0	201.5
S*HM *25	43.5	44.0	201.5
S*HM *30	43.5	56.0	201.5
S*HM *40	44.5	67.8	237.0
S*HM *50	44.5	80.0	237.0
S*HM *55	44.5	80.0	237.0
S*HM *60	44.5	68.0	237.5
S*HM *70	44.5	68.0	237.5
S*HM 75	44.5	68.0	237.5

Note: * = Universal letter/number. See model number for specifics.

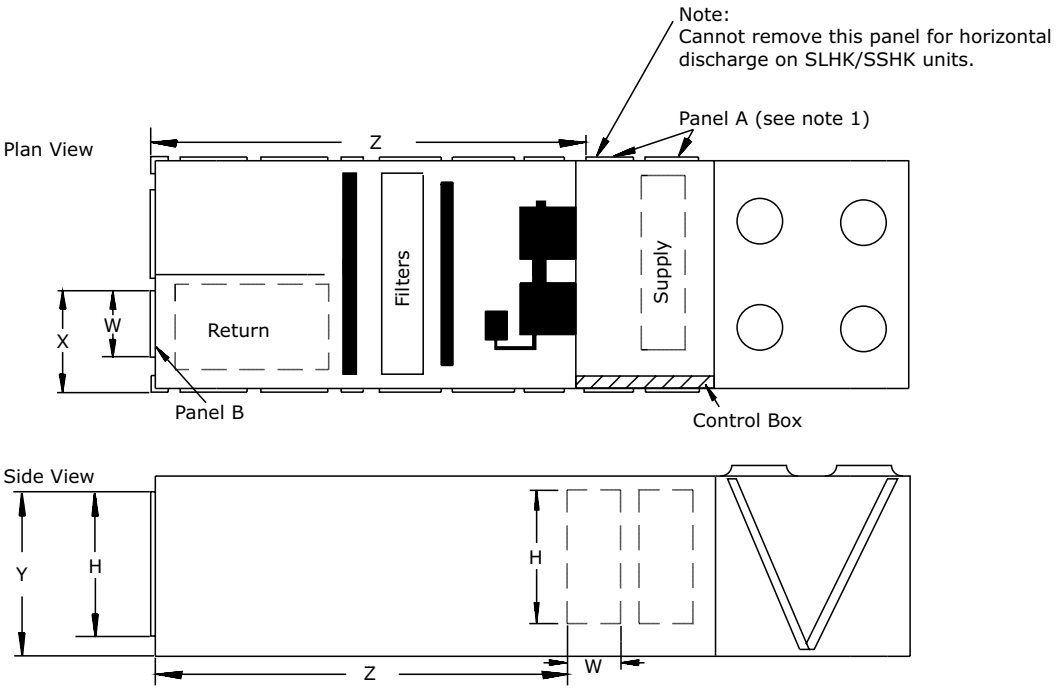
90 to 130 Ton Units

is a simplified sketch showing which panels can be used for horizontal supply and/or return. On 90 to 130 ton units, only one side of the extended casing may be used for horizontal supply because of the location of the unit control panel. There are, however, two panels on SXHL models (Panels A) on the side opposite the control box that can be removed along with the vertical support, which separates the two. Removal of the vertical support is optional, but will ensure maximum airflow. On SLHL and SSHL models, only one of the Panel As can be used for horizontal supply because of the location of the heating coil. Horizontal return is accomplished in much the same way as on S*HMs by removing the relief fan access door (Panel B). See Table 5, p. 32 and Table 6, p. 32 for S*HK panel dimensions (see note 4).

The SXHL, SLHL, SSHL rooftops can be factory modified to supply and return air horizontally without the use of a horizontal supply/return curb. To supply air horizontally, use panel A only. The panel on the opposite side cannot be used due to the location of the unit control panel. SXHL rooftop air conditioners do not have a panel configuration like the 20-89 ton rooftops.

To achieve maximum airflow, vertical support can be removed after the unit has been placed on the roof curb. It is secured by four screws. (See note 1) For horizontal discharge on SLHL and SSHL units, only the panel A next to the condenser fan section can be removed. The other panel A next to the supply fan cannot be used due to the location of the heating coils. To return air horizontally, the relief fan access door (panel B) can be removed and used as a return opening (see note 4).

Figure 5. Horizontal discharge panel dimensions – 90 to 130 tons SXHL, SLHL, SSHL units



Notes:

1. *SXHL units have two Panel As that can be removed. Once unit is installed, the panel(s) and the 6.5-inch vertical support channel in between can be removed.*
2. *Add an extra 0.20-inches pressure drop to the supply external static to account for the extra turn the air is making.*
3. *The openings all have a 1.25-inch lip around the perimeter to facilitate ductwork attachment.*
4. *If relief/return fans are being used, provisions should be made for access to the relief components, since the access door is now being used as a return.*
5. *Use the dimensions provided and the supply cfm to calculate the velocity (ft/min) through the openings to be sure they are acceptable coils.*

Table 5. SXHL, SLHL, SSHL - Panel A and B dimensions

Panel	H (in.)	W (in.)	Total Area (H X W)	
			($in.^2$)	(ft^2)
A	72.7	27.5	1999	13.9
B	72.7	32.0	2508	17.4

Table 6. SXHL, SLHL, SSHL - X, Y, Z dimensions

Model	X (in.)	Y (in.)	Z (in.)
S*HL 90-130	69.0	77.8	244.7

Note: Not available with gas or electric heat.

Seismic Requirements

For sites that have seismic requirements, certain IntelliPak configurations are able to meet IBC 2012 seismic compliance. Testing of the IntelliPak was performed in accordance with the following documents and regulations:

- 2012 International Building Code (IBC)

- ICC AC-156 2012, "Acceptance Criteria for Seismic Certification by Shake-Table Testing of Non-Structural Components."

Contact your Trane representative for more detail.

Acoustic Considerations

The best time to make provisions to reduce sound transmission to the occupied space is during the project design phase. Proper placement of rooftop equipment is critical to reducing sound transmitted into the building. The most economical means of avoiding an acoustical problem is to locate rooftop equipment away from acoustically-sensitive areas. If possible, locate rooftop equipment above corridors, utility rooms, restrooms, or other areas where higher sound levels are acceptable.

It is not possible to totally quantify the effect of the building structure on sound transmission, since this depends on the response of the roof and building members to the sound and vibration of the unit components. However, the following guidelines have been proven through experience to help reduce sound transmission through the building structure:

- Never cantilever the condensing section of the rooftop unit; a structural cross member must support this end of the unit.
- Locate the unit's center of gravity close to (or over) a column or main support beam to minimize roof deflection and vibration-related noise.
- If the roof structure is very light, roof joists should be replaced by a structural shape in the critical areas described above.
- If several units are to be placed on one span, they should be staggered to reduce deflection over that span.

In addition, the Trane Acoustics Program™ (TAP) allows for modeling of various sound paths to predict sound levels in the occupied space. The software models airborne sound from supply- and return-air paths, as well as duct breakout and roof transmission sound, so that the designer can identify potential sound problems and make design alterations before equipment installation. TAP is also capable of modeling the effect of outdoor sound on adjacent properties. This program is available at www.trane.com. Ask your local Trane representative for additional information.

Corrosive Atmospheres

Trane's IntelliPak™ Rooftops are designed and built to industrial standards and will perform to those standards for an extended period depending on the hours of use, the quality of maintenance performed, and the regularity of that maintenance.

One factor that can have an adverse effect on unit life is operation in a corrosive environment. Since the Microchannel condenser coil is an all-aluminum design, it provides a high level of corrosion protection on its own. Uncoated, it withstands a salt spray test in accordance with ASTM B117 for 1,000 hours. When rooftops are operated in highly corrosive environments, Trane recommends the corrosion protected condenser coil option.

This corrosion protection option meets the most stringent testing in the industry, including ASTM B117 Salt Spray test for 6,000 hours and ASTM G85 A2 Cyclic Acidified Salt Fog test for 2,400 hours. The acid fog test is the most stringent available today. This coating is added after coil construction covering all tubes, headers, fins and edges. The design provides superior protection from any corrosive agent.

IntelliPak paint innately handles harsh weather, including most coastal and salt environments and direct sun. The unit paint was salt spray tested in accordance with ASTM B117 and UV weathering resistance tested in accordance with ASTM G155 Test cycle 1 for 2000 hours. For further detail on the paint testing, refer to PROD-SLB034*-EN

Note: *Field coating is not allowed on Microchannel coils.*

Ventilation Override Sequences

Trane can provide five (5) different ventilation override sequences on IntelliPak™ rooftops. For convenience, the sequences are factory preset but are fully field edited from the user interface or Tracer TU. Any or all five sequences may be “locked” in by the user at the user interface.

Typically, a manual switch is used and located near the fire protection control panel. This enables the fire department access to the control for use during or after a fire. It is also possible to initiate the sequence from a field-installed automatic smoke detector. In either case, a contact closure begins the ventilation override control sequence.

The user can customize up to five (5) different override sequences for purposes such as smoke control. The following parameters within the unit can be defined for each of the five sequences:

- Supply Fan - on/off
- Variable Frequency Drives - on (60 Hz)/off (0 Hz)/controlling
- Relief/Return Fan - on/off
- Relief Air Dampers - open/closed
- Outdoor Air Dampers - open/closed
- Heat - off/controlling (output for) VAV Boxes - open/controlling

Compressors and condenser fans are shut down for any Ventilation Override sequence. Factory preset sequences include unit Off, Relief, Purge, Purge with duct pressure control, and Pressurization. Any of the user-defined Ventilation Override sequences can be initiated by closing a field supplied switch or contacts connected to an input on the Ventilation Override Module. If more than one ventilation override sequence is being requested, the sequence with the highest priority is initiated. Refer to the Ventilation Override Mode (VOM) information in the Control section of this catalog for more details on each override sequence.

Natural Gas Heating Considerations

Trane uses stainless steel throughout the construction of its IntelliPak™ natural gas drum and tube heat exchangers.

These heat exchangers can be applied with confidence, particularly with full modulation control, when mixed air temperatures are below 50°F, and low ambient temperatures can cause condensation to form on the heat exchanger. The natural gas heat exchangers are not recommended for applications with mixed air conditions entering the heat exchanger below 30°F to ensure adequate leaving air heating temperature. For airflow limitations and temperature rise across the heat exchanger information, see Natural Gas Heating Capacities table in Performance Data.

High Entering Return Temperature Applications

Some applications may have high entering return temperatures. It is recommended that the dry bulb temperatures in any application not exceed 95°F for extended periods of time. If this is a requirement, please work with the Applications or Product Support group in developing a specific assessment. Other factors, such as wet bulb and ambient temperatures, will also affect the system's reaction.

Modulating Hot Gas Reheat

Often supply fan VAV modulation, staged compressor control, or the addition of an eFlex™ variable speed compressor are sufficient in handling building humidity in a wide range of indoor load conditions. Applications where non-peak load conditions can be dominated by latent loads are candidates for the Hot Gas Reheat option. This includes many applications subject to ASHRAE Standard 62 requirements.

When a Hot Gas Reheat coil is energized, it increases the air temperature after exiting the evaporator coil. While this provides dehumidification, this is not a dehumidifier. The main function of the Packaged RTU is to provide zone temperature control. For times when dehumidification is needed, the hot gas reheat will be energized.

Applications which should be investigated before using the standard modulating hot gas reheat option, and will require additional investigation include the following:

- Process applications
- Units utilized as a make-up air or 100% outside air units
- Zones with dramatically varying load conditions (sanctuaries, locker rooms, gymnasiums, etc.

Generally, the standard Modulating Hot Gas Reheat option requires a call for cooling to initiate. If there is no call for cooling, and there is a desire for dehumidification, another solution will need to be

investigated. The IntelliPak™ packaged rooftop systems include non-standard solutions which can be considered for these types of applications.

IntelliPak™ Replacement Unit (IRU)

This option must be included when replacing an existing R-22 IntelliPak™ unit with the current R-410A design and is also applied when using a full perimeter curb with isolation. The IntelliPak™ rooftop replacement engineering bulletin RT-PRB027*-EN provides more detail on this.

Selection Procedure

This section outlines a step-by-step procedure that may be used to select a Trane air-cooled single-zone air conditioner. Air-cooled models should be selected based on dry bulb (DB) conditions. For specific model selection, utilize TSA or contact the local Trane Sales Office. This sample selection is based on the following conditions:

Summer Design	
Summer outdoor design conditions	95 DB/76 WB ambient temperature
Summer room design conditions	78 DB/64 WB
Total cooling load	430 MBh (35.8 tons)
Sensible cooling load	345 MBh (28.8 tons)
Outdoor air ventilation load	66.9 MBh
Return air temperature	80 DB/65 WB
Winter design:	
Winter outdoor design conditions	0°F
Return air temperature	70°F
Total heating load	475 MBh
Winter outdoor air ventilation load	133 MBh
Air delivery data:	
Supply fan CFM	17,500 CFM
External duct static pressure	1.2 in wg
Minimum outdoor air ventilation	1,750 CFM
Relief/Return fan CFM	12,000 CFM
Return air duct negative static pressure	0.65 in wg
Electrical characteristics:	
Voltage/cycle/phase	460/60/3
Unit Accessories	• Gas fired heat exchanger - high heat module • Throwaway filters • Economizer • Modulating 100% relief/return fan

Cooling Capacity Selection

1. Determine nominal unit size selection

   A summation of the peak cooling load and the outside air ventilation load shows: 430 MBh + 66.9 MBh = 496.9 MBh required unit capacity.Table 27, p. 66, a 50 ton unit capacity with standard efficiency evaporator coil at 80 DB/65WB, 95°F outdoor air temperature and 17,500 total supply CFM is 581 MBh total and 430 MBh sensible. Thus, a nominal 50 ton unit with standard efficiency is selected.

2. Determine evaporator coil entering conditions

   Mixed air dry bulb temperature determination:

   Using the minimum percent of OA (1,750 CFM ÷ 17,500 CFM = 10 percent), determine the mixture dry bulb to the evaporator.

   RADB + % OA (OADB - RADB) = 80 + (0.10) (95 - 80) = 80 + 1.5 = 81.5°F

   Approximate wet bulb mixture temperature:

AWB + % OA (OAWB - RAWB) = 65 + (0.10) (76 - 65) = 65 + 1.1 = 66.1°F

3. Determine supply fan motor heat gain

   Having selected a nominal 50 ton unit, the supply fan bhp can be calculated. The supply fan motor heat gain must be considered in final determination of unit capacity.

   Determine unit total static pressure (Table 55, p. 111) at design supply CFM:

Table 7. Determine unit total static pressure at design supply CFM

Supply Air Fan	
Supply Duct Static Pressure	1.20 inches
Evaporator Coil	0.60 inches
Return Duct Negative Static Pressure	0.65 inches
Heat Exchanger	0.31 inches
Throwaway Filter	0.10 inches
Economizer w/ relief Fan	0.12 inches
Trane® Roof Curb	0.13 inches
Unit Total Static Pressure	3.11 inches

   Using total of 17,500 CFM and total static pressure of 3.11 inches, estimate the bhp and rpm using the fan curve in Figure 14, p. 96, for an FC fan. The bhp is 16 at 989 rpm. Similarly, a DDP fan can be selected using Figure 18, p. 100, or Figure 19, p. 101.

   From Figure 6, p. 38, supply fan motor heat gain = 44 MBh.

4. Determine total required cooling capacity

   Required capacity = Total peak load + OA load + supply air fan motor heat.

   Required capacity = 430 + 66.9 + 44 = 540.9 MBh (45.1 tons)

5. Determine unit capacity

   From Table 27, p. 66 , unit capacity at 81.5 DB/66.1WB entering the evaporator, 17,500 supply air CFM, 95°F outdoor ambient, is 575 MBh (47.9 tons) with 475 MBh sensible.

6. Determine leaving air temperature

   Unit sensible heat capacity corrected for supply air fan motor heat = 475 MBh - 44 MBh = 431 MBh. Supply air dry bulb temperature difference =

$$\frac{\text{Sensible Btu}}{\text{1.085 x Supply CFM}} =$$

   431 MBh ÷ (1.085 x 17,500 CFM) = 22.7°F

   Supply air dry bulb = 81.5 DB - 22.7 = 58.8°F

   Unit enthalpy difference =

$$\frac{\text{Total Btu}}{\text{4.5 x Supply CFM}} =$$

   575 MBh ÷ (4.5 x 17,500 CFM) = 7.3 Btu/lb

   Leaving enthalpy = h(ent WB) - h(diff). From Table 14, p. 54 h(ent WB) = 30.9 Btu/lb

   Leaving enthalpy = 30.9 Btu/lb - 7.3 Btu/lb = 23.6 Btu/lb

   Supply air wet bulb = 55.6

   Leaving air temperature = 59.2 DB/55.6WB

Heating Capacity Selection

1. Determine air temperature entering heating module

   Mixed air temperature = RADB + % OA (OADB - RADB) = 70 + (0.10) (0 - 70) = 63°F

   Supply air fan motor heat temperature rise = 51,900 Btu ÷ (1.085 x 17,500 CFM) = 2.73°F

   Air temperature entering heating module = 63.0 + 2.73 = 65.7°F

2. Determine total winter heating load

   Total winter heating load = peak heating load + ventilation load - supply fan motor heat = 475 + 133 - 51.9 = 556.1 MBh

   a. Electric heating system

      Unit operating on 460/60/3 power supply.

      From Table 53, p. 88, kW may be selected for a nominal 50 ton unit operating 460-volt power. The 170 kW heat module (580.1 MBh) will satisfy the winter heating load of 563 MBh.

      Unit supply temperature at design heating conditions = mixed air temperature + air temperature rise = 65.7°F + 30.6°F = 96.3°F.

      Table 51, p. 88 shows an air temperature rise of 30.6°F for 17,500 CFM through the 170 kW heat module.

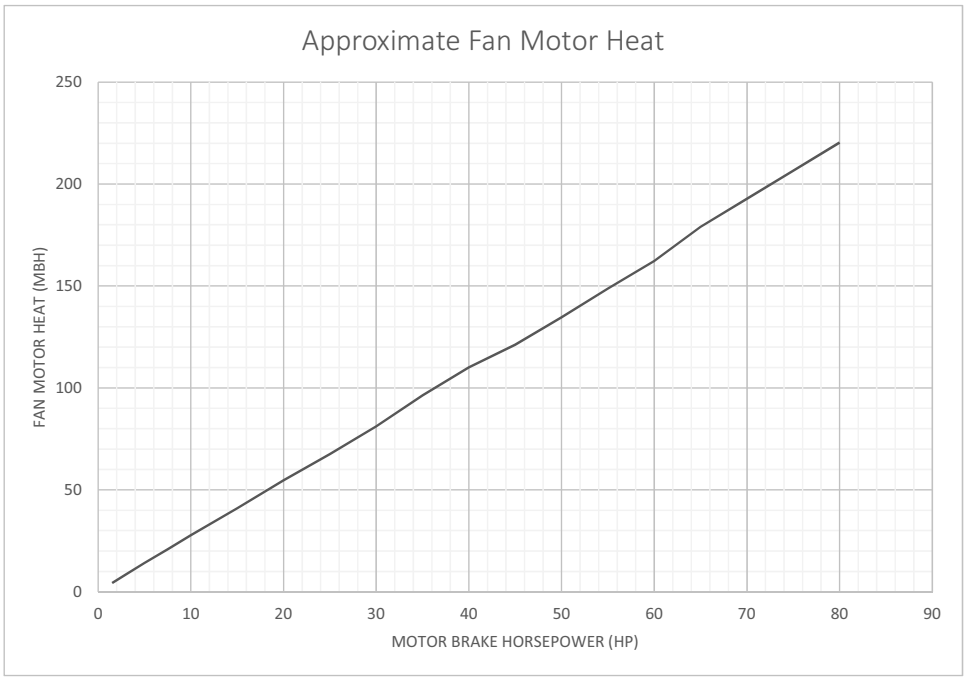
   b. Gas heating system (natural gas)

      From Table 47, p. 86 select the high heat module (688.5 MBh output) to satisfy winter heating load of 563 MBh at unit CFM.

      Table 47, p. 86 also shows an air temperature rise of 36.3°F for 17,500 CFM through the heating module.

      Unit supply temperature at design heating conditions = mixed air temperature + air temperature rise = 65.7°F + 36.3°F = 102.0°F.

      Figure 6. Fan motor



   c. Hot water heating

      Assume a hot water supply temperature of 190°F. Subtract the mixed air temperature from the hot water temperature to determine the ITD (initial temperature difference).

      ITD = 190°F - 65.7°F = 126°F. Divide the winter heating load by ITD = 563 MBh ÷ 126°F = 4.50

Q/ITD.

From Table 54, p. 89, select the low heat module. By interpolation, a Q/ITD of 4.50 can be obtained at a gpm at 25.7.

Water pressure drop at 25.7 gpm is 0.57 ft. of water. Heat module temperature rise is determined by:

$$\frac{\text{Total Btu}}{1.085 \times \text{Supply CFM}} = \Delta T$$

$$\frac{563{,}000}{1.085 \times 17{,}500} = 29.7°F$$

Unit supply air temperature = mixed air temperature + air temperature rise = 65.7 + 29.7 = 95°F.

d. Steam heating system

Assume a 15 psig steam supply.

From Table 50, p. 87, the saturated temperature steam is 250°F. Subtract mixed air temperature from the steam temperature to determine ITD. ITD = 250°F - 65.7°F = 186°F.

Divide winter heating load by ITD = 563 MBh ÷ 186°F = 3.03 Q/ITD.

From Table 49, p. 87, select the high heat module. The high heat module at 17,500 CFM has a Q/ITD = 5.11.

Heat module capacity, Q = ITD x Q/ITD = 186 F x 5.11 Q/ITD = 950 MBh

Heat module air temperature rise

$$\frac{\text{Total Btu}}{1.085 \times \text{Supply CFM}} = \Delta T$$

945 Btu ÷ (1.085 x 17,500 CFM) = 50°F.

Unit supply temperature at design conditions = mixed air temperature + air temperature rise = 65.1°F + 50°F = 116°F.

Air Delivery Procedure

Supply fan performance curves include internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drop (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).

Supply Fan Motor Sizing

The supply fan motor selected in the cooling capacity determination was 16 bhp and 989 rpm. Thus, a 20 hp supply fan motor is selected. For an FC fan selection, enter Table 58, p. 113 to select the proper drive. For a 50 ton rooftop with 20 hp motor, a drive number A - 1000 rpm is selected.

Relief Fan Motor Sizing

The relief fan is selected based on total return system negative static pressure and relief fan CFM. Return system negative static include return duct static and roof curb static pressure drop.

Return duct static pressure = 0.65 inches

Trane® roof curb (Table 55, p. 111) = 0.12 inches

Total return system negative static pressure = 0.77 inches

Relief fan CFM = 12,000 CFM

From , the required bhp is 3.45 hp at 574 rpm. Thus, the relief fan motor selected is 5 hp.

To select a drive, enter Table 63, p. 115 for a 5 hp motor for a 50 ton unit. Drive selection number 6 - 600 rpm.

Where altitudes are significantly above sea level, use , and Table 16, p. 55 and Figure 7, p. 55 for applicable correction factors.

Return Fan Motor Sizing

The return fan is selected based on the return fan CFM and the total return system negative static pressure. The return system negative static includes the return duct static, the relief damper pressure drop, and any roof curb static pressure drop.

Since return fans handle all of the return static, supply fan motor sizing does not need to include this value. This feature is helpful if the supply motor HP is over the maximum limit and in some cases, can allow supply motor downsizing.

However, since the return fan runs continuously to handle all of the return static, the sensible heat generated by the motor must be included in the entering evaporator coil mixed temperature equation.

Return Duct Static Pressure = 0.65

Roof curb Static Pressure (Table 55, p. 111) = 0.12

Relief Damper Pressure Drop = 0.41

Total Return System Static Pressure = 1.18

Return Fan CFM = 12000

From , the required bhp is 4.55. Thus the return fan is selected at 5HP. To select a drive, look at table Table 68, p. 119 for a 5HP return motor on a 50 HP unit. Drive selection number C - 1200.

Using Figure 6, p. 38 for fan motor heat, motor heat for 4.55 BHP = 10.4 MBh

10.4 MBh / (1.085 x 12000 return fan CFM) = 0.80°F

0.80°F is added to the return air temperature

Modulating Hot Gas Reheat Selection

The hot gas reheat coil is designed to deliver maximum reheat temperatures. Contact the local Trane Sales Office or refer to the IntelliPak™ Trane Select Assist (TSA) program to determine leaving air temperature, latent capacity, reheat sensible capacity, leaving unit dew point, and moisture removal when the unit is in reheat operation. If the reheat setpoint is not obtainable at the provided conditions the customer will be required to make adjustments to the conditions or change the reheat setpoint value. Please note that reheat operation will not be allowed when there is a call for heating or more than 50% call for cooling.

Unit Electrical Requirements

Selection procedures for electrical requirements for wire sizing amps and maximum overcurrent protection devices sizing are given in the electrical service section of this catalog.

Altitude Corrections

The rooftop performance tables and curves of this catalog are based on standard air (.075 lbs/ft). If the rooftop airflow requirements are at other than standard conditions (sea level), an air density correction is needed to project accurate unit performance.

Figure 7, p. 55 shows the air density ratio at various temperatures and elevations. Trane® rooftops are designed to operate between 40 and 90 degrees Fahrenheit leaving air temperature. The procedure to use when selecting a supply or relief fan on a rooftop for elevations and temperatures other than standard is as follows:

1. First, determine the air density ratio using Figure 7, p. 55.
2. Divide the static pressure at the nonstandard condition by the air density ratio to obtain the corrected static pressure.
3. Use the actual CFM and the corrected static pressure to determine the fan rpm and bhp from the rooftop performance tables or curves.

4. The fan rpm is correct as selected.
5. Bhp must be multiplied by the air density ratio to obtain the actual operating bhp.

   In order to better illustrate this procedure, the following example is used:

   Consider a 60 ton rooftop unit that is to deliver 18,000 actual CFM at 3-inches total static pressure (tsp), 55°F leaving air temperature, at an elevation of 5,000 ft. From Figure 7, p. 55, the air density ratio is 0.86.

   The rpm is correct as selected - 906 rpm.

   From the performance tables: a 60 ton rooftop will deliver 18,000 CFM at 3.49-inches tsp at 992 rpm and 26.1 bhp.

   Tsp = 3.0-inches / 0.86 = 3.49 inches tsp.

   Bhp = 26.1 x 0.86 = 22.4 bhp actual.

   Compressor MBh, SHR, and kW should be calculated at standard and then converted to actual using the correction factors in . Apply these factors to the capacities selected at standard CFM so as to correct for the reduced mass flow rate across the condenser. Heat selections other than gas heat will not be affected by altitude. Nominal gas capacity (output) should be multiplied by the factors given in Table 16, p. 55 before calculating the heating supply air temperature.

Model Number Description

20 to 75 Tons, Air Cooled

Digit 1 — Unit Type

S = Self-Contained (Packaged Rooftop)

Digit 2 — Unit Function

A = DX Cooling, No Heat
E = DX Cooling, Electric Heat
F = DX Cooling, Natural Gas Heat
L = DX Cooling, Hot Water Heat
S = DX Cooling, Steam Heat
X = DX Cooling, No Heat, Extended Casing

Digit 3 — System Type

H = Single Zone

Digit 4 — Development Sequence

M = Sixth

Digit 5, 6, 7 — Nominal Capacity

***20** = 20 Ton Air Cooled
***25** = 25 Ton Air Cooled
***30** = 30 Ton Air Cooled
***40** = 40 Ton Air Cooled
***50** = 50 Ton Air Cooled
***55** = 55 Ton Air Cooled
***60** = 60 Ton Air Cooled
***70** = 70 Ton Air Cooled
***75** = 75 Ton Air Cooled

Digit 8 — Voltage Selection

4 = 460/60/3 XL
5 = 575/60/3 XL
C = 380/50/3 XL
D = 415/50/3 XL
E = 200/60/3 XL
F = 230/60/3 XL

Note: *SEH units (units with electric heat) utilizing 200V or 230V require dual power source.*

Digit 9 — Heating Capacity

Note: *When the second digit is "F" (Gas Heat), the following applies: (M and T are available ONLY on 50 ton and above).*

H = High Heat — 2-Stage
K = Low Heat — Ultra Modulating
L = Low Heat — 2-Stage
M = Low Heat — Modulating
0 = No Heat
P = High Heat — Modulating
T = High Heat — Ultra Modulating

Note: *When the second digit is "E" (Electric Heat), the following applies:*

D = 30 kW
H = 50 kW
L = 70 kW
N = 90 kW
Q = 110 kW
R = 130 kW
U = 150 kW
V = 170 kW
W = 190 kW

Note: *When the second digit is "L" (Hot Water) or "S" (Steam) Heat, one of the following valve size values must be in Digit 9:*

High Heat Coil
1 = 0.50 inch
2 = 0.75 inch
3 = 1.00 inch
4 = 1.25 inches
5 = 1.50 inches
6 = 2.00 inches

Low Heat Coil
A = 0.50 inch
B = 0.75 inch
C = 1.00 inch
D = 1.25 inches
E = 1.50 inches
F = 2.00 inches

Digit 10 — Design Sequence

* = Current

Note: *Sequence may be any letter A through Z, or any digit 1 through 9.*

Digit 11— Relief/Return Option

0 = None
1 = Barometric
3 = Relief 3 HP with Statitrac
4 = Relief 5 HP with Statitrac
5 = Relief 7.5 HP with Statitrac
6 = Relief 10 HP with Statitrac
7 = Relief 15 HP with Statitrac
8 = Relief 20 HP with Statitrac
9 = Return 3 HP with Statitrac
M = Return 5 HP with Statitrac
N = Return 7.5 HP with Statitrac
P = Return 10 HP with Statitrac
R = Return 15 HP with Statitrac
T = Return 20 HP with Statitrac

Digit 12— Relief/Return Air Fan Drive

(Relief/Return Fan)
0 = None
4 = 400 RPM
5 = 500 RPM
6 = 600 RPM
7 = 700 RPM
8 = 800 RPM
9 = 900 RPM
A = 1000 RPM
B = 1100 RPM
(Return Fan Only)
C = 1200 RPM
D = 1300 RPM
E = 1400 RPM
F = 1500 RPM
G = 1600 RPM
H = 1700 RPM
J = 1800 RPM
K = 1900 RPM

Digit 13 — Filter (Pre DX/Final)

A = Throwaway
B = Cleanable Wire Mesh
C = High Efficiency Throwaway
D = Bag with Prefilter
E = Cartridge with Prefilter
F = Throwaway Filter Rack (Filter not included)
G = Bag Filter Rack (Filter Not Included)
H = Standard Throwaway Filter/Cartridge Final Filters
J = High Efficiency Throwaway Filter/Cartridge Final Filters

Digit 13 — Filter (Pre DX/Final) (continued)

K = Bag Filters with 2–inch Throwaway Prefilters/ Cartridge Final Filters
L = Cartridge Filters with 2–inch Throwaway Prefilters /Cartridge Final Filters
M = Standard Throwaway Filter/Cartridge Final Filters with 2"Throwaway Prefilters
N = High Efficiency Throwaway Filters/Cartridge Final Filters with 2"Throwaway Prefilters
P = Bag Filters with Prefilters/Cartridge Final Filters with 2–inch Throwaway Prefilters
Q = Cartridge Filters with Prefilters/Cartridge Final Filters with 2–inch Throwaway Prefilters
R = High Efficiency Throwaway/Final filter rack (no filters)
T = 2 inch and 1 inch Vertical Filter Rack (no filters) /Final Filter Rack (no filters)

Digit 14 — Supply Air Fan HP

1 = 3 HP FC
2 = 5 HP FC
3 = 7.5 HP FC
4 = 10 HP FC
5 = 15 HP FC
6 = 20 HP FC
7 = 25 HP FC
8 = 30 HP FC
9 = 40 HP FC
A = 50 HP FC
B = 3 HP DDP 80W
C = 3 HP DDP 120W
D = 5 HP DDP 80W
E = 5 HP DDP 120W
F = 7.5 HP DDP 80W
G = 7.5 HP DDP 120W
H = 10 HP DDP 80W (60-75T = 2 x 5 HP)
J = 10 HP DDP 100 or 120W (60-75T = 2 x 5 HP)
K = 15 HP DDP 80W (60-75T = 2 x 7.5 HP)
L = 15 HP DDP 100 or 120W (60-75T = 2 x 7.5 HP)
M = 20 HP DDP 80W (60-75T = 2 x 10 HP)
N = 20 HP DDP 100 or 120W (60-75T = 2 x 10 HP)
P = 25 HP DDP 80W
R = 25 HP DDP 120W
T = 30 HP DDP 80W (60-75T = 2 x 15 HP)
U = 30 HP DDP 120W (60-75T = 2 x 15 HP)
V = 40 HP DDP 80W(60-75T = 2 x 20 HP)
W = 40 HP DDP 100 or 120W (60-75T = 2 x 20 HP)
X = 50 HP DDP 80W (70-75T = 2 x 25 HP)
Y = 50 HP DDP 100 or 120W (70–75T = 2 x 25 HP)
Z = 30 HP DDP 100W (60-75T = 2 x 15 HP)

Digit 15 — Supply Air Fan RPM

4 = 400 RPM
5 = 500 RPM
6 = 600 RPM
7 = 700 RPM
8 = 800 RPM
9 = 900 RPM
A = 1000 RPM
B = 1100 RPM
C = 1200 RPM
D = 1300 RPM
E = 1400 RPM
F = 1500 RPM
G = 1600 RPM
H = 1700 RPM
J = 1800 RPM
K = 1900 RPM
L = 2000 RPM
M = 2100 RPM
N = 2200 RPM
P = 2300 RPM
R = 2400 RPM

Digit 16 — Outside Air

A = No Fresh Air
B = 0-25% Manual
D = 0-100% Economizer
E = 0-100% Economizer with Traq/DCV
F = 0-100% Economizer with DCV

Note: *Must install CO_2 sensor(s) for DCV to function properly.*

Digit 17 — System Control

6 = VAV Discharge Temp Control with VFD without Bypass
7 = VAV Discharge Temp Control with VFD and Bypass
8 = VAV Discharge Temp Control Supply and Relief/Return Fan with VFD without Bypass
9 = VAV Discharge Temp Control Supply and Relief/Return Fan with VFD and Bypass
A = VAV - Single Zone VAV - with VFD without Bypass
B = VAV - Single Zone VAV - with VFD and Bypass
C = VAV - Single Zone VAV - Supply and Relief/ Return Fan with VFD without Bypass
D = VAV - Single Zone VAV - Supply and Relief/ Return Fan with VFD with Bypass

Digit 18 — Zone Sensor

0 = None
A = Dual Setpoint Manual or Auto Changeover (BAYSENS108*)
C = Room Sensor w/ Override/Cancel Buttons (BAYSENS073*)
D = Room Sensor w/ Temp Adjustment/Override/ Cancel Buttons (BAYSENS074*)
L = Programmable Zone Sensor w/ System Function Modes for SZVAV/VAV (BAYSENS800*)

Note: **Asterisk indicates current model number digit. These sensors can be ordered to ship with the unit.*

Digit 19 — Ambient Control

0 = Standard
1 = 0° Fahrenheit

Digit 20 — Agency Approval

0 = None (cULus Gas Heater, see note)
1 = cULus

Note: *Includes cULus classified gas heating section only when second digit is a "F."*

Digit 21 — Miscellaneous Options

0 = Unit Mounted Terminal Block
A = Unit Mounted Disconnect Switch
B = Unit Mounted Disconnect Switch with High Fault SCCR
D = Unit Mounted Disconnect Switch with Convenience Outlet
E = Unit Mounted Disconnect Switch with High Fault SCCR and Convenience Outlet

Digit 22 — Refrigeration Options

0 = Without Hot Gas Bypass
B = Hot Gas Bypass
C = Hot Gas Reheat without Hot Gas Bypass
D = Hot Gas Reheat and Hot Gas Bypass

Model Number Description

Digit 23 — Economizer Control Options

O = Without Economizer
C = Economizer Control with Comparative Enthalpy
D = Economizer with Differential Dry Bulb
Z = Economizer Control with Reference Enthalpy
W = Economizer Control with Dry Bulb

Digit 24 — Damper Options

E = Low Leak Economizer Dampers
U = Ultra Low Leak Economizer Dampers and Ultra Low Leak motorized relief dampers when relief/ return option includes motorized dampers

Digit 25 — Power Meter

0 = None
P = Power Meter

Digit 26 — Efficiency Options

0 = Standard Efficiency Unit
H = High Efficiency Unit
V = eFlex™ Variable Speed Compressor

Digit 27 — Condenser Options

0 = Standard Aluminum Condenser Coil
J = Corrosion Protected Condenser Coil

Digit 28 — Rapid Restart

0 = Standard Restart
R = Rapid Restart

Digit 29 — Miscellaneous Options

0 = Motors without Internal Shaft Grounding
A = Motors with Internal Shaft Grounding

Digit 30 — Expansion Module

0 = None
E = Expansion Module

Digit 31 — Miscellaneous Options

N = Ventilation Override Module

Digit 32 — Service Options

0 = None
R = Extended Grease Lines
3 = Stainless Steel Sloped Drain Pan
4 = Stainless Steel Sloped Drain Pan with Grease Lines

Digit 33 — Cabinet Options

0 = Standard Panels
1 = Standard Panels with Double Wall
T = Hinged Access Doors
2 = Hinged Access Doors with Double Wall
U = IRU - with Standard Panels
3 = IRU - with Standard Panels with Double Wall
W = IRU - with Hinged Access Doors
4 = IRU - with Hinged Access Doors with Double Wall
Y = IRU with SST - with Standard Panels
5 = IRU with SST - with Standard Panels with Double Wall
Z = IRU with SST - with Hinged Access Doors
6 = IRU with SST - with Hinged Access Doors with Double Wall

Digit 34 — Filter Monitor

0 = None
1 = Pre-Evaporator
2 = Pre-Evaporator and Final Filter

Digit 35 — BAS/Communication Options

0 = None
7 = Trane LonTalk Communication Interface Module
8 = Modbus®
M = BACNet® Communications Interface
W = Air-Fi® Wireless

Digit 36 — Isolators

8 = Spring Isolators

Digit 37 —Airflow

A = Downflow Supply/Upflow Return
B = Horizontal Right Supply/ Horizontal End Return
C = Horizontal Right Supply/Upflow Return
E = Downflow Supply/Horizontal End Return

Digit 38 — Miscellaneous Options

A = Supply Fan Piezometer
B = Supply Isolation damper
C = Return Isolation damper
D = Both Supply and Return Isolation damper
E = Piezometer with Supply Isolation damper
F = Piezometer with Return Isolation damper
G = Piezometer with both Supply and Return Isolation damper

90 to 130 Tons, Air Cooled

Digit 1 — Unit Type

S = Self-Contained (Packaged Rooftop)

Digit 2 — Unit Function

E = DX Cooling, Electric Heat
F = DX Cooling, Natural Gas Heat
L = DX Cooling, Hot Water Heat
S = DX Cooling, Steam Heat
X = DX Cooling, No Heat, Extended Casing

Digit 3 — System Type

H = Single Zone

Digit 4 — Development Sequence

L = R-410A Development Sequence

Digit 5, 6, 7 — Nominal Capacity

***90** = 90 Ton Air Cooled
***11** = 105 Ton Air Cooled
***12** = 115 Ton Air Cooled
***13** = 130 Ton Air Cooled

Digit 8 — Power Supply

4 = 460/60/3 XL
5 = 575/60/3 XL

Digit 9 — Heating Capacity

Note: *When Digit 2 is "F" (Gas Heat), the following values apply in Digit 9:*

H = High Heat – 2-stage
O = No Heat
P = High Heat — Modulation
T = High Heat—Ultra Modulation

Note: *When the second digit calls for "E" (electric heat), the following values apply in Digit 9:*

W = 190 kW

Note: *When the second digit calls for "L" (hot water) or "S" (steam) heat, one of the following valve size values must be in Digit 9:*

High Heat Coil: 3 = 1", 4 = 1.25", 5 = 1.5", 6 = 2", 7 = 2.5"

Low Heat Coil: C = 1", D = 1.25", E = 1.5", F = 2", G = 2.5"

Digit 10 — Design Sequence

***** = Current

Note: *Sequence may be any letter A through Z, or any digit 1 through 9.*

Digit 11 — Relief Option

0 = None
7 = 100% Relief 15 HP with Statitrac
8 = 100% Relief 20 HP with Statitrac
9 = 100% Relief 25 HP with Statitrac
H = 100% Relief 30 HP with Statitrac
J = 100% Relief 40 HP with Statitrac

Digit 12 — Relief Fan

(Relief Fan)
0 = None
5 = 500 RPM
6 = 600 RPM
7 = 700 RPM
8 = 800 RPM

Digit 13 — Filter (Pre DX/Final)

A = Throwaway
C = High Efficiency Throwaway
D = Bag with Prefilter
E = Cartridge with Prefilter
F = Throwaway Filter Rack (filter not included)
G = Bag Filter Rack (Filter Not Included)
H = StandardThrowaway Filter/Cartridge Final Filters
J = High Efficiency Throwaway Filter/Cartridge Final Filters
K = Bag Filters with 2"Throwaway Prefilters/ Cartridge Final Filters
L = Cartridge Filters with 2"Throwaway Prefilters /Cartridge Final Filters
M = StandardThrowaway Filter/Cartridge Final Filters with 2–inch Throwaway Prefilters
N = High EfficiencyThrowaway Filters/Cartridge Final Filters with 2–inch Throwaway Prefilters
P = Bag Filters with Prefilters Cartridge Final Filters with 2–inch Throwaway Prefilters
Q = Cartridge Filters with Prefilters/Cartridge Final Filters with 2–inch Throwaway Prefilters

Digit 14 — Supply Air Fan HP

C = 30 HP (2x15 HP)
D = 40 HP (2x20 HP)
E = 50 HP (2x25 HP)
F = 60 HP (2x30 HP)
G = 80 HP (2x40 HP)

Digit 15 — Supply Air Fan Drive

A = 1000 RPM
B = 1100 RPM
C = 1200 RPM
D = 1300 RPM
E = 1400 RPM
F = 1500 RPM
G = 1600 RPM

Digit 16 — Outside Air

D = 0-100% Economizer (Std.)
E = 0-100% Economizer with Traq with DCV
F = 0-100% Economizer with DCV

Note: *Must install CO_2 sensor(s) for DCV to function properly.*

Digit 17 — System Control

6 = VAV Discharge Temperature Control with VFD without Bypass
7 = VAV Discharge Temperature Control with VFD and Bypass
8 = VAV Discharge Temperature Control Supply and ReliefFan with VFD without Bypass
9 = VAV Discharge Temperature Control Supply and Relief Fan with VFD and Bypass
A = VAV – Single Zone VAV – with VFD without Bypass
B = VAV – Single Zone VAV – with VFD with Bypass
C = VAV – Single Zone VAV – Supply and Relief/ Return Fan with VFD without Bypass
D = VAV – Single Zone VAV – Supply and Relief/ Return Fan with VFD with Bypass

Digit 18 — Zone Sensor

0 = None
A = Dual Setpoint Manual or Auto Changeover (BAYSENS108*)
C = Room Sensor with Override and Cancel Buttons (BAYSENS073*)
D = Room Sensor with Temperature Adjustment and Override and Cancel Buttons (BAYSENS074*)
L = Programmable Zone Sensor with System Function Modes for VAV (BAYSENS800*)

Note: **Asterisk indicates current model number digit A, B, C, etc. These sensors can be ordered to ship with the unit.*

Model Number Description

Digit 19 — Ambient Control

0 = Standard
1 = 0° Fahrenheit

Digit 20 — Agency Approval

0 = None (cULus Gas Heater, see note)
1 = cULus

Note: *Includes cULus classified gas heating section only when second digit of Model No. is a "F."*

Digit 21 — Miscellaneous

0 = Unit Mounted Terminal Block
A = Unit Mounted Disconnect Switch
B = Unit Mounted Disconnect Switch with High Fault SCCR
D = Unit Mounted Disconnect Switch with Convenience Outlet
E = Unit Mounted Disconnect Switch with High Fault SCCR and Convenience Outlet

Digit 22 — Refrigeration Options

0 = Without Hot Gas Bypass
B = Hot Gas Bypass

Digit 23 — Economizer Control Options

C = Economizer Control with Comparative Enthalpy
D = Economizer with Differential Dry Bulb
Z = Economizer Control with Reference Enthalpy
W = Economizer Control with Dry Bulb

Digit 24 — Damper Options

0 = Standard Dampers
E = Low Leak Economizer Dampers
U = Ultra Low Leak Economizer Dampers and Ultra Low Leak motorized relief dampers

Digit 25 — Power Meter

0 = None
1 = Power Meter

Digit 26 — Efficiency Options

0 = Standard Efficiency Unit
H = High Efficiency Unit

Digit 27 — Condenser Coil Options

0 = Air Cooled Aluminum Condenser Coil
J = Corrosion-Protected Condenser Coil

Digit 28 — Rapid Restart

0 = Non-Rapid Restart
R = Rapid Restart

Digit 29 — Miscellaneous

0 = Motors without Internal Shaft Grounding
A = Motors with Internal Shaft Grounding

Digit 30 — Expansion Module

0 = None
E = Expansion Module

Digit 31 — Miscellaneous

N = Ventilation Override Module

Digit 32 — Service Options

0 = None
R = Extended Grease Lines
3 = Stainless Steel Sloped Drain Pan
4 = Stainless Steel Sloped Drain Pan with Grease Lines

Digit 33 — Cabinet Options

0 = Standard Panels
1 = Standard Panels with Double Wall
T = Hinged Access Doors
2 = Hinged Access Doors with Double Wall
U = IRU - with Standard Panels
3 = IRU - with Standard Panels with Double Wall
W = IRU - with Hinged Access Doors
4 = IRU - with Hinged Access Doors with Double Wall
Y = IRU with SST - with Standard Panels
5 = IRU with SST - with Standard Panels with Double Wall
Z = IRU with SST - with Hinged Access Doors
6 = IRU with SST - with Hinged Access Doors with Double Wall

Digit 34 — Filter Monitor

0 = None
1 = Pre-Evaporator
2 = Pre-Evaporator and Final Filter

Digit 35 — BAS/Communication Options

0 = None
7 = Trane LonTalk Communication Interface Module
8 = ModBus®
M = BACnet® Communication Interface (BCI) Module
W = Air-Fi® Wireless

Digit 36 — Isolators

8 = Spring Isolators

Digit 37 —Airflow

A = Downflow Supply/Upflow Return
B = Horizontal Right Supply/ Horizontal End Return
C = Horizontal Right Supply/Upflow Return
E = Downflow Supply/Horizontal End Return

General Data

Table 8. General data - 20 to 50 tons

	20 Ton	25 Ton	30 ton	40 Ton	50 Ton
Compressor Data - Standard Capacity[a]					
Number/Size (Nominal)		1/6.2, 2/9.2	1/6.2, 2/10	1/7.7, 3/9.2	4/10.4
Model		Scroll	Scroll	Scroll	Scroll
Unit Capacity Steps (%)		100/75/63/37/25	100/76/62/38/24	100/74/48/22	100/75/50/25
No. of Circuits		1	1	2	2
Compressor Data - High Efficiency[a]					
Number/Size (Nominal)		1/15.25, 1/10.29	1/6.2, 2/10	3/7.7, 1/9.2	2/10.4, 2/11.8
Model		Scroll	Scroll	Scroll	Scroll
Unit Capacity Steps (%)		100/83/60/40/23	100/76/62/38/24	100/72/48/24	100/73/47/23
No. of Circuits		1	1	2	2
Compressor Data - eFlex Variable Speed[a]					
Number/Size (Nominal)	1/3-13 VS, 1/9.2	1/3-13 VS, 1/10.4	1/4-17 VS, 1/13.4	1/4-17 VS, 2/9.2	1/6-25 VS, 2/11.8
Capacity Control	Modulating	Modulating	Modulating	Modulating	Modulating
Unit Capacity Steps (%)	15-100	15-100	15-100	15-100	15-100
Number of Circuits	1	1	1	2	2
Air-Cooled Condenser Fans					
Number/Size/Type	2/30"/Prop	2/30"/Prop	2/30"/Prop	4/30"/Prop	4/30"/Prop
Hp (each)	1.5	1.5	1.5	1.5	1.5
Cycle/Phase	60/3	60/3	60/3	60/3	60/3
Evaporator Fans - Forward-Curved Fans (FC)					
Number/Size	2/15"	2/15"	2/18"	2/20"	2/20"
Number of Motors	1.5	1.5	1.5	1.5	1.5
Hp Range	3-20	3-20	5-20	7.5-30	7.5-30
Cfm Range[b]	4,000-9,000	5,000-11,000	6,000-13,500	8,000-18,000	10,000-22,500
ESP Range - (In. WG)	0.25-4.0	0.25-4.0	0.25-4.0	0.25-4.0	0.25-4.0
Evaporator Fans - eDrive™ Direct Drive Plenum Fans (DDP)					
Number/Size[c]	1/22.2”	1/22.2”	1/24.5”	1/27.0”	1/30.0”
Number of Motors	1	1	1	1	1
Hp Range	3-20	3-20	3-20	3-25	5-30
Cfm Range[b]	4,000-9,000	5,000-11,000	6,000-13,500	8,000-18,000	10,000-22,500
ESP Range - (In. WG)	0.25-4.0	0.25-4.0	0.25-4.0	0.25-4.0	0.25-4.0
Relief Fans - Forward-Curved Fans (FC) 100% Airflow					
Number/Size/Type	2/15"	2/15"	2/15"	2/18"	2/18"
Hp Range	3	3-5	3-7.5	5-10	5-10
Cfm Range[b]	4,000-10,000	4,000-12,000	4,000-14,000	7,500-16,000	9,000-20,000
ESP Range - (In. WG)	0.2-2.0	0.2-2.0	0.2-2.0	0.2-2.0	0.2-2.0
Return Fans - Belt Drive Plenum Fans (AF)					
Number/Size	1/24.5	1/24.5	1/24.5	1/27.0	1/27.0
Hp Range	3	3.0 - 5.0 HP	3.0 - 7.5	5.0 - 10.0	5.0 - 15.0
Cfm Range	4,000-9,000	4,000-11,000	4,000-12,500	7,500-18,000	9,000-20,000
ESP Range - (In. WG)	0.25 - 2.0	0.25 - 2.0	0.25 - 2.0	0.25 - 2.0	0.25 - 2.0
Evaporator Coil					
Size (Ft)	20.3	20.3	25.5	32.5	38
Rows/Fin Series	4/168	4/168	5/168	5/168	4/168
Tube Diameter/Surface	1/2”/Enhanced	1/2”/Enhanced	3/8”/Enhanced	3/8”/Enhanced	1/2”/Enhanced
Air-Cooled Condenser Coil					
Face Area (Ft^2)	58	58	58	116	116
Fin Series	252	252	252	252	252
Type	Microchannel	Microchannel	Microchannel	Microchannel	Microchannel
Electric Heat					
kW Range[d]	30-110	30-130	30-150	50-170	70-190
Capacity Steps	3	3	3	3	3
Natural Gas Heat[c]					
Low Heat Input[e]	235	235	350	350	500
High Heat Input[f]	500	500	500	850	850
Staged Heating Capacity Steps[g]	2	2	2	2	2
Modulating Gas Heat Turn Down Rate	See Table 13	See Table 13	See Table 13	See Table 13	See Table 13
Steady State Efficiency % [h]	81%	81%	81%	81%	81%
Hot Water Coil					
Size (Inches)	30x66x2 Row	30x66x2 Row	30x66x2 Row	42x66x2 Row	42x66x2 Row

Table 8. General data - 20 to 50 tons (continued)

	20 Ton	25 Ton	30 ton	40 Ton	50 Ton
Type	5W Prima-Flo E w/ turbulators	5W Prima-Flo E w/ turbulators	5W Prima-Flo E w/ turbulators	5W Prima-Flo E w/ turbulators	5W Prima-Flo E w/ turbulators
High Heat (Fins/Ft)	110	110	110	110	110
Low Heat (Fins/Ft)	80	80	80	80	80
Steam Coil					
Size (Inches)	30x66x1 Row	30x66x1 Row	30x66x1 Row	30x66x1 Row, 12x66x1 Row	30x66x1 Row 12x66x1 Row
Type	Type NS	Type NS	Type NS	Type NS	Type NS
High Heat (Fins/Ft)	96	96	96	96	72
Low Heat (Fins/Ft)	42	42	42	42	42
Pre-Evap Filters					
Panel Filters (Number/Size - Inches)	12 - 20x20x2	12 - 20x20x2	16 - 20x20x2	16 - 20x25x2	20 - 20x25x2
Face Area (Ft^2)	33.3	33.3	44.4	55.5	69.4
Bag Filters (Number/Size - Inches)	4 - 12x24x19	4 - 12x24x19	2 - 12x24x19	5 - 12x24x19	3 - 12x24x19
	3 - 24x24x19	3 - 24x24x19	6 - 24x24x19	6 - 24x24x19	9 - 24x24x19
Cartridge Filters (Number/Size - Inches)	4 - 12x24x12	4 - 12x24x12	2 - 12x24x12	5 - 12x24x12	3 - 12x24x12
	3 - 24x24x12	3 - 24x24x12	6 - 24x24x12	6 - 24x24x12	9 - 24x24x12
Prefilters (For Bag & Cartridge) (Number/Size - Inches)	4 - 12x24x2	4 - 12x24x2	2 - 12x24x2	5 - 12x24x2	3 - 12x24x2
	3 - 24x24x2	3 - 24x24x2	6- 24x24x2	6 - 24x24x2	9 - 24x24x2
Face Area (Ft^2)	20	20	28	34	42
Final Filters (SX Units only)					
Cartridge Filters (Number/Size - Inches)	4 - 12x24x12	4 - 12x24x12	1 - 12x24x12	5 - 12x24x12	2 - 12x24x12
	3 - 24x24x12	3 - 24x24x12	6 - 24x24x12	6 - 24x24x12	9 - 24x24x12
Prefilters (For Cartridge Filters) (Number/Size - Inches)	4 - 12x24x2	4 - 12x24x2	1 - 12x24x2	5 - 12x24x2	2 - 12x24x2
	3 - 24x24x2	3 - 24x24x2	6 - 24x24x2	6 - 24x24x2	9 - 24x24x2
Face Area (Ft^2)	20	20	26	34	40
Standard Unit Minimum Outside Air Temperature for Mechanical Cooling[i]					
Without Hot Gas Option	55°F	50°F	50°F	55°F	45°F
With Hot Gas Option	55°F	50°F	50°F	55°F	45°F
Low Ambient Option Minimum Outside Air Temperature					
Without Hot Gas Option	0°F	0°F	0°F	0°F	0°F
With Hot Gas Option	10°F	10°F	10°F	10°F	10°F

(a) 20 to 30 ton models are single circuit, 40 ton models are dual circuit.
(b) For CFM values outside these ranges, contact your local Trane sales office.
(c) 20-25T units with gas heat require 24.5" DDP fan; 30T units with gas heat require 27" DDP fan; and 40T units with gas heat require 30" fan.
(d) Refer to Electric heat kW ranges table for availability of kW ranges by voltage.
(e) Modulating is not available on 20 to 40T low heat.
(f) 40 and 50T High Heat with Horizontal Discharge is 800MBH. MBH is listed on gas heat rating plate.
(g) Two-stage gas heat: 1st stage 50% of heater MBh.
(h) Heating Performance is AHRI and DOE certified.
(i) Maximum return temperatures of 95ºF. Any higher, contact Product Support.

Table 9. General data - 55 to 75 tons

	55 ton	60 Ton	70 ton	75 ton
Compressor Data - Standard Capacity[a]				
Number/Size (Nominal)	2/11.8, 2/13.4	4/13.4	3/15.3, 1/20.8	2/15.3, 2/20.8
Model	Scroll	Scroll	Scroll	Scroll
Unit Capacity Steps (%)	100/73/47/23	100/75/50/25	100/69/46/23	100/71/42/21
No. of Circuits	2	2	2	2
Compressor Data - High Efficiency[a]				
Number/Size (Nominal)	4/11.8	3/13.4, 1/15.3	4/15.3	1/15.3, 3/20.8
Model	Scroll	Scroll	Scroll	Scroll
Unit Capacity Steps (%)	100/75/50/25	100/72/48/24	100/75/50/25	100/73/46/20
No. of Circuits	2	2	2	2
Compressor Data - eFlex Variable Speed[a]				
Number/Size (Nominal)	1/6-25 VS,1/11.8,1/13.4	1/6-25 VS,1/13.4,1/15.3	1/6-25 VS,1/15.3,1/20.8	1/6-25 VS, 3/15.3
Capacity Control	Modulating	Modulating	Modulating	Modulating
Unit Capacity Steps (%)	15-100	15-100	15-100	15-100
Number of Circuits	2	2	2	2
Air-Cooled Condenser Fans				
Number/Size/Type	4/30"/Prop	6/26"/Prop	6/26"/Prop	6/26"/Prop
Hp (each)	1.5	1	1	1
Cycle/Phase	60/3	60/3	60/3	60/3
Evaporator Fans - Forward-Curved Fans (FC)				
Number/Size	2/20"	2/22"	2/22"	2/22"
Number of Motors	1.5	1	1	1
Hp Range	7.5-30	10-50	10-50	10-50
Cfm Range[b]	10,000-22,500	14,000-27,000	16,000-27,000	16,000-27,000
ESP Range - (In. WG)	0.25-4.0	0.25-4.0	0.25-4.0	0.25-4.0
Evaporator Fans - eDrive™ Direct Drive Plenum Fans (DDP)				
Number/Size	1/30.0”	2/24.5"	2/27.0"	2/27.0"
Number of Motors	1	2	2	2
Hp Range	5-30	10-40	10-50	10-50
Cfm Range[b]	10,000-22,500	14,000-27,000	16,000-27,000	16,000-27,000
ESP Range - (In. WG)	0.25-4.0	0.25-4.0	0.25-4.0	0.25-4.0
Relief Fans - Forward-Curved Fans (FC) 100% Airflow				
Number/Size/Type	2/18"	2/20"	2/20"	2/20"
Hp Range	5-15	5-20	5-20	5-20
Cfm Range[b]	9,000-20,000	12,000-27,000	12,000-27,000	12,000-27,000
ESP Range - (In. WG)	0.2-2.0	0.2-2.0	0.2-2.0	0.2-2.0
Return Fans - Belt Drive Plenum Fans (AF)				
Number/Size	1/27.0	1/36.5	1/36.5	1/36.5
Hp Range	5.0 - 15.0	5.0 - 20.0	5.0 - 20.0	5.0 - 20.0
Cfm Range	9,000-20,000	12,000-27,000	12,000-27,000	12,000-27,000
ESP Range - (In. WG)	0.25 - 2.0	0.25 - 2.0	0.25 - 2.0	0.25 - 2.0
Evaporator Coil				
Size (Ft)	38	43	43	43
Rows/Fin Series	4/168	6/168	6/168	6/168
Tube Diameter/Surface	1/2”/Enhanced	3/8”/Enhanced	3/8”/Enhanced	3/8”/Enhanced
Air-Cooled Condenser Coil				
Face Area (Ft^2)	116	136	136	136
Fin Series	252	252	252	252
Type	Microchannel	Microchannel	Microchannel	Microchannel
Electric Heat				
kW Range[c]	70-190	90-190	90-190	90-190
Capacity Steps	3	3	3	3
Natural Gas Heat				
Low Heat Input	500	500	500	500
High Heat Input[d]	850	850	850	850
Staged Heating Capacity Steps[e]	2	2	2	2
Modulating Gas Heat Turn Down Rate	See Table 13	See Table 13	See Table 13	See Table 13
Steady State Efficiency % [f]	81%	81%	81%	81%
Hot Water Coil				
Size (Inches)	42x66x2 Row	42x90x2 Row	42x90x2 Row	42x90x2 Row
Type	5W Prima-Flo E w/ turbulators	5W Prima-Flo E w/ turbulators	5W Prima-Flo E w/ turbulators	5W Prima-Flo E w/ turbulators
High Heat (Fins/Ft)	110	110	110	110
Low Heat (Fins/Ft)	80	80	80	80

Table 9. General data - 55 to 75 tons (continued)

	55 ton	60 Ton	70 ton	75 ton
Steam Coil				
Size (Inches)	30x66x1 Row 12x66x1 Row	30x90x1 Row 12x90x1 Row	30x90x1 Row 12x90x1 Row	30x90x1 Row 12x90x1 Row
Type	Type NS	Type NS	Type NS	Type NS
High Heat (Fins/Ft)	96	72	72	72
Low Heat (Fins/Ft)	42	42	42	42
Pre-Evap Filters				
Panel Filters (Number/Size - Inches)	20 - 20x25x2	35 - 16x20x2	35 - 16x20x2	35 - 16x20x2
Face Area (Ft^2)	69.4	77.8	77.8	77.8
Bag Filters (Number/Size - Inches)	3 - 12x24x19	6 - 12x24x19	6 - 12x24x19	6 - 12x24x19
	9 - 24x24x19	8 - 24x24x19	8 - 24x24x19	8 - 24x24x19
Cartridge Filters (Number/Size - Inches)	3 - 12x24x12	6 - 12x24x12	6 - 12x24x12	6 - 12x24x12
	9 - 24x24x12	8 - 24x24x12	8 - 24x24x12	8 - 24x24x12
Prefilters (For Bag & Cartridge) (Number/Size - Inches)	3 - 12x24x2	6 - 12x24x2	6 - 12x24x2	6 - 12x24x2
	9 - 24x24x2	8 - 24x24x2	8 - 24x24x2	8 - 24x24x2
Face Area (Ft^2)	42	44	44	44
Final Filters (SX Units only)				
Cartridge Filters (Number/Size - Inches)	2 - 12x24x12	6 - 12x24x12	6 - 12x24x12	6 - 12x24x12
	9 - 24x24x12	8 - 24x24x12	8 - 24x24x12	8 - 24x24x12
Prefilters (For Cartridge Filters) (Number/Size - Inches)	2 - 12x24x2	6 - 12x24x2	6 - 12x24x2	6 - 12x24x2
	9 - 24x24x2	8 - 24x24x2	8 - 24x24x2	8 - 24x24x2
Face Area (Ft^2)	40	44	44	44
Standard Unit Minimum Outside Air Temperature for Mechanical Cooling[g]				
Without Hot Gas Option	35°F	30°F	45°F	45°F
With Hot Gas Option	35°F	30°F	45°F	45°F
Low Ambient Option Minimum Outside Air Temperature				
Without Hot Gas Option	0°F	0°F	0°F	0°F
With Hot Gas Option	10°F	10°F	10°F	10°F

[a] 20 to 30 ton models are single circuit, 40 ton models are dual circuit.
[b] For CFM values outside these ranges, contact your local Trane sales office.
[c] Refer to Electric heat kW ranges table for availability of kW ranges by voltage.
[d] Horizontal Discharge is 800MBH. MBH is listed on gas heat rating plate.
[e] Two-stage gas heat: 1st stage 50% of heater MBh.
[f] Heating Performance is AHRI and DOE certified.
[g] Maximum return temperatures of 95ºF. Any higher, contact Product Support.

Table 10. General data - 90 to 130 tons

	90 ton	105 ton	115 ton	130 ton
Compressor Data - Standard Efficiency[a]				
Number/Size (Nominal)	4/20.8	2/20.8, 2/26.3	1/20.8, 3/26.3	3/26.3, 1/31.2
Model	Scroll	Scroll	Scroll	Scroll
Unit Capacity Steps (%)	100/75/50/25	100/72/44/22	100/74/47/21	100/72/48/24
No. of Circuits	2	2	2	2
Compressor Data - Standard Efficiency[a]				
Number/Size (Nominal)	4/20.8	NA	NA	NA
Model	Scroll	NA	NA	NA
Unit Capacity Steps (%)	100/75/50/25	NA	NA	NA
No. of Circuits	2	NA	NA	NA
Evaporator Fans - Airfoil				
Number/Size	2/28"	2/28"	2/28"	2/28"
Number of Motors	2	2	2	2
Hp Range	30-80	30-80	30-80	30-80
Cfm Range[b]	26,000-46,000	26,000-46,000	26,000-46,000	26,000-46,000
ESP Range - (In. WG)	1.0-4.70	1.0-4.70	1.0-4.70	1.0-4.70
Relief Fans - Forward-Curved Fans (FC) 100% Airflow				
Number/Size/Type	2/22"	2/22"	2/22"	2/22"
Hp Range	15-40	15-40	15-40	15-40
Cfm Range[b]	26,000-40,000	26,000-40,000	26,000-40,000	26,000-40,000
ESP Range - (In. WG)	0.25-2.5	0.25-2.5	0.25-2.5	0.25-2.5
Condenser Fans - Prop. Condenser Fans - Standard Efficiency				
Number/Size	8/26"	10/26"	10/26"	12/26"
Hp (each)	1	1	1	1
Cfm Range	56400	56400	56400	56400
Cycle/Phase	60/3	60/3	60/3	60/3
Condenser Fans - Prop. Condenser Fans - High Efficiency				
Number/Size	10/26"			
Hp (each)	1			
Cfm Range	56400			
Cycle/Phase	60/3			
Coils - Evaporator Coil - Standard Capacity				
Dimensions	122.0 x 70.0	122.0 x 70.0	122.0 x 70.0	122.0 x 70.0
Size (Ft)	59.3	59.3	59.3	59.3
Rows/Fin Series	4/148	5/148	6/148	6/148
Tube Diameter/Surface	1/2 Enhanced	1/2 Enhanced	1/2 Enhanced	1/2 Enhanced
Evaporator Coil - High Capacity				
Dimensions	122.0 x 70.0	N/A	N/A	N/A
Size (Ft)	59.3	N/A	N/A	N/A
Rows/Fin Series	6/148	N/A	N/A	N/A
Tube Diameter/Surface	1/2 Enhanced	N/A	N/A	N/A
Condenser Coil - Standard Efficiency				
Size (Ft^2)	152	152	152	152
Rows/Fin Series	44250	44250	44250	44250
Type	Microchannel	Microchannel	Microchannel	Microchannel
Condenser Coil - High Efficiency				
Size (Ft^2)	152	N/A	N/A	N/A
Rows/Fin Series	44250	N/A	N/A	N/A
Type	Microchannel	N/A	N/A	N/A
Electric Heat				
kW Range[c]	190	190	190	190
Capacity Steps	3	3	3	3
Natural Gas Heat				
MBh Heat Input	1000	1000	1000	1000
Staged Heating Capacity Steps[d]	2	2	2	2
High Heat	See Table 13, p. 53			
Gas Heat Steady State Efficiency%[e]	81%	81%	81%	81%
Hot Water Coil				
Size (Inches)	(2) 30x84x2 Row	(2) 30x84x2 Row	(2) 30x84x2 Row	(2) 30x84x2 Row
Type	5W Prima-Flo E w/ turbulators	5W Prima-Flo E w/ turbulators	5W Prima-Flo E w/ turbulators	5W Prima-Flo E w/ turbulators
High Heat (Fins/Ft)	110	110	110	110
Low Heat (Fins/Ft)	80	80	80	80

Table 10. General data - 90 to 130 tons (continued)

	90 ton	105 ton	115 ton	130 ton
Steam Coil				
Size (Inches)	(2) 30x84x1 Row	(2) 30x84x1 Row	(2) 30x84x1 Row	(2) 30x84x1 Row
Type	Type NS	Type NS	Type NS	Type NS
High Heat (Fins/Ft)	96	96	96	96
Low Heat (Fins/Ft)	52	52	52	52
Filters				
Panel Filters (Number/Size - Inches)	25-24x24x2	25-24x24x2	25-24x24x2	25-24x24x2
Face Area (Ft^2)	100	100	100	100
Bag Filters (Number/Size (Inches)	3-12x24x19	3-12x24x19	3-12x24x19	3-12x24x19
	15-24x24x19	15-24x24x19	15-24x24x19	15-24x24x19
Cartridge Filters (Number/Size (Inches)	3-12x24x12	3-12x24x12	3-12x24x12	3-12x24x12
	15-24x24x12	15-24x24x12	15-24x24x12	15-24x24x12
Prefilters (For Bag & Cartridge)	3-20x24x2	3-20x24x2	3-20x24x2	3-20x24x2
	15-24x24x2	15-24x24x2	15-24x24x2	15-24x24x2
Face Area (Ft^2)	65	66	66	66
Final Filters (SX Units only)				
Cartridge Filters (Number/Size (Inches)	5 - 12x24x12	5 - 12x24x12	5 - 12x24x12	5 - 12x24x12
	10 - 24x24x12	10 - 24x24x12	10 - 24x24x12	10 - 24x24x12
Prefilters for Cartridge Filters (Number/Size (Inches)	5 - 12x24x2	5 - 12x24x2	5 - 12x24x2	5 - 12x24x2
	10- 24x24x2	10- 24x24x2	10- 24x24x2	10- 24x24x2
Face Area (Ft^2)	50	50	50	50
Standard Unit Minimum Outside Air Temperature for Mechanical Cooling[f]				
Without Hot Gas Option	45°F	45°F	45°F	45°F
With Hot Gas Option	45°F	45°F	45°F	45°F
Low Ambient Option Minimum Outside Air Temperature				
Without Hot Gas Option	0°F	0°F	0°F	0°F
With Hot Gas Option	10°F	10°F	10°F	10°F

(a) 90 to 130 ton models are dual circuit.
(b) For CFM values outside these ranges, contact your local Trane sales office.
(c) Refer to Electric heat kW ranges table for availability of kW ranges by voltage.
(d) Two-stage gas heat: 1st stage 50% of heater MBh.
(e) Heating Performance is AHRI and DOE certified.
(f) Maximum return temperatures of 95ºF. Any higher, contact Product Support.

Table 11. EER ratings

System Description (1)	EER (No Heat)	EER (with Heat) (2)	IEER for VAV (3)	AHRI Net Cooling Capacity
20 Ton, eFlex (V)	10.8	10.7	17.9	259000
25 Ton, Std. Efficiency (S)	10.7	10.6	14.8	303000
25 Ton, High Efficiency (H)	11.0	11.0	15.9	303000
25 Ton, eFlex (V)	10.7	10.7	17.1	287000
30 Ton, Std. Efficiency (S)	10.6	10.5	14.8	331000
30 Ton, High Efficiency (H)	11.0	10.9	15.8 / 15.7	334000
30 Ton, eFlex (V)	10.8	10.7	18.5 / 18.4	351000
40 Ton, Std. Efficiency (S)	10.3	10.2 / 10.1	14.7 / 14.6	447000
40 Ton, High Efficiency (H)	11.0	10.8	15.6	414000
40 Ton, eFlex (V)	10.6	10.5	16.4 / 16.3	446000
50 Ton, Std. Efficiency (S)	10.7	10.5	14.9 / 14.7	546000
50 Ton, High Efficiency (H)	11.2	11.0	16.0 / 15.8	582000
50 Ton, eFlex (V)	11.1	11.0	17.4 / 17.3	564000
55 Ton, Std. Efficiency (S)	10.2	10.1	14.6 / 14.5	610000
55 Ton, High Efficiency (H)	11.1	10.9 / 10.8	16.0 / 15.9	611000
55 Ton, eFlex (V)	11.0	10.8	17.4 / 17.2	608000
60 Ton, Std. Efficiency (S)	10.4	10.3	15.5	681000
60 Ton, High Efficiency (H)	11.0	10.9	16.2 / 16.1	688000

Table 11. EER ratings (continued)

System Description (1)	EER (No Heat)	EER (with Heat) (2)	IEER for VAV (3)	AHRI Net Cooling Capacity
60 Ton, eFlex (V)	10.9	10.8 / 10.9	17.7 / 17.6	676000

Notes:

1. When there is a single rating in this column, it indicates that all heat types (Natural Gas, Electric, and Hyrdronic) have the same EER Value. When there are two ratings, they follow the format of "Gas Heat & Hyrdronic Heat EER / Electric Heat EER". AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI Standard 340/360.
2. EER and/or IEER are rated at AHRI conditions and in accordance with DOE test procedures.
3. When there is a single rating in this column, it indicates that configurations with No Heat have the same IEER value as units with any heater type. When there are two ratings they follow the format of "No Heat IEER / Gas Heat & Hyrdronic Heat & Electric Heat IEER".
4. Cooling performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI Standard 340/360.
5. EER and/or IEER are rated at AHRI conditions and in accordance with DOE test procedures.
6. For simplified verification of your specific unit EER/IEER, and capacity at operating conditions, it is strongly recommended that a TOPSS (Trane Official Product Selection System) report be run.

Table 12. Economizer outdoor air damper leakage (of rated airflow)

	ΔP Across Dampers (In. WC)	
	0.5 (In.)	1.0 (In.)
Standard	1.5%	2.5%
Optional Low Leak	0.5%	1.0%
Optional Ultra Low Leak	—	3 CFM/Ft^2

Note: Above data for Standard and Low Leak based on tests completed in accordance with AMCA Standard 500 at AMCA Laboratories. Ultra low leak damper leakage rate is AMCA certified and meets California Title 24.

Table 13. Gas heat inputs/input ranges

Standard Gas Heat Input (MBh)	Two-Stage Gas Heat		Modulating Gas Heat	
	Low Fire Heat Input (MBh)	High Fire Heat Input (MBh)	4 to 1 Modulating Heat Input Range (MBh)	Ultra Modulating Heat Input Range (MBh)
235	117	235	NA	NA
350	175	350	NA	NA
500	250	500	125 - 500	36 - 500
850	425	850	125 - 850	48 - 850
1000	500	1000	125 - 1000	48 - 1000

Performance Adjustment Factors

Table 14. Enthalpy of saturated air

Wet Bulb Temperature	Btu Per Lb.
40	15.23
41	15.70
42	16.17
43	16.66
44	17.15
45	17.65
46	18.16
47	18.68
48	19.21
49	19.75
50	20.30
51	20.86
52	21.44
53	22.02
54	22.62
55	23.22
56	23.84
57	24.48
58	25.12
59	25.78
60	26.46
61	27.15
62	27.85
63	28.57
64	29.31
65	30.06
66	30.83
67	31.62
68	32.42
69	33.25
70	34.09
71	34.95
72	35.83
73	36.74
74	37.66
75	38.61

Figure 7. Air density ratios

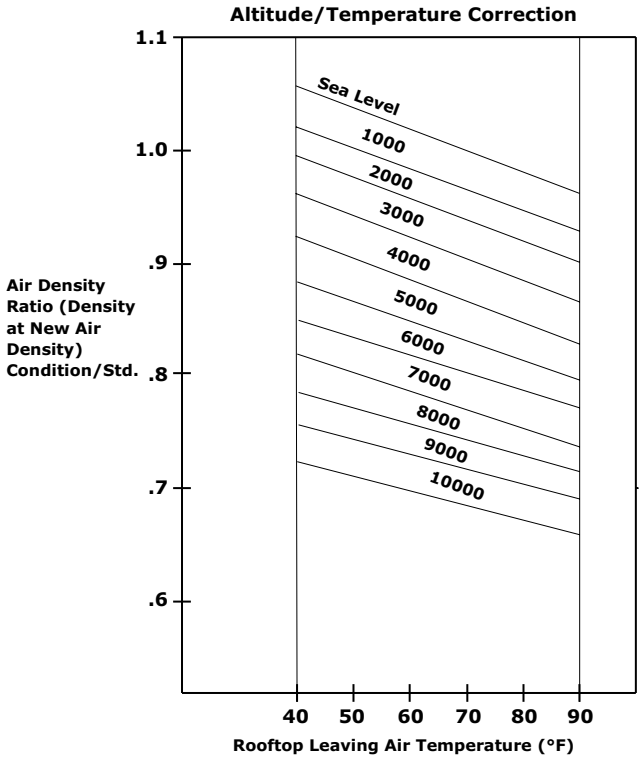


Table 15. Cooling capacity altitude correction factors

	Altitude (ft)								
	Sea Level	1000	2000	3000	4000	5000	6000	7000	8000
Cooling Capacity Multiplier	1.00	1.00	0.99	0.99	0.99	0.98	0.98	0.97	0.97
kW Correction Multiplier	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02
Sensible Heat Ratio Correction Multiplier	1.00	0.97	0.94	0.92	0.89	0.87	0.84	0.81	0.79

Table 16. Gas heating capacity altitude correction factors

	Sea Level to 2000	2001 to 2500	2501 to 3500	3501 to 4500	4501 to 5500	5501 to 6500	6501 to 7500
Capacity Multiplier	1.00	0.92	0.88	0.84	0.80	0.76	0.72

Note: *Correction factors are per ANSI Z223.1/NFPA 54. Local codes may supersede.*

Performance Data

Gross Cooling Capacities

Table 17. Gross cooling capacities (MBh) —20 ton air-cooled — eFlex™ variable speed compressor

CFM	Ent DB (°F)	Ambient Temperature (°F) 85 Entering Wet Bulb (°F) 61 CAP	61 SHC	67 CAP	67 SHC	73 CAP	73 SHC	95 Entering Wet Bulb (°F) 61 CAP	61 SHC	67 CAP	67 SHC	73 CAP	73 SHC	105 Entering Wet Bulb (°F) 61 CAP	61 SHC	67 CAP	67 SHC	73 CAP	73 SHC
4000	75	219	151	248	126	279	100	207	144	235	119	265	92	195	136	221	111	250	84
	80	220	173	248	148	279	122	208	166	236	141	265	115	196	158	222	133	250	107
	85	220	195	248	170	279	144	209	188	236	163	265	137	197	179	222	155	250	129
	90	222	217	249	192	280	166	211	209	237	185	266	159	199	199	223	177	251	151
6000	75	248	188	278	149	308	107	234	180	262	141	290	99	218	171	245	132	271	90
	80	250	220	279	182	308	140	235	212	263	174	291	132	220	203	246	165	272	123
	85	253	253	280	215	309	174	240	240	264	207	291	165	227	227	247	198	273	157
	90	266	266	281	249	309	207	254	254	266	239	292	199	240	240	249	230	273	190
7000	75	257	205	287	159	315	109	242	196	270	150	296	101	225	185	252	141	276	92
	80	260	242	288	198	316	148	245	233	271	189	297	140	228	223	253	180	277	130
	85	268	268	289	236	316	187	255	255	272	228	298	178	240	240	254	216	278	169
	90	283	283	292	273	317	226	269	269	275	264	298	217	254	254	258	254	278	208
8000	75	264	220	294	168	320	111	248	210	276	159	301	102	230	200	256	149	280	93
	80	268	263	295	212	321	156	252	252	277	203	301	147	236	236	257	194	280	137
	85	281	281	296	254	322	200	266	266	279	245	302	191	251	251	260	235	281	182
	90	297	297	300	298	322	244	281	281	283	283	302	235	265	265	265	265	281	226
9000	75	270	235	299	177	324	113	253	225	280	168	304	104	235	215	260	158	282	95
	80	275	275	300	227	325	163	260	260	281	218	304	154	244	244	261	205	282	144
	85	292	292	302	273	325	213	276	276	284	264	305	204	259	259	264	253	282	194
	90	307	307	307	307	326	263	291	291	291	291	305	250	273	273	273	273	283	240

CFM	Ent DB (°F)	Ambient Temperature (°F) 115 Entering Wet Bulb (°F) 61 CAP	61 SHC	67 CAP	67 SHC	73 CAP	73 SHC
4000	75	182	128	207	103	233	76
	80	182	150	207	125	234	99
	85	184	171	208	147	234	121
	90	188	188	209	169	235	143
6000	75	202	162	227	123	251	81
	80	204	193	228	156	251	114
	85	213	213	229	189	252	147
	90	226	226	232	220	253	180
7000	75	208	175	232	131	254	82
	80	211	211	233	170	255	121
	85	225	225	235	206	256	159
	90	238	238	239	239	256	198
8000	75	212	190	236	140	257	83
	80	219	219	237	184	257	127
	85	234	234	239	224	257	171
	90	247	247	247	247	258	212
9000	75	215	204	238	148	258	84
	80	226	226	240	194	258	134
	85	240	240	243	242	258	183
	90	252	252	253	253	259	228

Table 18. Gross cooling capacities (MBh) — 25 ton air-cooled — standard efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
4000	75	262	184	296	152	331	118	248	175	280	143	313	109	233	166	263	134	294	100
	80	263	211	296	180	331	146	249	203	281	171	314	137	234	194	264	162	294	128
	85	264	239	297	207	331	174	250	231	282	199	314	165	235	220	265	190	295	155
	90	267	266	297	235	332	201	254	254	282	226	315	193	241	241	265	217	295	183
6000	75	289	220	323	174	354	123	272	210	304	164	333	114	254	200	284	154	310	103
	80	291	257	324	213	354	163	274	248	305	203	334	153	256	237	285	193	310	142
	85	295	295	325	251	355	201	279	279	306	242	334	192	264	264	286	231	311	181
	90	310	310	326	290	356	240	295	295	308	278	335	230	279	279	288	268	312	220
7000	75	304	249	336	190	364	127	285	237	315	180	341	116	264	225	293	169	315	105
	80	307	295	337	239	364	175	289	284	317	228	341	165	269	269	294	217	316	154
	85	319	319	339	287	365	224	303	303	318	274	342	213	284	284	296	262	316	202
	90	336	336	342	332	365	272	319	319	322	321	342	261	299	299	300	300	316	250
8000	75	311	266	342	201	368	129	291	255	320	191	344	118	270	243	296	179	317	107
	80	316	316	343	257	368	184	297	297	321	246	344	174	278	278	298	234	317	162
	85	333	333	346	308	369	239	315	315	324	297	344	229	294	294	300	285	317	217
	90	349	349	350	350	370	295	330	330	330	330	346	280	308	308	308	308	319	268
9000	75	316	281	346	210	371	130	295	270	323	199	346	120	273	257	298	187	318	108
	80	323	323	347	271	371	191	305	305	325	257	346	180	285	285	300	244	318	169
	85	341	341	350	327	372	252	322	322	327	315	347	241	300	300	303	303	319	229
	90	357	357	358	358	374	309	336	336	337	337	348	297	312	312	312	312	320	285

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
4000	75	217	156	245	124	273	89
	80	217	184	246	152	273	117
	85	219	211	246	180	274	145
	90	228	228	247	207	274	173
6000	75	234	189	262	143	284	92
	80	237	226	263	182	285	131
	85	247	247	264	220	285	170
	90	261	261	266	256	286	208
7000	75	243	213	268	157	288	94
	80	249	249	269	205	288	142
	85	264	264	271	250	288	190
	90	277	277	278	278	288	238
8000	75	247	231	271	167	288	95
	80	258	258	272	219	288	150
	85	272	272	275	272	288	205
	90	283	283	283	283	289	255
9000	75	250	244	272	175	288	96
	80	262	262	273	231	288	156
	85	276	276	276	276	288	217
	90	285	285	286	286	290	271

Table 19. Gross cooling capacities (MBh) — 25 ton air-cooled — high efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
5000	75	270	188	304	156	343	124	256	179	289	148	326	115	241	170	273	139	308	106
	80	270	216	305	184	343	152	257	207	290	176	326	143	242	198	274	167	308	134
	85	271	243	306	212	343	179	258	235	291	203	327	171	243	225	275	194	309	162
	90	274	270	306	239	344	207	261	261	291	231	328	198	247	247	275	222	310	189
7000	75	298	225	335	179	375	133	282	215	317	170	355	123	264	205	297	160	333	113
	80	300	264	336	218	375	172	284	252	318	209	355	162	266	242	299	199	334	152
	85	304	301	337	257	376	211	288	288	319	247	356	201	272	272	300	237	335	191
	90	318	318	339	296	378	250	304	304	321	286	358	240	289	289	302	274	336	230
8750	75	314	254	351	197	391	138	296	244	331	187	369	128	276	231	309	176	345	117
	80	318	300	353	246	392	187	300	290	333	235	370	177	281	279	311	225	346	166
	85	329	329	355	294	394	236	313	313	335	282	372	225	296	296	313	271	348	215
	90	349	349	359	340	395	284	332	332	339	330	373	274	315	315	318	318	349	263
10000	75	323	272	360	209	400	141	303	261	338	198	376	131	283	249	315	187	350	119
	80	328	327	362	265	401	197	309	309	340	254	377	187	290	290	317	243	352	175
	85	345	345	364	317	403	253	328	328	343	306	379	242	309	309	321	294	354	231
	90	366	366	370	370	404	309	348	348	350	350	381	298	329	329	329	329	356	287
11000	75	328	288	365	219	405	144	308	276	343	207	380	133	287	264	319	196	354	121
	80	335	335	367	280	407	205	316	316	345	269	382	194	298	298	321	257	356	183
	85	356	356	371	337	408	267	338	338	349	325	384	256	318	318	326	313	357	244
	90	378	378	379	379	410	328	359	359	359	359	386	313	339	339	339	339	360	301

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
5000	75	225	161	256	129	289	96
	80	226	189	256	157	289	124
	85	228	215	257	185	290	152
	90	235	235	258	212	290	180
7000	75	245	194	277	149	310	102
	80	248	231	278	188	311	141
	85	257	257	279	227	312	180
	90	273	273	282	263	313	219
8750	75	255	219	286	165	319	106
	80	261	261	288	213	321	155
	85	278	278	291	259	322	203
	90	296	296	297	297	323	252
10000	75	261	237	291	175	323	108
	80	271	271	293	231	325	164
	85	290	290	297	282	327	219
	90	308	308	309	309	329	271
11000	75	264	251	294	184	325	109
	80	278	278	296	241	327	171
	85	297	297	301	301	329	232
	90	316	316	317	317	332	288

Table 20. Gross cooling capacities (MBh) —25 ton air-cooled — eFlex™ variable speed compressor

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
5000	75	256	181	289	149	326	117	242	172	274	141	309	108	227	163	258	132	291	99
	80	256	208	289	177	326	144	243	200	274	169	310	136	228	191	258	160	292	127
	85	257	236	290	205	327	172	244	227	275	196	310	164	230	218	259	187	292	155
	90	261	261	290	232	327	200	249	249	276	224	311	192	237	237	260	215	293	183
7000	75	281	217	317	172	355	125	265	207	299	162	335	116	247	197	279	152	314	106
	80	283	254	318	211	356	164	267	245	300	201	336	155	250	235	280	191	314	145
	85	288	288	319	249	357	203	274	274	301	240	337	194	259	259	282	230	315	184
	90	305	305	321	287	357	242	291	291	303	277	338	233	275	275	284	267	316	223
8750	75	296	246	332	189	370	130	277	236	311	179	348	120	258	223	290	168	324	110
	80	300	293	333	238	371	179	282	282	313	228	349	169	264	264	291	217	325	159
	85	314	314	335	285	372	228	298	298	315	274	350	218	281	281	294	263	326	207
	90	333	333	339	333	373	277	317	317	320	320	351	266	300	300	300	300	328	256
10000	75	303	264	339	201	377	134	284	253	318	191	354	123	264	242	295	180	329	112
	80	310	310	341	257	379	190	292	292	319	246	355	179	274	274	297	235	330	168
	85	329	329	344	310	380	245	312	312	323	299	357	235	294	294	301	287	332	224
	90	350	350	351	351	381	301	332	332	332	332	358	290	313	313	313	313	334	277
11000	75	309	279	344	210	382	136	289	268	322	199	358	125	268	257	298	188	332	114
	80	318	318	346	271	383	198	301	301	324	261	359	187	282	282	301	246	333	175
	85	340	340	350	329	385	259	321	321	328	318	361	248	302	302	306	306	335	237
	90	361	361	361	361	387	317	342	342	342	342	363	306	321	321	322	322	337	294

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
5000	75	211	154	240	123	272	90
	80	212	182	241	150	272	118
	85	214	209	242	178	273	146
	90	224	224	243	206	274	173
7000	75	229	187	259	142	291	95
	80	232	224	260	181	292	135
	85	244	244	261	220	293	174
	90	259	259	265	257	294	212
8750	75	238	212	267	158	299	99
	80	246	246	269	206	300	148
	85	263	263	272	252	301	196
	90	281	281	281	281	303	245
10000	75	243	230	271	168	302	101
	80	255	255	273	221	304	157
	85	274	274	278	276	305	212
	90	292	292	293	293	308	265
11000	75	246	244	274	176	304	102
	80	262	262	276	234	306	164
	85	281	281	282	282	307	225
	90	299	299	300	300	310	282

Table 21. Gross cooling capacities (MBh) — 30 ton air-cooled — standard efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
6000	75	293	210	330	171	367	129	277	200	313	161	348	119	260	190	293	151	326	109
	80	294	243	331	204	368	163	278	233	313	195	348	153	260	223	294	184	327	142
	85	295	276	331	238	368	196	279	266	314	228	349	186	262	254	294	217	327	176
	90	297	297	332	271	369	229	283	283	315	261	349	220	269	269	295	250	328	209
9000	75	324	261	360	201	392	136	304	250	339	190	368	125	283	238	315	178	343	113
	80	325	311	361	251	393	186	306	297	340	240	369	175	285	285	316	228	343	164
	85	331	331	362	300	393	236	315	315	341	289	370	225	297	297	317	278	344	213
	90	350	350	364	350	394	285	333	333	343	336	371	275	314	314	320	320	345	263
10500	75	333	285	368	214	398	138	312	274	346	203	373	127	289	261	321	191	346	115
	80	336	336	370	272	399	197	315	315	347	261	374	185	293	293	322	249	347	174
	85	349	349	371	330	399	255	331	331	348	319	374	244	311	311	323	303	347	232
	90	368	368	373	373	400	313	349	349	351	351	375	301	328	328	328	328	348	289
12000	75	340	309	374	227	402	141	318	297	350	216	376	129	294	279	324	203	348	117
	80	345	345	376	294	403	207	324	324	352	282	377	196	303	303	325	269	348	184
	85	363	363	377	355	403	274	343	343	353	343	377	262	321	321	328	328	349	250
	90	381	381	381	381	404	340	360	360	359	359	378	328	337	337	337	337	349	316
13500	75	345	327	379	240	405	143	322	314	354	228	378	131	297	297	326	215	349	119
	80	354	354	380	315	405	218	334	334	355	303	378	206	311	311	328	290	349	194
	85	374	374	382	382	406	293	352	352	357	357	379	281	329	329	331	331	349	268
	90	391	391	392	392	407	367	368	368	369	369	379	355	343	343	343	343	350	335

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
6000	75	241	179	272	140	302	98
	80	242	212	273	173	303	131
	85	243	243	274	206	304	165
	90	253	253	275	239	304	198
9000	75	260	226	290	166	315	101
	80	263	263	291	216	316	151
	85	277	277	292	265	316	201
	90	293	293	295	295	317	251
10500	75	265	244	294	178	317	103
	80	271	271	295	236	317	161
	85	289	289	297	289	318	219
	90	304	304	304	304	318	277
12000	75	268	265	296	190	318	104
	80	280	280	297	256	318	171
	85	297	297	300	300	318	237
	90	311	311	311	311	318	303
13500	75	271	271	297	201	318	106
	80	287	287	299	270	317	180
	85	303	303	302	302	317	255
	90	315	315	315	315	318	318

Table 22. Gross cooling capacities (MBh) — 30 ton air-cooled — high efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
6000	75	296	211	334	173	376	133	280	202	316	163	356	123	263	191	297	153	334	113
	80	296	244	334	206	376	167	281	235	317	197	356	157	264	224	298	186	335	146
	85	297	277	335	240	376	200	282	268	318	230	357	190	265	257	299	219	335	180
	90	300	300	336	273	377	234	285	285	318	263	358	224	272	272	299	252	336	213
9000	75	328	263	368	205	409	143	308	252	346	193	385	132	287	240	322	181	358	120
	80	329	313	369	255	410	194	310	299	347	243	386	182	289	287	324	231	359	170
	85	335	335	370	304	411	244	319	319	349	293	387	232	301	301	325	281	360	220
	90	355	355	372	354	412	294	338	338	351	340	388	282	319	319	327	327	361	270
10500	75	338	288	378	219	419	147	317	276	355	207	393	135	294	263	329	195	364	123
	80	340	340	379	277	419	206	320	320	356	265	394	194	298	298	331	253	365	181
	85	355	355	381	335	421	264	336	336	358	323	395	252	316	316	332	311	367	240
	90	376	376	384	384	422	322	357	357	362	362	396	311	336	336	337	337	368	298
12000	75	345	312	386	233	425	150	323	299	361	221	398	138	299	286	334	208	368	125
	80	350	350	387	299	426	217	329	329	363	287	399	205	307	307	336	274	369	192
	85	370	370	389	366	428	284	351	351	365	349	401	272	329	329	339	335	371	259
	90	392	392	395	395	429	351	372	372	372	372	402	338	349	349	349	349	372	325
13500	75	351	335	392	246	430	154	328	318	366	234	402	141	303	303	338	220	371	128
	80	359	359	394	321	432	229	340	340	368	309	403	216	318	318	340	295	372	203
	85	384	384	396	390	433	304	362	362	371	371	405	291	339	339	344	344	374	278
	90	406	406	405	405	434	379	384	384	384	384	406	366	359	359	359	359	375	352

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
6000	75	244	180	276	142	311	101
	80	245	213	277	175	311	135
	85	246	245	278	208	312	168
	90	256	256	278	241	313	202
9000	75	264	228	297	169	329	107
	80	267	267	298	219	330	158
	85	281	281	300	269	332	208
	90	299	299	303	303	333	258
10500	75	269	247	302	182	333	109
	80	275	275	304	240	335	168
	85	295	295	306	293	336	226
	90	313	313	312	312	337	285
12000	75	273	268	306	194	336	112
	80	286	286	307	260	338	178
	85	305	305	311	311	339	245
	90	324	324	324	324	340	311
13500	75	276	276	308	206	337	114
	80	293	293	310	281	339	189
	85	313	313	315	315	340	264
	90	332	332	332	332	366	341

Table 23. Gross cooling capacities (MBh) —30 ton air-cooled — eFlex™ variable speed compressor

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
6000	75	307	217	346	179	389	139	291	207	329	169	369	129	275	197	310	158	348	118
	80	308	250	347	212	389	172	292	240	329	202	370	162	275	230	311	192	348	151
	85	308	283	347	245	389	205	293	273	330	235	370	195	276	263	311	225	349	185
	90	310	310	348	278	390	239	295	295	331	268	371	229	280	280	312	258	350	218
9000	75	341	269	382	210	423	148	322	258	360	199	399	137	301	246	337	187	373	125
	80	343	319	383	260	424	198	323	308	362	249	400	187	303	293	338	237	374	175
	85	347	347	384	310	425	248	329	329	363	299	401	237	312	312	340	287	375	225
	90	366	366	386	360	426	298	349	349	364	348	402	287	331	331	342	333	376	275
10500	75	352	294	393	225	433	151	331	282	370	213	407	140	308	270	345	200	379	127
	80	354	349	394	283	433	210	334	334	371	271	408	198	312	312	346	259	380	186
	85	366	366	395	341	435	268	348	348	372	329	409	257	328	328	348	317	381	244
	90	387	387	398	395	436	327	368	368	375	375	410	315	348	348	351	351	382	302
12000	75	360	318	401	238	440	155	338	306	376	226	412	142	314	293	350	213	383	130
	80	364	364	402	305	441	222	343	343	378	293	413	209	320	320	352	280	384	196
	85	382	382	404	371	442	288	363	363	379	359	415	276	341	341	353	346	385	263
	90	404	404	408	408	443	355	383	383	385	385	416	342	361	361	360	360	386	329
13500	75	367	342	407	252	445	158	343	329	381	239	416	145	318	310	353	226	386	132
	80	373	373	409	327	446	233	351	351	383	314	418	221	330	330	355	300	387	207
	85	396	396	411	396	447	308	374	374	385	383	419	295	352	352	358	358	388	282
	90	418	418	418	418	448	383	396	396	394	394	420	370	371	371	372	372	389	356

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
6000	75	256	186	290	148	325	107
	80	257	219	291	181	325	140
	85	258	252	291	214	326	174
	90	266	266	292	247	327	207
9000	75	279	234	312	175	345	112
	80	281	280	314	225	345	162
	85	293	293	315	274	346	212
	90	311	311	317	317	347	262
10500	75	285	257	318	187	349	114
	80	289	289	319	245	350	173
	85	307	307	321	303	351	231
	90	325	325	326	326	352	289
12000	75	289	275	322	200	351	116
	80	299	299	323	266	352	183
	85	318	318	326	326	354	249
	90	336	336	337	337	354	316
13500	75	292	292	324	212	353	118
	80	307	307	326	286	354	193
	85	326	326	329	329	355	268
	90	344	344	345	345	356	335

Table 24. Gross cooling capacities (MBh) — 40 ton air-cooled — standard efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
8000	75	394	287	443	235	495	180	375	276	422	225	471	170	354	265	398	213	444	158
	80	395	331	444	280	495	225	376	320	422	269	471	214	355	309	399	257	444	202
	85	396	375	444	324	495	269	377	364	423	313	471	259	356	350	399	301	444	247
	90	399	399	445	367	496	314	383	383	424	357	472	303	365	365	400	345	445	291
11000	75	428	340	478	267	527	189	406	328	453	255	498	178	381	316	425	243	467	165
	80	429	400	479	328	527	251	407	389	454	316	499	239	382	374	426	304	468	226
	85	433	433	480	388	527	312	414	414	455	377	500	300	392	392	427	364	468	287
	90	454	454	481	449	528	372	435	435	456	437	500	361	414	414	429	422	469	348
14000	75	450	390	499	296	543	196	425	377	471	283	513	184	397	364	441	270	479	171
	80	452	452	500	373	544	274	428	428	472	361	513	262	402	402	442	347	479	249
	85	469	469	501	450	545	352	448	448	473	438	514	339	424	424	443	424	480	326
	90	494	494	504	504	545	429	472	472	477	477	514	417	447	447	448	448	480	403
16000	75	460	422	508	314	551	200	434	409	479	302	518	188	405	389	447	288	483	175
	80	465	465	509	402	551	289	440	440	481	390	519	277	415	415	449	376	484	263
	85	488	488	510	490	552	378	465	465	482	471	520	365	440	440	451	449	484	352
	90	513	513	516	516	552	466	489	489	489	489	520	454	462	462	462	462	484	440
18000	75	468	450	515	332	556	204	441	432	485	319	523	192	411	410	452	305	486	178
	80	477	477	517	432	556	304	454	454	487	419	523	292	428	428	454	405	486	278
	85	504	504	518	515	557	404	479	479	489	489	523	391	452	452	457	457	487	377
	90	529	529	529	529	557	503	503	503	503	503	524	490	473	473	473	473	487	476

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
8000	75	331	253	372	201	414	145
	80	332	297	373	245	415	190
	85	334	331	374	289	415	234
	90	347	347	375	333	416	279
11000	75	354	302	395	229	433	152
	80	356	353	397	290	434	213
	85	370	370	398	351	434	274
	90	391	391	400	398	435	335
14000	75	368	347	408	256	442	157
	80	376	376	409	334	442	235
	85	398	398	411	403	443	312
	90	419	419	420	420	443	389
16000	75	375	370	413	274	445	160
	80	389	389	415	362	445	249
	85	412	412	417	417	445	337
	90	432	432	432	432	445	425
18000	75	380	380	417	291	447	164
	80	399	399	419	390	447	263
	85	422	422	423	423	447	363
	90	440	440	440	440	447	446

Table 25. Gross cooling capacities (MBh) — 40 ton air-cooled — high efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
8000	75	375	277	420	225	468	170	356	267	399	214	445	159	335	255	376	203	419	148
	80	376	321	421	269	469	214	357	311	400	259	445	204	336	299	376	247	419	193
	85	376	364	421	313	469	259	358	352	400	303	446	248	337	335	377	291	419	237
	90	382	382	422	357	469	303	367	367	401	347	446	293	350	350	378	335	420	281
11000	75	405	329	451	256	497	179	383	317	426	244	470	167	358	305	400	232	439	155
	80	406	387	452	316	498	240	384	376	428	305	470	229	360	357	401	293	440	216
	85	413	413	453	377	498	301	394	394	429	366	471	290	374	374	402	354	441	277
	90	434	434	454	435	499	362	416	416	430	421	472	350	395	395	404	402	442	338
14000	75	423	378	469	284	513	186	399	366	443	272	483	174	372	350	413	260	450	161
	80	427	427	470	361	514	264	404	404	444	350	484	252	380	380	415	337	450	239
	85	447	447	472	438	514	341	426	426	445	424	485	329	403	403	416	407	451	316
	90	471	471	476	476	515	418	449	449	451	451	485	407	425	425	425	425	452	394
16000	75	432	407	478	302	520	190	407	394	450	290	489	178	379	374	419	277	454	165
	80	440	440	479	391	521	279	417	417	451	379	489	267	394	394	421	366	454	254
	85	464	464	481	471	521	368	442	442	453	451	490	355	417	417	423	423	455	342
	90	489	489	489	489	522	456	465	465	466	466	490	444	438	438	438	438	455	430
18000	75	439	432	484	320	525	194	413	413	456	308	493	182	385	385	424	295	457	169
	80	453	453	486	420	526	294	430	430	457	407	493	282	405	405	425	394	457	268
	85	479	479	488	488	526	394	455	455	460	460	494	381	428	428	429	429	458	368
	90	503	503	504	504	527	493	477	477	478	478	494	481	448	448	448	448	459	454

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
8000	75	312	244	350	191	389	136
	80	313	287	351	235	390	180
	85	316	315	352	280	390	225
	90	332	332	353	323	391	269
11000	75	332	292	370	219	405	142
	80	335	335	372	280	406	203
	85	352	352	373	341	407	264
	90	372	372	376	376	407	325
14000	75	344	334	381	246	413	147
	80	356	356	383	323	413	225
	85	377	377	385	384	414	302
	90	396	396	397	397	414	379
16000	75	350	350	386	263	416	151
	80	367	367	387	351	416	239
	85	389	389	391	391	416	328
	90	407	407	407	407	417	407
18000	75	356	356	389	280	418	154
	80	376	376	390	370	418	254
	85	397	397	397	397	418	354
	90	414	414	414	414	420	420

Table 26. Gross cooling capacities (MBh) — 40 ton air-cooled — eFlex™ variable speed compressor

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
8000	75	391	286	440	234	493	180	373	275	419	224	471	170	353	264	397	213	447	159
	80	392	330	440	278	493	225	373	319	420	268	471	215	353	308	398	257	447	204
	85	393	373	441	322	494	269	374	362	420	312	471	259	354	348	398	301	447	248
	90	397	397	441	366	494	313	381	381	421	356	472	303	364	364	399	345	448	293
11000	75	424	338	475	266	530	191	403	327	451	255	504	180	379	315	426	243	476	169
	80	425	399	476	327	530	252	404	386	452	316	504	242	381	372	427	304	476	230
	85	431	431	477	387	531	313	411	411	453	376	505	303	391	391	428	365	477	291
	90	451	451	478	448	532	374	433	433	455	435	506	363	414	414	430	420	478	352
14000	75	446	388	497	295	552	200	422	376	471	284	524	188	396	364	443	272	492	176
	80	448	447	498	373	552	278	425	425	473	361	524	266	404	398	445	349	493	254
	85	466	466	500	450	553	355	446	446	474	438	525	344	425	425	446	423	494	332
	90	492	492	503	503	554	433	472	472	478	478	526	421	450	450	453	453	495	409
16000	75	456	420	508	314	562	205	431	408	481	302	532	193	404	392	452	290	500	181
	80	461	461	509	403	563	294	439	439	482	391	533	282	415	415	453	378	501	270
	85	486	486	510	491	564	383	465	465	484	473	534	371	442	442	455	450	502	359
	90	514	514	517	517	565	471	492	492	494	494	535	460	468	468	468	468	503	447
18000	75	464	449	516	333	570	210	438	431	488	321	539	198	411	408	458	308	505	185
	80	475	475	518	432	571	310	452	452	490	420	540	298	429	429	460	407	506	285
	85	503	503	520	516	572	410	481	481	493	493	541	398	456	456	463	463	508	385
	90	532	532	533	533	573	509	509	509	509	509	542	497	483	483	484	484	509	485

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
8000	75	331	253	374	201	420	148
	80	332	297	374	246	421	192
	85	333	330	375	290	421	237
	90	347	347	376	334	422	281
11000	75	355	303	399	231	445	156
	80	357	353	400	292	446	218
	85	371	371	401	352	447	279
	90	393	393	403	399	448	340
14000	75	369	348	414	259	459	163
	80	378	378	415	336	460	241
	85	401	401	417	408	461	319
	90	426	426	427	427	462	396
16000	75	376	373	420	276	465	167
	80	391	391	422	365	466	257
	85	417	417	425	425	467	345
	90	442	442	443	443	468	434
18000	75	382	382	426	294	469	171
	80	403	403	427	394	470	272
	85	430	430	433	433	472	371
	90	455	455	456	456	473	465

Table 27. Gross cooling capacities (MBh) — 50 ton air-cooled —standard efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
10000	75	484	355	543	290	605	221	460	342	516	277	575	208	434	328	487	263	542	194
	80	486	410	544	345	605	277	462	397	517	332	576	264	436	383	488	318	543	250
	85	488	465	545	400	606	332	465	450	519	388	577	319	440	436	489	373	544	305
	90	499	499	546	456	606	388	480	480	520	443	578	375	458	458	491	429	545	361
14000	75	529	426	588	332	646	233	501	411	557	318	611	219	469	394	522	303	573	204
	80	532	499	589	410	646	311	505	484	559	396	612	297	475	468	524	380	574	282
	85	546	546	591	487	647	389	523	523	561	471	613	375	496	496	527	456	576	360
	90	576	576	595	562	649	466	552	552	565	545	615	452	524	524	532	529	577	437
17500	75	553	481	611	366	665	241	523	463	577	351	628	227	489	446	540	335	587	211
	80	562	562	613	462	666	339	534	534	579	448	629	324	503	503	542	429	588	309
	85	590	590	616	556	666	435	563	563	583	541	630	421	533	533	547	520	589	405
	90	621	621	625	625	668	530	592	592	595	595	631	515	561	561	561	561	590	499
20000	75	566	517	622	388	674	247	534	500	587	373	635	232	499	483	548	357	593	216
	80	581	581	624	496	674	358	552	552	589	481	636	343	521	521	551	464	594	327
	85	613	613	629	601	675	468	584	584	595	585	637	454	551	551	557	557	595	438
	90	644	643	644	644	677	575	613	613	613	613	638	560	578	578	579	579	596	538
22500	75	577	554	630	411	680	252	544	537	594	395	641	237	509	509	554	379	598	221
	80	599	599	633	531	681	377	569	569	597	515	641	362	536	536	557	493	598	346
	85	631	631	640	640	681	501	600	600	605	605	642	483	565	565	568	568	599	465
	90	661	661	661	661	683	620	628	628	628	628	644	598	590	590	591	591	600	580

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
10000	75	406	313	455	248	506	179
	80	408	368	456	303	507	235
	85	414	414	458	359	508	290
	90	435	435	460	413	509	346
14000	75	436	378	485	286	532	188
	80	444	444	487	364	533	266
	85	468	468	490	439	534	344
	90	494	494	498	498	536	421
17500	75	453	427	500	318	543	195
	80	471	471	502	412	544	292
	85	500	500	508	502	545	389
	90	526	526	526	526	546	481
20000	75	463	462	506	339	548	200
	80	487	487	510	441	548	310
	85	516	516	519	519	549	417
	90	539	539	540	540	550	519
22500	75	472	472	511	358	551	204
	80	500	500	515	473	551	328
	85	527	527	527	527	551	447
	90	548	548	549	549	553	553

Table 28. Gross cooling capacities (MBh) — 50 ton air-cooled —high efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
10000	75	508	367	570	303	640	236	484	354	544	289	610	222	457	339	513	275	576	208
	80	509	422	571	358	640	291	485	409	545	345	611	278	458	395	515	330	577	263
	85	511	477	572	413	641	347	488	462	546	400	611	334	462	447	516	385	578	319
	90	520	520	573	468	642	402	499	499	547	455	612	389	477	477	517	441	579	374
14000	75	557	439	623	347	694	252	529	425	591	333	659	237	497	409	555	316	619	221
	80	561	515	625	425	695	330	533	500	593	410	660	315	501	481	558	394	620	299
	85	572	572	627	502	697	408	547	547	596	488	662	393	520	520	560	470	622	377
	90	602	602	631	578	698	485	578	578	600	560	664	471	550	550	565	544	624	455
17500	75	586	496	652	382	723	262	554	480	617	367	684	247	519	463	577	350	640	230
	80	593	589	654	479	725	360	563	563	619	464	686	345	531	531	580	447	643	328
	85	620	620	658	574	727	457	593	593	623	558	688	442	562	562	585	537	645	425
	90	655	655	666	665	730	555	627	627	634	634	691	539	596	596	599	599	648	520
20000	75	601	536	666	406	738	269	568	516	629	390	696	253	531	497	588	372	651	236
	80	614	614	669	517	740	381	583	583	633	499	699	365	550	550	592	481	654	348
	85	648	648	674	624	743	492	619	619	639	603	702	476	586	586	599	585	657	459
	90	685	685	690	690	746	601	655	655	657	657	706	584	621	621	621	621	661	567
22500	75	613	571	678	429	749	276	579	553	639	413	706	259	541	534	597	395	659	242
	80	633	633	681	551	752	401	601	601	643	534	709	385	568	568	601	516	663	367
	85	671	671	689	669	755	526	640	640	652	651	713	510	605	605	612	612	666	493
	90	710	710	712	712	760	648	678	678	679	679	718	631	641	641	642	642	671	607

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
10000	75	427	324	480	259	539	192
	80	429	379	482	314	540	248
	85	433	431	483	370	541	303
	90	453	453	485	425	542	359
14000	75	462	390	517	299	576	204
	80	468	464	519	377	578	282
	85	490	490	522	452	580	360
	90	520	520	528	526	582	438
17500	75	481	441	535	332	594	212
	80	497	497	538	426	596	310
	85	529	529	544	518	599	408
	90	561	561	562	562	603	502
20000	75	492	477	544	354	602	218
	80	516	516	549	461	606	330
	85	550	550	557	557	609	441
	90	583	583	584	584	614	543
22500	75	501	501	551	376	608	223
	80	532	532	557	491	613	349
	85	567	567	570	570	616	470
	90	602	602	603	603	623	587

Table 29. Gross cooling capacities (MBh) — 50 ton air-cooled — eFlex™ variable speed compressor

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
10000	75	507	367	569	302	638	235	485	355	544	290	610	222	460	341	517	276	580	209
	80	509	422	570	358	638	291	486	410	545	345	611	278	462	396	518	332	580	265
	85	511	476	571	413	639	346	489	464	546	400	611	334	465	450	519	387	581	320
	90	520	520	572	468	640	401	500	500	548	455	612	389	479	479	521	442	582	376
14000	75	556	439	621	347	692	251	530	425	591	333	659	237	500	409	559	318	623	222
	80	560	514	623	424	693	329	533	500	593	410	660	315	505	485	561	395	624	301
	85	572	572	625	501	695	407	548	548	596	488	662	393	522	522	564	471	626	379
	90	600	600	629	577	697	484	578	578	600	563	664	471	553	553	569	545	628	456
17500	75	584	495	650	381	721	262	555	480	617	367	685	247	523	464	581	351	645	232
	80	592	582	652	478	723	359	565	561	619	464	687	345	535	535	584	448	647	329
	85	618	618	656	573	725	457	593	593	624	558	689	442	565	565	589	542	650	427
	90	653	653	665	655	728	554	627	627	636	635	692	538	598	598	604	604	653	522
20000	75	599	535	664	405	736	269	568	520	630	390	697	254	535	503	592	374	656	238
	80	613	613	667	514	738	380	585	585	633	498	700	365	554	554	596	482	659	350
	85	646	646	673	623	741	492	618	618	639	604	703	477	588	588	603	587	662	461
	90	683	683	690	690	745	600	655	655	659	659	707	585	624	624	625	625	667	568
22500	75	612	574	676	429	747	275	580	554	640	413	707	260	545	533	601	397	664	243
	80	632	632	680	550	750	401	602	602	644	534	711	385	571	571	606	517	668	369
	85	669	669	687	668	753	526	640	640	653	642	714	511	608	608	617	616	672	491
	90	708	708	711	711	758	647	678	678	679	679	720	631	645	645	646	646	677	614

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
10000	75	434	327	487	262	546	194
	80	435	381	488	317	547	250
	85	439	434	489	372	548	306
	90	458	458	491	428	549	361
14000	75	469	393	524	302	584	207
	80	474	467	526	380	586	285
	85	496	496	529	455	588	363
	90	525	525	535	527	590	441
17500	75	488	447	543	335	602	215
	80	504	504	546	429	605	313
	85	535	535	552	521	608	411
	90	567	567	570	570	612	505
20000	75	499	481	552	357	611	221
	80	521	521	557	464	615	333
	85	556	556	565	560	618	444
	90	591	591	591	591	624	551
22500	75	509	506	560	379	618	226
	80	538	538	565	499	623	352
	85	574	574	579	579	627	474
	90	610	610	610	610	633	591

Table 30. Gross cooling capacities (MBh) — 55 ton air-cooled —standard efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
10000	75	543	386	607	320	674	250	517	371	579	306	642	235	489	356	546	290	605	219
	80	544	441	608	376	675	305	518	426	579	361	642	291	490	411	547	345	605	274
	85	545	496	609	431	675	361	520	481	580	416	643	346	492	465	548	400	606	330
	90	550	548	610	486	676	416	527	527	582	471	643	402	502	502	550	455	607	385
14000	75	598	459	662	364	723	262	567	443	627	348	684	246	532	425	589	330	640	228
	80	600	535	663	441	724	340	570	518	629	425	685	324	536	500	590	407	641	306
	85	607	607	665	518	724	418	579	579	630	502	686	401	548	548	592	485	642	384
	90	632	632	667	594	725	495	606	606	633	577	686	479	576	576	595	560	643	461
17500	75	627	518	689	397	745	270	593	499	651	380	703	253	555	479	609	362	655	235
	80	633	608	691	494	746	367	599	591	653	477	703	350	563	563	610	458	656	332
	85	651	651	693	588	746	464	622	622	655	571	704	447	589	589	613	552	656	428
	90	684	684	698	680	747	560	653	653	661	661	705	543	617	617	622	622	657	525
20000	75	643	555	702	420	755	274	607	537	662	402	711	257	567	517	618	383	662	239
	80	651	651	704	530	756	386	617	617	664	513	711	368	580	580	620	491	662	350
	85	679	679	707	637	757	496	646	646	668	615	712	479	609	609	624	595	662	460
	90	710	710	716	716	758	607	676	676	679	679	713	586	636	636	637	637	663	566
22500	75	655	590	712	442	763	279	617	575	671	424	717	262	576	550	625	405	666	243
	80	668	668	714	566	764	404	633	633	673	545	717	387	596	596	627	525	666	368
	85	700	700	718	680	765	529	665	665	677	661	718	511	625	625	632	632	666	492
	90	730	730	732	732	767	649	693	693	693	693	720	631	650	650	651	651	668	610

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
10000	75	458	339	511	273	565	201
	80	459	394	512	328	565	257
	85	462	446	514	383	566	313
	90	476	476	515	438	567	368
14000	75	495	407	547	311	593	210
	80	499	479	549	389	594	288
	85	516	516	551	464	595	365
	90	543	543	555	537	596	442
17500	75	515	459	563	342	605	216
	80	526	526	565	439	605	313
	85	552	552	568	528	605	409
	90	578	578	579	579	606	502
20000	75	525	492	571	364	609	220
	80	542	542	573	471	609	330
	85	570	570	577	573	609	440
	90	593	593	594	594	610	546
22500	75	533	528	576	385	613	224
	80	555	555	578	504	612	348
	85	582	582	585	585	611	468
	90	603	603	603	603	613	582

Table 31. Gross cooling capacities (MBh) — 55 ton air-cooled —high efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
10000	75	525	377	590	312	662	245	502	364	564	299	632	231	476	349	534	284	598	216
	80	527	432	591	367	662	300	504	419	565	354	632	287	477	404	535	340	599	272
	85	529	486	592	423	662	356	506	473	566	409	633	342	480	459	537	395	600	328
	90	535	535	593	478	663	411	515	515	568	465	634	398	492	492	538	450	601	383
14000	75	579	450	646	357	720	261	551	435	615	342	684	246	519	419	579	326	643	230
	80	582	526	648	435	721	339	554	511	616	420	685	324	523	494	581	404	645	308
	85	591	591	650	512	722	417	566	566	619	497	686	402	538	538	583	481	646	386
	90	619	619	653	588	724	495	595	595	622	573	688	480	568	568	588	557	648	464
17500	75	609	507	677	392	750	272	578	491	641	377	710	256	543	474	602	359	666	239
	80	615	600	679	489	752	370	585	584	644	474	712	354	552	552	605	456	668	337
	85	639	639	682	584	754	467	612	612	648	568	714	451	581	581	609	550	670	434
	90	674	674	690	676	756	564	647	647	656	656	717	548	615	615	621	621	673	531
20000	75	624	547	692	416	765	279	592	531	655	400	724	262	555	512	614	382	677	245
	80	635	635	695	527	767	390	605	605	658	511	726	374	571	571	617	491	679	356
	85	668	668	700	635	770	501	639	639	664	614	728	485	606	606	623	595	682	468
	90	706	706	713	713	773	612	676	676	680	680	732	594	641	641	642	642	686	575
22500	75	637	582	705	440	777	285	603	565	666	423	734	268	566	545	623	405	685	250
	80	655	655	708	562	780	410	623	623	670	544	736	394	589	589	627	526	688	376
	85	693	693	715	680	782	536	661	661	677	662	739	519	626	626	636	636	691	501
	90	732	732	735	735	786	657	700	700	700	700	743	640	662	662	663	663	696	621

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
10000	75	447	334	501	268	561	200
	80	448	389	503	324	562	256
	85	452	441	504	379	563	312
	90	468	468	506	434	564	367
14000	75	484	402	540	309	599	212
	80	489	474	542	386	601	291
	85	508	508	545	462	603	369
	90	538	538	550	536	605	446
17500	75	504	455	559	341	618	221
	80	517	517	562	438	620	318
	85	548	548	567	527	623	416
	90	580	580	582	582	626	510
20000	75	515	488	569	363	627	226
	80	536	536	573	471	630	338
	85	569	569	580	575	632	449
	90	603	603	604	604	636	556
22500	75	525	524	576	385	633	231
	80	552	552	581	506	636	357
	85	587	587	592	592	639	479
	90	621	621	622	622	645	595

Table 32. Gross cooling capacities (MBh) — 55 ton air-cooled — eFlex™ variable speed compressor

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
10000	75	534	381	599	316	671	249	511	368	573	303	643	236	486	354	545	289	611	222
	80	535	436	599	371	671	304	512	423	574	359	643	291	488	409	546	345	612	277
	85	537	490	600	427	672	360	514	477	575	414	643	347	490	463	548	400	612	333
	90	543	540	601	482	672	415	523	523	577	469	644	402	501	501	549	455	613	388
14000	75	588	454	656	361	731	265	561	440	626	347	697	251	531	424	592	332	659	236
	80	591	530	658	439	732	343	564	515	627	425	698	329	534	500	594	409	660	314
	85	600	598	660	516	733	421	575	575	630	502	699	407	548	548	597	487	662	392
	90	626	626	663	592	734	499	603	603	633	578	701	485	578	578	601	562	664	469
17500	75	619	512	687	397	762	276	588	496	654	382	725	261	555	479	617	365	684	245
	80	625	605	690	494	764	374	595	588	656	479	726	359	564	563	620	462	686	343
	85	646	646	693	588	766	471	621	621	660	573	729	456	592	592	624	556	688	440
	90	683	683	700	681	768	568	656	656	668	661	731	553	627	627	635	635	691	537
20000	75	635	552	703	421	779	283	603	536	668	405	739	268	568	518	629	388	696	251
	80	646	644	706	532	781	395	616	616	671	516	741	379	584	584	633	497	698	363
	85	676	676	711	639	783	506	649	649	676	623	743	491	618	618	639	602	701	474
	90	714	714	724	724	786	615	686	686	692	692	747	599	654	654	657	657	705	582
22500	75	648	591	716	444	791	290	615	570	679	428	750	274	579	552	639	411	705	257
	80	665	665	720	566	794	415	634	634	683	550	752	399	601	601	643	532	708	383
	85	701	701	726	689	797	541	672	672	690	668	755	525	639	639	652	645	711	508
	90	741	741	746	746	801	662	710	710	713	713	760	646	676	676	677	677	716	628

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
10000	75	459	340	515	274	577	207
	80	460	395	516	330	578	262
	85	463	449	517	385	579	318
	90	477	477	519	440	580	374
14000	75	498	408	556	315	619	220
	80	503	483	558	393	620	298
	85	520	520	561	469	622	376
	90	550	550	566	546	624	453
17500	75	520	462	578	348	640	228
	80	532	532	580	445	642	326
	85	562	562	585	539	645	423
	90	595	595	599	599	648	518
20000	75	531	496	588	371	650	234
	80	550	550	592	479	653	346
	85	585	585	599	583	656	457
	90	619	619	620	620	660	564
22500	75	541	532	596	393	657	239
	80	567	567	601	513	661	365
	85	604	604	611	611	664	490
	90	640	640	641	641	669	604

Table 33. Gross cooling capacities (MBh) — 60 ton air-cooled —standard efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
14000	75	641	473	717	381	792	282	605	452	676	360	748	262	564	430	631	338	699	240
	80	644	550	719	459	794	361	607	530	678	438	749	340	566	507	633	416	700	318
	85	648	627	721	536	795	439	612	605	680	515	751	418	574	574	636	493	702	396
	90	670	670	723	613	797	516	639	639	683	593	753	496	605	605	638	570	704	474
18000	75	678	539	752	419	823	291	635	517	707	397	774	269	589	492	656	373	720	246
	80	682	640	755	519	825	391	641	615	709	496	776	370	597	589	659	472	722	347
	85	700	700	757	618	827	492	665	665	712	596	778	470	626	626	663	572	724	447
	90	739	739	763	718	829	591	702	702	718	694	780	570	662	662	670	668	726	546
21000	75	696	587	770	446	838	296	651	563	721	422	785	274	602	538	668	398	728	250
	80	705	700	772	562	840	414	662	662	724	539	788	391	616	616	671	514	731	367
	85	737	737	776	679	842	530	698	698	728	655	790	508	655	655	676	631	733	484
	90	777	777	786	786	844	647	736	736	740	740	792	624	691	691	692	692	736	600
24000	75	711	634	782	472	848	302	663	609	731	448	793	279	612	577	675	422	734	254
	80	725	725	785	605	850	436	682	682	734	581	795	413	638	638	679	555	736	388
	85	767	767	791	738	852	569	724	724	741	708	798	546	677	677	687	681	738	521
	90	806	806	807	807	855	702	762	762	763	763	801	679	713	713	714	714	742	654
27000	75	722	681	791	498	856	308	673	648	738	473	799	284	620	619	680	446	737	258
	80	747	747	795	648	858	458	703	703	742	623	801	434	654	654	684	596	739	409
	85	790	790	804	790	860	608	744	744	752	752	803	584	694	694	696	696	742	558
	90	830	830	831	831	864	758	782	782	783	783	807	734	729	729	730	730	746	704

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
14000	75	521	407	583	314	646	217
	80	524	484	586	392	648	295
	85	537	537	588	470	650	373
	90	569	569	591	547	652	451
18000	75	541	467	603	348	662	222
	80	550	550	606	448	664	323
	85	583	583	610	548	667	423
	90	618	618	620	620	669	522
21000	75	551	509	611	372	668	225
	80	571	571	615	488	670	342
	85	608	608	621	599	672	459
	90	643	643	644	644	675	575
24000	75	559	548	616	395	671	229
	80	589	589	620	528	673	362
	85	626	626	630	630	675	495
	90	661	661	661	661	679	629
27000	75	565	565	618	419	672	232
	80	603	603	624	564	674	382
	85	640	640	640	640	676	532
	90	673	673	673	673	682	670

Table 34. Gross cooling capacities (MBh) — 60 ton air-cooled — high efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
14000	75	657	481	736	390	821	294	621	460	696	369	776	273	581	438	651	347	726	250
	80	659	558	738	468	823	373	623	538	698	447	777	351	583	516	654	424	727	329
	85	663	635	740	545	824	451	628	615	700	524	779	429	590	585	656	502	729	407
	90	683	683	742	622	826	528	653	653	702	602	781	507	620	620	658	579	731	485
18000	75	696	548	777	430	861	305	654	525	731	407	809	282	609	501	680	382	752	258
	80	700	648	779	529	862	406	660	624	733	507	811	383	615	598	683	482	754	359
	85	717	717	782	629	865	506	681	681	736	606	813	483	642	642	686	582	757	459
	90	756	756	787	729	867	606	720	720	743	707	816	583	680	680	693	678	759	559
21000	75	716	596	797	457	880	312	671	573	748	433	824	288	623	547	693	408	764	263
	80	725	709	800	574	882	430	681	678	751	550	827	406	635	635	697	524	766	380
	85	756	756	805	690	885	546	717	717	756	667	830	523	674	674	702	641	769	497
	90	799	799	814	803	887	663	759	759	767	767	833	639	714	714	717	717	772	614
24000	75	732	644	813	485	894	319	685	619	760	459	835	294	633	589	702	433	771	267
	80	746	746	816	618	896	453	703	703	764	593	838	428	656	656	706	566	774	401
	85	789	789	822	751	899	586	746	746	771	723	841	561	699	699	715	693	777	535
	90	834	834	838	838	903	720	790	790	791	791	845	695	740	740	741	741	782	668
27000	75	745	688	824	511	904	325	696	662	769	485	843	299	642	629	709	457	776	272
	80	769	769	828	661	907	476	725	725	773	635	846	450	676	676	714	607	780	423
	85	817	817	838	808	910	626	770	770	784	776	850	600	719	719	726	726	783	573
	90	863	863	863	863	915	776	815	815	816	816	855	750	761	761	762	762	789	723

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
14000	75	538	415	603	323	671	226
	80	540	492	605	401	673	305
	85	552	552	608	478	675	383
	90	583	583	611	556	677	461
18000	75	560	476	625	357	691	232
	80	568	565	628	457	693	333
	85	600	600	632	556	696	433
	90	636	636	642	640	698	533
21000	75	570	520	635	381	698	236
	80	588	588	638	497	701	353
	85	627	627	645	611	704	470
	90	665	665	666	666	708	587
24000	75	579	557	641	405	703	240
	80	608	608	645	538	706	374
	85	648	648	655	654	709	507
	90	686	686	687	687	714	641
27000	75	586	586	644	428	705	243
	80	623	623	650	579	709	394
	85	664	664	665	665	712	544
	90	702	702	703	703	719	689

Table 35. Gross cooling capacities (MBh) — 60 ton air-cooled — eFlex™ variable speed compressor

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
14000	75	644	475	721	383	803	287	611	456	684	364	762	268	576	436	644	344	717	247
	80	646	552	723	461	804	365	614	533	686	442	763	346	578	513	646	421	718	325
	85	651	629	724	538	806	443	619	607	688	519	765	424	586	579	648	499	720	403
	90	672	672	727	615	808	521	645	645	690	596	767	502	615	615	651	576	722	481
18000	75	681	541	759	422	840	298	643	520	717	401	793	277	602	498	671	379	742	254
	80	686	640	762	522	842	398	649	619	720	501	795	377	609	595	674	479	744	355
	85	704	704	764	622	844	499	671	671	723	601	798	478	636	636	678	579	747	455
	90	743	743	770	720	847	599	710	710	729	699	800	578	674	674	685	674	749	555
21000	75	700	589	778	450	858	305	659	567	733	428	807	282	615	544	684	404	753	259
	80	709	695	781	566	860	422	670	664	736	544	810	400	630	630	687	521	756	376
	85	742	742	786	683	863	539	706	706	741	661	813	517	667	667	693	635	758	493
	90	784	784	796	785	866	655	747	747	757	741	816	633	706	706	710	710	762	610
24000	75	715	637	793	477	871	311	672	614	744	454	817	288	626	586	693	429	760	264
	80	732	732	796	610	874	445	691	691	748	587	821	422	649	649	697	562	763	398
	85	774	774	803	741	877	579	734	734	756	717	824	556	692	692	705	689	766	531
	90	818	818	822	822	880	712	777	777	778	778	828	689	732	732	733	733	771	665
27000	75	728	680	804	504	881	317	682	655	753	479	825	293	634	623	699	454	765	268
	80	753	753	808	653	884	468	712	712	758	629	828	444	668	668	704	604	768	419
	85	800	800	818	798	887	618	757	757	769	758	832	594	711	711	716	716	771	569
	90	846	846	846	846	892	768	801	801	802	802	837	745	752	752	753	753	777	715

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
14000	75	537	414	601	322	668	225
	80	540	492	604	400	669	304
	85	551	551	606	477	672	382
	90	582	582	609	555	674	459
18000	75	558	475	623	356	687	231
	80	567	563	626	456	689	332
	85	598	598	629	555	692	432
	90	634	634	645	621	695	532
21000	75	569	517	632	380	694	235
	80	587	587	635	496	697	352
	85	625	625	642	610	700	469
	90	662	662	663	663	703	585
24000	75	577	557	638	404	698	238
	80	606	606	642	537	702	372
	85	645	645	652	651	705	506
	90	683	683	684	684	709	639
27000	75	584	584	641	427	701	242
	80	620	620	647	573	704	392
	85	661	661	663	663	707	542
	90	698	698	699	699	714	687

Table 36. Gross cooling capacities (MBh) — 70 ton air-cooled —standard efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F) 85 Entering Wet Bulb (°F) 61 CAP	61 SHC	67 CAP	67 SHC	73 CAP	73 SHC	95 Entering Wet Bulb (°F) 61 CAP	61 SHC	67 CAP	67 SHC	73 CAP	73 SHC	105 Entering Wet Bulb (°F) 61 CAP	61 SHC	67 CAP	67 SHC	73 CAP	73 SHC
16000	75	748	549	830	441	906	323	704	525	782	416	851	298	657	498	729	390	792	272
	80	751	638	832	530	907	412	707	613	784	505	853	388	660	587	731	479	793	361
	85	756	726	834	618	909	501	715	697	786	593	855	477	672	664	733	567	795	450
	90	779	779	837	706	911	590	743	743	789	682	857	565	702	702	737	656	797	539
20000	75	784	615	863	477	930	328	735	588	809	451	870	302	682	560	750	423	804	275
	80	790	725	865	588	932	440	742	698	811	562	872	414	690	670	753	534	806	386
	85	809	809	869	699	934	551	764	764	815	672	874	525	718	718	757	645	808	498
	90	846	846	874	808	937	662	803	803	822	782	876	636	755	755	766	747	811	608
22000	75	798	646	874	494	938	331	746	619	818	467	875	304	691	590	756	439	807	276
	80	806	767	877	616	940	454	756	737	821	589	877	427	704	695	760	561	809	399
	85	831	831	881	738	942	576	786	786	825	711	879	549	737	737	765	683	811	521
	90	872	872	889	858	945	698	825	825	835	819	882	671	773	773	779	778	814	643
24000	75	809	678	883	511	944	334	755	650	824	484	879	307	698	618	761	454	809	278
	80	820	802	886	644	946	468	770	762	828	617	881	440	717	717	765	587	812	412
	85	852	852	891	777	948	601	805	805	833	750	883	574	752	752	771	718	814	545
	90	893	893	903	889	951	734	843	843	849	848	886	707	787	787	789	789	818	678
26000	75	818	709	890	528	949	337	763	678	830	500	883	309	705	647	765	470	812	280
	80	834	829	893	672	951	482	783	783	833	644	885	454	727	727	769	614	814	425
	85	871	871	900	814	954	627	820	820	841	785	888	599	765	765	777	755	817	570
	90	911	911	917	917	958	771	857	857	860	860	892	743	798	798	798	798	821	714
27000	75	822	722	893	536	952	339	767	692	832	508	885	311	707	661	766	478	813	282
	80	841	840	897	686	954	489	788	788	836	658	887	461	732	732	770	628	815	432
	85	879	879	904	833	957	640	827	827	844	804	890	611	770	770	779	766	818	582
	90	918	918	923	923	961	789	863	863	865	865	894	761	802	802	802	802	823	729

CFM	Ent DB (°F)	Ambient Temperature (°F) 115 Entering Wet Bulb (°F) 61 CAP	61 SHC	67 CAP	67 SHC	73 CAP	73 SHC
16000	75	607	472	673	363	728	245
	80	611	559	676	452	730	334
	85	627	627	678	541	732	423
	90	660	660	683	628	734	512
20000	75	627	532	689	394	735	246
	80	639	628	692	505	737	358
	85	669	669	696	616	739	469
	90	703	703	709	706	741	580
22000	75	634	559	693	409	736	247
	80	651	651	696	531	738	370
	85	685	685	702	651	740	492
	90	717	717	719	719	743	614
24000	75	640	587	695	424	737	249
	80	661	661	699	558	739	383
	85	697	697	707	687	742	516
	90	726	726	727	727	745	649
26000	75	644	615	697	439	738	251
	80	671	671	701	584	740	396
	85	706	706	711	706	742	540
	90	732	732	733	733	747	680
27000	75	646	628	697	447	738	252
	80	675	675	702	597	740	402
	85	709	709	714	712	742	552
	90	734	734	735	735	747	697

Table 37. Gross cooling capacities (MBh) — 70 ton air-cooled —high efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
16000	75	725	538	814	434	911	327	684	515	768	411	861	304	639	490	719	386	806	279
	80	727	626	816	523	913	416	687	603	771	500	863	393	642	579	721	475	808	369
	85	734	715	818	612	915	505	695	691	773	589	865	482	655	655	724	564	810	458
	90	763	763	821	700	917	594	729	729	777	677	867	571	691	691	728	653	813	547
20000	75	762	605	853	474	951	338	716	580	802	449	895	314	666	553	747	423	834	288
	80	768	716	856	585	953	450	723	690	806	560	898	426	675	664	750	534	837	400
	85	790	790	860	696	956	562	751	751	810	671	901	537	708	708	755	645	840	511
	90	836	836	867	808	959	673	796	796	818	782	904	649	752	752	765	753	844	623
22000	75	776	637	868	493	966	344	728	611	815	467	907	318	676	584	757	440	844	292
	80	786	759	871	615	968	467	739	730	818	590	910	441	690	690	761	562	847	415
	85	818	818	876	738	971	589	777	777	824	712	914	564	731	731	767	685	851	538
	90	866	866	887	859	975	712	824	824	837	831	918	687	777	777	783	783	855	660
24000	75	788	669	880	511	978	349	739	643	825	485	917	323	684	615	765	457	852	295
	80	802	799	884	645	981	483	754	754	829	619	921	457	705	705	770	591	855	430
	85	843	843	891	779	984	617	799	799	837	753	924	591	751	751	778	722	860	563
	90	893	893	905	905	989	750	849	849	854	854	929	725	799	799	802	802	865	697
26000	75	799	701	890	530	988	353	748	674	833	503	926	327	692	642	771	474	858	299
	80	817	817	895	674	991	499	770	770	838	647	929	472	719	719	777	619	862	444
	85	865	865	903	820	995	644	819	819	848	790	933	617	769	769	788	761	867	589
	90	918	918	923	923	1000	789	871	871	873	873	939	762	819	819	820	820	873	735
27000	75	804	717	895	539	992	356	752	687	837	511	929	329	696	657	774	482	861	300
	80	825	825	900	689	996	507	777	777	842	662	933	480	727	727	780	633	865	452
	85	876	876	909	840	1000	657	829	829	853	810	937	630	777	777	793	781	870	602
	90	929	929	933	933	1006	808	881	881	882	882	944	781	828	828	829	829	877	753

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
16000	75	591	464	666	361	748	254
	80	595	553	668	450	750	343
	85	613	612	671	538	752	433
	90	651	651	676	628	755	522
20000	75	612	526	688	395	770	261
	80	624	624	692	506	774	373
	85	663	663	698	618	777	485
	90	706	706	711	711	781	596
22000	75	620	556	696	412	778	264
	80	640	640	700	534	782	387
	85	683	683	708	655	786	510
	90	728	728	730	730	790	633
24000	75	628	583	702	428	784	267
	80	654	654	707	562	788	402
	85	701	701	717	693	792	536
	90	747	747	749	749	798	670
26000	75	634	608	707	444	788	270
	80	668	668	713	589	793	416
	85	716	716	726	725	798	561
	90	764	764	765	765	805	706
27000	75	637	622	709	453	790	271
	80	674	674	715	603	795	423
	85	723	723	730	730	800	573
	90	772	772	773	773	808	721

Table 38. Gross cooling capacities (MBh) — 70 ton air-cooled — eFlex™ variable speed compressor

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
16000	75	727	539	814	435	909	326	688	517	772	413	863	305	647	495	727	390	812	282
	80	729	628	816	524	911	416	691	606	775	502	864	394	651	582	730	479	814	371
	85	737	706	819	612	913	505	703	680	777	591	867	483	666	653	732	568	817	461
	90	763	763	821	701	915	594	732	732	780	679	869	572	697	697	736	655	819	550
20000	75	763	606	853	474	948	338	720	582	806	451	896	314	675	558	755	426	839	290
	80	769	715	856	585	950	450	728	689	809	562	898	426	685	655	759	537	842	402
	85	794	792	860	697	953	561	755	755	813	673	901	538	714	714	763	649	846	513
	90	835	835	867	806	956	672	798	798	822	776	905	649	758	758	776	742	849	625
22000	75	777	638	867	493	962	343	733	614	818	469	907	318	685	586	765	443	848	293
	80	787	748	871	615	965	466	746	717	822	591	910	442	701	685	769	566	852	416
	85	818	818	875	738	968	589	778	778	827	711	914	564	738	738	775	686	856	539
	90	865	865	888	842	972	711	826	826	844	811	918	687	783	783	795	780	860	662
24000	75	790	668	879	512	974	348	743	643	828	487	917	323	693	616	773	460	856	297
	80	806	778	883	645	978	482	762	748	832	620	921	457	716	716	777	594	860	431
	85	841	841	890	776	981	616	801	801	839	751	925	591	758	758	786	725	864	565
	90	892	892	910	880	986	750	850	850	862	849	930	725	805	805	812	812	870	699
26000	75	800	699	889	530	984	352	752	673	836	504	925	327	701	646	779	477	862	300
	80	822	809	894	674	988	498	777	777	841	649	929	472	729	729	785	622	867	446
	85	864	864	902	816	992	643	821	821	851	791	934	617	775	775	796	755	871	591
	90	916	916	929	918	998	788	872	872	880	880	940	763	824	824	827	827	878	733
27000	75	805	715	894	539	989	355	757	688	840	513	929	329	705	660	782	485	865	302
	80	830	825	899	689	993	506	784	784	845	663	933	480	735	735	788	636	869	453
	85	874	874	909	836	997	656	830	830	856	805	938	631	783	783	801	765	874	604
	90	927	927	937	936	1003	807	881	881	888	888	944	782	832	832	835	835	882	751

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
16000	75	605	471	679	367	759	258
	80	609	559	682	456	761	348
	85	626	626	685	544	764	437
	90	661	661	690	632	767	526
20000	75	627	532	702	401	780	264
	80	641	624	706	512	784	377
	85	674	674	711	621	787	488
	90	716	716	728	710	791	600
22000	75	635	560	710	417	787	267
	80	655	654	714	540	791	390
	85	694	694	721	660	795	513
	90	738	738	745	744	800	636
24000	75	642	589	716	434	792	270
	80	668	668	721	567	797	405
	85	711	711	731	693	801	539
	90	757	757	758	758	807	673
26000	75	649	615	720	450	796	273
	80	679	679	726	595	801	418
	85	727	727	741	714	806	564
	90	773	773	774	774	814	705
27000	75	652	623	722	458	798	274
	80	685	685	728	605	803	425
	85	733	733	746	727	808	576
	90	780	780	782	782	817	723

Table 39. Gross cooling capacities (MBh) — 75 ton air-cooled —standard efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
16000	75	797	574	891	469	990	357	753	549	842	443	933	331	704	522	788	416	872	303
	80	799	662	893	558	991	447	755	637	844	532	935	421	708	610	790	505	874	393
	85	804	751	895	646	993	536	761	727	846	621	937	510	714	699	792	593	876	482
	90	821	821	897	734	995	625	783	783	849	709	939	599	743	743	796	682	878	571
20000	75	841	642	935	508	1032	368	791	614	879	480	968	340	736	585	818	451	899	310
	80	846	753	938	619	1034	480	796	726	882	592	970	452	743	697	821	562	901	422
	85	859	859	941	730	1037	591	814	814	885	702	973	563	765	765	825	673	904	533
	90	899	899	947	842	1039	702	855	855	892	814	976	674	808	808	832	785	907	644
22000	75	857	675	951	527	1047	372	805	646	892	498	980	343	748	616	828	468	907	313
	80	864	798	955	649	1049	495	813	768	896	621	982	466	758	738	832	590	910	436
	85	885	885	959	771	1052	618	838	838	900	743	985	589	789	789	837	713	913	558
	90	931	931	967	895	1055	740	884	884	909	864	988	711	833	833	848	834	916	680
24000	75	871	707	965	546	1059	376	816	678	903	516	989	347	757	647	837	485	913	315
	80	881	840	969	679	1061	511	828	811	907	649	991	481	771	771	841	618	916	449
	85	909	909	974	812	1064	644	862	862	913	783	995	614	810	810	848	752	919	583
	90	960	960	985	947	1068	778	910	910	925	915	998	748	855	855	862	862	923	716
26000	75	883	738	977	564	1069	380	826	709	912	533	996	350	766	677	844	501	918	318
	80	896	883	981	708	1071	526	841	841	917	678	999	495	783	783	848	646	921	463
	85	934	934	987	853	1074	670	883	883	924	823	1002	640	828	828	857	791	924	608
	90	986	986	1001	997	1079	815	932	932	940	940	1006	784	874	874	877	877	929	752
27000	75	888	754	982	573	1073	382	831	724	916	542	999	351	769	692	847	510	920	319
	80	903	901	986	723	1075	533	848	848	921	692	1002	502	790	790	851	660	923	470
	85	945	945	994	873	1079	684	893	893	929	843	1005	653	836	836	861	811	926	620
	90	997	997	1009	1009	1083	834	942	942	948	948	1010	803	882	882	884	884	931	770

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
16000	75	653	494	730	388	806	275
	80	657	583	733	477	808	364
	85	667	667	735	565	810	453
	90	701	701	739	654	812	542
20000	75	679	555	754	421	825	279
	80	687	666	757	532	827	391
	85	716	716	761	643	830	502
	90	756	756	770	753	833	613
22000	75	688	585	761	437	830	281
	80	700	700	765	559	833	404
	85	736	736	771	682	835	526
	90	778	778	784	784	839	648
24000	75	696	615	767	453	834	283
	80	713	713	771	586	836	417
	85	754	754	779	720	839	550
	90	796	796	798	798	843	684
26000	75	702	642	772	469	836	285
	80	724	724	776	613	839	430
	85	769	769	786	755	842	574
	90	810	810	811	811	846	719
27000	75	705	657	773	476	837	285
	80	730	730	778	626	839	436
	85	775	775	789	774	842	586
	90	816	816	817	817	847	736

Table 40. Gross cooling capacities (MBh) — 75 ton air-cooled —high efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
16000	75	827	589	923	483	1022	370	781	563	871	456	963	343	732	535	815	428	897	313
	80	829	678	924	572	1024	460	784	652	873	545	964	432	734	624	817	517	899	402
	85	833	767	926	661	1026	549	789	741	875	634	966	521	741	712	819	605	900	492
	90	848	845	929	749	1028	638	808	808	878	722	968	610	764	764	822	694	903	581
20000	75	872	657	970	523	1065	380	821	629	911	494	997	350	764	598	846	463	922	318
	80	877	768	972	634	1067	492	826	740	913	605	999	462	770	709	849	574	924	430
	85	889	875	975	745	1069	603	842	836	917	716	1001	573	790	790	853	685	926	541
	90	925	925	980	856	1072	714	880	880	923	827	1004	684	830	830	860	796	929	652
22000	75	890	690	987	542	1080	384	835	660	924	511	1008	353	776	629	857	479	929	320
	80	896	813	990	664	1082	507	843	784	928	634	1010	476	785	750	860	601	932	443
	85	916	916	993	786	1084	630	866	866	932	756	1013	598	812	812	865	724	934	565
	90	958	958	1001	909	1087	752	910	910	940	879	1016	721	856	856	874	845	937	687
24000	75	905	722	1001	560	1091	388	848	692	936	529	1016	356	786	659	865	496	934	322
	80	914	855	1004	693	1094	522	858	824	939	662	1019	490	798	785	869	629	937	456
	85	940	940	1009	826	1097	655	888	888	944	795	1022	623	833	833	875	763	940	589
	90	988	988	1019	959	1100	789	935	935	956	927	1025	757	877	877	888	878	943	723
26000	75	918	754	1012	578	1101	391	858	723	945	546	1023	358	794	690	872	512	938	324
	80	930	898	1016	722	1103	537	872	859	949	690	1026	504	812	811	876	656	941	469
	85	963	963	1022	867	1106	681	910	910	955	835	1029	648	852	852	883	801	944	614
	90	1014	1014	1035	1010	1110	826	958	958	970	960	1032	793	895	895	901	901	948	758
27000	75	924	770	1017	587	1105	393	863	738	949	554	1026	360	798	705	874	520	940	325
	80	938	919	1021	736	1108	544	879	872	953	704	1029	511	818	818	879	670	942	476
	85	973	973	1028	887	1111	694	920	920	960	855	1031	661	860	860	887	817	945	626
	90	1025	1025	1043	1026	1115	844	967	967	977	974	1036	811	903	903	907	907	949	776

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
16000	75	678	506	754	398	825	281
	80	682	595	756	486	827	371
	85	690	677	759	575	829	460
	90	719	719	762	664	831	549
20000	75	704	567	777	430	841	284
	80	712	677	780	541	843	396
	85	736	736	784	652	845	507
	90	775	775	792	762	848	618
22000	75	713	597	785	446	899	306
	80	724	711	788	568	847	408
	85	756	756	793	690	848	532
	90	796	796	805	794	852	652
24000	75	720	626	790	461	906	309
	80	737	737	794	595	848	423
	85	773	773	800	726	851	554
	90	812	812	817	817	854	687
26000	75	727	653	794	476	912	311
	80	748	748	798	621	850	433
	85	788	788	806	762	854	574
	90	825	825	826	826	856	721
27000	75	730	667	795	484	914	313
	80	753	753	800	634	850	437
	85	818	818	809	781	856	595
	90	830	830	830	830	856	736

Table 41. Gross cooling capacities (MBh) — 75 ton air-cooled — eFlex™ variable speed compressor

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
16000	75	796	574	890	469	989	358	755	551	845	446	938	334	711	526	796	421	882	308
	80	798	663	892	558	990	448	758	639	847	535	939	423	714	615	798	510	884	398
	85	803	752	894	647	992	537	763	724	849	623	941	513	720	687	800	598	886	487
	90	821	812	897	735	994	626	785	784	852	712	943	602	749	749	804	687	888	576
20000	75	840	642	934	509	1032	369	794	617	883	483	974	343	744	590	828	456	911	315
	80	845	754	937	620	1034	481	799	728	886	594	976	455	751	700	830	567	913	427
	85	859	834	940	731	1037	592	818	804	889	705	979	566	773	770	834	678	916	539
	90	899	899	946	842	1039	703	859	859	896	817	981	677	816	816	842	787	918	650
22000	75	856	675	950	527	1048	373	808	649	896	501	986	346	756	621	838	473	920	318
	80	864	798	953	650	1050	496	816	768	899	623	989	469	766	728	841	595	923	441
	85	886	877	958	772	1053	619	842	842	904	745	991	592	796	796	847	717	926	564
	90	931	931	966	895	1055	741	888	888	913	861	995	714	842	842	857	817	929	686
24000	75	870	707	964	546	1060	378	820	680	908	518	996	350	766	651	847	490	927	321
	80	880	834	967	679	1062	512	831	795	911	652	999	484	779	752	851	623	930	455
	85	910	910	973	813	1065	646	866	866	917	785	1002	618	818	818	858	757	933	589
	90	959	959	984	934	1069	779	914	914	930	892	1005	751	864	864	873	846	937	722
26000	75	882	739	975	564	1070	382	830	711	917	536	1004	353	774	682	854	506	933	323
	80	896	862	979	708	1073	527	845	821	921	680	1007	499	794	780	858	650	936	469
	85	933	933	986	853	1076	672	887	887	929	825	1010	643	837	837	867	796	939	614
	90	985	985	1001	967	1080	816	936	936	945	923	1014	788	883	883	889	879	944	758
27000	75	888	755	980	573	1075	384	835	727	921	544	1007	355	778	697	857	514	935	325
	80	903	876	984	723	1077	535	852	834	925	694	1010	506	800	793	862	664	938	476
	85	944	944	992	873	1081	685	897	897	934	845	1013	656	845	845	871	812	941	626
	90	997	997	1009	983	1085	835	947	947	955	939	1018	806	892	892	896	896	947	776

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
16000	75	664	500	744	395	822	282
	80	667	589	746	483	824	371
	85	679	653	748	572	826	461
	90	710	710	752	661	828	550
20000	75	691	562	769	428	844	287
	80	699	660	772	539	846	398
	85	727	727	776	650	849	510
	90	769	769	785	742	852	621
22000	75	701	592	777	444	850	289
	80	713	683	780	566	853	412
	85	749	749	786	689	856	534
	90	791	791	801	771	859	657
24000	75	709	622	783	460	855	291
	80	727	712	787	593	857	425
	85	767	767	795	724	860	558
	90	810	810	815	806	865	692
26000	75	716	652	788	475	858	293
	80	739	739	792	620	861	438
	85	783	783	802	753	864	583
	90	826	826	828	828	869	727
27000	75	719	663	790	483	859	293
	80	745	745	795	633	862	444
	85	789	789	806	763	865	595
	90	833	833	834	834	871	745

Table 42. Gross cooling capacities (MBh) — 90 ton air-cooled —standard efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
27000	75	984	802	1088	620	1186	426	930	775	1028	592	1119	399	872	745	963	563	1046	369
	80	991	942	1091	769	1187	577	938	914	1032	741	1121	549	881	880	966	712	1047	520
	85	1014	1014	1094	918	1190	727	969	969	1035	890	1123	699	919	919	970	860	1050	669
	90	1068	1068	1101	1056	1192	876	1020	1020	1043	1027	1125	848	968	968	980	980	1052	818
32000	75	1014	882	1115	666	1208	436	956	853	1051	636	1136	408	893	810	982	606	1058	377
	80	1026	1026	1119	842	1210	615	971	971	1055	813	1138	586	911	911	985	782	1060	555
	85	1070	1070	1123	1019	1212	792	1019	1019	1060	983	1140	763	963	963	992	944	1062	732
	90	1125	1125	1136	1136	1214	969	1071	1071	1075	1075	1143	940	1011	1011	1011	1011	1064	909
37000	75	1036	955	1135	710	1222	446	975	916	1067	680	1147	416	910	882	994	648	1066	385
	80	1056	1056	1139	914	1225	652	1001	1001	1071	884	1149	622	943	943	998	852	1067	590
	85	1113	1113	1146	1102	1227	857	1057	1057	1079	1070	1151	827	994	994	1007	1007	1069	795
	90	1167	1167	1166	1166	1229	1061	1107	1107	1106	1106	1153	1031	1040	1040	1041	1041	1072	979
42000	75	1054	1022	1149	754	1233	456	991	987	1078	723	1154	425	922	922	1002	690	1070	393
	80	1088	1088	1153	986	1235	689	1030	1030	1082	954	1156	659	967	967	1006	902	1071	626
	85	1146	1146	1163	1163	1237	922	1085	1085	1094	1094	1158	891	1017	1017	1020	1020	1073	849
	90	1199	1199	1199	1199	1240	1143	1133	1133	1134	1134	1161	1099	1060	1060	1060	1060	1076	1063
45000	75	1063	1062	1156	780	1238	462	999	999	1083	748	1158	431	929	929	1005	714	1072	398
	80	1104	1104	1160	1028	1240	712	1044	1044	1088	977	1159	680	978	978	1010	940	1073	647
	85	1162	1162	1173	1173	1242	961	1098	1098	1102	1102	1161	929	1028	1028	1026	1026	1073	895
	90	1214	1214	1214	1214	1246	1185	1145	1145	1145	1145	1165	1150	1068	1068	1121	1121	1150	1125

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
27000	75	810	714	895	532	969	339
	80	822	822	899	681	971	490
	85	865	865	903	825	973	639
	90	911	911	915	915	975	788
32000	75	829	777	909	574	978	346
	80	852	852	913	750	979	524
	85	903	903	921	910	981	701
	90	947	947	947	947	983	877
37000	75	842	842	918	615	982	353
	80	881	881	922	811	983	558
	85	929	929	933	933	984	762
	90	969	969	969	969	986	943
42000	75	852	852	923	656	983	360
	80	900	900	928	865	984	592
	85	946	946	945	945	984	824
	90	981	981	981	983	988	988
45000	75	857	857	924	680	983	364
	80	909	909	930	903	983	613
	85	953	953	954	954	984	858
	90	985	985	985	985	988	988

Table 43. Gross cooling capacities (MBh) — 90 ton air-cooled —standard efficiency and high efficiency

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
27000	75	1044	828	1159	647	1268	455	986	799	1096	618	1199	426	923	766	1027	586	1125	396
	80	1052	971	1162	797	1270	605	996	940	1099	767	1202	577	934	907	1030	736	1128	546
	85	1079	1079	1166	945	1272	754	1031	1031	1104	916	1204	726	977	977	1036	885	1131	696
	90	1137	1137	1174	1087	1274	903	1087	1087	1113	1057	1206	875	1032	1032	1047	1024	1133	845
32000	75	1078	906	1191	694	1294	465	1017	870	1123	663	1222	436	950	835	1050	630	1144	405
	80	1093	1077	1194	870	1296	643	1034	1034	1127	840	1224	614	972	972	1054	807	1146	583
	85	1143	1143	1200	1038	1298	820	1090	1090	1135	1006	1226	791	1030	1030	1063	972	1149	760
	90	1203	1203	1214	1208	1300	996	1147	1147	1151	1151	1228	967	1086	1086	1087	1087	1152	931
37000	75	1105	978	1213	738	1311	475	1040	944	1142	707	1236	445	970	907	1066	673	1155	414
	80	1130	1130	1217	943	1313	680	1073	1073	1147	911	1238	650	1010	1010	1071	866	1158	619
	85	1193	1193	1226	1133	1315	884	1134	1134	1158	1100	1240	854	1070	1070	1084	1065	1159	823
	90	1252	1252	1252	1252	1317	1082	1191	1191	1192	1192	1243	1045	1124	1124	1125	1125	1163	1011
42000	75	1126	1052	1230	783	1325	485	1059	1017	1156	750	1247	455	986	979	1077	715	1163	422
	80	1168	1168	1235	1002	1326	718	1107	1107	1162	967	1248	687	1040	1040	1084	931	1165	654
	85	1231	1231	1247	1227	1326	949	1168	1168	1176	1176	1249	918	1099	1099	1101	1101	1166	879
	90	1288	1288	1289	1289	1330	1162	1222	1222	1223	1223	1253	1129	1150	1150	1151	1151	1170	1094
45000	75	1137	1096	1238	809	1331	491	1068	1060	1162	776	1252	460	994	994	1081	741	1167	428
	80	1187	1187	1243	1042	1331	740	1124	1124	1169	1006	1252	709	1055	1055	1089	969	1167	676
	85	1250	1250	1258	1258	1332	982	1184	1184	1186	1186	1253	949	1113	1113	1113	1113	1169	906
	90	1305	1305	1306	1306	1336	1214	1236	1236	1237	1237	1257	1180	1161	1161	1161	1161	1172	1144

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
27000	75	858	730	955	554	1048	366
	80	872	871	959	704	1052	516
	85	921	921	966	845	1054	665
	90	974	974	980	980	1057	814
32000	75	881	799	974	597	1063	374
	80	912	912	979	774	1066	551
	85	968	968	990	937	1068	728
	90	1021	1021	1023	1023	1072	893
37000	75	898	870	987	639	1072	382
	80	945	945	993	830	1074	586
	85	1003	1003	1008	1008	1076	790
	90	1053	1053	1054	1054	1080	975
42000	75	912	912	995	680	1077	389
	80	971	971	1003	893	1078	621
	85	1027	1027	1028	1028	1080	835
	90	1073	1073	1074	1074	1084	1057
45000	75	921	921	998	705	1079	394
	80	983	983	1007	930	1080	642
	85	1039	1039	1039	1039	1081	869
	90	1081	1081	1081	1081	1085	1085

Table 44. Gross cooling capacities (MBh) — 105 ton air-cooled

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
31000	75	1137	924	1258	715	1369	492	1073	892	1188	683	1292	461	1004	857	1112	649	1208	427
	80	1147	1087	1262	887	1371	665	1085	1053	1192	854	1294	633	1018	1015	1116	820	1211	600
	85	1181	1181	1266	1057	1373	837	1127	1127	1197	1025	1296	805	1067	1067	1122	991	1213	771
	90	1243	1243	1276	1218	1376	1008	1187	1187	1209	1185	1299	976	1125	1125	1136	1136	1215	942
35000	75	1162	989	1281	752	1386	500	1095	955	1208	718	1306	467	1023	908	1128	683	1219	433
	80	1177	1171	1285	945	1388	695	1113	1113	1212	912	1308	662	1044	1044	1133	877	1221	628
	85	1228	1228	1290	1138	1391	888	1169	1169	1219	1093	1310	856	1105	1105	1141	1056	1223	821
	90	1290	1290	1305	1305	1393	1081	1229	1229	1235	1235	1312	1049	1162	1162	1163	1163	1225	1014
39000	75	1183	1047	1299	788	1399	507	1114	1005	1222	753	1316	474	1039	966	1140	717	1226	440
	80	1204	1204	1303	1003	1401	724	1138	1138	1227	969	1318	691	1073	1073	1145	932	1228	656
	85	1266	1266	1311	1204	1403	940	1203	1203	1236	1168	1320	907	1134	1134	1155	1129	1230	871
	90	1328	1328	1331	1331	1405	1155	1262	1262	1262	1262	1322	1114	1189	1189	1190	1190	1233	1069
43000	75	1201	1101	1313	823	1409	515	1129	1063	1234	788	1323	481	1052	1023	1149	751	1231	446
	80	1230	1230	1317	1060	1411	754	1167	1167	1238	1025	1325	720	1097	1097	1154	980	1232	684
	85	1298	1298	1327	1279	1417	993	1231	1231	1250	1240	1326	957	1158	1158	1168	1168	1233	921
	90	1358	1358	1358	1358	1420	1221	1287	1287	1289	1289	1329	1175	1209	1209	1210	1210	1236	1136
44000	75	1205	1115	1316	832	1411	517	1132	1077	1236	796	1324	483	1055	1037	1151	759	1232	447
	80	1237	1237	1320	1074	1413	761	1173	1173	1241	1039	1326	727	1103	1103	1156	985	1233	691
	85	1305	1305	1331	1298	1419	1006	1237	1237	1253	1251	1327	970	1163	1163	1170	1170	1234	934
	90	1365	1365	1366	1366	1422	1239	1293	1293	1294	1294	1335	1203	1213	1213	1214	1214	1242	1154
46000	75	1212	1145	1321	849	1415	521	1139	1106	1240	813	1327	486	1060	1059	1154	776	1234	451
	80	1251	1251	1326	1103	1416	776	1185	1185	1245	1059	1328	741	1113	1113	1160	1011	1235	705
	85	1318	1318	1338	1330	1423	1032	1248	1248	1259	1259	1330	995	1172	1172	1176	1176	1235	959
	90	1377	1377	1378	1378	1426	1275	1302	1302	1303	1303	1338	1227	1220	1220	1221	1221	1243	1187

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
31000	75	934	812	1035	614	1123	394
	80	951	951	1039	785	1125	566
	85	1005	1005	1045	945	1127	737
	90	1060	1060	1062	1062	1129	908
35000	75	950	870	1047	648	1130	399
	80	978	978	1052	841	1132	593
	85	1038	1038	1061	1018	1134	787
	90	1091	1091	1092	1092	1136	972
39000	75	963	926	1056	681	1135	405
	80	1005	1005	1061	889	1136	620
	85	1063	1063	1073	1073	1137	836
	90	1112	1112	1113	1113	1140	1030
43000	75	974	974	1062	714	1137	410
	80	1025	1025	1068	933	1138	648
	85	1082	1082	1084	1084	1138	885
	90	1127	1127	1127	1127	1145	1097
44000	75	976	976	1063	722	1138	412
	80	1030	1030	1070	945	1138	655
	85	1086	1086	1086	1086	1138	897
	90	1129	1129	1130	1130	1145	1113
46000	75	981	981	1065	738	1139	414
	80	1038	1038	1072	970	1138	668
	85	1093	1093	1093	1093	1138	922
	90	1133	1133	1134	1134	1145	1139

Table 45. Gross cooling capacities (MBh) — 115 ton air-cooled

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
31000	75	1207	957	1333	746	1444	519	1139	921	1259	711	1363	486	1066	884	1179	675	1277	451
	80	1217	1120	1337	917	1446	691	1150	1084	1263	883	1365	658	1079	1046	1183	846	1280	623
	85	1245	1245	1340	1088	1448	863	1187	1187	1267	1054	1367	829	1125	1125	1189	1018	1282	795
	90	1309	1309	1350	1250	1450	1034	1249	1249	1278	1214	1369	1000	1185	1185	1201	1177	1283	965
35000	75	1235	1022	1358	782	1462	526	1164	981	1280	747	1378	492	1087	937	1197	709	1289	457
	80	1249	1205	1361	975	1463	720	1180	1162	1284	940	1380	686	1107	1105	1201	903	1290	651
	85	1296	1296	1367	1163	1465	914	1234	1234	1290	1127	1381	880	1166	1166	1209	1083	1292	844
	90	1360	1360	1379	1348	1467	1106	1295	1295	1305	1297	1383	1072	1225	1225	1229	1229	1294	1037
39000	75	1258	1080	1376	817	1475	533	1184	1036	1296	781	1389	499	1105	995	1210	743	1297	463
	80	1277	1270	1380	1032	1476	749	1207	1207	1300	996	1390	715	1135	1135	1214	958	1298	679
	85	1337	1337	1387	1234	1478	964	1271	1271	1309	1197	1391	930	1199	1199	1224	1157	1299	894
	90	1400	1400	1405	1405	1479	1179	1330	1330	1332	1332	1393	1138	1254	1254	1256	1256	1301	1100
43000	75	1277	1135	1391	852	1485	540	1200	1095	1308	815	1396	505	1119	1052	1219	777	1303	469
	80	1305	1305	1394	1089	1486	778	1235	1235	1312	1052	1397	743	1162	1162	1224	1006	1303	706
	85	1371	1371	1404	1309	1487	1016	1300	1300	1323	1270	1397	980	1224	1224	1237	1223	1302	943
	90	1431	1431	1432	1432	1491	1238	1357	1357	1358	1358	1399	1199	1276	1276	1277	1277	1304	1159
44000	75	1281	1149	1394	861	1487	542	1204	1109	1310	824	1398	507	1122	1067	1221	785	1304	471
	80	1311	1311	1398	1103	1488	786	1242	1242	1315	1060	1398	750	1168	1168	1227	1013	1304	713
	85	1378	1378	1408	1328	1489	1028	1307	1307	1326	1289	1398	992	1230	1230	1240	1234	1303	956
	90	1490	1490	1439	1439	1494	1255	1362	1362	1363	1363	1401	1216	1280	1280	1281	1281	1305	1175
46000	75	1289	1179	1400	878	1491	546	1211	1138	1315	841	1401	510	1128	1095	1225	802	1305	474
	80	1325	1325	1404	1132	1492	800	1255	1255	1320	1080	1401	764	1179	1179	1230	1038	1305	727
	85	1392	1392	1415	1365	1494	1054	1319	1319	1332	1318	1400	1018	1240	1240	1245	1245	1305	974
	90	1449	1449	1451	1451	1498	1289	1372	1372	1373	1373	1405	1250	1287	1287	1288	1288	1307	1208

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
31000	75	994	844	1100	639	1191	417
	80	1009	997	1104	811	1194	589
	85	1062	1062	1111	972	1195	760
	90	1119	1119	1126	1119	1197	931
35000	75	1012	898	1115	673	1200	422
	80	1038	1038	1119	866	1201	616
	85	1098	1098	1128	1045	1202	809
	90	1153	1153	1155	1155	1204	995
39000	75	1027	955	1124	706	1206	428
	80	1066	1066	1129	915	1206	643
	85	1126	1126	1141	1117	1206	858
	90	1177	1177	1178	1178	1208	1054
43000	75	1039	1011	1131	739	1209	433
	80	1089	1089	1137	959	1208	670
	85	1147	1147	1151	1151	1208	907
	90	1193	1193	1193	1193	1209	1118
44000	75	1041	1022	1133	747	1210	435
	80	1094	1094	1139	971	1208	677
	85	1152	1152	1154	1154	1207	919
	90	1196	1196	1196	1196	1209	1134
46000	75	1046	1038	1135	763	1211	437
	80	1103	1103	1142	996	1209	690
	85	1159	1159	1161	1161	1208	935
	90	1200	1200	1201	1201	1209	1167

Table 46. Gross cooling capacities (MBh) — 130 ton air-cooled

CFM	Ent DB (°F)	Ambient Temperature (°F)																	
		85						95						105					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
31000	75	1301	1002	1433	789	1541	555	1230	965	1355	752	1456	520	1153	925	1271	713	1363	482
	80	1308	1171	1435	960	1543	728	1238	1134	1358	923	1457	692	1163	1090	1274	885	1364	655
	85	1326	1322	1438	1130	1545	900	1263	1263	1361	1094	1459	864	1197	1197	1278	1055	1366	826
	90	1387	1387	1445	1302	1546	1071	1325	1325	1369	1258	1460	1035	1258	1258	1287	1218	1367	997
35000	75	1332	1067	1459	824	1559	561	1258	1029	1378	787	1469	525	1177	988	1290	747	1372	486
	80	1343	1254	1462	1017	1561	756	1270	1215	1381	980	1470	719	1191	1173	1293	940	1374	681
	85	1376	1376	1465	1210	1564	950	1313	1313	1385	1173	1472	913	1242	1242	1298	1133	1374	874
	90	1442	1442	1475	1394	1567	1144	1375	1375	1396	1355	1473	1105	1301	1301	1310	1302	1375	1066
39000	75	1357	1131	1479	859	1577	569	1280	1092	1394	821	1479	530	1196	1042	1303	780	1378	491
	80	1372	1337	1482	1074	1580	787	1296	1287	1397	1036	1481	747	1216	1216	1306	995	1380	707
	85	1422	1422	1487	1284	1583	1003	1353	1353	1403	1246	1483	963	1277	1277	1313	1199	1381	923
	90	1485	1485	1499	1484	1586	1218	1412	1412	1418	1418	1486	1178	1331	1331	1333	1333	1383	1138
43000	75	1378	1195	1494	894	1592	577	1297	1144	1406	855	1488	537	1211	1100	1312	813	1384	496
	80	1397	1397	1497	1131	1595	817	1322	1322	1409	1091	1491	776	1243	1243	1315	1050	1385	735
	85	1458	1458	1503	1355	1584	1050	1384	1384	1417	1315	1494	1014	1304	1304	1324	1271	1387	973
	90	1518	1518	1521	1521	1602	1293	1439	1439	1440	1440	1498	1252	1352	1352	1353	1353	1391	1203
44000	75	1382	1205	1497	902	1595	579	1301	1159	1409	863	1491	539	1214	1114	1314	822	1385	498
	80	1403	1403	1500	1145	1598	824	1328	1328	1412	1105	1494	783	1249	1249	1317	1064	1386	742
	85	1466	1466	1507	1374	1601	1068	1391	1391	1420	1333	1496	1027	1309	1309	1326	1289	1388	985
	90	1525	1525	1526	1526	1605	1311	1445	1445	1444	1444	1501	1258	1357	1357	1357	1357	1393	1213
46000	75	1391	1231	1503	919	1586	578	1309	1188	1414	880	1495	542	1220	1143	1317	838	1387	501
	80	1416	1416	1506	1173	1590	835	1341	1341	1416	1133	1498	798	1261	1261	1321	1091	1389	756
	85	1480	1480	1514	1411	1607	1094	1403	1403	1426	1370	1501	1053	1319	1319	1331	1319	1391	1011
	90	1537	1537	1538	1538	1612	1343	1455	1455	1456	1456	1505	1300	1435	1435	1364	1364	1396	1247

CFM	Ent DB (°F)	Ambient Temperature (°F)					
		115					
		Entering Wet Bulb (°F)					
		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC
31000	75	1075	886	1186	675	1270	445
	80	1087	1050	1189	846	1271	617
	85	1131	1131	1193	1017	1272	788
	90	1188	1188	1204	1178	1347	987
35000	75	1095	948	1201	708	1276	448
	80	1113	1111	1204	901	1276	642
	85	1170	1170	1210	1084	1276	835
	90	1224	1224	1227	1227	1277	1028
39000	75	1112	998	1211	740	1251	443
	80	1140	1140	1214	955	1278	668
	85	1199	1199	1222	1156	1279	883
	90	1248	1248	1249	1249	1281	1092
43000	75	1124	1055	1218	772	1281	457
	80	1165	1165	1221	1009	1281	695
	85	1221	1221	1231	1220	1281	932
	90	1262	1262	1262	1262	1285	1152
44000	75	1127	1069	1219	780	1281	458
	80	1170	1170	1222	1017	1281	702
	85	1225	1225	1232	1229	1281	944
	90	1264	1264	1240	1240	1286	1169
46000	75	1132	1097	1221	796	1282	461
	80	1180	1180	1225	1036	1281	715
	85	1233	1233	1236	1236	1282	969
	90	1245	1245	1085	1049	1287	1202

Heating Performance

Table 47. Natural gas heating capacities, 20 to 75 tons

Nominal Tons	MBh (Input)	MBh (Output)	Air Temperature Rise vs Unit CFM											
			CFM											
			4000	5000	6000	6250	7000	8000	9000	10000	10650	11000	11500	12000
20	235	190.35	43.9	35.1	29.2	28.1	25.1	21.9	19.5					
	500	405				59.7	53.3	46.7	41.5					
25	235	190.35		35.1	29.2	28.1	25.1	21.9	19.5	17.5	16.5	15.9		
	500	405				59.7	53.3	46.7	41.5	37.3	35.1	33.9		
30	350	283.5			43.5	41.8	37.3	32.7	29.0	26.1	24.6	23.8	22.7	21.8
	500	405					53.3	46.7	41.5	37.3	35.1	33.9	32.5	31.1
40	350	283.5						32.7	29.0	26.1	24.6	23.8	22.7	21.8
	850	688.5									59.7	57.7	55.2	52.9
50-55	500	405								37.3	35.1	33.9	32.5	31.1
	850	688.5											55.2	52.9
60-75	500	405												
	850	688.5												

Nominal Tons	MBh (Input)	MBh (Output)	Air Temperature Rise vs Unit CFM											
			CFM											
			13500	14000	17000	18000	19500	21000	22500	24000	25500	27000	28500	30000
20	235	190.35												
	500	405												
25	235	190.35												
	500	405												
30	350	283.5	19.4											
	500	405	27.6											
40	350	283.5	19.4	18.7	15.4									
	850	688.5	47.0	45.3	37.3	35.3								
50-55	500	405	27.6	26.7	22.0	20.7	19.1	17.8	16.6					
	850	688.5	47.0	45.3	37.3	35.3	32.5	30.2	28.2					
60-75	500	405		26.7	22.0	20.7	19.1	17.8	16.6	15.6				
	850	688.5		45.3	37.3	35.3	32.5	30.2	28.2	26.4	24.9	23.5	22.3	21.2

Notes:

1. All heaters are 81% efficient.
2. Air temperature rise at sea level = heat output (Btu) ÷ (CFM x 1.085).
3. CFM values below the minimum and above the maximum shown in this table are not cULus approved.

Table 48. Natural gas heating capacities, 90 to 130 tons

Nominal Tons	MBh (Input)	MBh (Output)	Air Temperature Rise vs Unit CFM								
			CFM								
			28350	30250	32550	34750	37000	39250	41500	43000	46000
90 to 130	1000	810	26.3	24.7	22.9	21.5	20.2	19.0	18.0	17.4	16.2

Notes:

1. All heaters are 81% efficient.
2. CFM values below the minimums and above the maximums shown in this table are not cULus approved.
3. Air Temperature Rise at sea level = Heat Output (Btu) ÷ (CFM x 1.085).

Table 49. Steam heating capacities (Q/ITD)

20 Nominal Ton Unit					25 Nominal Ton Unit					30 Nominal Ton Unit				
Steam Module	Unit Standard Air Volume (CFM)				Steam Module	Unit Standard Air Volume (CFM)				Steam Module	Unit Standard Air Volume (CFM)			
	4000	6000	8000	10000		5000	7500	10000	12500		6000	9000	12000	15000
Low Heat	0.95	1.18	1.37	1.52	Low Heat	1.06	1.33	1.52	1.74	Low Heat	1.18	1.64	1.69	2
High Heat	1.94	2.47	2.95	3.31	High Heat	2.2	2.85	3.31	3.65	High Heat	2.47	3.12	3.59	3.95
40 Nominal Ton Unit					**50/55 Nominal Ton Unit**					**60 Nominal Ton Unit**				
Steam Module	Unit Standard Air Volume (CFM)				Steam Module	Unit Standard Air Volume (CFM)				Steam Module	Unit Standard Air Volume (CFM)			
	8000	12000	16000	20000		10000	15000	20000	25000		12000	18000	24000	30000
Low Heat	1.61	2.01	2.29	2.6	Low Heat	1.82	2.21	2.6	2.85	Low Heat	2.32	2.81	3.33	3.71
High Heat	3.36	4.28	4.93	5.43	High Heat	3.86	4.79	5.43	5.97	High Heat	3.85	4.84	5.62	6.18
70–75 Nominal Ton Unit					**90, 105, 115, 130 Nominal Ton Unit**									
Steam Module	Unit Standard Air Volume (CFM)				Steam Module	Unit Standard Air Volume (CFM)								
	16000	20000	24000	30000		27000	33000	40000	46000					
Low Heat	2.65	2.98	3.33	3.71	Low Heat	5.17	5.7	6.19	6.53					
High Heat	4.5	5.1	5.62	6.18	High Heat	8.83	8.8	9.04	9.26					

Note: Capacities expressed as MBh (Q) per initial temperature difference (ITD) between the entering air temperature to the steam module and the entering steam temperature. Maximum recommended operating pressure is 35 PSIG.

Table 50. Properties of steam

Steam Pressure (Psig)	2	5	10	15	20	25	30	40	50
Temperature Of Steam (°F)	219	227	239	250	259	267	274	287	298

Table 51. Electric heat air temperature rise — 20 to 75 tons

kW Input	Total MBh	CFM											
		4000	6000	8000	10000	12000	14000	16000	18000	20000	22000	24000	26000
30	102.4	23.6	15.7	11.8	9.4	7.9	6.7	5.9	5.2	4.7	4.3	3.9	3.6
50	170.6	39.3	26.2	19.7	15.7	13.1	11.2	9.8	8.7	7.9	7.1	6.6	6.0
70	238.8		36.7	27.5	22	18.3	15.7	13.8	12.2	11	10	9.2	8.5
90	307.1		47.2	35.4	28.3	23.6	20.2	17.7	15.7	14.2	12.9	11.8	10.9
110	375.3			43.2	34.6	28.8	24.7	21.6	19.2	17.3	15.7	14.4	13.3
130	443.6				40.9	34.1	29.2	25.6	22.7	20.4	18.6	17	15.7
150	511.8				47.2	39.3	33.7	29.5	26.2	23.6	21.4	19.7	18.1
170	580.1					44.6	38.2	33.4	29.7	26.7	24.3	22.3	20.6
190	648.3					49.8	42.7	37.3	33.2	29.9	27.2	24.9	23

Notes:

1. Maximum permitted air temperature rise; 20-50 tons (cULus - 50°F), 60 - 75 tons (cULus - 43°F).
2. Air temperature rise at sea level = kW x 3413 ÷ (scfm x 1.085)
3. All heaters on units provide 3 increments of capacity.
4. See Electrical Data for electrical sizing information.
5. 200 and 230 volt electric heat rooftops require dual power supplies to the control box. All other rooftops have single power connections.

Table 52. Electric heat air temperature rise — 90 to 130 tons

kW Input	Total MBh	CFM					
		24000	27000	30000	33000	36000	40000
190	648.3	24.9	22.1	19.9	18.1	16.5	15.3

Notes:

1. Air temperature at sea level = kW x 3413 ÷ (scfm x 1.085)
2. Only available in 460/60/3 and 575/60/3 voltages.

Table 53. Electric heat kW ranges

Nominal Tons	Nominal Voltage			
	200	230	460	575
20	30-90	30-110	30-110	30-110
25	30-90	30-110	30-130	30-130
30	30-110	30-110	30-150	30-150
40	50-110	50-110	50-170	50-170
50–55	70-110	70-110	70-190	70-190
60	90-110	90-110	90-190	90-190
70	90-110	90-110	90-190	90-190
75	90-110	90-110	90-190	90-190
90	N/A	N/A	190	190
105	N/A	N/A	190	190
115	N/A	N/A	190	190
130	N/A	N/A	190	190

Table 54. Hot water heating capacities (Q/ITD)

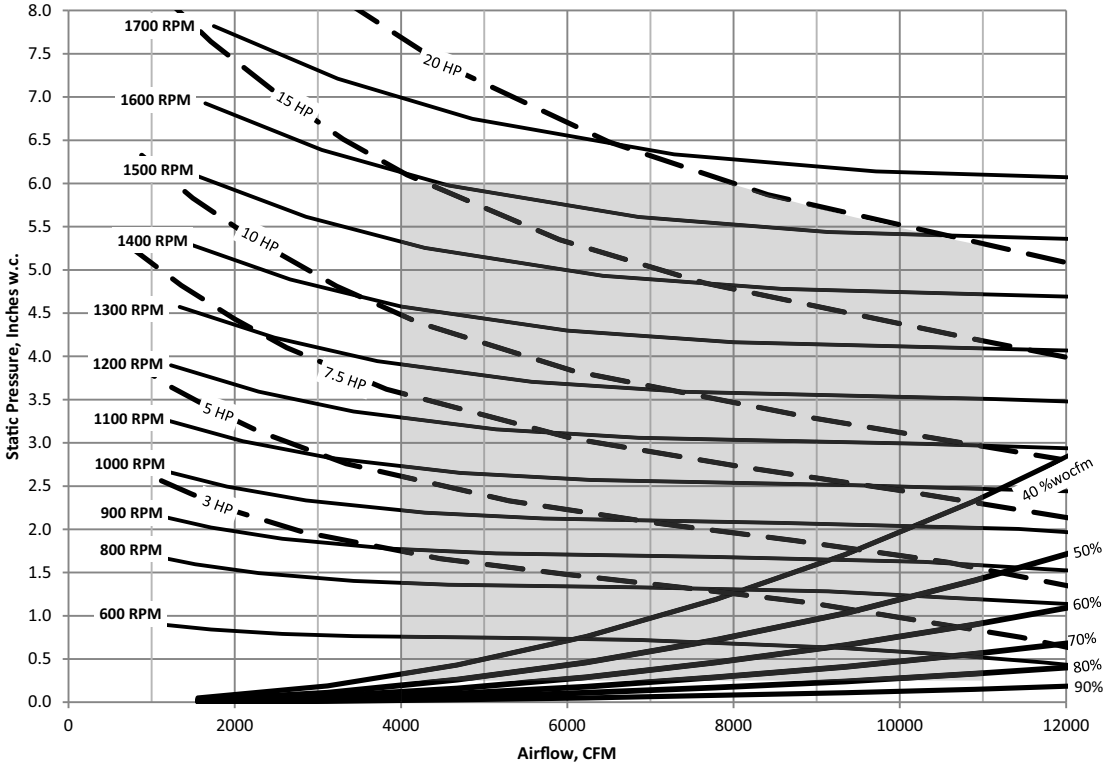
20, 25, 30Nominal Tons								
Hot Water Module	Gpm	Water PD (ft)	Unit Standard Air Volume (CFM)					
			4000	6000	8000	10000	12000	14000
Low	10	0.54	1.65	1.99	2.21	2.37	2.48	2.56
High	20	0.91	2.23	2.78	3.16	3.44	3.67	3.85
Low	20	0.91	1.88	2.35	2.69	2.94	3.12	3.27
High	30	1.49	2.36	3	3.46	3.81	4.09	4.31
Low	30	1.49	1.97	2.51	2.9	3.19	3.42	3.6
High	40	2.25	2.43	3.12	3.63	4.02	4.34	4.6
Low	40	2.25	2.02	2.6	3.02	3.34	3.6	3.79
High	50	3.2	2.48	3.2	3.74	4.17	4.51	4.8
Low	60	4.31	2.08	2.69	3.16	3.51	3.79	4.02
High	70	5.65	2.54	3.3	3.88	4.35	4.73	5.04
40, 50 to 55 Nominal Tons								
Hot Water Module	Gpm	Water PD (ft)	Unit Standard Air Volume (CFM)					
			8000	11000	14000	17000	20000	23000
Low	20	0.7	3	3.44	3.75	3.98	4.14	4.29
High	30	1.05	3.85	4.46	4.91	5.26	5.54	5.76
Low	40	1.51	3.4	4	4.43	4.76	5.02	5.21
High	50	2.1	4.2	4.95	5.52	5.97	6.34	6.64
Low	60	2.78	3.56	4.23	4.73	5.11	5.4	5.63
High	75	4.04	4.39	5.24	5.89	6.41	6.85	7.21
Low	80	4.5	3.65	4.36	4.89	5.31	5.63	5.88
High	90	5.54	4.46	5.34	6.03	6.58	7.04	7.42
Low	100	6.66	3.71	4.44	5	5.43	5.77	6.04
High	125	9.99	4.56	5.5	6.23	6.83	7.33	7.75
60, 70, 75 Nominal Tons								
Hot Water Module	Gpm	Water PD (Ft)	Unit Standard Air Volume (CFM)					
			12000	16000	20000	24000	28000	31500
Low	25	0.98	4.28	4.82	5.2	5.48	5.69	5.83
High	30	1.22	5.24	5.91	6.4	6.77	7.06	7.27
Low	50	2.48	4.9	5.63	6.18	6.6	6.92	7.15
High	60	3.33	6.01	6.94	7.66	8.22	8.69	9.03
Low	75	4.83	5.14	5.97	6.6	7.09	7.46	7.73
High	90	6.65	6.32	7.38	8.2	8.87	9.42	9.83
Low	100	8	5.28	6.16	6.84	7.36	7.78	8.07
High	120	11.15	6.49	7.62	8.51	9.23	9.84	10.3
Low	125	11.99	5.37	6.29	6.99	7.54	7.98	8.29
High	150	16.8	6.6	7.77	8.71	9.47	10.11	10.6
90, 105, 115, 130 Nominal Tons								
Hot Water Module	Gpm	Water PD (Ft)	Unit Standard Air Volume (CFM)					
			27000	30000	33000	36000	39000	42000
Low	30	0.77	6.68	6.87	7.04	7.18	7.3	7.41
High	40	1.02	8.51	8.8	9.04	9.26	9.45	9.62
Low	60	1.69	8.07	8.38	8.64	8.87	9.07	9.25
High	80	2.6	10.21	10.64	11.03	11.38	11.69	11.98
Low	100	3.71	8.82	9.19	9.52	9.8	10.05	10.26
High	120	5.07	10.95	11.46	11.92	12.33	12.71	13.05
Low	140	6.59	9.19	9.6	9.96	10.27	10.55	10.79
High	160	8.37	11.37	11.93	12.43	12.88	13.3	13.67
Low	175	9.8	9.39	9.82	10.2	10.53	10.82	11.07
High	200	12.52	11.64	12.23	12.76	13.24	13.68	14.08

Note: Capacities expressed as MBh per initial temperature difference (ITD) between the entering air temperature to the hot water coil and the entering water temperature. Ethylene glycol or other capacities can be determined from the Trane® heating coil computer program. Capacity and pressure drop of ethylene glycol vary greatly with temperature and concentration.

Supply Fan Performance

Note: *Direct Drive plenum fan applications require minimum external static values ranging from 0.3 to 0.7 in H_2O.*

Figure 8. Supply fan performance with or without variable frequency drive - 20 and 25 tons air-cooled - forward curved

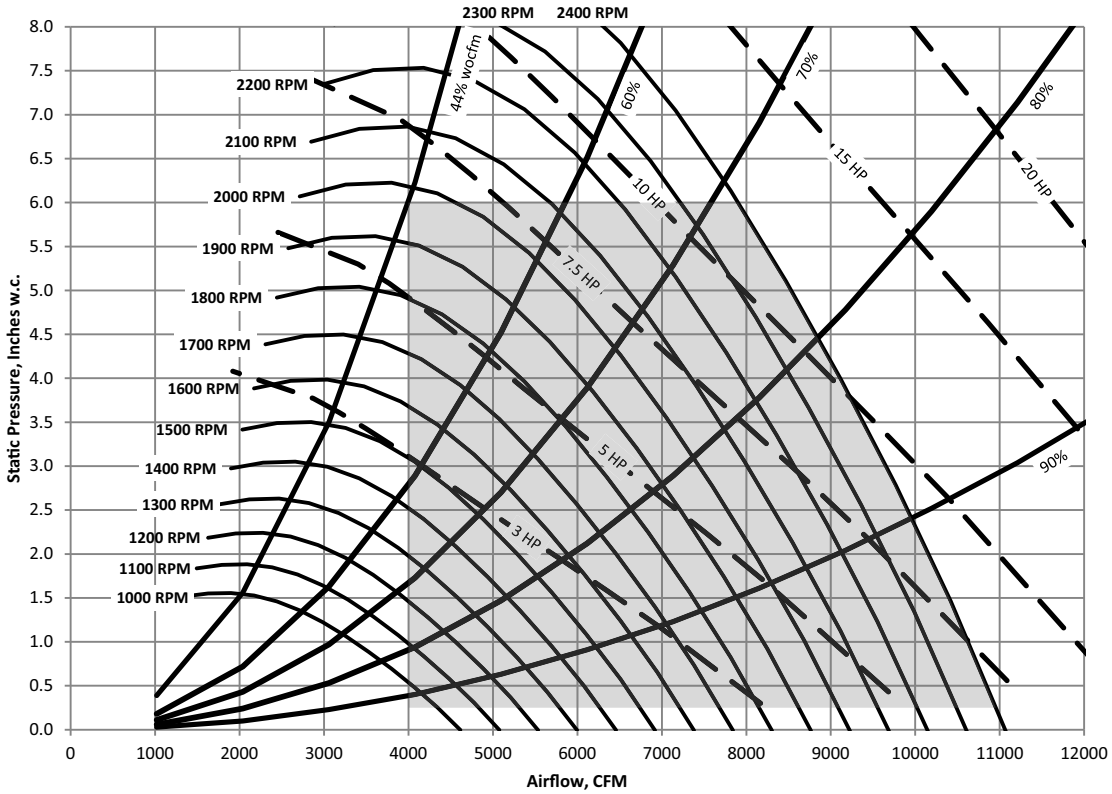


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Fan performance for 20 and 25 tons rooftops is identical. Contact your local Trane® representative for information on oversized motors.*
- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 20 ton - 9,000 Cfm, 25 ton - 11,000 Cfm.*
- *Minimum motor horsepower is 3 hp. Maximum motor horsepower is 20 hp. Maximum fan RPM is 1750.*

Figure 9. Supply fan performance with variable frequency drive - 20 and 25 tons cooling only - direct drive plenum, 80% width

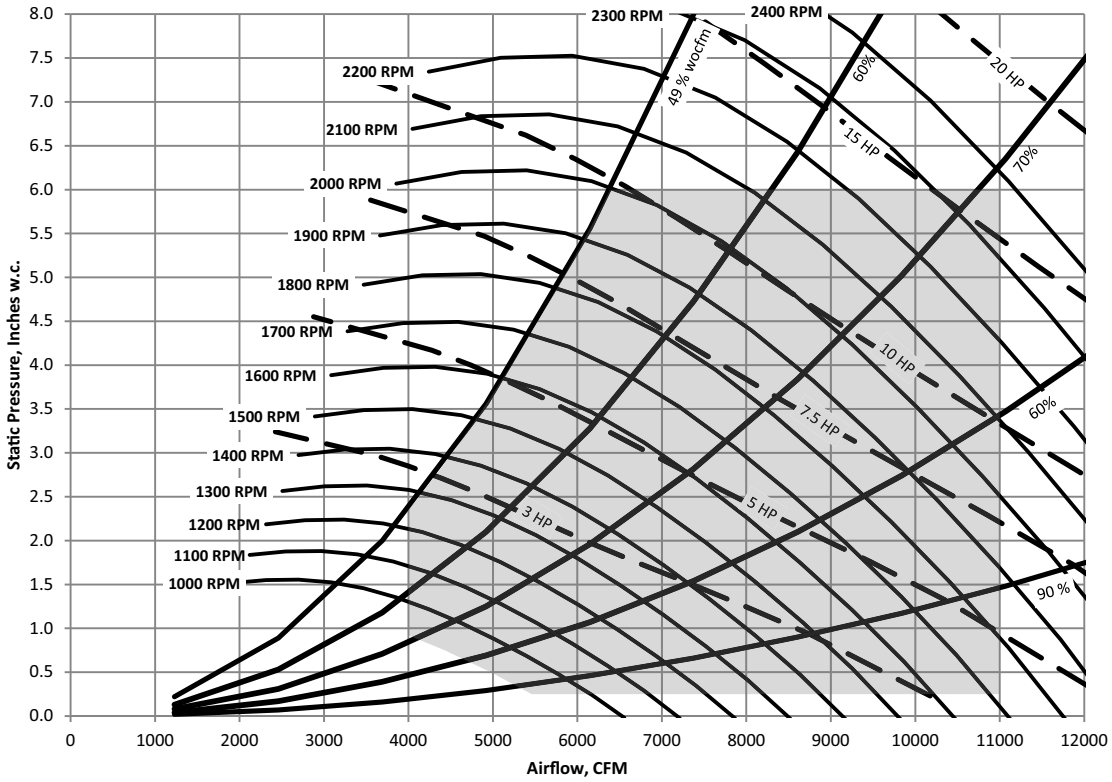


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 20 ton - 9,000 Cfm, 25 ton - 11,000 Cfm.*
- *Minimum motor horsepower is 3 hp. Maximum motor horsepower is 20 hp. Maximum fan RPM is 2400.*

Figure 10. Supply fan performance with variable frequency drive - 20 and 25 tons cooling only - direct drive plenum, 120% width

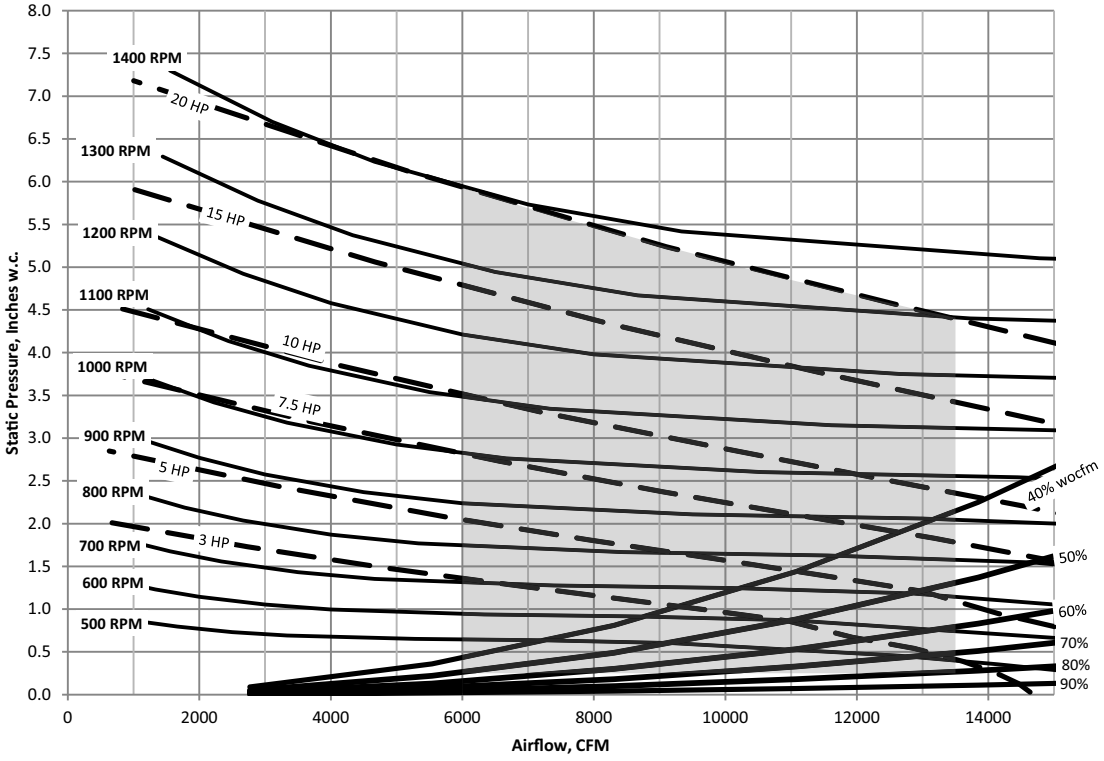


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 20 ton - 9,000 Cfm, 25 ton - 11,000 Cfm.*
- *Minimum motor horsepower is 3 hp. Maximum motor horsepower is 20 hp. Maximum fan RPM is 2400.*

Figure 11. Supply fan performance with or without variable frequency drive — 30 ton air-cooled - forward curved

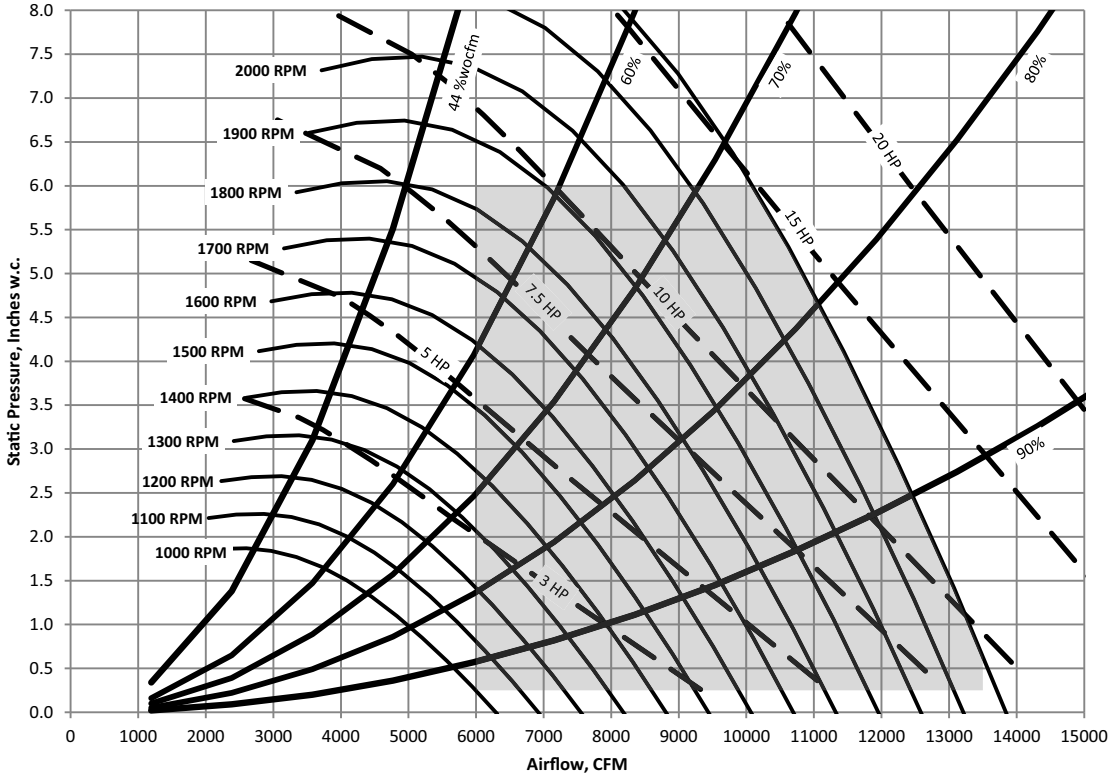


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 30 ton - 13,500 Cfm.*
- *Minimum motor horsepower is 5 hp. Maximum motor horsepower is 20 hp. Maximum fan RPM is 1450.*

Figure 12. Supply fan performance with variable frequency drive — 30 ton cooling only, 20/25 ton gas heat - direct drive plenum, 80% width

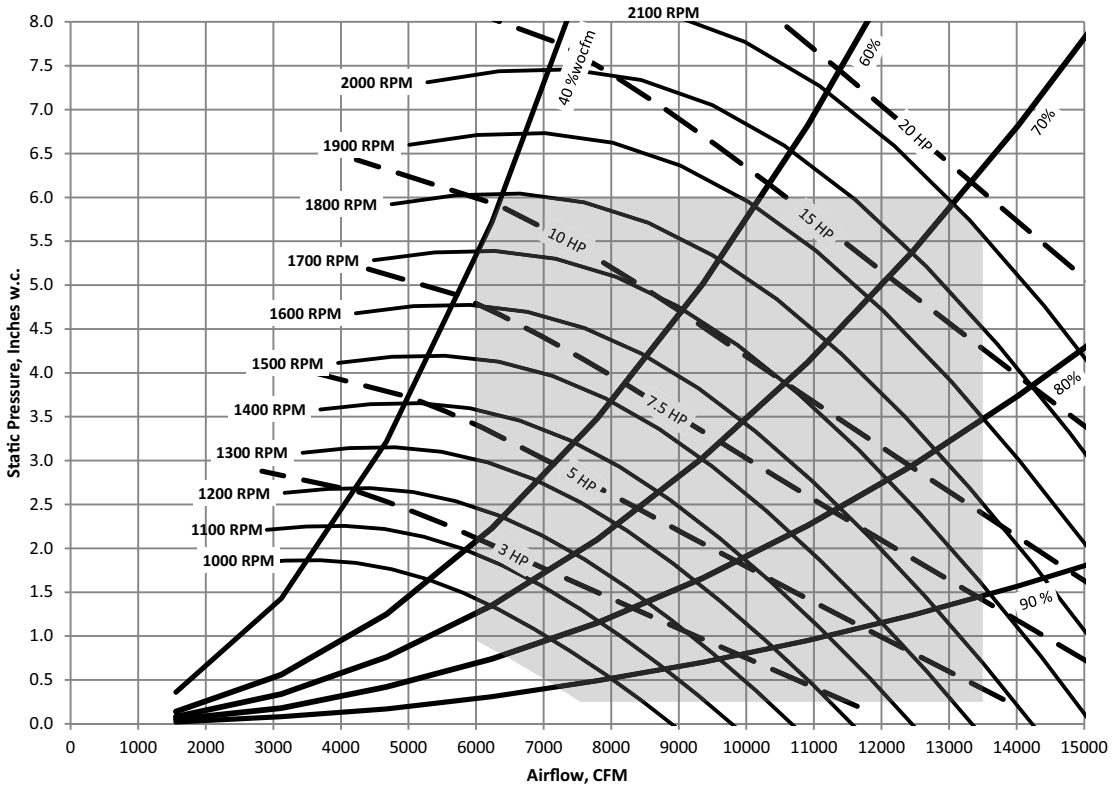


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 30 ton - 13,500 Cfm.*
- *Minimum motor horsepower is 3 hp. Maximum motor horsepower is 20 hp. Maximum fan RPM is 2200.*

Figure 13. Supply fan performance with variable frequency drive — 30 ton cooling only, 20/25 ton gas heat- direct drive plenum, 120% width

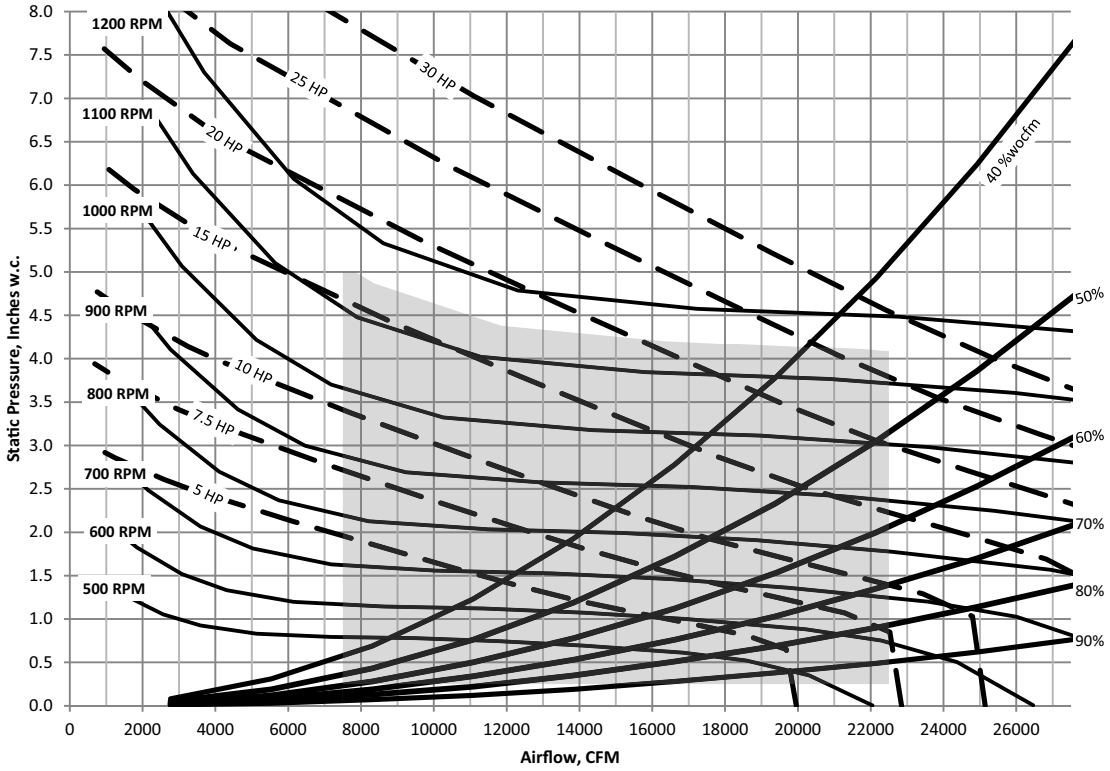


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 30 ton - 13,500 Cfm.*
- *Minimum motor horsepower is 3 hp. Maximum motor horsepower is 20 hp. Maximum fan RPM is 2,100.*

Figure 14. Supply fan performance with or without variable frequency drive - 40, 50 and 55 tons air-cooled - forward curved

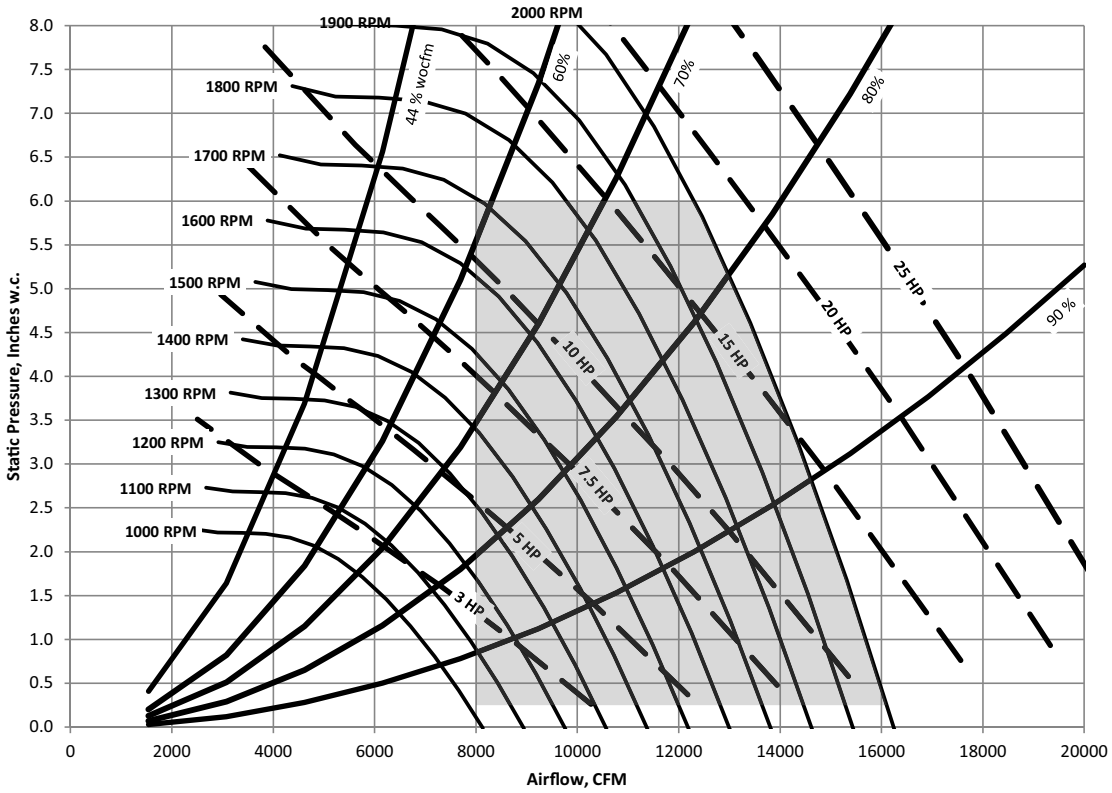


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Fan performance for 40 and 50 to 55 ton rooftops is identical. Contact your local Trane® representative for information on oversized motors.*
- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 40 ton - 18,000 Cfm and 50 ton - 22,500 Cfm.*
- *Minimum motor horsepower is 7.5 hp. Maximum motor horsepower is 30 hp. Maximum ½ hp to 15 hp fan Rpm is 1,141 Rpm, maximum 20 hp to 30 hp fan Rpm is 1,170 Rpm.*

Figure 15. Supply fan performance with variable frequency drive - 40 ton cooling only, 30 ton gas heat - direct drive plenum, 80% width

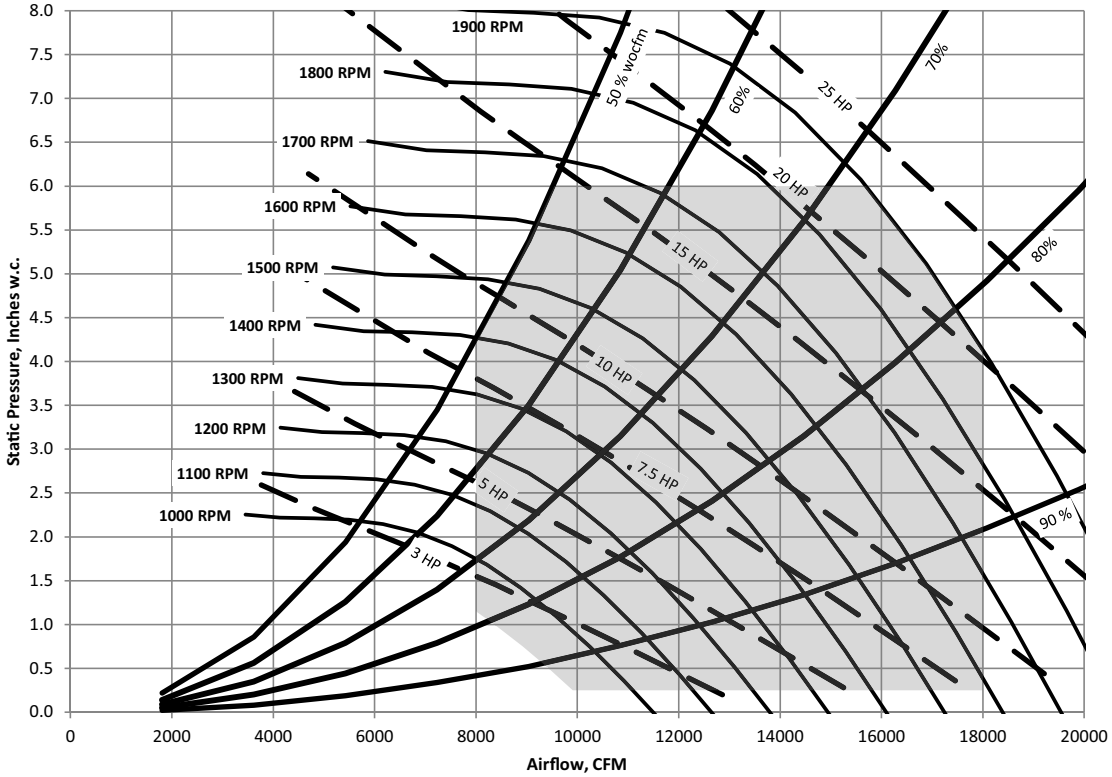


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 40 ton - 18,000 Cfm.*
- *Minimum motor horsepower is 3 hp. Maximum motor horsepower is 25 hp. Maximum fan RPM is 2,000.*

Figure 16. Supply fan performance with variable frequency drive - 40 ton cooling only - direct drive plenum, 120% width

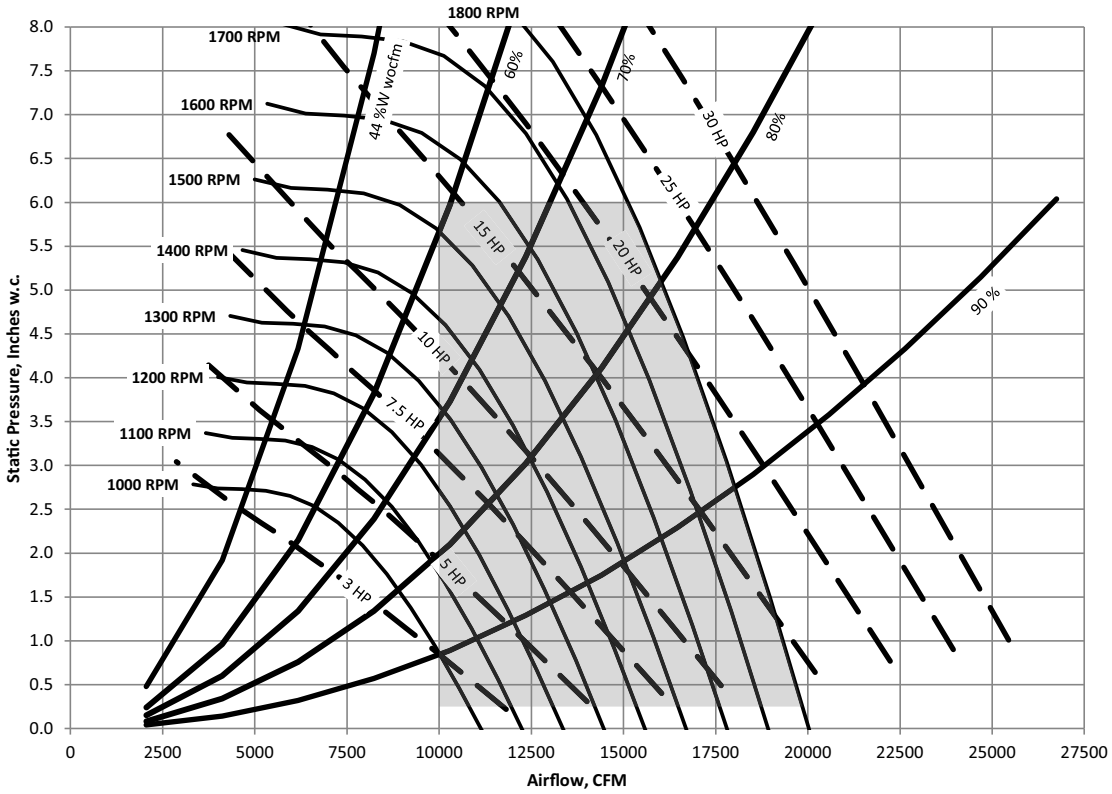


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 40 ton - 18,000 Cfm.*
- *Minimum motor horsepower is 3 hp. Maximum motor horsepower is 25 hp. Maximum fan RPM is 1,900.*

Figure 17. Supply fan performance with variable frequency drive - 50, 55 tons, 40 ton gas heat - direct drive plenum, 80% width

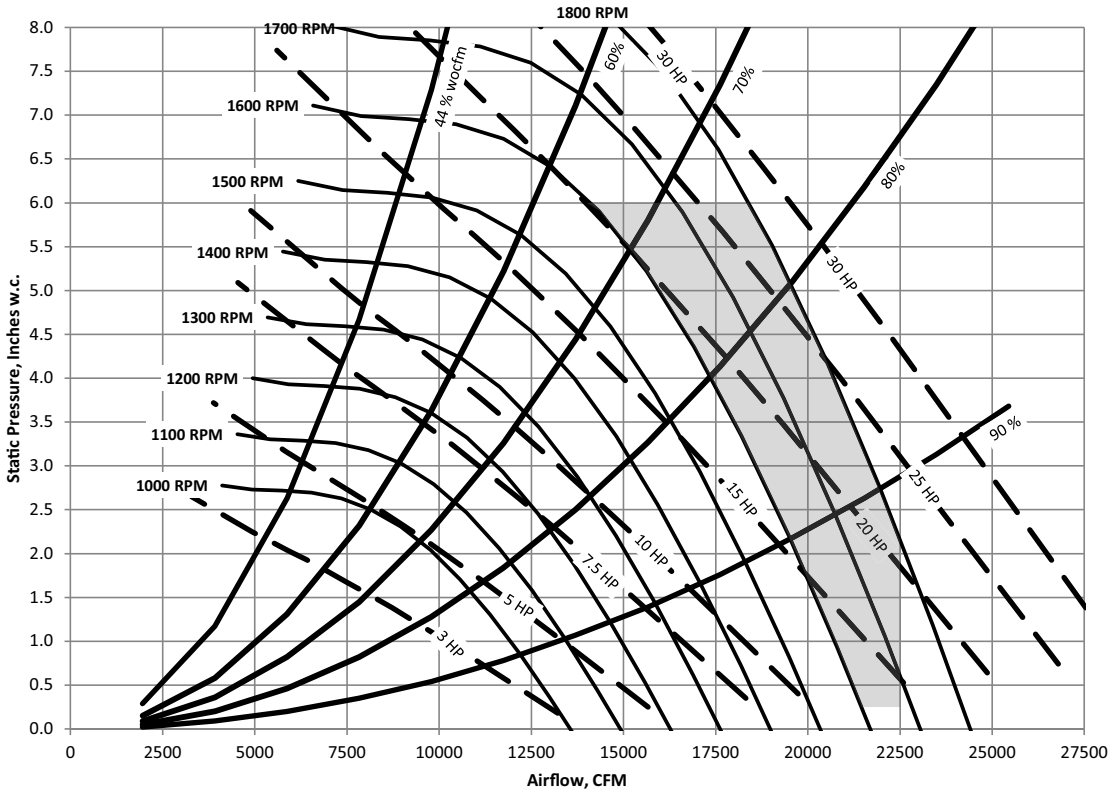


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 50, 55 tons - 22,500 Cfm.*
- *Minimum motor horsepower is 5 hp. Maximum motor horsepower is 30 hp. Maximum fan RPM is 1,800.*

Figure 18. Supply fan performance with variable frequency drive - 50, 55 tons, 40 ton gas heat - direct drive plenum, 100% width

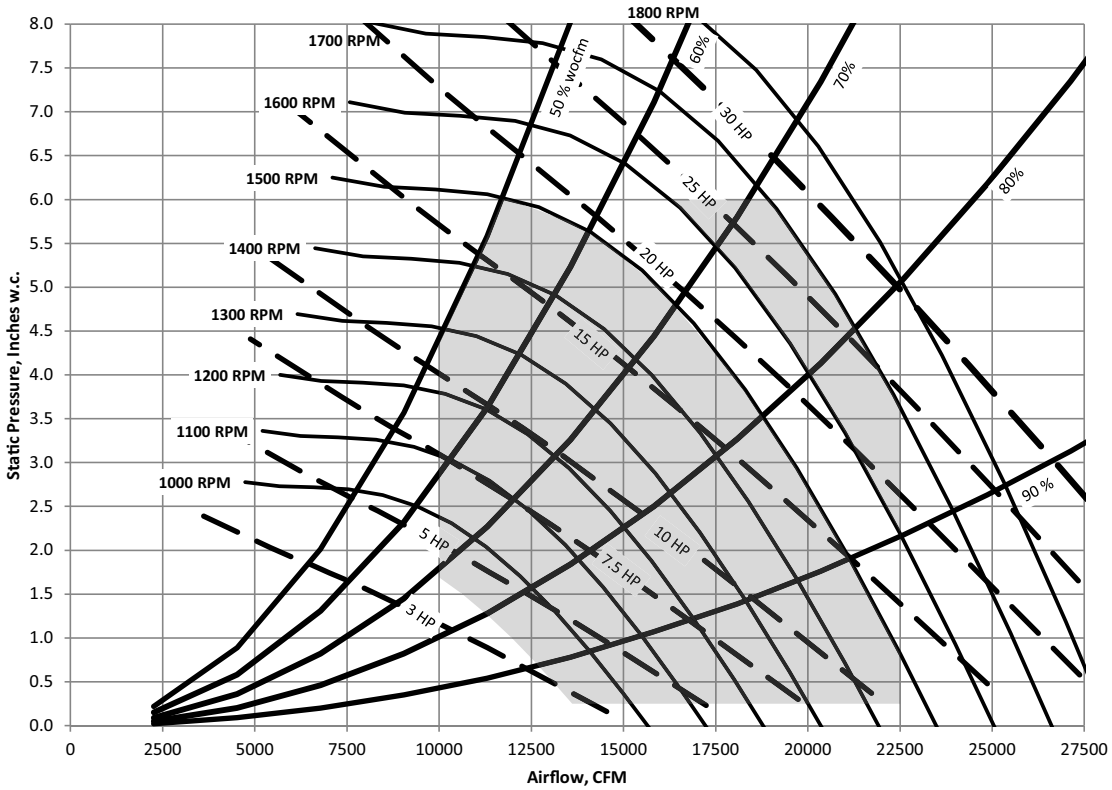


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 50, 55 tons - 22,500 Cfm.*
- *Minimum motor horsepower is 5 hp. Maximum motor horsepower is 30 hp. Maximum fan RPM is 1,800.*

Figure 19. Supply fan performance with variable frequency drive - 50, 55 tons, 40 ton gas heat - direct drive plenum, 120% width

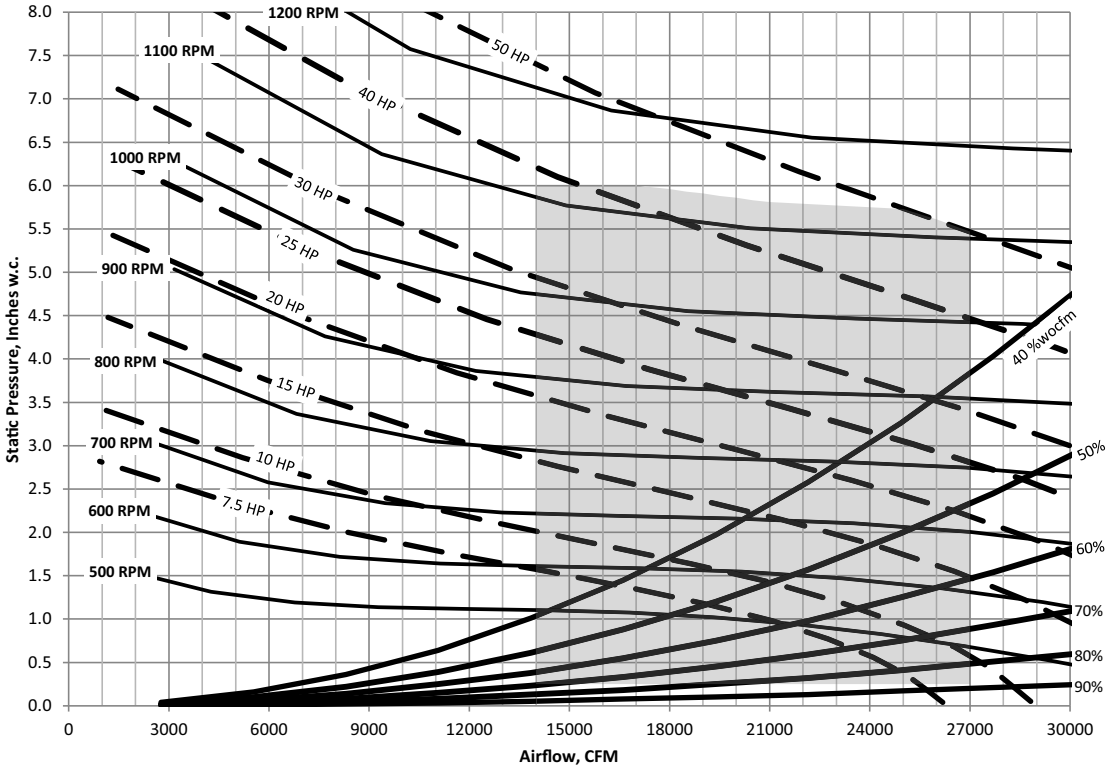


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 50, 55 tons - 22,500 Cfm.*
- *Minimum motor horsepower is 5 hp. Maximum motor horsepower is 30 hp. Maximum fan RPM is 1,700.*

Figure 20. Supply fan performance with or without variable frequency drive - 60, 70 and 75 tons air-cooled - forward curved

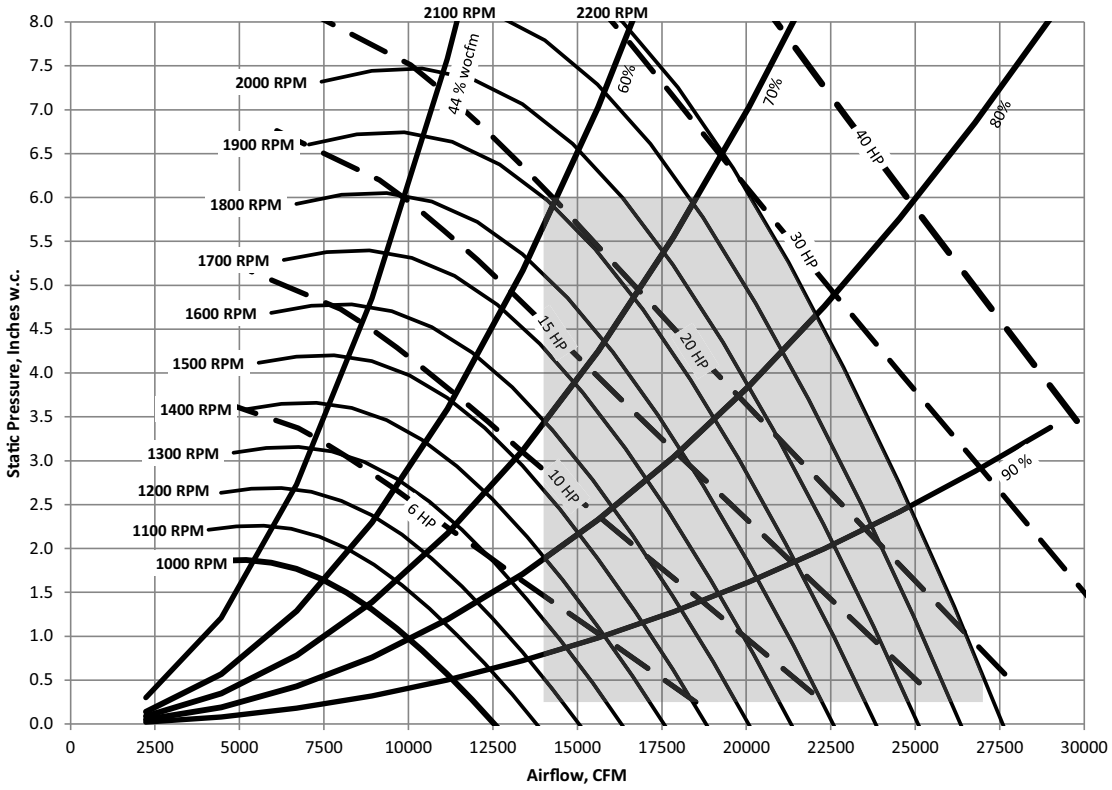


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Fan performance for 60 and 70 to 75 tons rooftops is identical. Contact your local Trane® representative for information on oversized motors.*
- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 60 to 75 tons - 27,000 Cfm and 50 ton - 22,500 Cfm.*
- *Minimum motor horsepower is 10 hp. Maximum motor horsepower is 50 hp. Maximum fan Rpm is 1,130 Rpm. 40 and 50 HP motor available as standard in 460 and 575 volt only*

Figure 21. Supply fan performance with variable frequency drive - 60 ton cooling only air-cooled - direct drive plenum, 80% width

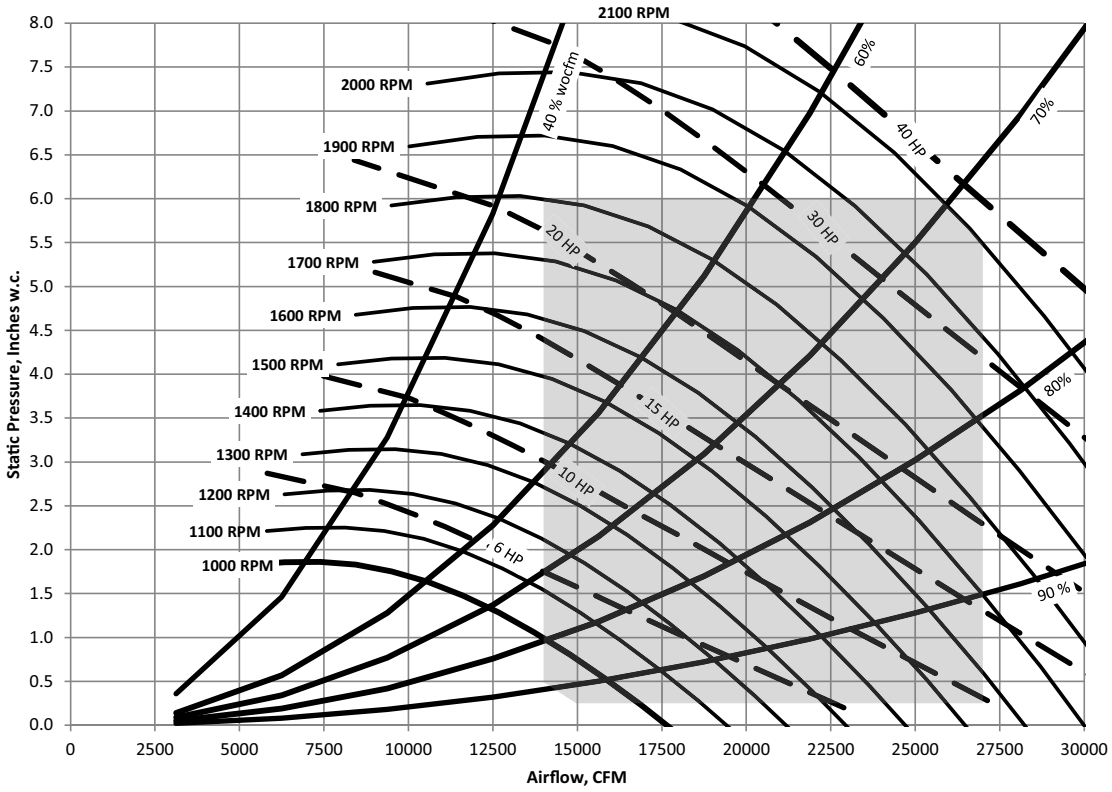


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *60 ton units with gas heat use the 30" DDP fans. See Figure 27, p. 109 .*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 60 ton - 27,000 Cfm.*
- *Minimum motor horsepower is 10 hp (2 x 5 hp motors). Maximum motor horsepower is 40 hp (2 x 20 hp motors). Maximum fan RPM is 2,200.*

Figure 22. Supply fan performance with variable frequency drive - 60 ton cooling only air-cooled - direct drive plenum, 120% width

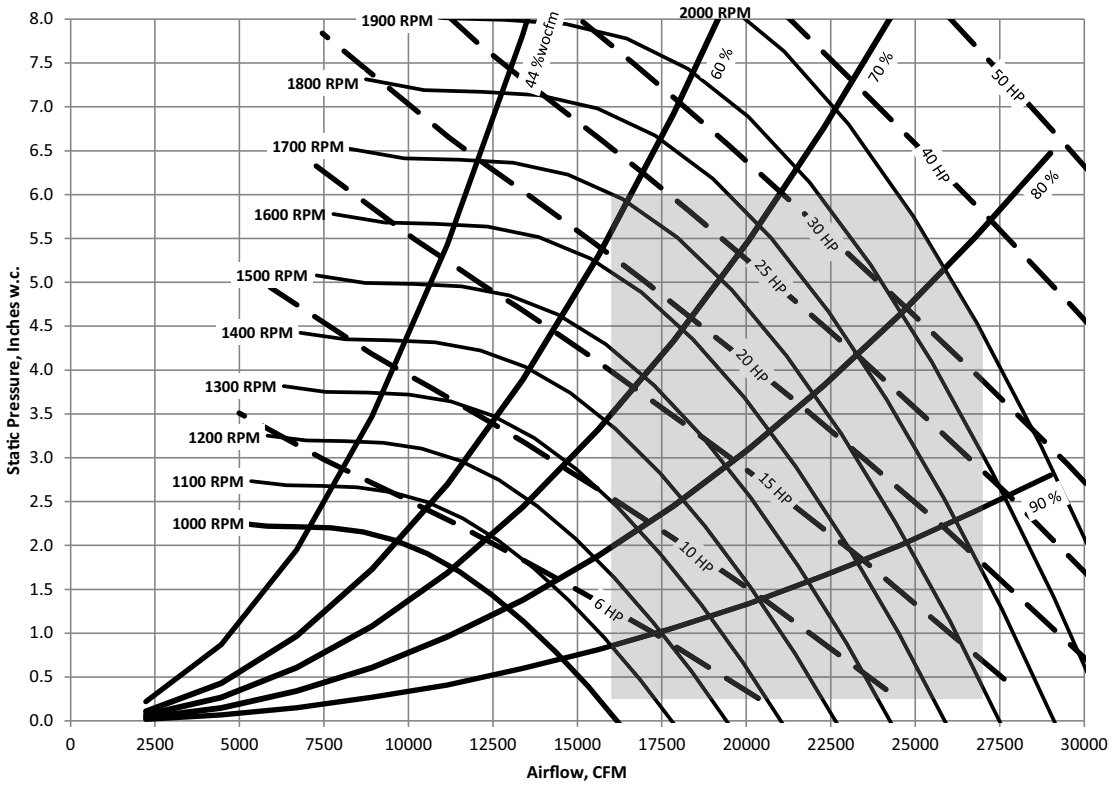


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *60 ton units with gas heat use the 30" DDP fans. See Figure 28, p. 110 .*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 60 ton - 27,000 Cfm.*
- *Minimum motor horsepower is 10 hp (2 x 5 hp motors). Maximum motor horsepower is 40 hp (2 x 20 hp motors). Maximum fan RPM is 2,100.*

Figure 23. Supply fan performance with variable frequency drive - 70 and 75 tons cooling only - direct drive plenum, 80% width

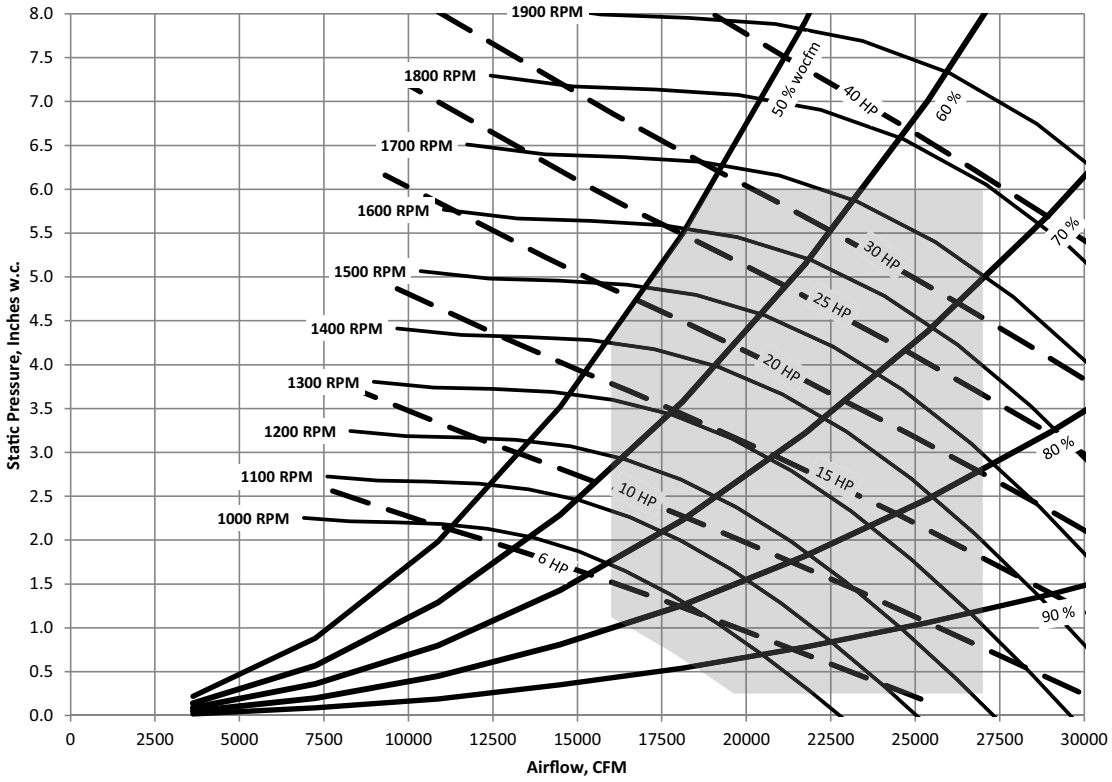


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *70-75 ton gas heat units use 30" DDP fans. See Figure 27, p. 109.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 60 ton gas heat and 70, 75 tons - 27,000 Cfm.*
- *Minimum motor horsepower is 10 hp (2 x 5 hp motors). Maximum motor horsepower is 50 hp (2 x 25 hp motors). Maximum fan RPM is 2,000.*

Figure 24. Supply fan performance with variable frequency drive - 70 and 75 tons cooling only- direct drive plenum, 120% width

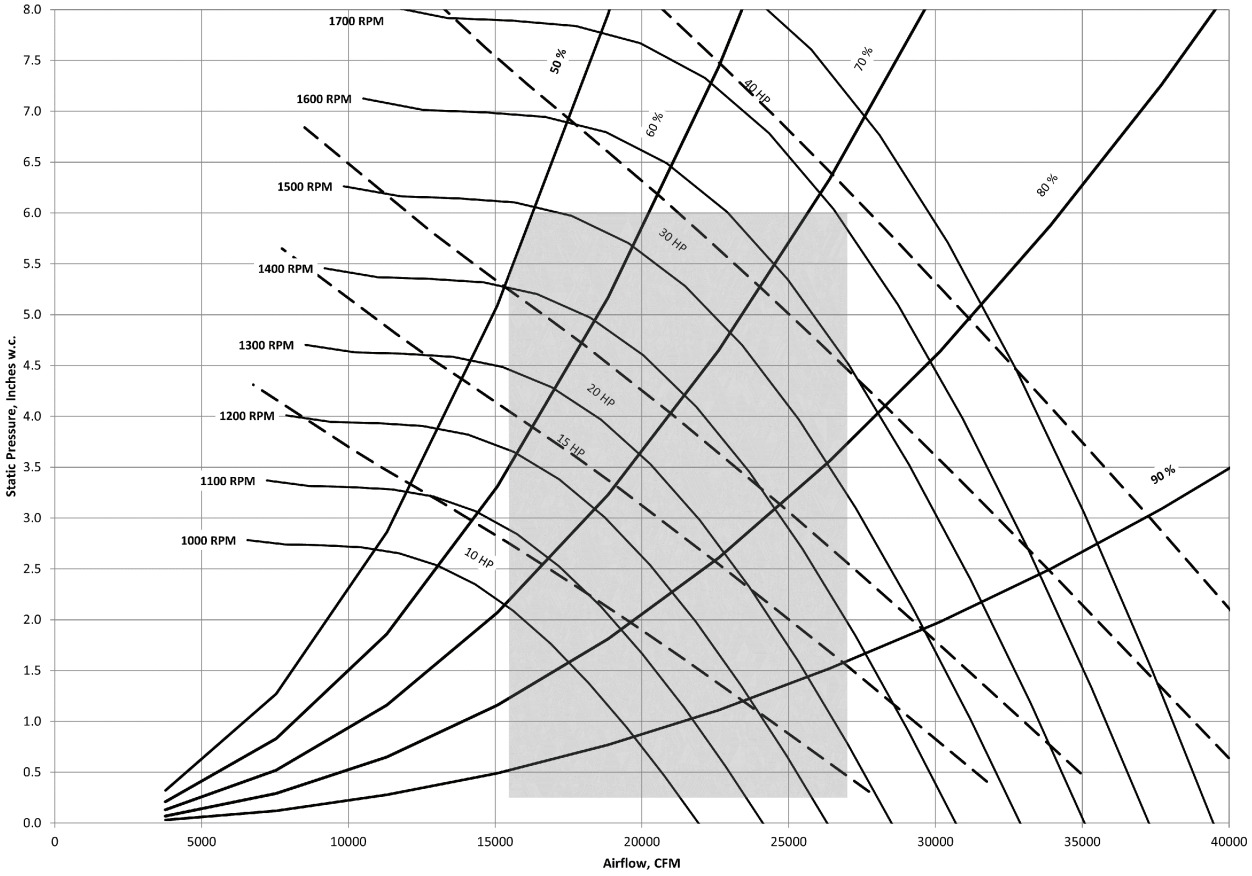


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *70-75 ton gas heat units use 30" DDP fans. See Figure 27, p. 109.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 60 ton gas heat and 70, 75 tons - 27,000 Cfm.*
- *Minimum motor horsepower is 10 hp (2 x 5 hp motors). Maximum motor horsepower is 50 hp (2 x 25 hp motors). Maximum fan RPM is 1,900.*

Figure 25. Supply fan performance with variable frequency drive - 60, 70, and 75 tons gas heat, direct drive plenum, 80% width

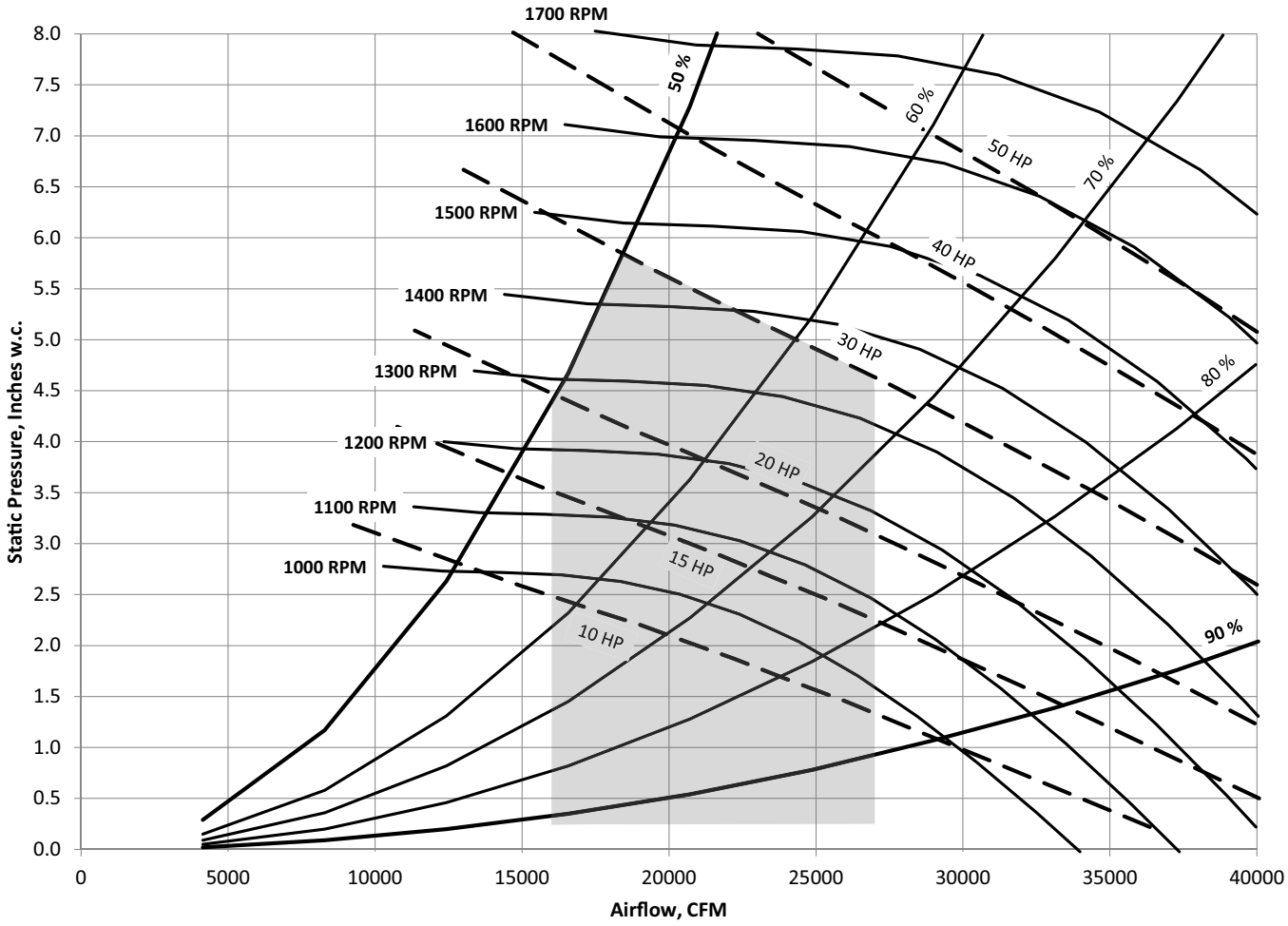


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 60, 70, and 75 tons gas heat - 27,000 Cfm.*
- *Minimum motor horsepower is 10 hp (2 x 5 hp motors). Maximum motor horsepower is 40 hp (2 x 20 hp motors). Maximum fan RPM is 1,700.*

Figure 26. Supply fan performance with variable frequency drive - 60, 70, and 75 tons gas heat, direct drive plenum, 100% width

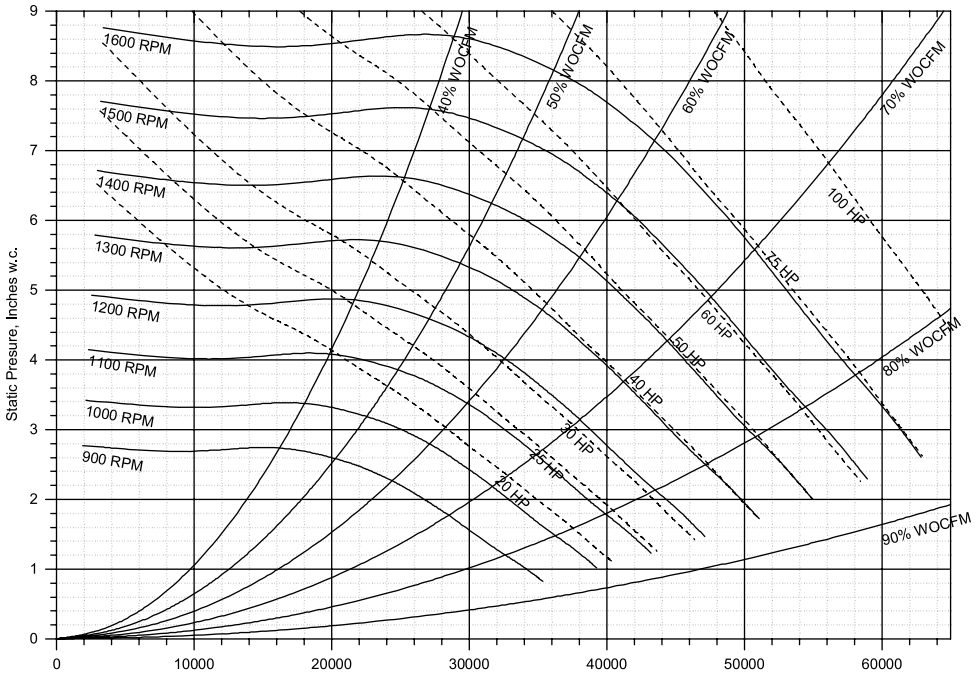


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Shaded areas represent selectable area. Contact your local Trane® representative for more information.*
- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 60, 70, and 75 tons gas heat - 27,000 Cfm.*
- *Minimum motor horsepower is 10 hp (2 x 5 hp motors). Maximum motor horsepower is 30 hp (2 x 15 hp motors). Maximum fan RPM is 1,500.*

Figure 27. Supply fan performance with or without variable frequency drive - 90 ton air-cooled

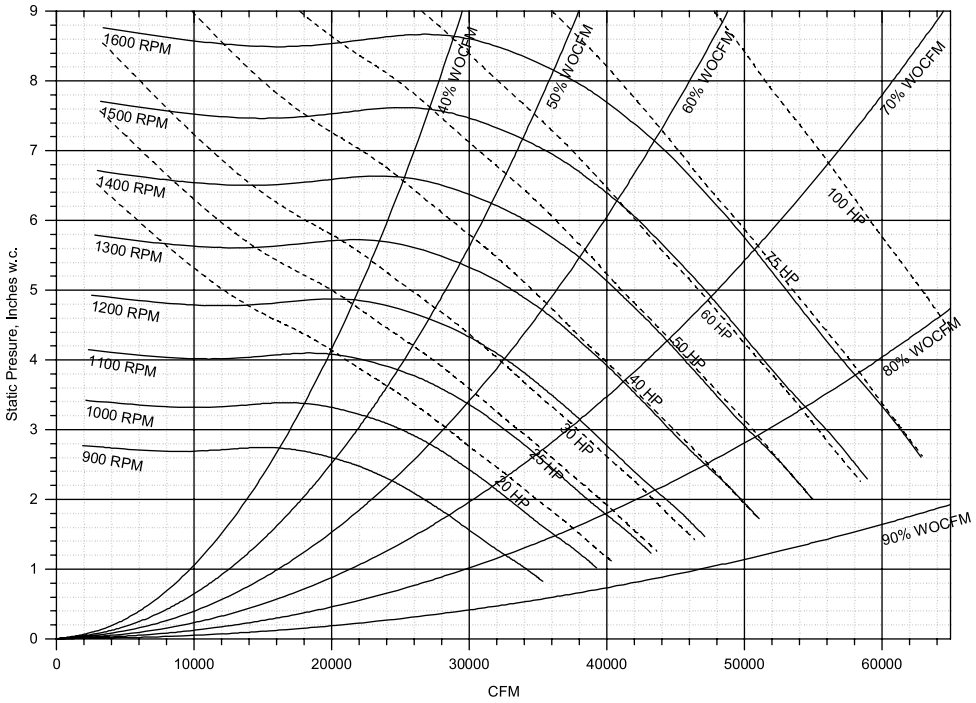


Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 90 ton - 46,000 Cfm.*
- *Minimum motor horsepower is 30 hp.*

Figure 28. Supply fan performance with or without variable frequency drive - 105, 115, 130 ton air-cooled



Important: *Maximum static pressure leaving the rooftop is 4.0" H_2O positive. The static pressure drops from the supply fan to the space cannot exceed 4.0" H_2O.*

Notes:

- *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component static pressure drops (evaporator coil, filters, optional economizer, optional relief fan, optional heating system, optional cooling only extended casing, optional roof curb).*
- *Maximum Cfm (for cULus approval) as follows: 105, 115, 130 ton - 46,000 Cfm.*
- *Minimum motor horsepower is 30 hp.*

Table 55. Component static pressure drops (in. W.G.), 20 to 75 tons air-cooled

Nom	CFM Std	Evap Coil		Heating System										Filters						Std Roof	Econ w/ or w/out Relief	HGRH
				SFH_ - FC		SFH_ - DDP		SHE_	SLH_		SSH_		Throwaway		Perm Wire	Bag & Pre	Cart & Pre	Final Cart				
		Dry	Wet	Low	High	Low	High	All kW	Low	High	Low	High	Std	High								
20	4000	0.12	0.16	0.02	N/A	0.09	N/A	0.02	0.05	0.06	0.02	0.06	0.03	0.03	0.01	0.30	0.24	0.22	0.01	0.03	0.01
	6000	0.24	0.29	0.05	0.05	0.21	0.22	0.04	0.09	0.12	0.05	0.12	0.06	0.06	0.02	0.50	0.44	0.30	0.02	0.06	0.02
	8000	0.37	0.44	0.09	0.09	0.37	0.39	0.07	0.15	0.19	0.10	0.20	0.09	0.09	0.03	0.71	0.68	0.45	0.05	0.12	0.04
	9000	0.45	0.52	0.12	0.12	0.48	0.50	0.09	0.19	0.24	0.12	0.22	0.11	0.11	0.04	0.83	0.81	0.55	0.07	0.15	0.05
25	5000	0.18	0.22	0.03	N/A	0.04	N/A	0.03	0.07	0.09	0.04	0.09	0.05	0.05	0.02	0.40	0.34	0.25	0.01	0.03	0.01
	6000	0.24	0.29	0.05	0.05	0.21	0.22	0.04	0.10	0.12	0.06	0.13	0.07	0.07	0.02	0.50	0.44	0.30	0.02	0.05	0.02
	7500	0.34	0.41	0.08	0.08	0.31	0.35	0.06	0.14	0.17	0.09	0.18	0.09	0.09	0.03	0.66	0.62	0.41	0.04	0.10	0.03
	10000	0.53	0.62	0.14	0.15	0.58	0.61	0.11	0.23	0.28	0.15	0.29	0.13	0.13	0.05	0.95	0.95	0.66	0.10	0.19	0.06
	11000	0.62	0.71	0.17	0.18	0.71	0.74	0.13	0.29	0.33	0.19	0.35	0.15	0.15	0.06	1.06	1.11	0.79	0.12	0.23	0.07
30	6000	0.17	0.24	0.05	0.05	0.08	0.13	0.04	0.09	0.12	0.05	0.12	0.04	0.04	0.01	0.34	0.26	0.24	0.02	0.06	0.02
	9000	0.33	0.45	0.11	0.12	0.17	0.29	0.09	0.19	0.24	0.12	0.22	0.07	0.07	0.02	0.54	0.48	0.36	0.07	0.15	0.04
	12000	0.53	0.67	0.20	0.21	0.30	0.51	0.16	0.31	0.39	0.22	0.41	0.11	0.11	0.04	0.75	0.75	0.58	0.16	0.27	0.07
	14000	0.68	0.83	0.26	0.29	0.39	0.69	0.22	0.40	0.51	0.30	0.50	0.14	0.14	0.06	0.95	0.95	0.76	0.25	0.39	0.09
40	8000	0.19	0.26	0.09	N/A	0.13	n/a	0.07	0.09	0.11	0.05	0.11	0.04	0.04	0.02	0.37	0.31	0.25	0.01	0.03	0.02
	10000	0.27	0.36	0.14	0.11	0.20	0.37	0.11	0.13	0.16	0.08	0.16	0.06	0.06	0.02	0.49	0.43	0.32	0.02	0.03	0.03
	12000	0.36	0.48	0.20	0.15	0.28	0.47	0.16	0.17	0.22	0.11	0.21	0.08	0.08	0.03	0.61	0.56	0.41	0.04	0.07	0.05
	16000	0.57	0.73	0.34	0.26	0.49	0.70	0.29	0.28	0.36	0.20	0.36	0.12	0.12	0.05	0.88	0.87	0.66	0.10	0.09	0.08
	17000	0.62	0.79	N/A	0.29	0.55	0.77	0.32	0.31	0.39	0.22	0.41	0.13	0.13	0.06	0.95	0.95	0.74	0.12	0.11	0.10
	18000	0.68	0.86	N/A	0.33	N/A	0.83	0.36	0.35	0.43	0.25	0.44	0.14	0.14	0.07	1.02	1.04	0.83	0.14	0.13	0.11
50-55	10000	0.20	0.25	0.12	0.10	0.20	N/A	0.11	0.13	0.16	0.07	0.15	0.04	0.04	0.01	0.37	0.30	0.25	0.03	0.05	0.03
	14000	0.34	0.42	0.26	0.20	0.38	0.17	0.22	0.22	0.28	0.15	0.28	0.07	0.07	0.03	0.56	0.50	0.37	0.07	0.08	0.05
	17000	0.46	0.57	0.39	0.29	0.55	0.26	0.32	0.31	0.40	0.22	0.41	0.10	0.10	0.04	0.72	0.68	0.50	0.12	0.11	0.08
	20000	0.59	0.73	0.58	0.41	0.75	0.38	0.44	0.42	0.52	0.30	0.51	0.12	0.12	0.05	0.88	0.88	0.66	0.19	0.17	0.11
	23000	0.74	0.89	0.69	0.54	0.99	0.53	0.58	0.47	0.67	0.41	0.69	0.15	0.15	0.07	1.05	N/A	0.87	0.27	0.22	0.14
60	12000	0.27	0.37	0.10	0.08	0.28	0.14	0.06	0.10	0.13	0.06	0.11	0.05	0.05	0.01	0.44	0.37	0.27	0.02	0.07	0.03
	16000	0.43	0.58	0.18	0.14	0.44	0.28	0.11	0.17	0.21	0.11	0.19	0.07	0.07	0.02	0.63	0.58	0.39	0.05	0.10	0.06
	20000	0.62	0.80	0.27	0.21	0.63	0.46	0.17	0.24	0.31	0.16	0.27	0.10	0.10	0.03	0.84	0.82	0.56	0.10	0.16	0.09
	24000	0.83	1.03	0.40	0.30	0.86	0.68	0.24	0.33	0.42	0.22	0.39	0.11	0.11	0.04	1.06	1.08	0.78	0.16	0.23	0.13
	27000	1.00	1.22	0.46	0.32	1.05	0.88	0.30	0.41	0.52	0.30	0.47	0.16	0.16	0.06	1.18	1.24	0.98	0.27	0.28	0.16
70-75	16000	0.44	0.58	0.18	0.14	0.44	0.28	0.11	0.17	0.21	0.11	0.19	0.07	0.07	0.02	0.63	0.58	0.39	0.05	0.10	0.06
	20000	0.62	0.82	0.27	0.21	0.63	0.46	0.17	0.24	0.31	0.16	0.27	0.10	0.10	0.03	0.84	0.82	0.56	0.10	0.16	0.09
	22000	0.73	0.94	0.33	0.25	0.74	0.56	0.20	0.29	0.37	0.19	0.33	0.12	0.12	0.04	0.95	0.95	0.66	0.13	0.20	0.11
	24000	0.84	1.07	0.40	0.30	0.86	0.68	0.24	0.33	0.42	0.22	0.39	0.14	0.14	0.04	1.06	1.08	0.78	0.16	0.23	0.13
	26000	0.95	1.20	0.47	0.32	0.98	0.81	0.28	0.39	0.49	0.27	0.45	0.16	0.16	0.05	1.17	1.23	0.91	0.23	0.26	0.15
	27000	1.01	1.26	0.51	0.33	1.05	0.88	0.30	0.42	0.52	0.30	0.48	0.17	0.17	0.06	1.12	1.26	0.98	0.27	0.28	0.16

Notes:

1. Static pressure drops of accessory components must be added to external static pressure to enter fan selection tables.
2. Gas heat section maximum temperature rise of 60° F.
3. Throwaway filter option limited to 300 ft/min face velocity.
4. Bag filter option limited to 740 ft/min face velocity.
5. Horizontal roof curbs assume 0.50" static pressure drop or double the standard roof curb pressure drop, whichever is greater.
6. No additional pressure loss for model SXH_.
7. For final filters w/ prefilters (digit 13 = M, N, P, Q) also add pressure drop for throwaway filter.

Table 56. Component static pressure drops (in. W.G.), 90 to 130 tons air-cooled

Nom	CFM Std	Evap Coil		High Cap Evap		Heating System							Filters						Std Roof	Econ w/ or w/ out Relief
						SFHL		SEHL	SLHL		SSHL		Throwaway		Perm Wire	Bag & Pre	Cart & Pre	Final Cart		
		Dry	Wet	Dry	Wet	Low	High	All kW	Low	High	Low	High	Std	High						
90	27000	0.40	0.53	0.60	0.80	N/A	0.25	0.13	0.26	0.31	0.22	0.32	0.11	0.13	N/A	0.68	0.65	0.77	N/A	0.20
	32000	0.53	0.70	0.80	1.03	N/A	0.31	0.16	0.35	0.41	0.30	0.43	0.14	0.16	N/A	0.84	0.84	1.07	N/A	0.31
	37000	0.67	0.88	1.01	1.32	N/A	0.39	0.23	0.45	0.52	0.40	0.55	0.17	0.19	N/A	1.02	1.04	1.43	N/A	0.41
	42000	0.83	1.08	1.25	1.62	N/A	0.46	0.29	0.56	0.65	0.50	0.68	0.21	0.22	N/A	1.19	1.06	1.86	N/A	0.52
	45000	0.93	1.20	1.40	1.80	N/A	0.52	0.32	0.63	0.73	0.58	0.76	0.24	0.24	N/A	N/A	N/A	2.14	N/A	0.63
105	31000	N/A	N/A	0.63	0.83	N/A	0.28	0.17	0.33	0.39	0.29	0.40	N/A	0.13	N/A	0.82	0.80	1.00	N/A	0.22
	35000	N/A	N/A	0.77	1.01	N/A	0.36	0.21	0.41	0.48	0.36	0.50	N/A	0.16	N/A	0.96	0.96	1.28	N/A	0.32
	39000	N/A	N/A	0.92	1.20	N/A	0.42	0.26	0.49	0.57	0.44	0.60	N/A	0.19	N/A	1.09	1.12	1.59	N/A	0.44
	43000	N/A	N/A	1.08	1.40	N/A	0.45	0.30	0.57	0.66	0.53	0.71	N/A	0.22	N/A	1.22	1.30	1.95	N/A	0.54
	46000	N/A	N/A	1.21	1.56	N/A	0.55	0.34	0.65	0.75	0.61	0.79	N/A	0.24	N/A	N/A	N/A	2.24	N/A	0.64
115/ 130	31000	0.76	1.00	N/A	N/A	N/A	0.28	0.17	0.33	0.39	0.29	0.40	N/A	0.13	N/A	0.82	0.80	1.00	N/A	0.22
	35000	0.92	1.21	N/A	N/A	N/A	0.36	0.21	0.41	0.48	0.36	0.50	N/A	0.16	N/A	0.96	0.96	1.28	N/A	0.32
	39000	1.10	1.44	N/A	N/A	N/A	0.42	0.26	0.49	0.57	0.44	0.60	N/A	0.19	N/A	1.09	1.12	1.59	N/A	0.44
	43000	1.30	1.68	N/A	N/A	N/A	0.45	0.30	0.57	0.66	0.53	0.71	N/A	0.22	N/A	1.22	1.30	1.95	N/A	0.54
	46000	1.45	1.86	N/A	N/A	N/A	0.55	0.34	0.65	0.75	0.61	0.79	N/A	0.24	N/A	N/A	N/A	2.24	N/A	0.64

Notes:

1. Static pressure drops of accessory components must be added to external static pressure to enter fan selection tables.
2. Gas heat section maximum temperature rise of 60° F.
3. Throwaway filter option limited to 300 ft/min face velocity.
4. Bag filter option limited to 740 ft/min face velocity.
5. Horizontal roof curbs assume 0.50" static pressure drop or double the standard roof curb pressure drop, whichever is greater.
6. No additional pressure loss for model SXHL.
7. For final filters w/ prefilters (digit 13 = M, N, P, Q) also add pressure drop for throwaway filter.

Table 57. Component static pressure drops (in. W.G.)—relief damper for return fan

Nom Tons	Cfm	Relief Damper for Return Fan	Nom Tons	Cfm	Relief Damper for Return Fan
20	4000	0.08	50-55	10000	0.28
	6000	0.19		14000	0.56
	8000	0.35		17000	0.75
	9000	0.44		20000	1.15
	10000	0.55		24000	1.66
	12000	0.79		28000	2.26
25	5000	0.13	60	12000	0.31
	6000	0.19		16000	0.56
	7500	0.30		20000	0.88
	10000	0.55		24000	1.27
	11000	0.67		28000	1.73
	12500	0.85		30000	1.99
	14000	1.08	70-75	12000	0.31
30	6000	0.19		16000	0.56
	9000	0.44		20000	0.88
	12000	0.79		22000	1.05
	14000	1.08		24000	1.27
	15000	1.20		26000	1.47
	17000	1.60		28000	1.73
40	8000	0.18		31000	N/A
	10000	0.28		33000	N/A
	12000	0.41			
	16000	0.73			
	17000	0.82			
	20000	1.15			
	22000	1.39			

Fan Drive Selections

Supply Fan Performance

Table 58. FC supply air fan drive selections — 20 to 75 tons

Nom Tons	3 Hp		5 Hp		7.5 Hp		10 Hp		15 Hp		20 Hp		25 Hp		30 Hp		40 Hp		50 Hp	
	RPM	Drive No	RPM	Drive No	RPM	Drive No	RPM	Drive No	RPM	Drive No	RPM	Drive No	RPM	Drive No	RPM	Drive No	RPM	Drive No	RPM	Drive No
20	500	5	700	7	900	9	1100	B	1200	C	1400	E								
	600	6	800	8	1000	A	1200	C	1300	D	1500	F								
	700	7	900	9	1100	B	1300	D	1400	E	1600	G								
	800	8	1000	A	1200	C	1400	E	1500	F	1700	H								
	900	9	1100	B	1300	D			1600	G										
25	500	5	700	7	800	8	1000	A	1200	C	1400	E								
	600	6	800	8	900	9	1100	B	1300	D	1500	F								
	700	7	900	9	1000	A	1200	C	1400	E	1600	G								
	800	8	1000	A	1100	B	1300	D	1500	F	1700	H								
	900	9	1100	B	1200	C	1400	E	1600	G										
					1300	D														
30			600	6	700	7	800	8	900	9	1100	B								
			700	7	800	8	900	9	1000	A	1200	C								
			800	8	900	9	1000	A	1100	B	1300	D								
			900	9	1000	A	1100	B	1200	C	1400	E								
									1300	D										
40					500	5	700	7	800	8	900	9	1000	A	1000	A				
					600	6	800	8	900	9	1000	A	1100	B	1100	B				
					700	7	900	9	1000	A	1100	B								
					800	8														
50-55					500	5	600	6	700	7	800	8	900	9	1000	A				
					600	6	700	7	800	8	900	9	1000	A	1100	B				
					700	7	800	8	900	9	1000	A	1100	B						
					800	8	900	9	1000	A	1100	B								

Table 58. FC supply air fan drive selections — 20 to 75 tons (continued)

Nom Tons	3 Hp		5 Hp		7.5 Hp		10 Hp		15 Hp		20 Hp		25 Hp		30 Hp		40 Hp		50 Hp	
	RPM	Drive No	RPM	Drive No	RPM	Drive No	RPM	Drive No	RPM	Drive No	RPM	Drive No	RPM	Drive No	RPM	Drive No	RPM	Drive No	RPM	Drive No
60, 70, 75							400	4	500	5	600	6	700	7	800	8	900	9	1000	A
							500	5	600	6	700	7	800	8	900	9	1000	A	1100	B
							600	6	700	7	800	8	900	9	1000	A	1100	B		
							700	7	800	8	900	9	1000	A						

Table 59. 80%, 100% and 120% wheel width DDP supply air fan speed ranges - 20 to 75 tons

Nom Tons	DDP Fan Wheel Width	Speed Range (RPM)									
		3 HP	5 HP	7.5 HP	10 HP	15 HP	20 HP	25 HP	30 HP	40 HP	50 HP
20 & 25	80%	1000-1500	1000-1700	1000-2000	1700-2200	1700-2400	1700-2400	N/A	N/A	N/A	N/A
	120%	1000-1300	1000-1500	1000-1800	1000-1900	1700-2200	1700-2400	N/A	N/A	N/A	N/A
20/25 Gas Heat, 30	80%	1000-1200	1000-1500	1000-1700	1000-1900	1700-2100	1700-2200	N/A	N/A	N/A	N/A
	120%	1000-1100	1000-1300	1000-1500	1000-1600	1700-1900	1700-2100	N/A	N/A	N/A	N/A
30 Gas Heat, 40	80%	1000	1000-1200	1000-1400	1000-1600	1000-1800	1700-2000	1700-2000	N/A	N/A	N/A
	120%	N/A	1000-1100	1000-1300	1000-1400	1000-1600	1700-1800	1700-1800	N/A	N/A	N/A
40 Gas Heat 50-55	80%	N/A	1000	1000-1200	1000-1300	1000-1500	1700	1700-1800	1700-1800	N/A	N/A
	100%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1700-1800	N/A	N/A
	120%	N/A	N/A	1000	1000-1200	1000-1300	1400-1500	N/A	1700	N/A	N/A
60	80%	N/A	N/A	N/A	1000-1500	1000-1700	1000-1900	N/A	1700-2100	1700-2200	N/A
	120%	N/A	N/A	N/A	1000-1300	1000-1500	1000-1600	N/A	1700-1900	1700-2100	N/A
70 & 75	80%	N/A	N/A	N/A	1000-1200	1000-1400	1000-1600	N/A	1000-1800	1700-2000	1700-2000
	120%	N/A	N/A	N/A	1000-1100	1000-1300	1000-1400	N/A	1000-1600	1700-1800	1700-1900
60 Gas Heat, 70 & 75 Gas Heat	80%	N/A	N/A	N/A	1000-1300	1000-1400	1000-1600	N/A	1300-1700	1500-1700	N/A
	100%	N/A	N/A	N/A	1000-1100	1000-1200	1000-1300	N/A	1000-1500	NA	N/A

Note: Some rpms will not allow bypass. Please check TOPSS™ on all applications.

Table 60. Air-cooled supply air fan drive selections — 90 to 130 tons

RPM	15 HP	20 HP	25 HP	30 HP	40 HP
1000	A	A			
1100	B	B	B		
1200	C	C	C	C	
1300		D	D	D	D
1400			E	E	E
1500			F	F	F
1600				G	G

Relief Fan Performance

Table 61. Modulating 100% relief fan performance — 20 to 75 tons

Nom Tons	CFM Std Air	Negative Static Pressure															
		0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
20	4000	379	0.34	515	0.70	622	1.12	712	1.59	791	2.10	861	2.64				
	6000	421	0.61	541	1.03	643	1.52	732	2.07	811	2.66						
	8000	487	1.10	583	1.56	674	2.11	757	2.72								
	10000	567	1.88	643	2.37	719	2.96										
25	4000	379	0.34	515	0.70	622	1.12	712	1.59	791	2.10	861	2.64	927	3.22	988	3.84
	6000	421	0.61	541	1.03	643	1.52	732	2.07	811	2.66	882	3.28	948	3.94	1010	4.64
	8000	487	1.10	583	1.56	674	2.11	757	2.72	834	3.38	904	4.09	970	4.82		
	10000	567	1.88	643	2.37	719	2.96	794	3.63	864	4.35						
	12000	651	2.98	716	3.56	779	4.18	843	4.88								
30	4000	379	0.34	515	0.70	622	1.12	712	1.59	791	2.10	861	2.64	927	3.22	988	3.84
	6000	421	0.61	541	1.03	643	1.52	732	2.07	811	2.66	882	3.28	948	3.94	1010	4.64
	8000	487	1.10	583	1.56	674	2.11	757	2.72	834	3.38	904	4.09	970	4.82	1030	5.59
	10000	567	1.88	643	2.37	719	2.96	794	3.63	864	4.35	931	5.11	993	5.91	1053	6.77
	12000	651	2.98	716	3.56	779	4.18	843	4.88	905	5.64	967	6.47	1026	7.34		
	14000	736	4.47	796	5.17	850	5.83	904	6.57	960	7.38						

Table 61. Modulating 100% relief fan performance — 20 to 75 tons (continued)

Nom Tons	CFM Std Air	Negative Static Pressure															
		0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
40	7500	318	0.67	444	1.21	545	1.85	629	2.54	702	3.27	767	4.02	828	4.83	884	5.66
	9000	331	0.97	444	1.47	543	2.17	628	2.94	702	3.75	770	4.60	831	5.48	887	6.37
	12000	381	2.13	460	2.40	546	3.04	627	3.89	701	4.83	769	5.82	831	6.87	889	7.93
	14000	422	3.40	486	3.49	557	3.98	631	4.76	701	5.72	768	6.78	830	7.90	888	9.07
	16000	468	5.12	520	5.07	579	5.37	643	6.01	707	6.88	769	7.92	829	9.08	887	10.32
50-55	9000	331	0.97	444	1.47	543	2.17	628	2.94	702	3.75	770	4.60	831	5.48	887	6.37
	12000	381	2.13	460	2.40	546	3.04	627	3.89	701	4.83	769	5.82	831	6.87	889	7.93
	15000	445	4.20	502	4.21	567	4.61	636	5.32	704	6.26	769	7.32	830	8.47	888	9.67
	18000	516	7.41	559	7.19	609	7.32	662	7.76	719	8.49	776	9.44	833	10.56	887	11.79
	20000	566	10.31	602	9.91	644	9.88	690	10.15	739	10.69	789	11.48	841	12.48	893	13.68
60, 70, 75	12000	351	1.49	423	2.09	502	3.00	572	4.02	634	5.07	690	6.09	740	7.04	784	7.91
	15000	412	2.68	460	3.15	521	3.96	585	5.02	646	6.24	702	7.53	749	8.83	801	10.14
	18000	478	4.41	516	4.88	557	5.54	607	6.49	662	7.66	715	9.01	766	10.48	814	12.01
	21000	549	6.75	578	7.36	612	7.92	647	8.71	688	9.77	735	11.03	781	12.46	827	14.03
	24000	617	9.83	644	10.59	672	11.22	702	11.88	732	12.77	766	13.89	805	15.22	846	16.72
	27000	688	15.11	711	15.09	736	15.45	761	16.18	788	17.02	815	17.92	844	18.99	876	20.31

Notes:

1. Shaded areas indicate non-standard drive selections. These drive selections must be manually factory selected.
2. Refer to General Data Table for minimum and maximum HP.

Table 62. Air-cooled modulating 100% relief fan performance — 90 to 130 tons

Nom Tons	CFM Std Air	Negative Static Pressure									
		0.25		0.50		0.75		1.00		1.25	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
90-130	28000	495	12.81	519	13.30	547	13.93	582	15.27	619	17.14
	30000	527	15.67	550	16.22	573	16.71	604	17.84	637	19.53
	32000	559	18.92	581	19.53	602	20.03	628	20.90	658	22.39
	34000	591	22.60	612	23.28	632	23.84	653	24.48	681	25.74
	36000	623	26.73	643	27.47	662	28.09	680	28.62	705	29.66
	38000	656	31.34	675	32.14	693	32.83	710	33.42	730	34.17
	40000	688	36.46	707	37.31	724	38.07	741	38.73	757	39.29
Nom Tons	**CFM Std Air**	**Negative Static Pressure**									
		1.50		**1.75**		**2.00**		**2.25**		**2.50**	
		RPM	**BHP**	**RPM**	**BHP**	**RPM**	**BHP**	**RPM**	**BHP**	**RPM**	**BHP**
90-130	28000	655	18.85	689	20.51	721	22.51	750	24.43	777	26.28
	30000	672	21.63	705	23.38	737	25.16	768	27.31	795	29.37
	32000	690	24.39	723	26.63	753	28.44	784	30.37	811	32.54
	34000	710	27.55	739	29.75	771	32.16	799	34.04	828	36.04
	36000	732	31.25	759	33.29	788	35.76	817	38.26	844	40.23
	38000	755	35.51	780	37.38	806	39.60	834	42.26	861	44.90
	40000	779	40.45	804	42.09	827	44.14	853	46.63	879	49.41

Notes:

1. Shaded areas indicate non-standard drive selections. These drive selections must be manually factory selected.
2. Refer to General Data Table for minimum and maximum HP.

Table 63. 100% Relief fan drive selections — 20 to 75 tons

	3 Hp		5 Hp		7.5 Hp		10 Hp		15 Hp		20 Hp	
	RPM	Drive No.	RPM	Drive No.	RPM	Drive No.	RPM	Drive No.	RPM	Drive No.	RPM	Drive No.
20	500	5										
	600	6										
	700	7										
	800	8										
	900	9										
25	500	5	700	7								
	600	6	800	8								
	700	7	900	9								
	800	8	1000	A								
	900	9										
30	500	5	700	7	800	8						
	600	6	800	8	900	9						
	700	7	900	9	1000	A						
	800	8	1000	A	1100	B						
	900	9										

Table 63. 100% Relief fan drive selections — 20 to 75 tons (continued)

	3 Hp		5 Hp		7.5 Hp		10 Hp		15 Hp		20 Hp	
	RPM	Drive No.	RPM	Drive No.	RPM	Drive No.	RPM	Drive No.	RPM	Drive No.	RPM	Drive No.
40			400 500 600 700 800	4 5 6 7 8	600 700 800	6 7 8	700 800	7 8				
50–55			400 500 600 700 800	4 5 6 7 8	600 700 800	6 7 8	700 800	7 8	700 800 900	7 8 9		
60			400	4	600	6	600	6	700	7	800	8
70			500	5	700	7	700	7	800	8		
75			600	6								

Table 64. 100% Relief fan drive selections — 90 to 130 tons

Nom Tons	15 HP		20 HP		25 HP		30 HP		40 HP	
	RPM	Drive No.	RPM	Drive No.	RPM	Drive No.	RPM	Drive No.	RPM	Drive No.
90-130	500 600	5 6	500.00 600.00 700	5 6 7	600.00 700.00 800	6 7 8	600.00 700.00 800	6 7 8	700.00 800.00	7 8

Return Fan Performance

Table 65. Return fan performance—20, 25, 30 ton air-cooled (24.5" Fan)

CFM Std Air	Return Fan Static Pressure Including Relief Damper P.D.															
	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4000	557	0.29	638	0.48	710	0.68	776	0.89	838	1.10	899	1.32	969	1.60	1038	1.89
4500	605	0.36	682	0.57	749	0.79	811	1.02	869	1.25	926	1.49	980	1.73	1033	1.99
5000	654	0.44	727	0.67	790	0.91	850	1.16	905	1.41	957	1.67	1007	1.93	1057	2.20
5500	704	0.53	773	0.79	834	1.04	889	1.30	943	1.58	992	1.86	1040	2.15	1087	2.44
6000	756	0.64	821	0.92	879	1.20	932	1.47	982	1.77	1030	2.06	1076	2.38	1121	2.70
6500	808	0.76	868	1.06	925	1.36	976	1.66	1024	1.97	1070	2.29	1114	2.61	1157	2.95
7000	861	0.90	917	1.21	972	1.55	1021	1.87	1067	2.19	1112	2.53	1154	2.87	1195	3.22
7500	913	1.06	968	1.39	1019	1.74	1068	2.10	1112	2.44	1155	2.79	1196	3.15	1235	3.51
8000	967	1.24	1019	1.58	1068	1.96	1115	2.34	1158	2.71	1199	3.08	1238	3.45	1277	3.84
8500	1021	1.44	1071	1.80	1116	2.19	1162	2.60	1204	3.00	1244	3.39	1283	3.79	1320	4.19
9000	1075	1.67	1123	2.04	1166	2.45	1210	2.88	1252	3.30	1290	3.72	1327	4.14	1363	4.56
9500	1130	1.92	1175	2.31	1217	2.73	1258	3.17	1299	3.62	1337	4.07	1373	4.52	1408	4.96
10000	1186	2.20	1228	2.60	1269	3.04	1307	3.50	1347	3.97	1384	4.45	1419	4.91	1454	5.38
10500	1241	2.50	1280	2.92	1321	3.37	1357	3.85	1395	4.34	1432	4.85	1466	5.33	1500	5.84
11000	1297	2.84	1334	3.27	1373	3.74	1409	4.23	1443	4.74	1480	5.26	1515	5.79	1546	6.29
11500	1353	3.20	1387	3.64	1425	4.13	1460	4.64	1493	5.16	1528	5.71	1561	6.25	1594	6.79
12000	1408	3.60	1441	4.06	1477	4.56	1512	5.08	1544	5.62	1576	6.18	1610	6.75	1642	7.32
12500	1464	4.03	1496	4.50	1530	5.01	1565	5.56	1596	6.11	1626	6.68	1658	7.28	1689	7.87
13000	1520	4.49	1551	4.98	1583	5.51	1617	6.06	1648	6.64	1677	7.22	1707	7.84	1737	8.44
13500	1576	4.99	1606	5.50	1636	6.03	1669	6.60	1700	7.20	1728	7.80	1756	8.42	1785	9.06
14000	1633	5.52	1661	6.05	1690	6.60	1721	7.19	1752	7.79	1780	8.42	1807	9.05	1834	9.70

Notes:

1. Max fan RPM 1715 for 24.5" Class I Fan
2. Max motors available are as follows: 20T: 3HP, 25; 5HP, 30T: 7.5 HP
3. Max CFM available is as follows; 20T: 9000, 25T: 11000, and 30T: 13500
4. Min CFM is 4000 for 20T, 25T, and 30T
5. Return fan belt drive RPM selections will be available to cover 500-1600 RPM range +/- 50 RPM
6. Performance data includes cabinet and rain hood effect. Damper pressure drop must be added to the return duct static. See table Component static pressure drops - relief damper for return fan in Performance Data.
7. Shaded area indicates nonstandard BHP or RPM selections. Contact a local Trane® representative for more information.

Table 66. Return fan performance—40, 50 and 55 ton air-cooled (27" Fan)

CFM Std Air	Return Fan Static Pressure Including Relief Damper P.D.															
	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
7500	709	0.82	766	1.16	815	1.50	861	1.85	906	2.22	949	2.60	991	2.99	1033	3.39
8000	748	0.95	803	1.31	851	1.67	895	2.04	938	2.43	979	2.82	1018	3.22	1058	3.64
8500	788	1.09	840	1.47	887	1.86	930	2.24	971	2.64	1010	3.05	1049	3.48	1087	3.92
9000	827	1.24	878	1.64	924	2.05	965	2.46	1005	2.88	1043	3.31	1080	3.75	1115	4.19
9500	867	1.41	916	1.83	961	2.27	1001	2.70	1040	3.14	1076	3.58	1112	4.03	1146	4.50
10000	908	1.60	955	2.04	999	2.50	1038	2.95	1075	3.41	1111	3.88	1145	4.34	1179	4.83
10500	948	1.81	994	2.27	1036	2.75	1075	3.23	1111	3.70	1145	4.18	1179	4.68	1212	5.18
11000	989	2.04	1033	2.51	1074	3.01	1112	3.51	1147	4.01	1181	4.51	1213	5.02	1245	5.53
11500	1030	2.28	1072	2.78	1112	3.29	1149	3.82	1184	4.33	1216	4.86	1248	5.38	1279	5.92
12000	1071	2.55	1112	3.06	1151	3.59	1187	4.14	1221	4.69	1253	5.24	1284	5.78	1314	6.33
12500	1112	2.83	1152	3.37	1189	3.92	1225	4.48	1258	5.06	1290	5.62	1320	6.19	1349	6.76
13000	1153	3.14	1192	3.70	1228	4.27	1263	4.86	1296	5.45	1327	6.04	1356	6.63	1385	7.23
13500	1194	3.47	1232	4.05	1267	4.63	1301	5.24	1333	5.85	1364	6.47	1393	7.08	1421	7.70
14000	1236	3.83	1272	4.42	1307	5.03	1340	5.66	1371	6.29	1401	6.94	1430	7.57	1457	8.20
14500	1277	4.21	1313	4.82	1346	5.45	1379	6.10	1410	6.75	1439	7.42	1467	8.08	1494	8.73
15000	1319	4.62	1353	5.25	1386	5.90	1417	6.55	1448	7.23	1477	7.92	1504	8.61	1531	9.29
15500	1361	5.05	1394	5.71	1426	6.37	1457	7.05	1486	7.74	1514	8.44	1542	9.16	1569	9.87
16000	1402	5.51	1435	6.18	1466	6.87	1496	7.57	1525	8.28	1553	9.01	1580	9.74	1606	10.47
16500	1444	6.00	1476	6.69	1506	7.40	1535	8.12	1564	8.85	1591	9.58	1617	10.34	1643	11.10
17000	1486	6.52	1517	7.23	1547	7.96	1575	8.70	1603	9.44	1629	10.20	1655	10.97	1681	11.75
17500	1528	7.07	1558	7.80	1587	8.55	1615	9.30	1642	10.07	1668	10.85	1694	11.64	1718	12.43
18000	1570	7.65	1599	8.40	1627	9.17	1655	9.94	1681	10.73	1707	11.53	1732	12.33	1757	13.15
18500	1612	8.26	1640	9.03	1668	9.81	1695	10.62	1721	11.43	1746	12.23	1771	13.07	1794	13.89
19000	1654	8.91	1682	9.70	1709	10.50	1735	11.31	1760	12.14	1785	12.97	1809	13.82	1833	14.67
19500	1696	9.59	1723	10.40	1749	11.22	1775	12.06	1800	12.90	1825	13.76	1848	14.62	1872	15.50

Table 66. Return fan performance—40, 50 and 55 ton air-cooled (27" Fan) (continued)

CFM Std Air	Return Fan Static Pressure Including Relief Damper P.D.															
	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
20000	1738	10.30	1765	11.13	1790	11.97	1816	12.83	1840	13.69	1864	14.56	1888	15.46	1910	16.34
20500	1780	11.05	1806	11.90	1831	12.76	1856	13.63	1880	14.52	1903	15.41	1926	16.31	1949	17.22
21000	1822	11.84	1848	12.71	1872	13.59	1897	14.48	1920	15.39	1943	16.29	1966	17.23	1988	18.14
21500	1864	12.66	1889	13.55	1914	14.45	1937	15.36	1960	16.29	1983	17.22	2005	18.16	2027	19.11
22000	1899	13.05	1926	14.11	1952	15.16	1977	16.20	2001	17.23	2024	18.24	2047	19.27	2069	20.28
22500	1941	13.91	1967	14.98	1992	16.05	2017	17.12	2041	18.19	2064	19.23	2086	20.27	2108	21.31

Notes:

1. Max fan RPM 1981 For 27" Class II Fan
2. Max Motor Available 15 HP For 27" Fan Size
3. Max motors Available are as follows: 40T: 10 HP & 50-55T: 15 HP
4. Max CFM is as follows: 40T: 18000, 50-55T: 22500
5. Min CFM is as follows: 40T: 7500, 50-55T: 9000
6. Return fan belt drive RPM selections will be available to cover 700-1900 RPM range +/- 50 RPM
7. Performance data includes cabinet and rain hood effect. Damper pressure drop must be added to the return duct static. See table Component static pressure drops - relief damper for return fan in Performance Data.
8. Shaded area indicates nonstandard BHP or RPM selections. Contact a local Trane® representative for more information.

Table 67. Return fan performance—60 to 75 tons air-cooled (36.5" fan)

CFM Std Air	Return Fan Static Pressure Including Relief Damper P.D.															
	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
12000	459	1.07	502	1.59	541	2.13	578	2.71	613	3.31	647	3.91	681	4.54	713	5.20
13000	490	1.27	530	1.83	567	2.40	603	3.01	636	3.65	668	4.29	700	4.94	731	5.64
14000	520	1.49	560	2.09	595	2.70	628	3.34	660	3.99	691	4.69	721	5.38	751	6.10
15000	552	1.73	590	2.38	623	3.03	655	3.70	686	4.39	715	5.11	744	5.85	771	6.59
16000	583	2.00	619	2.70	652	3.39	682	4.09	712	4.82	740	5.57	767	6.34	794	7.14
17000	615	2.30	650	3.05	681	3.78	710	4.52	739	5.28	766	6.06	792	6.85	818	7.67
18000	646	2.64	680	3.43	711	4.20	739	4.98	766	5.78	792	6.60	817	7.41	842	8.27
19000	678	3.01	711	3.85	741	4.67	768	5.48	794	6.31	819	7.16	844	8.03	867	8.89
20000	711	3.42	742	4.30	771	5.17	797	6.02	823	6.90	847	7.77	871	8.66	894	9.59
21000	743	3.87	773	4.78	801	5.70	827	6.60	852	7.51	875	8.41	898	9.36	920	10.30
22000	775	4.36	805	5.31	832	6.28	857	7.22	881	8.17	904	9.11	926	10.09	947	11.06
23000	808	4.89	836	5.88	863	6.90	887	7.89	911	8.88	933	9.87	954	10.86	975	11.88
24000	840	5.46	868	6.49	894	7.56	918	8.60	941	9.63	962	10.67	983	11.71	1004	12.75
25000	873	6.08	900	7.15	925	8.26	948	9.35	970	10.42	992	11.49	1012	12.59	1032	13.67
26000	906	6.75	931	7.86	956	9.00	979	10.16	1001	11.28	1021	12.37	1041	13.49	1061	14.63
27000	939	7.47	963	8.62	987	9.79	1010	11.01	1031	12.18	1052	13.33	1071	14.47	1090	15.65

Notes:

1. Max fan RPM 1151 for 36.5" Class I Fan
2. Max motor available 20 HP for 36.5" fan size
3. Max motor available 20 HP for 60, 70, and 75T
4. Max CFM is 27000 for 60, 70, and 75T
5. Min CFM is 12000 for 60, 70, and 75T
6. Return fan belt drive RPM selections will be available to cover 500-1100 RPM range +/- 50 RPM
7. Performance data includes cabinet and rain hood effect. Damper pressure drop must be added to the return duct static. See table Component static pressure drops - relief damper for return fan in Performance Data.

Table 68. 100% Return fan drive selections — 20 to 75 tons air-cooled

	3 Hp		5 Hp		7.5 Hp		10 Hp		15 Hp		20 Hp	
	RPM	Drive No.	RPM	Drive No.	RPM	Drive No.	RPM	Drive No.	RPM	Drive No.	RPM	Drive No.
20	500	5										
	600	6										
	700	7										
	800	8										
	900	9										
	1000	A										
	1100	B										
	1200	C										
	1300	D										
25	500	5	1100	B								
	600	6	1200	C								
	700	7	1300	D								
	800	8	1400	E								
	900	9	1500	F								
	1000	A	1600	G								
	1100	B										
	1200	C										
	1300	D										
30	500	5	1100	B	1400	E						
	600	6	1200	C	1500	F						
	700	7	1300	D	1600	G						
	800	8	1400	E								
	900	9	1500	F								
	1000	A	1600	G								
	1100	B										
	1200	C										
	1300	D										
40			700	7	1200	C	1400	E				
			800	8	1300	D	1500	F				
			900	9	1400	E	1600	G				
			1000	A	1500	F	1700	H				
			1100	B								
			1200	C								
			1300	D								
50–55			700	7	1200	C	1400	E	1600	G		
			800	8	1300	D	1500	F	1700	H		
			900	9	1400	E	1600	G	1800	J		
			1000	A	1500	F	1700	H	1900	K		
			1100	B								
			1200	C								
			1300	D								
60			500	5	700	7	800	8	900	9	1100	B
			600	6	800	8	900	9	1000	A		
			700	7	900	9	1000	A	1100	B		
			800	8								
70, 75			500	5	700	7	800	8	900	9	1100	B
			600	6	800	8	900	9	1000	A		
			700	7	900	9	1000	A	1100	B		
			800	8								

Electrical Data

Electrical Service Sizing

To correctly size electrical service wiring for a unit, find the appropriate calculations listed below. Each type of unit has its own set of calculations for MCA (Minimum Circuit Ampacity) and MOP (Maximum Overcurrent Protection). Read the load definitions that follow and then find the appropriate set of calculations based on unit type.

Note: *Set 1 is for cooling only, cooling with gas heat, or cooling with hot water/steam heat units. Set 2 is for cooling with electric heat units*

Load Definitions: (To determine load values, see the Electrical Service Sizing Data Tables on the following page.)

LOAD1 = Current of the largest motor (compressor or fan motor)

LOAD2 = Sum of the currents of all remaining motors

LOAD3 = Current of electric heaters

LOAD4 = Any other load rated at 1 AMP or more

SAH_ (Cooling Only) units

SEH_ (Cooling with Electric Heat) units

SXH_ (Extended Casing Cooling Only) units

SLH_ and SSH_ (Cooling with Hydronic Heat) units

SFH_ (Cooling with Gas Heat) units

Load Definitions	
LOAD 1	Current (RLA, MRC, FLA or MOC) of the largest motor (compressor or fan motor)
LOAD 2	Sum of the currents (RLA, MRC, FLA or MOC) of all remaining motors
LOAD 3	Current of electric heaters
LOAD 4	Any other load rated at 1 amp or more

Load 4 — Control Power Transformer Loads for All Modes				
	200V	**230V**	**460V**	**575V**
20–75 ton units	10.0 Amps	9.0 Amps	4.5 Amps	3.5 Amps
90–130 ton units	—	—	9.0 Amps	7.0 Amps

Set 1: Cooling Only Rooftop Units and Cooling with Gas Heat or Hydronic Heat Rooftop Units

MCA = (1.25 x LOAD1) + LOAD2 + LOAD4

MOP = (2.25 x LOAD1) + LOAD2 + LOAD4

Select a fuse rating equal to the MOP value. If the MOP value does not equal a standard fuse size as listed in NEC 240-6, select the next lower standard fuse rating.

Note: *If selected MOP is less than the MCA, then select the lowest standard maximum fuse size which is equal to or larger than the MCA, provided the selected fuse size does not exceed 800 amps.*

Set 2: Rooftop units with Electric Heat

Single Source Power units (460V and 575V)

To arrive at the correct MCA and MOP values for these units, two sets of calculations must be performed. First calculate the MCA and MOP values as if the unit was in cooling mode (use the equations given in Set 1). Then calculate the MCA and MOP values as if the unit were in heating mode as follows. (Keep in mind when determining LOADS that the compressors don't run while the unit is in heating mode).

For units using heaters less than 50 kW:

MCA = 1.25 x (LOAD1 + LOAD2 + LOAD4) + (1.25 x LOAD3)

For units using heaters equal to or greater than 50 kW:

MCA = 1.25 x (LOAD1 + LOAD2 + LOAD4) + LOAD3

The nameplate MCA value will be the larger of the cooling mode MCA value or the heating mode MCA value calculated above.

MOP = (2.25 x LOAD1) + LOAD2 + LOAD3 + LOAD4

The selection MOP value will be the larger of the cooling mode MOP value or the heating mode MOP value calculated above.

Select a fuse rating equal to the MOP value. If the MOP value does not equal a standard fuse size as listed in NEC 240-6, select the next lower standard fuse rating.

Note: *If selected MOP is less than the MCA, then select the lowest standard maximum fuse size which is equal to or larger than the MCA, provided the selected fuse size does not exceed 800 amps.*

Dual Source Power units (200–230V with Electric Heat)

These units will have two circuit values shown on the nameplate. The first circuit value will be the refrigeration (cooling mode) values calculated per Set 1. The second set of circuit values shown on the nameplate will be for the electric heating circuit as follows.

MCA = (1.25 x LOAD3)

MOP = (1.25 x LOAD3)

Select a fuse rating for the electric heating circuit that is equal to the MOP value obtained in the equation above. If the MOP value does not equal a standard fuse size as listed in NEC 240-6, select the next lower standard fuse rating (see note below for exception).

Note: *If the available MOP option is less than the MCA obtained in the equation above, then reselect the lowest standard maximum fuse size which is equal to, or larger, than the MCA, provided the reselected fuse size does not exceed 800 amps.*

Service Sizing Data

Table 69. Compressor electrical service sizing data (20 to 130 tons)

Tonnage	No. of Compressors	200 V		230 V		460 V		575 V	
		RLA/MRC[a] (ea.)	LRA (ea.)	RLA/MRC[a] (ea.)	LRA (ea.)	RLA/MRC[a] (ea.)	LRA (ea.)	RLA/MRC[a] (ea.)	LRA (ea.)
20 Variable Speed	1[b]	34.3	N/A	29.9	N/A	14.9	N/A	12.5	N/A
	1	36.8	267	32.0	267	16.0	142	15.2	103
25 Standard	1	27.7	203	27.7	203	14.5	98	12.5	84
	2	36.8	267	32.0	267	16.0	142	15.2	103
25 High Efficiency	1	57.8	340	57.4	340	27.1	179	24.4	132
	1	37.1	240	36.4	240	17.0	140	13.3	108
25 Variable Speed	1[b]	38.6	N/A	33.6	N/A	23.1	N/A	14.1	N/A
	1	40.3	267	40.3	267	19.1	142	15.8	103
30 Standard	1	27.7	203	27.7	203	14.5	98	12.5	84
	2	40.3	267	40.3	267	19.1	142	15.8	103
30 High Efficiency	1	27.7	203	27.7	203	14.5	98	12.5	84
	2	40.3	267	40.3	267	19.1	142	15.8	103
30 Variable Speed	1[b]	52.3	N/A	45.5	N/A	22.7	N/A	19.1	N/A
	1	51.3	315	45.6	315	22.3	158	19.1	136
40 Standard	1	30.6	203	28.4	203	13.3	98	11.9	84
	3	36.8	267	32.0	267	16.0	142	15.2	103
40 High Efficiency	2	30.6	203	28.4	203	13.3	98	11.9	84
	2	36.8	267	32.0	267	16.0	142	15.2	103
40 Variable Speed	1[b]	52.3	N/A	45.5	N/A	24.6	N/A	19.1	N/A
	2	36.8	267	32.0	267	16.0	142	15.2	103
50 Standard	4	40.3	267	40.3	267	19.1	142	15.8	103
50 High Efficiency	2	40.3	267	40.3	267	19.1	142	15.8	103
	2	46.2	304	42.3	304	20.1	147	17.2	122
50 Variable Speed	1[b]	85.9	N/A	74.7	N/A	39.6	N/A	32.3	N/A
	2	46.2	304	42.3	304	20.1	147	17.2	122
55 Standard	2	46.2	304	42.3	304	20.1	147	17.2	122
	2	51.3	315	45.6	315	22.3	158	19.1	136
55 High Efficiency	4	46.2	304	42.3	304	20.1	147	17.2	122
55 Variable Speed	1[b]	85.9	N/A	74.7	N/A	39.6	N/A	32.3	N/A
	1	46.2	304	42.3	304	20.1	147	17.2	122
	1	51.3	315	45.6	315	22.3	158	19.1	136
60 Standard	4	51.3	315	45.6	315	22.3	158	19.1	136
60 High Efficiency	3	51.3	315	45.6	315	22.3	158	19.1	136
	1	59.8	345	52.0	345	26.0	155	23.1	126
60 Variable Speed	1[b]	84.8	N/A	73.7	N/A	39.6	N/A	31.9	N/A
	1	51.3	315	45.6	315	22.3	158	19.1	136
	1	59.8	345	52.0	345	26.0	155	23.1	126
70 Standard	2	59.8	345	52.0	345	26.0	155	23.1	126
	1	59.6	320	51.8	320	25.9	160	22.1	135
	1	77.4	485	69.3	485	33.7	215	27.1	175
70 High Efficiency	4	59.8	345	52.0	345	26.0	155	23.1	126
70 Variable Speed	1[b]	96.2	N/A	78.7	N/A	45.0	N/A	36.2	N/A
	1	59.6	320	51.8	320	25.9	160	22.1	135
	1	77.4	485	69.3	485	33.7	215	27.1	175
75 Standard	2	59.6	320	51.8	320	25.9	160	22.1	135
	2	77.4	485	69.3	485	33.7	215	27.1	175
75 High Efficiency	1	59.6	320	51.8	320	25.9	160	22.1	135
	3	77.4	485	69.3	485	33.7	215	27.1	175
75 Variable Speed	1[b]	91.3	N/A	79.1	N/A	43.0	N/A	35.2	N/A
	1	59.6	320	51.8	320	25.9	160	22.1	135
	2	59.8	345	52.0	345	26.0	155	23.1	126

Table 69. Compressor electrical service sizing data (20 to 130 tons) (continued)

Tonnage	No. of Compressors	200 V		230 V		460 V		575 V	
		RLA/MRC[a] (ea.)	LRA (ea.)	RLA/MRC[a] (ea.)	LRA (ea.)	RLA/MRC[a] (ea.)	LRA (ea.)	RLA/MRC[a] (ea.)	LRA (ea.)
90 Standard and High Efficiency	4	N/A	N/A	N/A	N/A	33.7	215	27.1	175
105 Standard	2	N/A	N/A	N/A	N/A	33.7	215	27.1	175
	2	N/A	N/A	N/A	N/A	45.9	260	36.7	210
115 Standard	1	N/A	N/A	N/A	N/A	33.7	215	27.1	175
	3	N/A	N/A	N/A	N/A	45.9	260	36.7	210
130 Standard	3	N/A	N/A	N/A	N/A	45.9	260	36.7	210
	1	N/A	N/A	N/A	N/A	55.8	320	44.6	235

(a) RLA (Rated Load Amps) applies to fixed speed compressors; MRC (Max Rated Current) applies to variable speed compressors.
(b) Variable Speed Compressor.

Table 70. Electrical service sizing data — condenser fan motors — 20 to 130 tons

Tonnage, Type	No. of Motors	200 V	230 V	460 V	575 V
		FLA/MOC[a] (ea.)	FLA/MOC[a] (ea.)	FLA/MOC[a] (ea.)	FLA/MOC[a] (ea.)
20V	2[b]	4.3	4.3	1.9	2
25S	2	5.4	5.4	2.7	2.2
25S Low Ambient	1	5.4	5.4	2.7	2.2
	1[b]	4.3	4.3	1.9	2.0
25H, 25V	2[b]	4.3	4.3	1.9	2.0
30S, 30H	2	5.4	5.4	2.7	2.2
30S, 30H Low Ambient	1	5.4	5.4	2.7	2.2
	1[b]	4.3	4.3	1.9	2.0
30V	2[b]	4.3	4.3	1.9	2.0
40S	4	5.4	5.4	2.7	2.2
40S Low Ambient	2	5.4	5.4	2.7	2.2
	2[b]	4.3	4.3	1.9	2.0
40H, 40V	4[b]	4.3	4.3	1.9	2.0
50S, 55S	4	5.4	5.4	2.7	2.2
50S, 55S Low Ambient	2	5.4	5.4	2.7	2.2
	2[b]	4.3	4.3	1.9	2.0
50H, 50V, 55H, 55V	4[b]	4.3	4.3	1.9	2.0
60S, 60H, 70S, 70H, 75S, 75H	6	4.1	4.1	1.8	1.4
60S, 60H, 70S, 70H, 75S, 75H Low Ambient	4	4.1	4.1	1.8	1.4
	2[b]	3.0	3.0	1.5	1.4
60V, 70V, 75V	6[b]	3.0	3.0	1.5	1.4
90S	8	N/A	N/A	1.8	1.4
90S Low Ambient	6	N/A	N/A	1.8	1.4
	2[b]	N/A	N/A	2.2	1.5
90H, 105S, 115S	10	N/A	N/A	1.8	1.4
90H, 105S, 115S Low Ambient	8	N/A	N/A	1.8	1.4
	2[b]	N/A	N/A	2.2	1.5
130S	12	N/A	N/A	1.8	1.4
130S Low Ambient	10	N/A	N/A	1.8	1.4
	2[b]	N/A	N/A	2.2	1.5

(a) FLA (Full Load Amps) applies to fixed speed motors; MOC (Max Operating Current) applies to variable speed motors.
(b) Variable speed motor.

Table 71. Electrical service sizing data — supply/relief/return motors WITH bypass option — 20 to 130 tons

	200 V	230 V	460 V	575 V
	FLA (ea.)	FLA (ea.)	FLA (ea.)	FLA (ea.)
Motor Horsepower	Supply/Relief/Return Fan Motor (4 pole)			
3	9.7	8.4	4.2	3.4
5	15.3	13.2	6.6	5.3
7.5	22.8	19.6	9.8	7.8
10	29.5	25.2	12.6	10.1
15	43.0	36.0	18.0	15.0
20	56.1	49.4	24.7	19.5
25	72.0	61.0	30.5	24.8

Table 71. Electrical service sizing data — supply/relief/return motors WITH bypass option — 20 to 130 tons (continued)

	200 V	230 V	460 V	575 V
	FLA (ea.)	FLA (ea.)	FLA (ea.)	FLA (ea.)
30	84.0	73.2	36.6	29.0
40	N/A	N/A	49.0	39.0
50	N/A	N/A	59.0	47.2
Motor Horsepower	**Supply Fan Motor (6 pole)**			
3	10.1	9.0	4.5	3.6
5	17.0	14.8	7.4	5.6
7.5	25.0	22.0	11.0	9.0
10	32.0	28.6	14.3	11.9
15	47.0	41.0	20.5	16.3
20	63.0	54.0	27.0	20.8

Notes:
1. FLA is for individual motors by HP, not total unit supply fan HP.
2. Return fan motors are available in 3-20 Hp
3. 40 and 50 Hp motor available as standard in 460 and 575 volt only
4. DDP fans selected under 1,700 RPM will have 6-pole motors
5. 60-75T units with DDP supply fan motors have 1 VFD and 2 motors.
6. 90-130T units have 2 VFDs and 2 motors.

Table 72. Electrical service sizing data — single supply/relief/return motors WITHOUT bypass option — 20 to 130 tons

	200 V	230 V	460 V	575 V
	MOC (ea.)	MOC (ea.)	MOC (ea.)	MOC (ea.)
Motor Horsepower	**Supply/Relief/Return Fan Motor (4 pole)**			
3	8.8	7.6	3.8	3.1
5	13.9	12.0	6.0	4.8
7.5	20.7	17.8	8.9	7.1
10	26.8	22.9	11.5	9.2
15	39.1	32.7	16.4	13.6
20	51.0	44.9	22.5	17.7
25	65.5	55.5	27.7	22.5
30	76.4	66.5	33.3	26.4
40	N/A	N/A	44.5	35.5
50	N/A	N/A	53.6	42.9
Motor Horsepower	**Supply Fan Motor (6 pole)**			
3	9.2	8.2	4.1	3.3
5	15.5	13.5	6.7	5.1
7.5	22.7	20.0	10.0	8.2
10	29.1	26.0	13.0	10.8
15	42.7	37.3	18.6	14.8
20	57.3	49.1	24.5	18.9

Notes:
1. MOC (Max Operating Current) is VFD Input Current when fan motor is operating at FLA
2. MOC is for individual motors by HP, not total unit supply fan HP.
3. Return fan motors are available in 3-20 Hp.
4. 40 and 50 Hp motor available as standard in 460 and 575 volt only.
5. DDP fans selected under 1,700 RPM will have 6-pole motors.
6. 90-130T units have 2 VFDs and 2 motors.

Table 73. Electrical service sizing data — dual DDP supply fan motors WITHOUT bypass option — 60 to 75 tons

	200 V	230 V	460 V	575 V
	MOC	MOC	MOC	MOC
Motor Horsepower	**2x Supply Fan Motors (4 pole)**			
2x 7.5HP	41.5	35.6	17.8	14.2
2x 10HP	53.6	45.8	22.9	18.4
2x 15HP	78.2	65.5	32.7	27.3
2x 20HP	N/A	N/A	44.9	35.5
2x 25HP	N/A	N/A	55.5	45.1
Motor Horsepower	**2x Supply Fan Motors (6 pole)**			
2x 5HP	30.9	26.9	13.5	10.2
2x 7.5HP	45.5	40.0	20.0	16.4
2x 10HP	58.2	52.0	26.0	21.6
2x 15HP	85.5	74.5	37.3	29.6

Table 73. Electrical service sizing data — dual DDP supply fan motors WITHOUT bypass option — 60 to 75 tons (continued)

	200 V	230 V	460 V	575 V
	MOC	MOC	MOC	MOC
2x 20HP	N/A	N/A	49.1	37.8

Notes:

1. MOC (Max Operating Current) is VFD Input Current when fan motors are operating at FLA
2. MOC for dual DDP supply fans without bypass represents the total VFD input current for both supply fan motors.
3. Dual DDP fans selected under 1,700 RPM will have 6-pole motors

Table 74. Electrical service sizing data —electric heat module (electric heat units only) — 20 to 130 tons

Module kW	Electric Heat FLA			
	200V	230V	460V	575V
30	83.3	72.2	36.1	28.9
50	138.8	120.3	60.1	48.1
70	194.3	168.4	84.2	67.4
90	249.8	216.5	108.3	86.6
110	305.3	264.6	132.3	105.9
130	-	-	156.4	125.1
150	-	-	180.4	144.3
170	-	-	204.5	163.6
190	-	-	228.5	182.8

Note: Electric heat FLA are determined at 208, 240, 480 and 600 volts.

Table 75. Voltage utilization range

Unit Voltage	Voltage Utilization Range
200/60/3	180-220
230/60/3	207-253
460/60/3	414-506
575/60/3	517-633

Dimensional Data

Figure 29. Heating/cooling unit dimensions - 20 to 75 tons air-cooled

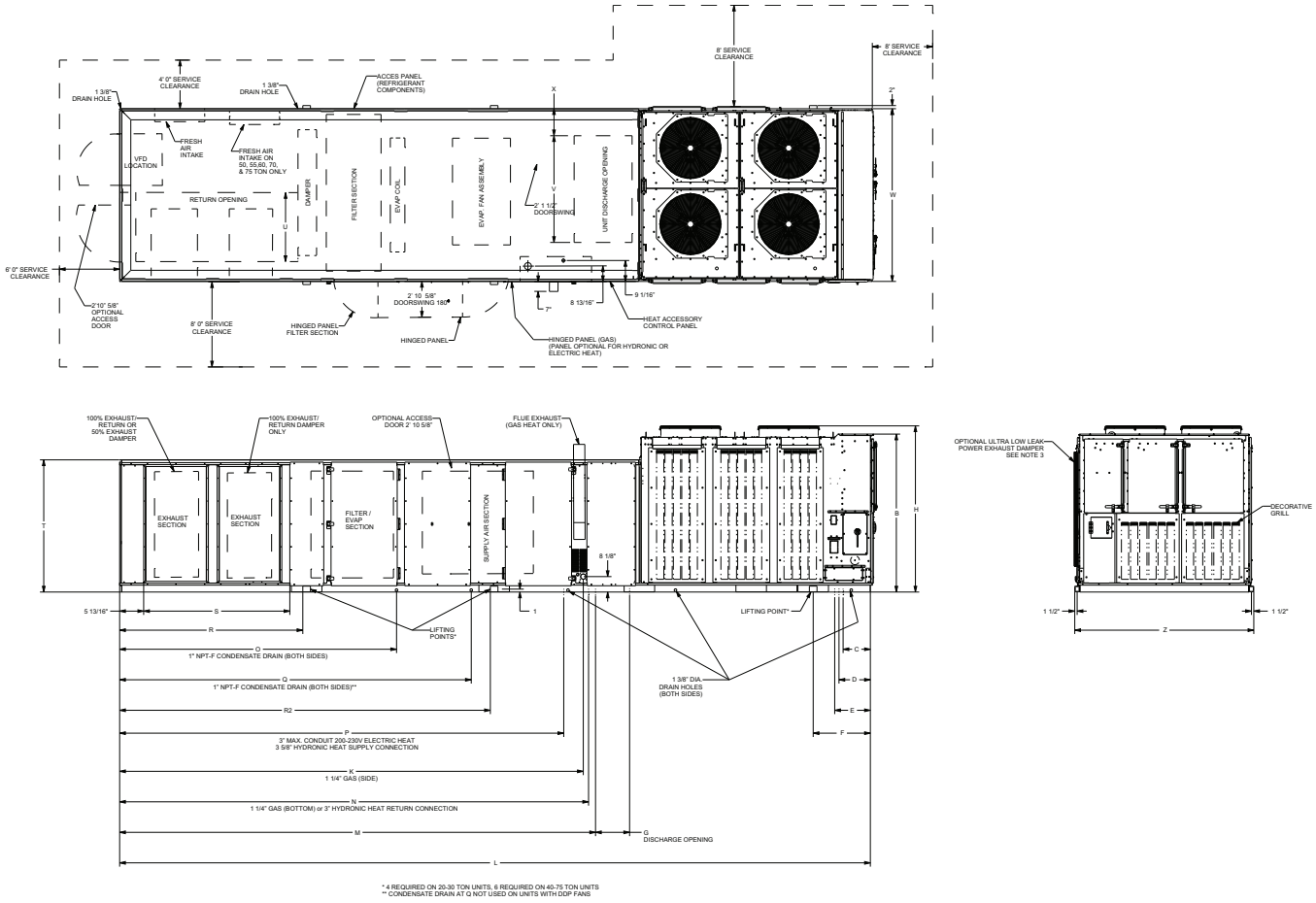


Table 76. Heating/cooling unit dimensions (ft. in.) - air-cooled - SEH_, SFH_, SSH_, SLH_, SXH_

Nom. Tons	H	L	W	B	C	D	E	F	G
20, 25	7-3	24-1 3/8	7-6 1/2	6-9	0-9 1/2	1-3 5/8	1-7 9/16	1-3 1/2	2-2 1/2
30	7-3	24-1 3/8	7-6 1/2	6-9	0-9 1/2	1-3 5/8	1-7 9/16	1-3 1/2	2-2 1/2
40	7-3	32-10 1/2	7-6 1/2	6-9	0-9 7/8	1-5 7/8	1-10 1/8	2-5	2-5
50, 55	7-3	32-10 1/2	7-6 1/2	6-9	0-9 7/8	1-5 7/8	1-10 1/8	2-5	2-5
60	7-3 1/4	32-10 1/2	9-8	6-9	0-9 7/8	1-5 7/8	1-10 1/8	2-5	2-5
70, 75	7-3 1/4	32-10 1/2	9-8	6-9	0-9 7/8	1-5 7/8	1-10 1/8	2-5	2-5

Nom. Tons	J	K	M	N	O	P	Q	R	R2
20, 25	16-9 3/4	16-6	16-3 13/16	16-7	10-7	15-5 5/16	13-3	7-0	N/A
	16-9 3/4	16-6							
30	16-9 3/4	16-6	16-3 13/16	16-7	10-7	18-11 11/16	15-4 15/16	8-0	N/A
	16-9 3/4	16-6							
40	20-1 3/4	19-6	19-10 5/16	19-7	12-1	18-11 11/16	15-4 15/16	8-0	16-2 5/16
	20-6 3/4	20-3							
50, 55	20-1 3/4	19-6	19-10 5/16	19-7	12-1	15-5 5/16	13-3	7-0	16-2 5/16
	20-6 3/4	20-3							
60	20-1 3/4	19-6	19-10 5/16	19-7	12-1	18-11 11/16	15-4 15/16	8-0	16-2 5/16
	20-6 3/4	20-3							
70, 75	20-1 3/4	19-6	19-10 5/16	19-7	12-1	18-11 11/16	15-4 15/16	8-0	16-2 5/16
	20-6 3/4	20-3							

Nom. Tons	S		T	U		V	X	Z
	w/Exh Fan	w/ Ret Fan		w/Exh Fan	w/ Ret Fan			
20, 25	6-6 15/16	3-0	3-9 5/16	3-4 3/8	2-9 15/16	5-7	0-5 13/16	7-9 1/2
30	6-6 15/16	3-0	4-9 5/16	3-4 3/8	2-9 15/16	5-7	0-5 13/16	7-9 1/2

Table 76. Heating/cooling unit dimensions (ft. in.) - air-cooled - SEH_, SFH_, SSH_, SLH_, SXH_ (continued)

Nom. Tons	S		T	U		V	X	Z
	w/Exh Fan	w/ Ret Fan		w/Exh Fan	w/ Ret Fan			
40	7-8 3/16	3-4	5-9 5/16	3-4 3/8	3-1½	5-7	0-5 13/16	7-9 1/2
50, 55	7-8 3/16	3-4	6-9 3/8	3-4 3/8	3-1½	5-7	0-5 13/16	7-9 1/2
60	7-8 3/16	4-5	5-9 5/16	4-5 3/8	4-2½	7-8½	0-5 13/16	9-11
70, 75	7-8 3/16	4-5	5-9 5/16	4-5 3/8	4-2½	7-8½	0-5 13/16	9-11

Notes:

1. In columns J and K: top dimension = high gas heat, bottom dimension = low gas heat.
2. Unit drawing is representative only and may not accurately depict all models.
3. Use high gas heat J dimension for all hydronic heat connections.
4. Optional Ultra Low Leak Power Exhaust extends beyond lifting lug and increases overall "Z" dimension by 0.65".

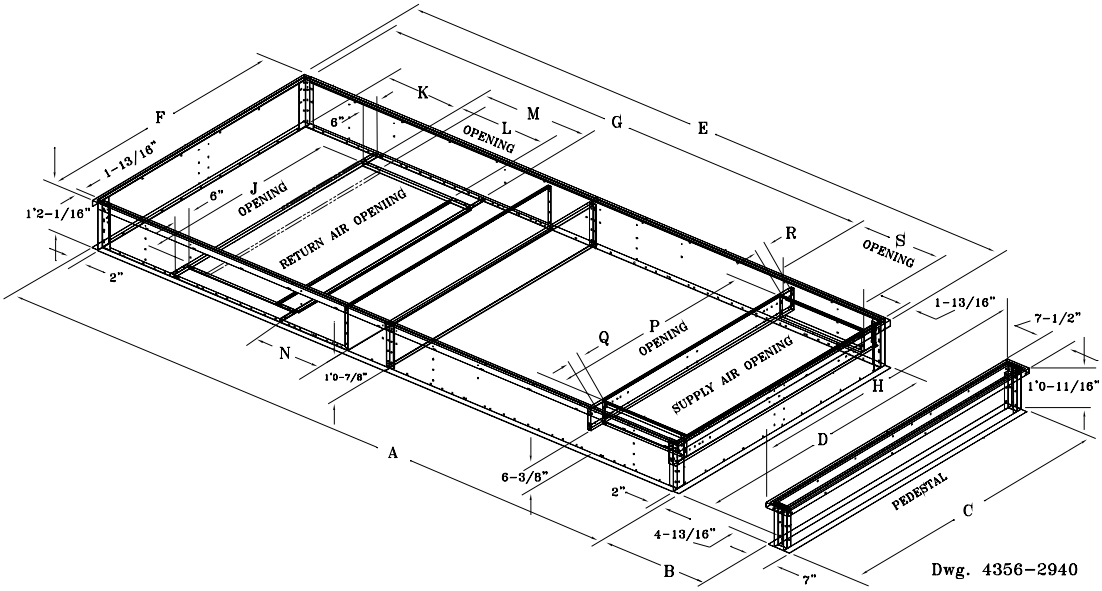
Table 77. Cooling only unit dimensions (ft. in.) - SAHM

Nom. Tons	H	L	W	B	C	D	E	F	G	J	K
20, 25	7-3	21-9 3/4	7-6 1/2	6-9	0-9 1/2	1-3 5/8	1-7 9/16	1-3 1/2	2-2 1/2	14-0 1/4	12-6
30	7-3	21-9 3/4	7-6 1/2	6-9	0-9 1/2	1-3 5/8	1-7 9/16	1-3 1/2	2-2 1/2	14-0 1/4	12-6
40	7-3	29-8	7-6 1/2	6-9	0-9 7/8	1-5 7/8	1-10 1/8	2-5	2-5	16-7 13/16	15-4 15/16
50, 55	7-3	29-8	7-6 1/2	6-9	0-9 1/2	1-5 7/8	1-10 1/8	2-5	2-5	16-7 13/16	15-4 15/16
60	7-3 1/4	29-8	9-8	6-9	0-9 7/8	1-5 7/8	1-10 1/8	2-5	2-5	16-7 13/16	15-4 15/16
70, 75	7-3 1/4	29-8	9-8	6-9	0-9 7/8	1-5 7/8	1-10 1/8	2-5	2-5	16-7 13/16	15-4 15/16

Nom. Tons	M	M2	N		O	P	Q		R	S	U
			w/Exh Fan	w/ Ret Fan			w/Exh Fan	w/ Ret Fan			
20, 25	7-0	N/A	6-6 15/16	3	10-7	3-9 5/16	3-4 3/8	2 - 9 15/16	5-7	0-11 3/4	7-9 1/2
30	7-0	N/A	6-6 15/16	3	10-7	4-9 5/16	3-4 3/8	2 - 9 15/16	5-7	0-11 3/4	7-9 1/2
40	8-0	16-2 5/16	7-8 3/16	3 - 4	12-1	5-9 5/16	3-4 3/8	3 - 1 1/2"	5-7	0-11 3/4	7-9 1/2
50, 55	8-0	16-2 5/16	7-8 3/16	3 - 4	12-1	6-9 3/8	3-4 3/8	3 - 1 1/2"	5-7	0-11 3/4	7-9 1/2
60	8-0	16-2 5/16	7-8 3/16	4 - 5	12-1	5-9 5/16	4-5 3/8	4 - 2 1/2"	6-10 7/8	1-4 9/16	9-11
70, 75	8-0	16-2 5/16	7-8 3/16	4 - 5	12-1	5-9 5/16	4-5 3/8	4 - 2 1/2"	6-10 7/8	1-4 9/16	9-11

Note: Optional ultra low leak power exhaust extends beyond lifting lug and increases overall "U" dimension by 0.65".

Figure 30. Optional roof curb dimensions (downflow) — 20 to 75 tons air cooled



Note: *The pedestal was purposely designed 1–3/8" shorter than the curb because the unit base rails rest on the pedestal at one point and on the curb at a different point.*

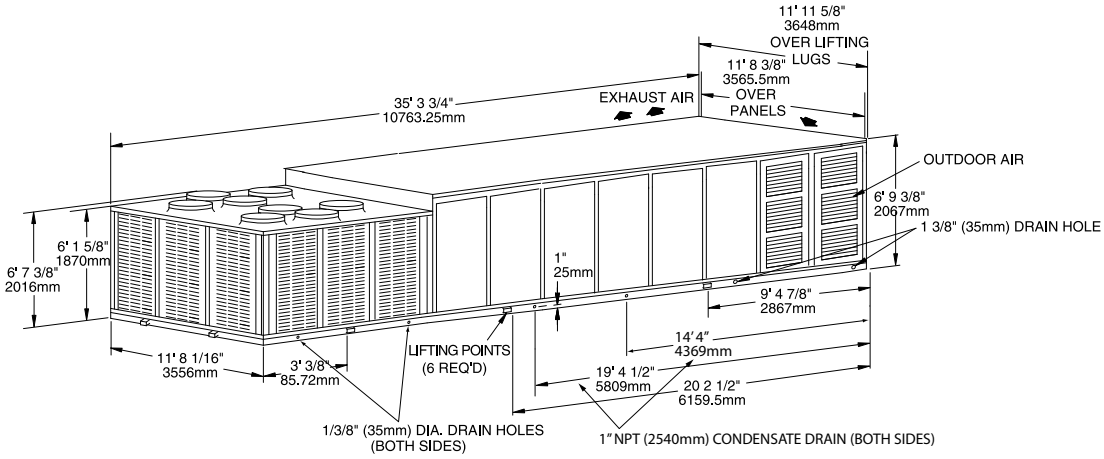
Table 78. Downflow roof curb dimensions (ft. in.) — 20 to 75 tons air cooled

Tons	Model	A	B	C	D	E	F	G	H	J
20,25,30	SAHM	16'-3 7/8"	2'-10 1/16"	7'-10 7/16"	7'-0 13/16"	16'-3 9/16"	7'-0 1/2"	13'-6 15/16"	7'-11 15/16"	5'-8 13/16"
	S*HM	18'-7 1/2"	2'-10 1/16"	7'-10 7/16"	7'-0 13/16"	18'-7 3/16"	7'-0 1/2"	15'-10 9/16"	7'-11 15/16"	5'-8 13/16"
404, 5055	SAHM	19'-1 15/16"	7'-10 1/16"	7'-10 7/16"	7'-0 13/16"	19'-1 5/8"	7'-0 1/2"	16'-2 9/16"	7'-11 15/16"	5'-8 13/16"
	S*HM	22'-4 1/2"	7'-10 1/16"	7'-10 7/16"	7'-0 13/16"	22'-4 1/8"	7'-0 1/2"	19'-5"	7'-11 15/16"	5'-8 13/16"

Table 78. Downflow roof curb dimensions (ft. in.) — 20 to 75 tons air cooled (continued)

Tons	Model	A	B	C	D	E	F	G	H	J
60,70,757	SAHM	19'-1 15/16"	7'-10 1/16"	9'-11 15/16"	9'-2 5/16"	19'-1 5/8"	9'-2"	16'-2 9/16"	10'-1 7/16"	7'-10 5/16"
	S*HM	22'-4 1/2"	7'-10 1/16"	9'-11 15/16"	9'-2 5/16"	22'-4 1/8"	9'-2"	19'-5"	10'-1 7/16"	7'-10 5/16"
Tons	**K**	**L**	**M**	**N**	**P**	**Q**	**R**	**S**		
20,25,30	2'-0"	2'-5 5/16"	2'-11 5/16"	1'-10 5/8"	5'-9 1/2"	0'-5 11/16"	0'-5 11/16"	2'-3 5/16"		
	2'-0"	2'-5 5/16"	2'-11 5/16"	1'-10 5/8"	5'-7 3/8"	1'-0 7/16"	0'-1"	2'-3 5/16"		
404, 5055	2'-0"	3'-6"	4'-0"	1'-10 5/8"	5'-9 1/2"	0'-5 11/16"	0'-5 11/16"	2'-5 15/16"		
	2'-0"	3'-6	4'-0	1'-10 5/8"	5'-7 3/8"	0'-11 3/16"	0'-2 1/4"	2'-5 15/16"		
60,70,757	2'-0"	3'-6"	4'-0"	1'-10 5/8"	6'-11 7/8"	0'-11 3/16"	0'-11 3/16"	2'-5 15/16"		
	2'-0"	3'-6"	4'-0"	1'-10 5/8"	7'-8 3/4"	0'-11 3/16"	0'-2 3/8"	2'-5 15/16"		

Figure 31. Heating/cooling and cooling only rooftops — 90, 105, 115, 130 ton air-cooled



Note: *Ultra low leak power exhaust damper option extends 0.65" beyond lifting lugs.*

Figure 32. Roof curb heating/cooling and cooling only rooftops — 90, 105, 115, 130 ton air-cooled

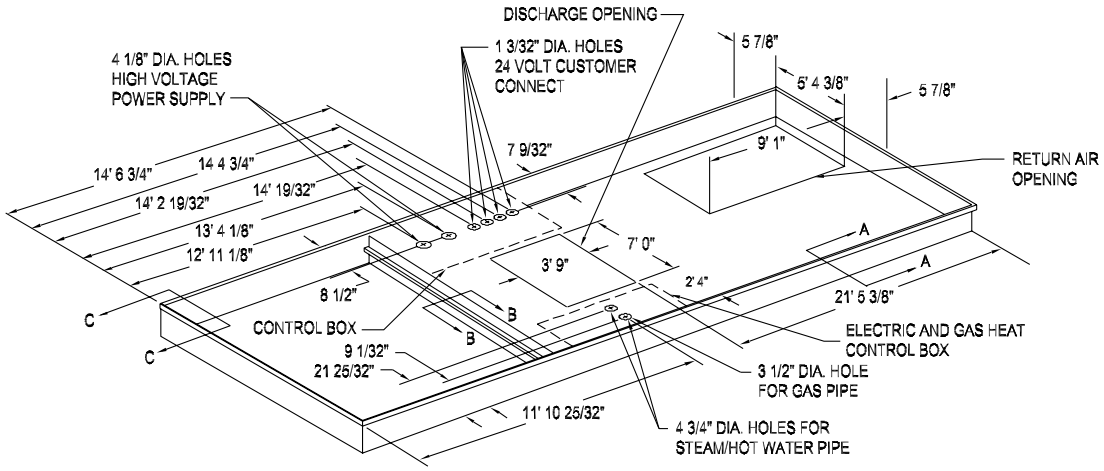


Figure 33. Cross section through roof curb and base pan

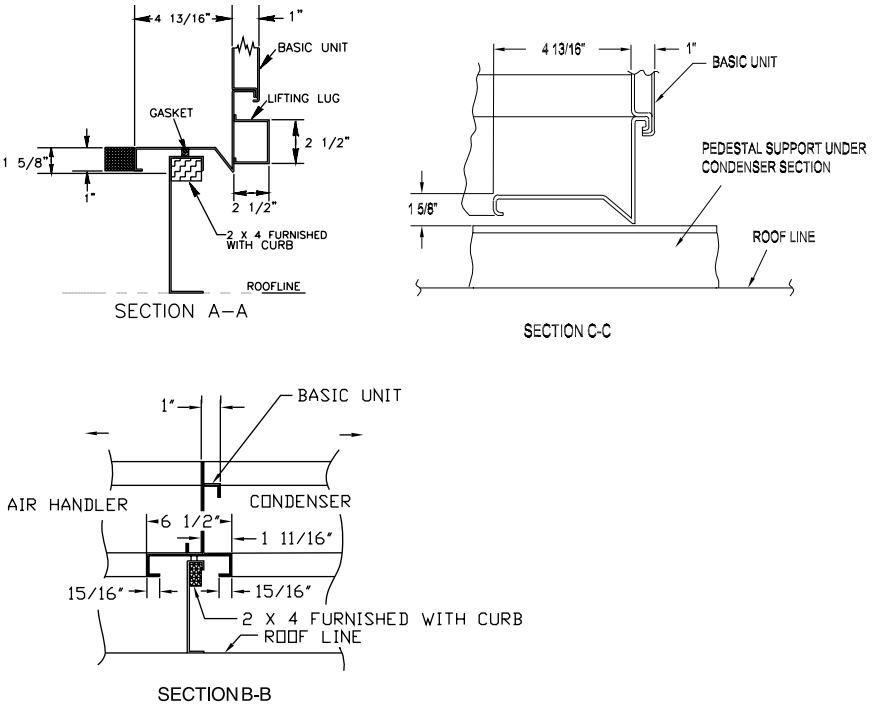
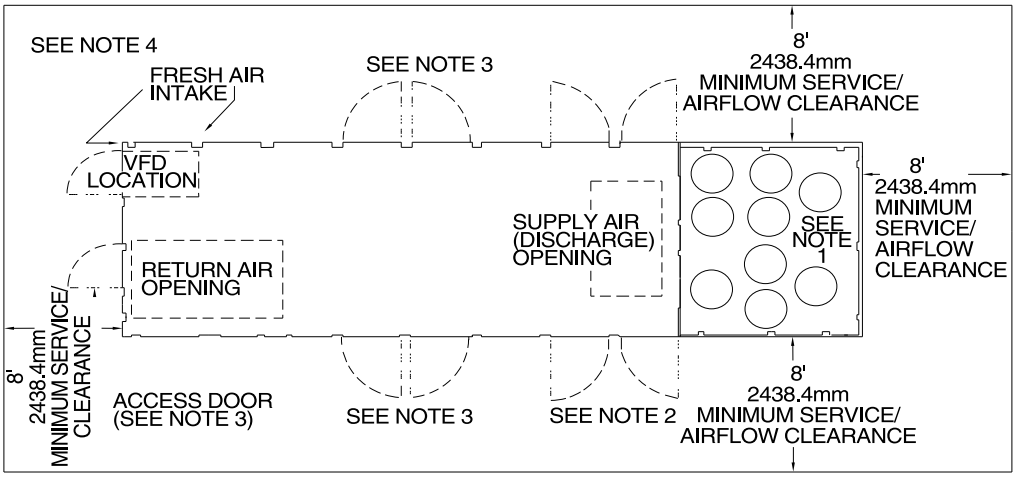


Figure 34. Service clearance — 90 to 130 tons air-cooled



Notes:

- *Provide unrestricted clearance over the condenser fans.*
- *A minimum clearance of 2' 4½" is required to open the hinged control panel doors. Both doors swing outward in a 180-degree arc.*
- *A minimum clearance of 2' 10¾" is required to open the access doors on the unit's supply fan, evaporator, filter and relief fan sections. All hinged doors swing outward in a 180-degree arc.*
- *90-130 ton models have two outdoor air intakes located at the back of the unit and one small outdoor air intake located at the end of the unit.*
- *A minimum clearance of 3' 7" is required to open the hinged access panel door to the VFD enclosure.*
- *Unit drawing is representative only and may not accurately depict all models.*

Field-Installed Sensors

Note: *Remote sensors are available for use with all zone sensors to provide remote sensing capabilities.*

Figure 35. Field installed zone sensor—with timed override button and local setpoint adjustment (BAYSENS074*), with timed override only (BAYSENS073*), sensor only (BAYSENS077*)

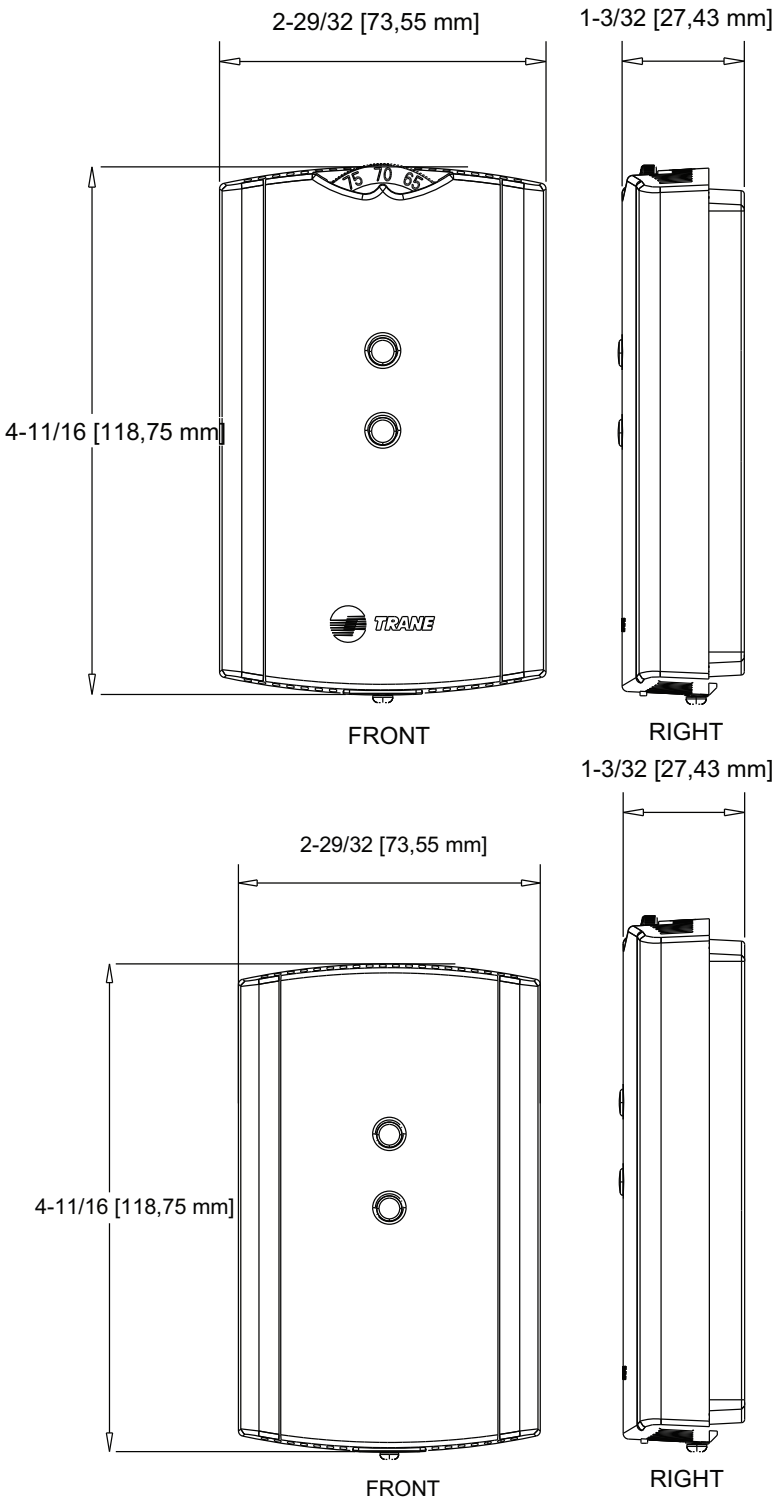
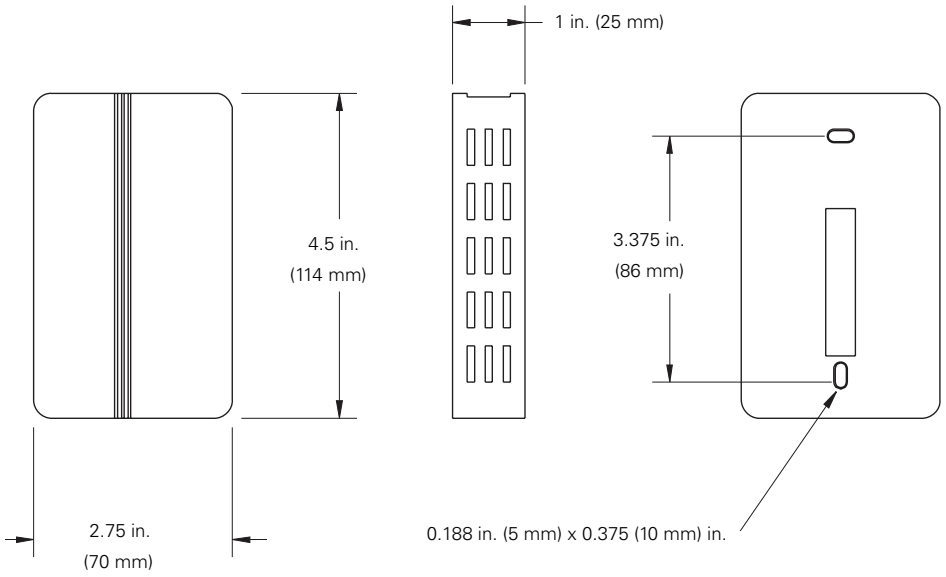


Figure 36. Field installed humidity sensor—wall (BAYSENS036*) or duct mount (BAYSENS037*)



Weights

Table 79. Air-cooled condenser - approximate operating weights (lbs.)

Unit	Without Exhaust Fan						With Exhaust Fan					
	SA	SX	SE	SF	SL	SS	SA	SX	SE	SF	SL	SS
20	4599	4919	5184	5439	5309	5473	4897	5217	5482	5737	5607	5771
25	4602	4922	5187	5442	5312	5576	4906	5226	5491	5746	5616	5880
30	5035	5381	5646	5901	5771	5933	5492	5838	6103	6358	6228	6390
40	7130	7485	7810	8200	8020	7700	7800	8155	8480	8870	8690	8370
50	7554	8004	8329	8719	8539	8270	8273	8723	9048	9438	9258	8989
55	7560	8004	8329	8719	8539	8270	8279	8723	9048	9438	9258	8989
60	8835	9481	9806	10296	10291	10464	9778	10424	10749	11239	11234	11407
70	9018	9663	9988	10478	10473	10646	9961	10606	10931	11421	11416	11589
75	9350	9999	10324	10814	10809	10982	10293	10942	11267	11757	11752	11925
90	X	13167	13322	13967	14042	14017	X	14505	14660	15305	15380	15355
105	X	13800	13955	14600	14675	14650	X	15138	15293	15938	16013	15988
115	X	14004	14159	14804	14879	14854	X	15342	15497	16142	16217	16192
130	X	14942	14445	15090	15165	15140	X	16280	15783	16428	16503	16478

Notes:

1. Weights shown are for air-cooled units with standard efficiency and include the following features: FC fans, Supply Fan VFD, standard scroll compressors, 100% economizer, throwaway filters, maximum motor sizes, 460V XL start, high capacity heat, and access doors.
2. Weights shown represent approximate operating weights and have a ±10% accuracy. To calculate weight for a specific unit configuration, utilize TOPSS™ or contact the local Trane® sales representative. ACTUAL WEIGHTS ARE STAMPED ON THE UNIT NAMEPLATE.

Table 80. Roof curb max weight (lbs./kg.)

Unit	Roof Curb Max. Weight	
	SAH_	SEH_, SFH_, SLH_, SSH, SXH_
20, 25, 30	490	510
40, 50, 55	515	550
60, 70, 75	610	640
90-130	N/A	770

Note: Roof curb weights include the curb and pedestal.

Mechanical Specifications

General

Units shall be specifically designed for outdoor rooftop installation on a roof curb and be completely factory assembled and tested, piped, internally wired, fully charged with R-410A compressor oil, factory run tested and shipped in one piece. Units shall be available for direct expansion cooling only, or direct expansion cooling with natural gas, electric, hot water or steam heating. Filters, outside air system, exhaust air system, optional non-fused disconnect switches and all operating and safety controls shall be furnished factory installed.

All units shall be UL listed to US and Canadian Safety Standards. Cooling capacity shall be rated in accordance with AHRI Standard 360. All units shall have decals and tags to aid in service and indicate caution areas. Electrical diagrams shall be printed on long life water resistant material and shall ship attached to control panel doors.

Casing

Exterior panels shall be zinc-coated, galvanized steel painted with a slate gray air-dry finish durable enough to withstand a minimum of 672 hours consecutive salt spray application in accordance with standard ASTM B117. Screws shall be zinc-plus-zinc chromate coated.

Heavy gauge steel hinged access panels with tiebacks to secure door in open position shall provide access to filters and heating sections. Refrigeration components, supply air fan and compressor shall be accessible through removable panels as standard. Unit control panel, filter section, and gas heating section shall be accessible through hinged access panels as standard. Optional double wall construction hinged access doors shall provide access to filters, return/exhaust air, heating and supply fan section. All access doors and panels shall have neoprene gaskets. Interior surfaces or exterior casing members shall have ½ inch fiberglass insulation.

Unit base shall be watertight with heavy gauge formed load-bearing members, formed recess and curb overhang. Unit lifting lugs shall accept chains or cables for rigging. Lifting lugs shall also serve as unit tie down points.

Refrigeration System

Compressors

The Trane Scroll compressor shall be industrial grade, direct drive 3600 RPM maximum speed scroll type. The motor shall be suction gas-cooled hermetic design. Compressor shall have centrifugal oil pump with dirt separator, oil sight glass, and oil charging valve. Compressor shall also be provided with thermostatic motor winding temperature control to protect against excessive motor temperatures resulting from over-/under-voltage or loss of charge, high and low pressure cutouts, and reset relay.

eFlex™ Variable Speed Compressors (200/230/460/575V)

Trane® eFlex™ variable speed compressors shall be capable of speed modulation from 25 Hz to a maximum of 100 Hz. The minimum unit capacity shall be 15% of full load or less. The compressor motor shall be a permanent magnet type. Each compressor shall have a crankcase heater installed, properly sized to minimize the amount of liquid refrigerant present in the oil sump during off cycles. Compressors shall be equipped with a bearing oil injection system that optimizes bearing and scroll set lubrication, sealing, and controls the oil circulation rate. Optimal bearing lubrication shall be provided by a gear oil pump.

Each variable speed compressor shall be matched with a specially designed variable frequency drive which modulates the speed of the compressor motor and provides several compressor protection functions. Control of the variable speed compressor and inverter shall be integrated with the IPak unit controller to ensure optimal equipment reliability and efficiency.

Power Supplies

The 20 to 75 tons air-cooled rooftops shall be available with 200, 230, 460, and 575 voltage power supplies and 90 to 130 tons units shall be available with 460 or 575 voltage power supplies.

Ambient Control

Variable speed condenser motors shall be provided to allow the unit to operate down to 0°F.

Corrosion Protected Condenser Coil

Optional protection on the all aluminum, microchannel condenser coil shall consist of a corrosion resistant coating that shall withstand ASTM B117 Salt Spray test for 6,000 hours and ASTM G85 A2 Cyclic Acidified Salt Fog test for 2,400 hours. This coating shall be added after coil construction covering all tubes, headers and fin edges, therefore providing optimum protection in more corrosive environments.

Modulating Hot Gas Reheat Control

A reheat condenser coil shall be factory installed downstream of the unit evaporator coil. Modulating electronic valves shall control the flow of refrigerant between the indoor reheat and outdoor condensers in response to the unit discharge air temperature in order to dehumidify the space. The modulating valves shall always apply to circuit 1.

Modulating reheat valves shall be electronically controlled by the Symbio™ 800 unit controller. This fully integrates reheat valve control with unit operation to ensure optimal equipment reliability and efficiency. Modulating reheat valves shall be stepper type valves for precise refrigerant control. Valve position shall be displayed at the user interface to assist field diagnostics.

Hot Gas Bypass

Electronic Hot Gas Bypass valve piping and controls shall all be included on circuit 1 to allow operation at low airflow, avoiding coil frosting and damage to compressor. When suction pressure falls below valve adjustable setpoint, the valve shall modulate hot gas to the inlet of the evaporator. Valves sized to meet ASHRAE 90.1.

Evaporator Coil Drain Pan

Drain pan shall be double sloping [galvanized] [stainless] steel and promote runoff of standing water from condensation inside the unit. Two drain pipes shall be installed through the base channel on each side of the unit. Drain pipe connection shall be installed through the side of the unit and connector size is 1.25 NPTI. The stainless steel option shall provide protection in corrosive environments.

Air-Cooled Condensing

Air-Cooled Condenser Coil

Condenser coils shall have all aluminum microchannel coils. All coils shall be leak tested at the factory to ensure pressure integrity. The condenser coil shall be pressure tested to 650 psig. Subcooling circuit (s) shall be provided as standard.

The High Efficiency Condenser Coil option shall include additional rows of coil that provide increased efficiency compared to standard coils.

Air-Cooled Condenser Fans and Motors

All condenser fans shall be vertical discharge, direct drive fans, statically balanced, with aluminum blades and zinc plated steel hubs. Condenser fan motors shall be three-phase motors with permanently lubricated ball bearings, built-in current and thermal overload protection and weather-tight slingers over motor bearings. Modulating condenser fans shall be provided on eFlex™ units.

Air Handling System

Supply Fan

Supply fan motors shall be open drip-proof. All supply fans shall be dynamically balanced in factory. Supply fan shall be test run in unit and shall reach rated rpm. All 60 Hz supply fan motors shall meet the Energy Independence Security Act of 2007 (EISA).

20 to 75 Tons with Forward-Curved Supply Fan

Supply fans shall have two double-inlet, forward-curved fans mounted on a common shaft with fixed sheave drive. Fans shall be factory-tested to reach rated rpm before the fan shaft passes through first critical speed. Fan shaft shall be mounted on two grease lubricated ball bearings designed for 200,000 hours average life. Optional extended grease lines shall allow greasing of bearings from unit filter section. Fan motor and fan assembly shall be mounted on common base to allow consistent belt tension with no relative motion between fan and motor shafts. Entire assembly shall be completely isolated from unit and fan board by double deflection rubber-in-shear isolators, or by optional 2" deflection spring isolation.

20 to 75 Tons eDrive™ Direct-Drive Plenum Supply Fan

The eDrive™ direct drive plenum supply fan shall be [one][two] single width, single inlet 9-blade plenum fans. Fan blades shall be aluminum backward-inclined airfoil. Plenum fans shall be direct-driven. Entire assembly shall be completely isolated from unit and fan board by 2" deflection spring isolation. Multiple fan widths shall be available to optimize efficiency. Fan shall not require routine maintenance such as fan bearing lubrication, belt tensioning and replacement, sheave alignment, and setscrew torque checks.

90 to 130 Tons Forward-Curved Supply Fan

All supply fans shall have two independent fan assemblies with double inlet, forward-curved air foil fan, motor and fixed pitch sheave drive. All fans shall be statically and dynamically balanced and tested in factory. Supply fans shall be test run in unit as part of unit test. Unit shall reach rated rpm before fan shaft passes through first critical speed. Fan shafts shall be mounted on two grease lubricated ball bearings designed for 200,000 hours average life.

Optional extended grease lines shall allow greasing of bearings from unit filter section. Fan motor and fan assembly shall be mounted on common base to allow consistent belt tension with no relative motion between fan and motor shafts. Entire assemblies shall be completely isolated from unit and fan board by two-inch deflection spring isolators.

System Control Options

Variable Air Volume Discharge Temperature Control with Variable Frequency Drives without Bypass

Option provides all necessary controls to operate a VAV rooftop from the discharge air temperature, including discharge air microprocessor controller and discharge air sensor.

The microprocessor controller coordinates the economizer control and the stages of cooling with discharge air temperature reset capabilities. Option include factory installed and tested VFDs to provide supply fan motor speed modulation.

VFD receives 0-10 VDC 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. Optional bypass control provides full nominal airflow in the event of drive failure.

Single Zone Variable Air Volume

Single zone VAV option provides all necessary controls to operate a rooftop unit based on maintaining two temperature setpoints; the discharge air and zone. Option includes factory-installed variable frequency drive (VFD) to provide supply fan motor speed modulation. During Single Zone VAV cooling, the unit maintains zone cooling setpoint by modulating the supply fan speed more or less to meet zone load demand, and the unit maintains discharge temperature to the discharge cooling setpoint by modulating economizer if available and staging DX cooling.

Variable Air Volume Supply Air Temperature Control with Variable Frequency Drives and Bypass

Bypass control provides full nominal airflow in the event of drive failure.

Electrical

Unit shall be completely factory wired with necessary control and contactor pressure lugs or terminal block for power wiring. Units shall provide an option for a non-fused disconnect with external handle for safety.

Unit Voltage

Rooftops shall be available with 200, 230, 460, and 575 voltage, 3 phase, 60 Hz power supplies.

Unit Interrupt Rating (Short Circuit Current Rating-SCCR)

A standard SCCR of 5,000 amps shall be applied to the unit enclosure. A high fault SCCR option is available that provides a 65,000A SCCR for 200V, 230V, and 460V units; 35,000A SCCR for 575V units.

Internal Shaft Grounding Ring

Motors shall have internal bearing protection for use with VFDs to provide a conductive discharge path away from the motor bearings to ground. Bearing Protection Rings shall be circumferential rings with conductive micro fibers which provide the path of least resistance and dramatically extend motor life.

Phase Monitor

Standard on 20 to 75 tons. Phase monitor shall protect 3-phase equipment from phase loss, phase reversal and phase imbalance. Any fault condition shall produce a Failure Indicator LED and send the unit into an auto stop condition. cULus approved.

Non-Fused Disconnect

An external handle mounted on the control box door shall be provided to disconnect unit power with the control box door closed for safety.

Symbio™ 800 Controller

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

BACnet® Communication Interface

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

AirFi® Wireless Communication Interface Module (WCI)

Trane’s Air-Fi Wireless Communication interface provides wireless communication between the Tracer SC+ and Symbio™ 800 controller.

Trane LonTalk® Communication Interface Module

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

Modbus Communication Protocol

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

Power Monitor

Factory installed power meter shall measure unit energy usage to 0.2% accuracy (ANSI C12.20) and communicate through the Symbio™ 800 controller enabling viewing through user interface or building automation system.

Controls Expansion Hardware

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

Rapid Restart

Option provides immediate startup upon power failure. A backup generator shall be required on site before unit startup. Rapid Restart shall begin immediately after recovery from a power loss and work by restarting the compressors and supply fan quickly to provide full cooling within two to three minutes.

Filters

General

Filter options shall mount integral within unit and be accessible by hinged access panels.

No Filters Option (Two-inch throwaway filter rack only)

Shall provide a complete set of two-inch thick filter racks, without the filter media to accommodate applications which require field supplied filters.

No Filters Option (Bag/cartridge with pre-filter filter rack)

Shall provide a long-lasting galvanized steel frame without the filter media to accommodate applications which require field supplied filters.

Pre-Evaporator Filter Options (Available for all units)

Throwaway Filters, MERV 4

Filters shall be two-inch [50.8 mm] thick, UL Class 2, glass fiber type and rated at 80% average synthetic dust weight arrestment when tested in accordance with ASHRAE 52-76 and 52.1 test methods. Filters shall be mounted in galvanized steel rack.

Permanent Cleanable Wire Mesh Option, MERV 3

Shall be washable permanent wire mesh with metal frame.

High Efficiency Throwaway Option, MERV 8

Shall be two-inch high efficiency media filters with average dust spot efficiency of 25-35 percent and an average arrestance in excess of 90 percent when tested in accordance with ASHRAE 52-76.

90-95 Percent Bag Filter Option, MERV 14

Shall have glass fiber media mounted in a galvanized steel frame. These Class 1 single piece disposable bag filters shall have a 90-95% dust spot efficiency rating per ASHRAE 52-76. To ensure maximum bag filter life two-inch MERV 8 pre-filters shall be included with the bag filters.

90-95 Percent Cartridge Filter Option, MERV 14

Twelve-inch deep cartridge filters shall be mounted in a galvanized steel frame. Filters shall be Class 1 listed by Underwriters Laboratories and have a 90-95% dust spot efficiency per ASHRAE 52-76. To ensure maximum cartridge filter life, two-inch MERV 8 pre-filters shall be provided.

Final Filter Options (Available for SX Units only)

Final filter section filter options shall mount integral within the blank section unit casing and be accessible by hinged access doors.

90-95 Percent, Cartridge, Final Filter Option, Merv 14

Available on cooling only SX units. Twelve-inch deep cartridge filters shall be mounted in a galvanized steel frame. Filters shall be Class 1 listed by Underwriters Laboratories and have a 90-95% dust spot efficiency per ASHRAE 52-76.

90-95 Percent, Cartridge Filter with two-inch pre-filters, Final Filter Option, MERV 14

Available on cooling only SX units. 2", MERV 8 pre-filters shall be included with the cartridge filters. Pre-filters shall be mounted in the same galvanized steel frame as the cartridge final filters.

Relief Air

General

Return air options shall include no relief, barometric relief, 100 percent modulating relief fan and 100 percent modulating relief fan with direct space building pressurization control. Relief motors shall be open drip-proof fan cooled. All 60 Hz motors meet the Energy Independence and Security Act of 2007 (EISA). All 50 Hz relief motors meet the U.S. Energy Policy Act of 1992 (EPACT).

No Relief (standard)

Rooftops can be built for makeup air applications with no relief. Relief air opening shall be sealed with panel and made watertight.

Barometric Relief Option

Gravity dampers shall open to relieve positive pressure in the return air section of the rooftop. Barometric relief dampers shall relieve building overpressurization, when that overpressurization is great enough to overcome the return duct pressure drops.

Modulating Relief Fan Option

Two, double-inlet, forward-curved fans shall be mounted on a common shaft with fixed sheave drive. All fans shall be dynamically balanced and tested in factory before being installed in unit. Relief fan shall be test run as part of unit final run test. Unit shall reach rated rpm before fan shaft passes through first critical speed. Fan shaft shall be mounted on two grease lubricated ball bearings designed for 200,000-hour average life.

Optional extended grease lines shall be provided to allow greasing of bearings from unit filter section. Fan motor and assembly shall be mounted on common base to allow consistent belt tension with no relative motion between fan and motor shafts. Entire assembly shall be completely isolated from unit and fan board by spring isolation on motor sizes larger than 5 hp.

With Statitrac™ Enabled

For VAV rooftops, the modulating relief discharge dampers (or VFD) shall be modulated in response to building pressure. A differential pressure control system, (Statitrac™), shall use a differential pressure transducer to compare indoor building pressure to outdoor ambient atmospheric pressure. The FC relief fan shall be turned on when required to lower building static pressure setpoint.

With Statitrac™ Disabled

Relief dampers at unit outlet shall modulate relief airflow in response to OA damper position.

Ventilation Override Mode

With the ventilation override option installed, the unit shall be programmed to transition to up to 5 different programmed sequences for Smoke Purge, Evacuation, Pressurization, Purge, Purge with duct control sequence and Unit off. The transition shall occur when a binary input on the VOM is closed (shorted); this would typically be a hard wired relay output from a smoke detector or fire control panel.

Return Air

General

Return air options shall include 100 percent modulating return fan and 100 percent modulating return with direct space building pressurization control. All 60 Hz motors meet the Energy Independence and Security Act of 2007 (EISA).

100 Percent Modulating Return Fan

A single width plenum fan with airfoil blade shall be mounted on a shaft with fixed sheave drive. The fan shall be dynamically balanced for the operating envelop and tested in factory before being installed in unit. The plenum fan shall be test run in unit as part of unit test. Fan operating envelop rpm shall be below first critical speed.

Fan shaft shall be mounted on two grease lubricated ball or roller bearings designed for 200,000-hour average life. Extended grease lines shall be provided to allow greasing of bearings from section base rail. Fan motor and assembly shall be mounted on common base to allow consistent belt tension with no relative motion between fan and motor shafts. The entire assembly shall be completely isolated from unit with 2-inch spring isolators. Discharge dampers at unit outlet shall modulate relief airflow in response to OA / return air damper position.

A single width plenum fan with airfoil blade can relieve up to 100 percent supply air. The fan operates in conjunction with the supply fan. The relief damper modulates in response to economizer damper position on constant volume rooftops.

100 Percent Modulating Return Fan with Statitrac™ Control Option

A single width plenum fan with airfoil blade shall be mounted on a shaft with fixed sheave drive. The fan shall be dynamically balanced for the operating envelop and tested in factory before being installed in unit. The plenum fan shall be test run as part of unit final run test. Fan operating envelop rpm shall be below first critical speed.

Fan shaft shall be mounted on two grease lubricated ball or roller bearings designed for 200,000-hour average life. Extended grease lines shall be provided to allow greasing of bearings from section base rail. Fan motor and assembly shall be mounted on common base to allow consistent belt tension with no relative motion between fan and motor shafts. The entire assembly shall be completely isolated from unit with 2-inch spring isolators.

Option shall be provided with all the necessary controls to control/ maintain building space pressure through a VAV rooftop. The variable frequency drive (VFD) modulates the speed of the return fan motor in response to return plenum pressure. The 100 percent modulating relief damper shall be modulated in response to building pressure. A differential pressure control system, (Statitrac), shall use a differential pressure transducer to compare indoor building pressure to outdoor ambient atmospheric pressure. The (Statitrac) control system shall modulate the dampers to control the building pressure to within the adjustable, specified deadband that shall be adjustable at the user interface. The return fan shall modulate in response to return plenum static pressure. Optional bypass control provides full nominal airflow in the event of drive failure.

Outside Air

General

Three outside air options: 100 percent return air, 0 to 25 percent manually controlled outside air, and 0-100 percent fully modulating economizer.

Manual Outside Air Option

Manually controlled outside air damper shall provide up to 25 percent outside air. Manual outside air damper shall be set at desired position at unit startup.

0-100 Percent Modulating Economizer Option

Economizer option shall be operated through the primary temperature controls to automatically utilize outside air for “free” cooling. Automatically modulated return and outside air dampers shall maintain

proper temperature in the conditioned space. Economizer shall be equipped with an automatic lockout when the outdoor high ambient temperature is too high for proper cooling.

Minimum position control shall be standard and adjustable at the user interface or through the building management system. A spring return motor shall ensure closure of OA dampers during unit shutdown or power interruption. Mechanical cooling shall be available to aid the economizer mode at any ambient. Standard economizer dampers leakage rate shall be 2.5 percent of nominal airflow (400 cfm/ton) at 1 inch wg. static pressure.

Low-Leak Economizer Damper Option

Low leak dampers shall be provided with gasketing added to the damper blades and rolled stainless steel jamb seals to the sides of the damper assembly. Low leak economizer dampers shall have a leakage rate of 1 percent based on testing data completed in accordance with AMCA Standard 500 at AMCA Laboratories.

Ultra Low-Leak Economizer Damper Option

Economizer return and outside air dampers shall be provided with horizontal airfoil blades and spring-return actuators. The economizer shall have a functional life of 60,000 opening and closing cycles. Dampers shall be AMCA 511 Class 1A certified with a maximum leakage rate of 3 CFM/sq-ft at 1.0 in WC pressure differential thus exceeding requirements of ASHRAE 90.1-2013, California Title 24-2013, and IECC-2012.

IntelliPak® units ordered with ultra low leak economizers shall be listed on the California Energy Commission Registry for factory compliance with Title 24 Economizer and FDD requirements. A label shall be applied to the unit identifying construction with the ultra low leak economizer and FDD controls.

Ultra low leak motorized exhaust dampers shall be provided when the ultra low leak economizer is ordered with an exhaust/return option that includes motorized dampers. Ultra low leak motorized exhaust dampers shall be AMCA 511 Class 1A certified with a maximum leakage rate of 3 cfm/sq-ft at 1.0 in WC pressure differential. This exceeds the most stringent requirements of ASHRAE 90.1 and IECC (4 CFM/sq-ft at 1.0 in WC pressure differential).

Economizer Control with Comparative Enthalpy

Two enthalpy sensors shall be provided to compare total heat content of the indoor air and outdoor air to determine the most efficient air source when economizing.

Economizer Control with Reference Enthalpy

An outdoor enthalpy sensor shall be provided to compare the total heat content of outdoor air to a locally adjustable setpoint. The setpoint shall be programmed at the user interface to determine if the outdoor enthalpy condition is suitable for economizer operation.

Economizer Control with Dry Bulb

An outdoor temperature sensor shall be included for comparing the outdoor dry bulb temperature to a locally adjustable temperature setpoint. The setpoint shall be programmed at the user interface to determine if outdoor air temperature is suitable for economizer operation.

Differential Dry Bulb

An outdoor and return air temperature sensor is used to compare the dry bulb temperature of the outside air to the return air temperature to determine if it is suitable to economize.

Outside Air Measurement (Traq™)

A factory mounted airflow measurement station (Traq™) shall be provided in the outside air opening to measure airflow. The airflow measurement station shall measure from 40 CFM/ton to maximum airflow. The airflow measurement station shall adjust for temperature variations. Measurement accuracy shall meet requirements of LEED IE Q Credit 1 as defined by ASHRAE 62.1-2007.

Demand Control Ventilation

When equipped with a CO_2 sensor, the fresh air damper position shall modulate in response to a CO_2 sensor in the conditioned space, in order to minimize the unit energy consumption and simultaneously meet the ventilation requirements of ASHRAE Std 62.1. The Traq™ airflow monitoring solution shall augment the system, allowing for measurement and control of outside airflow.

Heating System

Electric Heating Option

All electric heat models shall be completely assembled and have wired electric heating system integral within the rooftop unit. Heavy duty nickel chromium elements internally wired with a maximum density of 40 watts per square inch shall be provided. Heater circuits shall be 48 amps or less, each individually fused. Automatic reset high limit control shall operate through heater primary contactors and a manual reset high limit control, located in the electric heat control box, shall operate through heater backup contactors.

The 460 and 575 volt electric units shall have optional factory mounted non-fused disconnect switch located in the main control panel to serve the entire unit.

The 200 and 230 volt SEH* models shall have separate power supply to heating section.

Steam Heating Option

Steam coils shall be Type NS, with non-freeze steam distribution circuits. Distributor tubes shall be located concentrically within condensing tubes to assure even steam distribution. Coils shall be pitched to provide complete drainage. Steam modulating valve with actuator shall be provided.

Hot Water Heating Option

Hot water coils shall be Type 5W and factory mounted in the rooftop unit to provide complete drainage of coil. Hot water modulating valve with actuator shall be provided.

Gas-Fired Heating Option

All gas-fired units shall be completely assembled, have a wired, gas-fired heating system integral within unit, and fire tested prior to shipment. Units shall be cULus approved specifically for outdoor applications downstream from refrigerant cooling coils.

All gas heaters shall have 81% steady state efficiency, meeting the 2023 Department of Energy efficiency code. Gas-fired heating system control shall be fully integrated with the unit controls. Gas safety controls shall include electronic flame sensing capability, which proves combustion air prior to ignition sequence and during operation. The ignition sequence shall include a pre-purge cycle. Direct spark ignition shall be provided on all heat exchangers; ultra modulating heaters shall have direct spark ignition provided to the pilot line.

A three minute delay shall be provided between first and second stage gas valve operation on two-stage heaters.

Heat exchangers shall be drum and tube design with pre-mix burners. Free-floating design shall eliminate expansion and contraction stresses and noises. Heating system shall incorporate forced draft fans and include a chimney that exhausts away from the air intake. All gas heaters shall be made from grades of stainless steel suitable for condensing situations. Gasketed cleanout plate shall be provided for maintenance and inspection of tubes/turbulators.

All gas piping shall be threaded connection with a pipe cap provided. Gas supply connection shall be provided through the side or bottom of unit. Heat exchanger shall be factory pressure and leak tested.

Miscellaneous Options

Two-Inch Spring Isolators

Supply and relief/return fan (if applicable) assemblies shall be isolated with two-inch nominal deflection to reduce transmission of vibrations (standard feature on 90 to 130 tons).

Special Unit Paint Colors

Shall allow matching of HVAC equipment to customer specified color. This option shall be for standard paint compound in different colors only.

Service

Access Doors

Hinged access doors shall provide easy access to supply fan, filters, exhaust/return fan, and the heating section. Double wall construction with dual density insulation sandwiched between heavy gauge galvanized steel panels for strength and durability can be selected.

Supply Airflow Measurement (Piezometer)

Plenum supply fan shall have an airflow measurement device to measure differential pressure and to calculate fan airflow. The device shall be capable of measuring airflow within ± 5 percent total accuracy when operating within the stable operating region of the fan curve. Fan airflow performance and noise levels shall not be affected by the installation of the device. The fan inlet shall not be obstructed by the airflow measurement device.

Powered Convenience Outlet

A 15A, 115V Ground Fault Interrupter convenience outlet shall be factory installed. It shall be wired and powered from a factory mounted transformer. Unit-mounted, non-fused disconnect with external handle shall be furnished with factory powered outlet.

Extended Grease Lines

Lines shall allow greasing of supply and relief fan bearings through the filter access door.

IntelliPak™ Replacement Unit (IRU)

The IntelliPak replacement solution shall include a condenser base pan, strengthening of the condenser section with welded reinforcement of condenser base rail, as well as welded integral supports to the condenser base. This additional strength shall allow the reuse of the existing pedestal as well as any Trane® full perimeter curb and reduce installation risk and labor. Also optional with stainless steel.

Accessories

Roof Mounting Curb

Roof mounting curb shall be heavy gauge zinc coated steel with nominal two-inch by four-inch nailer setup. Supply/return air opening gasketing shall be provided. Curb shall ship knocked down for easy assembly. Channel shall be provided to allow for adjustment of return air opening location. Curb shall be manufactured to National Roofing Contractors Association guidelines.

Electronic Zone Sensors

- Remote Sensor shall be available to be used for remote zone temperature sensing capabilities when zone sensors are used as Remote panels
- Integrated Comfort System sensors shall be available with sensor only, sensor with timed override, and sensor with local temperature setpoint adjustment with timed override.
- Humidity Sensor - Monitors the humidity levels in the space for 1) Humidification and/or 2) Modulating Hot Gas Reheat.

Field-Installed Kits

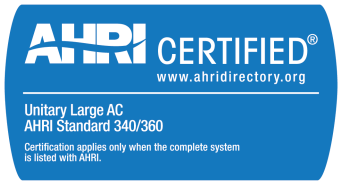
- Trane® LonTalk® Communication Interface kit - For future opportunities and upgrade flexibility, this kit contains a LonTalk Communication Interface module, which is required for communication with Tracer® Summit or a 3rd party building automation system.

- Trane Air-Fi® Wireless Communications Interface (Field Installed) — Trane Air-Fi Wireless Communications Interface (WCI) provides wireless communication between the Tracer SC, Unit Controllers.

Certified AHRI Performance

Packaged Rooftop units cooling, heating capacities and efficiencies shall be rated within the scope of the Air-Conditioning, Heating & Refrigeration Institute (AHRI) Certification Program and display the AHRI Certified® mark as a visual confirmation of conformance to the certification sections of AHRI Standard 340-360 (I-P) and ANSIZ21.47 and 10 CFR Part 431 pertaining to Commercial Warm Air Furnaces. The applications in this catalog specifically excluded from the AHRI certification program are:

- Ventilation modes
- Heat Recovery
- Units larger than nominal 63 tons



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

Trane - by Trane Technologies (NYSE: TT), a global innovator - creates comfortable, energy efficient indoor environments for commercial and residential applications. For more information, please visit trane. com or tranetechnologies.com.

Trane has a policy of continuous product and product data improvements and reserves the right to change design and specifications without notice. We are committed to using environmentally conscious print practices.

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